

Quarterly Bulletin

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BANK OF ENGLAND





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Quarterly Bulletin

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Executive summary

Topical articles (pages 99–156)

Macroeconomic uncertainty: what is it, how can we measure it and why does it matter?

(by Abigail Haddow, Chris Hare, John Hooley and Tamarah Shakir). The onset of the financial crisis in 2008 brought an end to the 'Great Stability' period, making prospects for UK and global economic growth not just weaker, but more uncertain. This article focuses on how firms' and households' uncertainty about the economic outlook can have important implications for economic activity. Heightened uncertainty might affect the economy through a variety of channels: depressing demand for goods and services as (more cautious) firms and households cut back on spending, and potentially impairing the supply side of the economy by affecting productivity growth or credit provision. Uncertainty is not directly observable and so it is difficult to measure. But it is possible to construct a range of proxy indicators based on data from financial markets, consumer and business surveys, and media reports. Many of these indicators have remained elevated in recent years. And a simple empirical model supports the view that over the past few years, uncertainty is likely to have adversely affected spending decisions and contributed to the depth of the recent recession and weakness of the recovery.

Do inflation expectations currently pose a risk to the economy? (by Becky Maule and Alice Pugh).

Inflation expectations play an important role in determining the current rate of inflation. CPI inflation has been above the 2% target for most of the past five years, and the Monetary Policy Committee (MPC) has judged that it is more likely than not to remain above the target over much of the next two years. There is a risk that this prolonged period of above-target inflation could cause households, companies and financial market participants to believe that the MPC has become more tolerant of above-target inflation. Such a change in perceptions could cause inflation expectations to drift upwards, and subsequently trigger changes in wage and price-setting decisions. While there is little evidence to suggest that inflation expectations have become less well anchored to the target over the past year, empirical analysis suggests that movements in inflation expectations do have the potential to impact on wages and prices. Therefore the MPC will continue to monitor developments in inflation expectations, which remain an important factor in policy decisions.

Public attitudes to monetary policy (by Michael Goldby). The Bank's success in meeting its objective of price stability will depend, in part, on the public's understanding of, and support for, the monetary policy framework. In order to gauge the extent of this understanding, the Bank conducts a regular survey of households' attitudes to monetary policy. This article presents the results from the latest surveys. The results suggest that public awareness of the policy framework has remained broadly constant over the past year at a reasonably high level. In the May 2013 survey, more respondents thought that the Bank's inflation target was about right than those who thought it was too high or too low. Satisfaction with the way the Bank sets interest rates in order to control inflation remains much lower than before the financial crisis. The extent of satisfaction with the Bank has moved closely with changes in consumer confidence, which in turn is linked to a range of macroeconomic variables including GDP growth, inflation and unemployment.

Cross-border bank credit and global financial stability (by Bob Hills and Glenn Hoggarth). The concept of 'global liquidity' has played a part in some of the more contentious international policy debates in recent years. This article looks in detail at one aspect of global liquidity: cross-border credit provided by banks. Cross-border banking can have considerable long-run benefits, by diversifying the available sources of lending and borrowing, and by increasing competition. But such flows can also amplify risks in times of stress. As this article sets out, cross-border bank lending contributed to the build-up in vulnerabilities before the recent crisis — in particular by generating mismatches on banks' balance sheets regarding both currency and maturity — and exacerbated the bust once the crisis hit. The article then considers possible policy responses to prevent or mitigate such a scenario in the future. It argues that it is important for policymakers to ensure that they can properly monitor these flows, from the point of view of recipient countries and the global system as a whole. It also briefly examines the scope for more formal multilateral policy mechanisms.

The Old Lady of Threadneedle Street (by John Keyworth). Most people are familiar with the Bank's nickname — the Old Lady of Threadneedle Street — but few know the details of its origins: a late 18th century political cartoon by that arch-exponent of satire, James Gillray. To promote an exhibition that runs in the Bank of England Museum until the end of December entitled *Cartoons and Caricatures*, this article begins by providing a historical context for Gillray's original 'Old Lady' cartoon. The use of this nickname, along with graphic satire of the Bank and its activities, has continued over the two centuries that followed, and today the tradition is maintained by cartoonists such as Steve Bell. The article also explores a number of other themes through the prism of caricature, such as: the convertibility of banknotes to gold; the forging of banknotes; and the nationalisation of the institution.

Central counterparties: what are they, why do they matter and how does the Bank supervise them? (by Dan Nixon and Amandeep Rehlon). Central counterparties, or CCPs, are an important part of the financial system. They can reduce and 'mutualise' (share between their members) counterparty credit risk in the markets in which they operate, by placing themselves between the buyer and seller of an original trade and guaranteeing the performance of that trade. And their importance is increasing since, in response to the financial crisis, G20 leaders mandated in September 2009 that standardised over-the-counter derivatives should be cleared through CCPs. As part of major changes to the system of financial regulation in the United Kingdom introduced by the Government in April 2013, the Bank is now responsible for the supervision of CCPs. This article explains what CCPs are and sets out their importance to the financial system, including the benefits they bring and some of the risks they could present if not properly managed. It also summarises the Bank's approach to supervising CCPs and describes some of the key priorities the Bank is pursuing.

Recent economic and financial developments (pages 157–67)

Markets and operations. This article reviews developments in financial markets between the 2013 Q1 *Quarterly Bulletin* and 24 May 2013, drawing on the qualitative intelligence gathered by the Bank in the course of meeting its objectives for financial and monetary stability. The article also sets out usage of the Bank's operations since the previous *Bulletin*. A broad-based increase in risky asset prices across much of the review period reflected, in part, a widely held view among market participants that the stance of central banks would remain accommodative in the medium term, as well as investors' increased willingness to bear risk. Government borrowing costs in the euro area had fallen, as concerns about fiscal matters in the euro area subsided to some degree. And capital markets reached new highs. But speculation about the path of monetary policy in the United States contributed to a pause in the rally of asset prices in some markets towards the end of the review period.

Report (pages 169–73)

A review of the work of the London Foreign Exchange Joint Standing Committee in 2012.

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

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

Topical articles



Macroeconomic uncertainty: what is it, how can we measure it and why does it matter?

By Abigail Haddow and Chris Hare of the Bank's Conjunctural Assessment and Projections Division, John Hooley of the Bank's International Finance Division and Tamarah Shakir of the Bank's Macroprudential Strategy Division.⁽¹⁾⁽²⁾

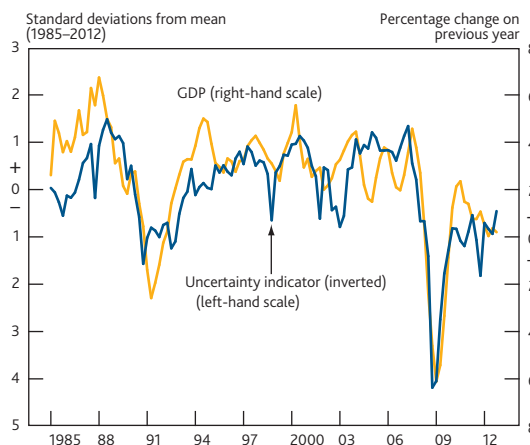
The onset of the financial crisis in 2008 brought an end to the 'Great Stability' period, making prospects for UK and global economic growth appear not just weaker, but more uncertain. This elevated uncertainty is likely to have adversely affected spending decisions and contributed to the depth of the recent recession and the weakness of the recovery. While uncertainty is not directly observable, this article constructs an aggregate measure of the economic uncertainty faced by households and companies, based on a number of proxy indicators. It also provides some quantitative analysis of the impact of uncertainty on economic activity, drawing a distinction between shocks to uncertainty that are short-lived and those that are more persistent.

Since mid-2008, the UK economy has faced an unprecedented series of large adverse shocks that have led companies and households to become more uncertain about future economic prospects. These shocks include one of the United Kingdom's largest ever financial crises, continuing headwinds from the euro-area debt crisis and the implementation of the Government's fiscal consolidation programme. The unusual size and nature of these shocks might have led households and companies to reassess their beliefs about the range of possible paths the economy can take. In other words, they may have become more 'uncertain' about the current and future economic climate.

Elevated levels of uncertainty have had an adverse effect on the UK economy in the recent past (**Chart 1**) by affecting decision-making in all parts of the economy, including households, companies, banks and financial markets, as well as policymakers. Evidence of that effect can be seen in spending patterns, investment decisions, asset prices and policy choices. The Monetary Policy Committee (MPC) has warned that high levels of uncertainty are likely both to have contributed to the weakness in UK demand since the onset of the recession and to pose a key risk to future demand prospects.⁽³⁾

To understand how changes in uncertainty affect the economy, it is important to recognise their source. Different types of uncertainty are likely to affect individual sectors of the economy differently and also have different degrees of persistence. So the nature of an uncertainty shock has an

Chart 1 Uncertainty and GDP



Sources: ONS for GDP, Table B for the uncertainty indicator.

important bearing on how demand and supply prospects and, ultimately, the inflation outlook are affected.

This article explains how macroeconomic uncertainty matters for the UK economy. It outlines the different ways in which uncertainty can affect real economic activity. It describes the level of uncertainty in the United Kingdom and other countries and its evolution during the recent recession. It also explores the extent to which elevated levels of uncertainty can explain the recent weakness in UK activity using a number of empirical

(1) The authors would like to thank Lai Wah Co and Jeanne Le Roux for their help in producing this article.

(2) To watch a short video explaining some of the key points from this article, see: <http://www.youtube.com/watch?v=7fht63NXToC>

(3) For example, see the May 2013 *Inflation Report*.

estimates. A deeper understanding of how uncertainty shocks have affected the UK economy in the recent past is likely to help policymakers assess how future shocks to uncertainty might affect demand and supply prospects.

Why does uncertainty matter?

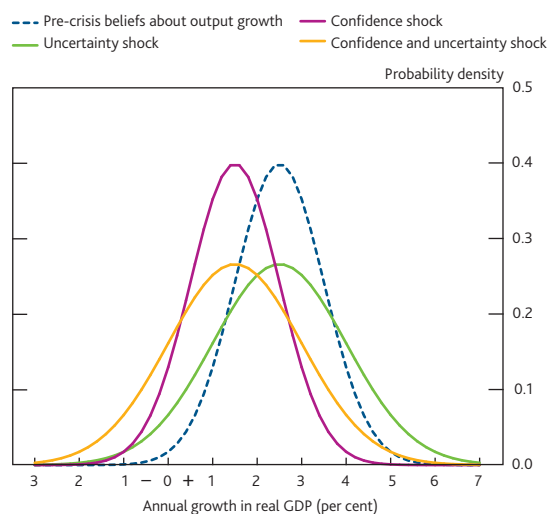
No one can predict exactly what will happen in the future. But in order to make everyday economic decisions — about work, spending, investments, education and so on — people use information around them to form judgements about what might happen. This includes families assessing prospects for future take-home pay, or companies evaluating the outlook for demand for their goods and services. These judgements carry uncertainty over the likelihood of alternative outcomes.⁽¹⁾ For example, it might be possible to form a judgement that there is a 50% chance it will rain tomorrow, but that probability is an estimate. In contrast, the probability that an unbiased coin will land on heads when tossed is 50%; and that is known with certainty.

Some underlying level of uncertainty always exists in an economy. Indeed, the MPC gives an explicit account of its uncertainty around the economic outlook by publishing its forecasts for growth and inflation in the form of ‘fan charts’, rather than single-point forecasts.⁽²⁾ But as uncertainty about future economic conditions changes over time it can affect spending decisions. If one company is taken over by another, the employees may feel more uncertain about whether next year’s pay will be higher or lower than currently. Or businesses may become more unsure about the level of next year’s orders if there is a change of government in one of their export markets.

Probability theory can help to provide a more precise definition of uncertainty. A probability density function (pdf) describes the set of probabilities assigned to different outcomes for a given phenomenon, such as economic growth. While in reality, precise distributions around future events are usually not possible to construct, a pdf can be used as a simple illustrative device for thinking about uncertainty and its distinction from other related concepts, such as confidence. While the most likely outcome is described by the mean or ‘first moment’ of the distribution, the width, or ‘second moment’ of the distribution can be thought of as the uncertainty associated with that outcome because it captures the range of possible outcomes or the volatility in outcomes.

Chart 2 illustrates how this framework can be used to understand how expectations for future economic growth might respond to different combinations of confidence and uncertainty shocks. Suppose the dashed blue line represents companies’ starting beliefs about future annual growth in real GDP. The growth rate they believe to be most likely is shown

Chart 2 A stylised probability density function illustrating the impact of uncertainty and confidence shocks on expectations of GDP growth



Source: Bank calculations.

by the mode of the distribution — here taken to be 2.5%.⁽³⁾ They also attribute a non-negligible chance to GDP growth being as low as zero and as high as 5%; this range of outcomes captures the level of perceived uncertainty. Now suppose companies become more uncertain about the economy and attach greater probability to the occurrence of both higher and lower growth rates, while still believing the most likely outcome will be growth of 2.5%. This is reflected in **Chart 2** by an increase in the width, or ‘second moment’ of the pdf, which shifts from the dashed blue line to the green line; the range of possible outcomes for growth now lies between -2% and 7%.

In practice, however, uncertainty or ‘second moment’ shocks are unlikely to occur independently of shocks to other moments. Particularly during a crisis, shocks to uncertainty may coincide with shocks to the mean (first moment) of the distribution, sometimes described as changes in ‘confidence’. For example, following a financial crisis, say, companies may believe the economy is likely to grow at a lower rate than before, but they may also think a greater number of outcomes is possible. On its own, a ‘confidence’ shock would induce a leftward shift in the pdf with a lower modal outcome: from the dashed blue line to the magenta line in **Chart 2**. If, however, companies became both less confident and more uncertain about future economic growth, the pdf would both widen and shift to the left, shown by the orange line. Moreover, the rise in uncertainty might also be associated with increased concern about extreme events, skewed towards worries about bad or disastrous events. In fact, asymmetric

(1) This aligns with Frank Knight’s description of uncertainty — referring to an event whose probability is either unknowable or impossible to measure accurately, versus the concept of risk, where probability can be determined. See Knight (1921).

(2) See the box on page 39 of the November 2007 *Inflation Report*.

(3) The average annual growth rate of UK real GDP between 1956 and 2007 was 2.8%.

Table A Channels through which uncertainty affects the economy

Sector	Channel	Description	References	Economic variable affected
Households	Precautionary savings	Households unsure about labour income and postpone consumption to insure against temporary shocks to income.	Carroll (1996)	Consumption
Firms	'Wait and see'	Firms uncertain about future sales and profits postpone production and investment until uncertainty is resolved.	Dixit and Pindyck (1994)	Investment and productivity
	'Entry and exit'	Firms postpone entering new markets, including export markets. These firms are likely to be the most productive.	Bloom (2009), Disney, Haskell and Heden (2003)	Productivity and exports
	Labour market distortions	Households unwilling to search for more productive jobs, firms unwilling to post vacancies so the resulting matches are less productive.	Lazear and Spletzer (2011)	Productivity
All sectors	Financial	Uncertainty over future asset price volatility raises risk premia and the cost of credit to households and companies.	Whaley (2000), Gilchrist, Sim and Zakrajsek (2010)	Credit, consumption and investment

shocks that generate a higher perceived probability of bad or extreme events occurring are likely to affect the skew of outcomes or 'third moment' of the probability distribution. But here the focus is on uncertainty shocks that increase people's perceptions of the probability of both high and low outcomes occurring in an equal way.⁽¹⁾

This article focuses on the uncertainty faced by households and companies. Economic activity is also likely to be affected by the way that other economic agents, for example financial market participants and policymakers, respond to changes in uncertainty. For example, the Bank of England's policymakers must take uncertainty about both the current and future state of the economy into account when making policy decisions.⁽²⁾ And to meet their objectives for price stability and financial stability, the MPC and the Financial Policy Committee need to act to mitigate the effects of changes in uncertainty.

How do uncertainty shocks affect economic activity?

Shocks to uncertainty affect economic activity through a number of channels. They affect the level of demand for goods and services in the economy, via consumption and investment decisions. But uncertainty can also have an impact on the supply side of the economy, by affecting productivity growth or credit provision. These channels are summarised in **Table A**. It is important to consider how uncertainty shocks affect these demand and supply channels because they have different implications for activity and inflationary pressure. So it is crucial to understand these effects in order to determine the appropriate monetary policy response. For example, if an increase in uncertainty reduces demand but has no impact on supply it will tend to put downward pressure on inflation as a margin of slack opens up in the economy. By contrast, if an increase in uncertainty also reduces supply, it would lessen the amount of slack and downward pressure on inflation so monetary policy makers might, other things equal, need to loosen policy less to maintain stable inflation.

Demand-side channels

Higher uncertainty can induce households to save more. Faced with uncertainty about their future labour income, households might build up a 'buffer stock' of savings to draw on in periods of temporarily low income (Carroll (1996), Romer (1990)).⁽³⁾ The flipside of increased saving for the future is a reduction in household consumption today. For example, Benito (2004) finds that a one standard deviation rise in unemployment risk for the head of the household reduces consumption in the United Kingdom by 2.7%. The effect on saving and spending is temporary, however, and will dissipate, once households have saved the amount they require as insurance against future fluctuations in their income.

The effect on consumption might also be skewed towards particular types of spending. For example, the decision to buy durable goods, especially big-ticket items such as cars, is particularly sensitive to uncertainty shocks because these purchases are costly to reverse (Romer (1990)). Buying a new car entails a particularly high fixed cost since there is a large drop in its value after being used for the first time. So households would rather wait to see the outcome of economic conditions before purchasing such durable goods. Benito's study of UK households suggests unemployment risk causes purchases of durables to be significantly delayed.

For similar reasons, uncertainty faced by companies can lead them to postpone investment. Investing in new projects typically involves fixed installation costs, so companies value the option of delaying investment decisions until uncertainty about the viability of a project has been resolved (Dixit and Pindyck (1994)). Heightened uncertainty is likely to raise the value of this 'wait and see' option and therefore depress investment spending temporarily.

(1) Uncertainty shocks that affect the 'third moment' of probability distributions or the skew of outcomes have traditionally been used to explain financial market puzzles. This article excludes discussion of higher moments but some recent applications of these types of uncertainty shocks can be found in Barro (2006) and Gabaix (2012).

(2) A discussion of the ways that the Bank of England deals with these uncertainty challenges in the context of monetary policy is given in 'Uncertainty in macroeconomic policy making: art or science?' — lecture by Mervyn King at the Royal Society, March 2010. See also Batini, Martin and Salmon (1999) for a review of the types of uncertainty faced by policymakers.

(3) This result relies on the assumption of convex marginal utility.

Supply-side channels

Uncertainty can also affect the productive potential, or the 'supply side', of the economy. For example, if higher levels of uncertainty lead companies to postpone their investment plans it not only affects demand today but also the future supply capacity of the economy. The growth rate of the capital stock is lower when investment spending falls, which is likely to restrict the amount companies can produce in the future. Also, in times of heightened uncertainty about demand, companies may be more reluctant to enter new export markets. There is evidence that such activities are an important source of productivity growth as Disney, Haskell and Heden (2003) show for the manufacturing sector. So such behaviour may prevent the most productive use of resources and reduce supply.

Activity in the labour market is also likely to be affected by uncertainty. Bloom (2009) suggests that uncertainty can cause companies to postpone hiring and firing decisions. And uncertainty may make workers less willing to seek new jobs, leading to less 'churn' in the labour market, which in turn could impact on productivity growth through less efficient matching of skills to jobs (Lazear and Spletzer (2011)).

Finally, the banking sector and financial markets are affected by uncertainty which, as well as having negative consequences for demand, can have particularly adverse impacts on the supply side of the economy. For example, uncertainty about the macroeconomic outlook is likely to have a negative effect on asset prices because investors require compensation that captures the risk of holding the asset — a risk premium.⁽¹⁾ During periods of heightened uncertainty, investors require greater compensation as insurance against future risks. This reduces asset prices and the financial wealth of investors holding those assets. Asset prices also tend to be more volatile during periods of heightened uncertainty. Lower and more volatile asset prices are likely to discourage investment by making borrowing more expensive, since the cost of credit tends to be negatively related to the financial wealth of borrowers. Elevated risk premia can have a particularly large impact on the banking sector. In addition, general macroeconomic uncertainty is likely to reduce banks' incentives to provide loans for households and companies. So increased uncertainty may lead to a tightening in credit conditions and restrict investment and funding for new start-up companies, which are typically an important source of innovation (Gilchrist, Sim and Zakrajsek (2010)).

How can uncertainty be measured?

Economic uncertainty is difficult to quantify. In contrast to variables such as inflation, uncertainty cannot be directly observed, since it relates to individuals' subjective beliefs about the economy. There are different types of uncertainty, which may affect households and companies differently. And

there are different sources of uncertainty, from unexpected changes in economic policies to natural disasters or wars (Bloom, Kose and Terrones (2013)).

But it is possible to observe uncertainty indirectly using a number of proxy indicators. **Table B** summarises some of the publicly available measures for the United Kingdom. These measures are primarily based on financial market data or results from surveys and cover a range of different types of uncertainty.

Table B Indicators of economic uncertainty for the United Kingdom

Variable	Data type	Sector
FTSE option-implied volatility ^(a)	Financial market	Whole economy
Sterling option-implied volatility ^(b)	Financial market	Whole economy
Dispersion of company earnings forecasts ^(c)	Financial market/ survey	Firm
Dispersion of annual GDP growth forecasts ^(d)	Financial market/ survey	Whole economy
GfK unemployment expectations balance ^(e)	Survey	Household
CBI 'demand uncertainty limiting investment' score ^(f)	Survey	Firm
Number of press articles citing 'economic uncertainty' ^(g)	Media	Whole economy

- (a) Three-month option-implied volatility of the FTSE All-Share index. Option-implied volatility not available before 1992. Prior to this date, realised volatility is used (calculated as the rolling 65-day standard deviation), with data available from 1975. Sources: London Stock Exchange and New York Stock Exchange/London International Financial Futures and Options Exchange (NYSE Liffe).
- (b) Three-month option-implied volatility of the sterling-euro and sterling-dollar export-weighted exchange rate. Data available from 2001. Source: British Bankers' Association.
- (c) Standard deviation of analysts' forecasts for earnings growth over the next twelve months. Data available from 1998. Source: Institutional Brokers' Estimate System.
- (d) Standard deviation of external forecasts for annual GDP growth for the current and following calendar year, combined as a simple unweighted average. Data are first seasonally adjusted to account for the varying degree of information available to forecasters over the data cycle. Data available from 1989. Source: Consensus Economics.
- (e) Headline balance from the question 'How do you expect the number of people unemployed in this country will change over the next twelve months?'. Data available from 1985. Source: GfK.
- (f) 'Uncertainty about demand' score from the question 'What factors are likely to limit your capital expenditure authorisations over the next twelve months?' in the Confederation of British Industry's (CBI) *Quarterly Industrial Trends and Service Sector surveys*. Data available from 1979. Prior to 1998 only the manufacturing survey is available. Post-1998 the scores from each survey are weighted together to derive a whole-economy score based on the shares of manufacturing and services in gross value added. Source: CBI.
- (g) Sample covers printed editions of the *Financial Times*, *The Guardian*, *The Independent* and *The Times*. Data available from 1988. Source: Factiva.

One of the most widely used indicators of uncertainty is the option-implied volatility of equity prices, based on the prices of options contracts traded on the FTSE All-Share index.⁽²⁾ In principle, the more uncertainty exists about the future path of the stock market, the higher the price that investors are willing to pay for options contracts that protect them against changes in its level. To the extent that uncertainty about companies' equity prices reflects uncertainty about those companies' demand prospects, this measure may provide a reasonable guide to uncertainty at the whole-economy level.

Other measures derived from financial markets also provide useful indicators of uncertainty. The option-implied volatility of the exchange rate may provide a measure of companies' uncertainty about export receipts or the costs of imported inputs into production. And the variation among external

(1) See Inkinen, Stringa and Voutsinou (2010) for more details.

(2) One of the most commonly used is the VIX index, which measures the implied volatility of options on the S&P 500 index.

forecasts of future GDP outturns or company earnings may reflect the degree of uncertainty about the level of future demand.

Survey-based measures of uncertainty attempt to measure directly the uncertainty faced by households or companies. The GfK consumer confidence survey asks households how they expect the number of unemployed to change over the next year. The Confederation of British Industry (CBI) conducts a quarterly survey of companies and asks whether uncertainty about future demand is posing a constraint on their investment plans.

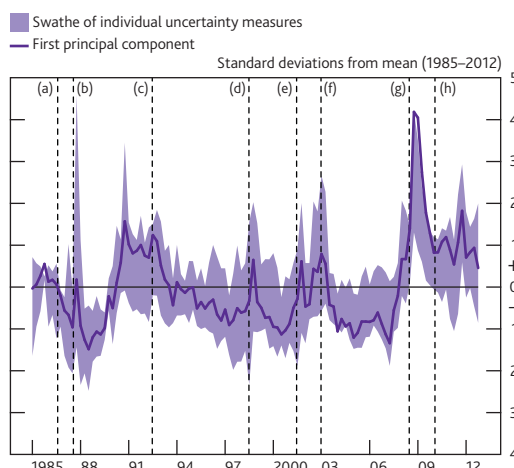
Another, rather different measure of uncertainty is based on the number of citations of 'economic uncertainty' in the printed press. To the extent that newspapers reflect (and influence) the public mood, this measure could provide a barometer for uncertainty in the economy.

None of the above measures is a perfect proxy for uncertainty, however, and each has disadvantages. Financial market measures can be influenced by external conditions and so may not accurately reflect the degree of uncertainty in the UK economy. Measures of implied volatility are also sensitive to the assumptions of the models used to generate them. Some of the survey measures may proxy not just second moment (uncertainty) but also first moment (confidence) shocks.⁽¹⁾ And the number of citations of uncertainty in the press may be influenced by structural trends in the newspaper industry. But taken together, the set of indicators is likely to give a useful steer on the degree of uncertainty in the economy.

How has uncertainty evolved over the recent UK recession?

To assess how economic uncertainty in the United Kingdom has evolved over time, **Chart 3** shows a time-series swathe of the seven uncertainty measures from **Table B**. While there is some variation among the different measures of uncertainty, they do tend to move together, suggesting there is a common 'uncertainty' component to all the measures. The individual measures are also combined into a single summary uncertainty index using a statistical technique called principal components analysis. This method involves extracting from a set of related variables a smaller number of new variables, called principal components, which explain most of the variation in the original set. The 'first principal component' accounts for the greatest amount of variation in the original set of variables and is shown by the solid purple line in **Chart 3**. Each of the seven individual uncertainty measures is strongly correlated with the first principal component, although the financial market measures appear to have the strongest correlation (**Table C**).

Chart 3 A time series of uncertainty indicators



Sources: See **Table B**.

- (a) 'Big Bang' (October 1986).
- (b) 'Black Monday' (October 1987).
- (c) Sterling exits ERM (September 1992).
- (d) LTCM failure (September 1998).
- (e) September 11 attacks (September 2001).
- (f) Iraq war (March 2003).
- (g) Lehman Brothers' failure (September 2008).
- (h) Greece requests EU/IMF assistance (April 2010).

Table C Correlation of individual uncertainty measures with principal component

Uncertainty measure	Correlation with first principal component (2001 Q4–2012 Q4)
Dispersion of company earnings forecasts	0.92
Sterling option-implied volatility	0.89
CBI 'demand uncertainty limiting investment' score	0.85
FTSE option-implied volatility	0.84
GfK unemployment expectations balance	0.83
Number of press articles citing 'economic uncertainty'	0.63
Dispersion of annual GDP growth forecasts	0.59

Sources: See **Table B**.

The uncertainty index shown in **Chart 3** suggests the UK economy has experienced a number of uncertainty 'shocks' over the past two decades. The largest rises in uncertainty occurred during recessions (1990 and 2008). But the uncertainty index also rose above its mean on other occasions which coincided with particular 'bad news' events. In 1998, uncertainty increased in the wake of the failure of the US hedge fund Long Term Capital Management (LTCM). There was then a double-peak rise in uncertainty during the early 2000s which coincided with the September 11 attacks and the onset of the Iraq war.⁽²⁾

Conversely, uncertainty was at an unusually low level for a prolonged period just prior to the recent crisis. In 2003, the

(1) For example, the wording of the question used to generate the CBI demand uncertainty measure does not clearly distinguish between a change in the variance of demand and a change in the level of expected demand. And households' expectations about unemployment may also proxy for their (first moment) expectations about economic growth.

(2) Other selected events include: (a) the 'Big Bang' — liberalisation of the London Stock Exchange in 1986; (b) 'Black Monday' — record falls in world stock markets in October 1987; and (c) sterling's exit from the European Exchange Rate Mechanism (ERM).

index fell sharply, to over one standard deviation below its mean. The experience of unprecedented stability in both the UK and world economies before the crisis might have altered — in hindsight, perhaps unrealistically — individuals' perceptions of the likelihood of future economic shocks occurring.

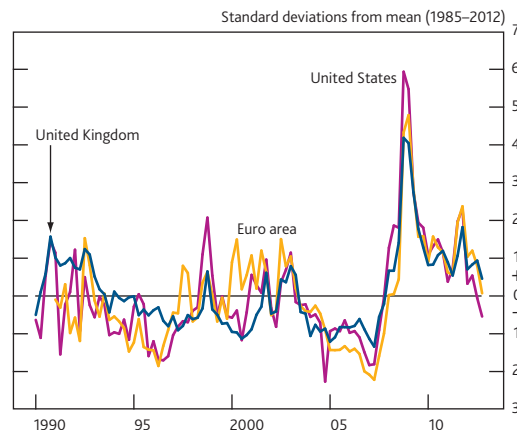
But the magnitude of the uncertainty shock experienced in the recent financial crisis was unprecedented over the period covered. During late 2008, the uncertainty index rose to over four standard deviations above its mean. In part, this might have reflected a rapid reassessment of risks from the financial sector in the wake of the failure of Lehman Brothers. The shock to uncertainty during the recent crisis has also been unusually persistent. In each previous episode of heightened uncertainty, shown in **Chart 3**, the uncertainty index began to fall back within one to three years of the original shock, including following the 1990s recession. By contrast, uncertainty has remained one standard deviation above its mean for most of the past five years and still appears to be elevated.⁽¹⁾

The initial shock to uncertainty in 2008 might have been followed by additional uncertainty shocks stemming from a variety of sources. For example, the increase in the uncertainty index during late 2010 coincided with the intensification of the euro-area sovereign debt crisis, which might have raised companies' uncertainty about external demand conditions. An alternative explanation is that the low level of uncertainty prior to the crisis was simply misplaced, as people mistakenly believed that the economic cycle had become much less volatile than is really the case.

The recent evolution of uncertainty in the United Kingdom has been strikingly similar to that in other advanced economies. **Chart 4** shows the uncertainty index for the United Kingdom alongside the corresponding indices for the euro area and the United States. All indices rose sharply in 2008, fell back somewhat over 2009 and 2010 and picked up again in the second half of 2011. The close correlation of uncertainty across different countries suggests that external factors, such as global financial stress, have been important drivers of the uncertainty shock in the United Kingdom.

The increase in uncertainty during the recent crisis also appears to have coincided with an adverse shock to confidence. For example, businesses might have become both more uncertain and more pessimistic about the level of next year's orders. **Chart 5** shows the uncertainty index alongside a confidence index constructed using the same statistical method.⁽²⁾ The two indices are closely correlated (inversely) and the confidence index fell sharply as uncertainty rose in late 2008. This combined shock to uncertainty and to confidence suggests that following the recent crisis, firms and households have revised down their central expectation of the economic

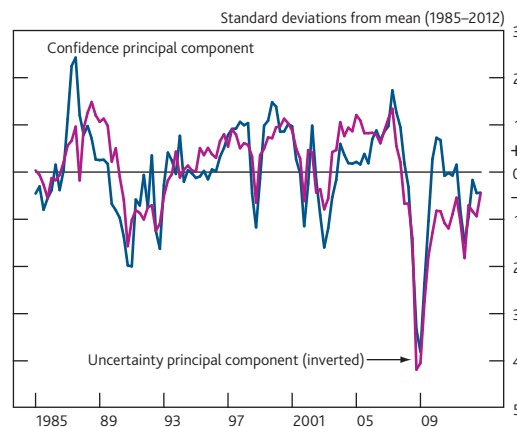
Chart 4 Uncertainty in selected advanced countries^(a)



Sources: Thomson Reuters Datastream for euro-area and US uncertainty measures, see **Table B** for the UK uncertainty measure.

(a) Uncertainty indicators for the euro area and United States include option-implied volatility of exchange rates and equity prices, and unemployment expectations balances.

Chart 5 Uncertainty and confidence indicators^(a)



Sources: Thomson Reuters Datastream and sources in **Table B**.

(a) See footnote (2) at the bottom of this page for the confidence principal component and **Table B** for the uncertainty principal component.

outlook, while also perceiving a higher probability of extreme events occurring either side of that (more pessimistic) central case.⁽³⁾

This raises the question of whether the uncertainty index can be considered a true measure of uncertainty, or whether instead it may simply be picking up the effect of changes in confidence around future outcomes. But results from statistical 'Granger causality' tests suggest that this is not the case. These tests determine whether one time-series variable contains useful information for forecasting another and, although a positive result does not necessarily indicate the presence of true causality, it is usually consistent with it.⁽⁴⁾ In fact, changes in uncertainty are found to 'Granger cause'

(1) This broad narrative of the evolution of uncertainty still holds when the indicator in **Chart 3** is normalised over the pre-crisis period.

(2) The confidence index is constructed as the first principal component of the detrended FTSE index, and business and consumer confidence balances.

(3) A combined shock to confidence and uncertainty is illustrated by a shift from the blue line to the orange line in **Chart 2**.

(4) See Granger (1969).

Table D Granger causality tests for relationships between uncertainty, confidence and GDP growth (1985–2012)^(a)

		To		
		Uncertainty	Confidence	GDP growth
From	Uncertainty	–	***	**
	Confidence	–	–	***
	GDP growth	**	***	–

(a) Three stars, two stars and one star denote statistical significance at the 1%, 5% and 10% levels, respectively. Tests run using two lags.

changes in confidence, whereas confidence appears to have no such effect on uncertainty (Table D).

Empirical effect of uncertainty shocks on the UK economy

It is important for policymakers to quantify the effects of uncertainty on the economy. There is a strong theoretical basis for an impact of uncertainty on economic activity (Table A). And as shown in Chart 1, empirically, uncertainty appears to be countercyclical, rising in recessions and falling in periods of economic stability. The correlation of the uncertainty index with annual output growth is high, at around -0.7. And Kose and Terrones (2012) find that uncertainty is systematically high during recessions and low during expansions across a sample of 21 economies.

Establishing that uncertainty 'causes' fluctuations in output growth in the United Kingdom is not straightforward, however. As discussed above, it is difficult to know whether proxy measures accurately reflect true uncertainty. But even if one is confident in the measure of uncertainty, changes in the index may not arise solely from shocks to uncertainty itself. It is plausible, for example, that a shock to output may itself cause a rise in uncertainty. Indeed, this two-way causality is exactly what is suggested by Granger causality tests (Table D). In other words, there is likely to be an endogenous relationship between uncertainty and activity, meaning that separating the two effects is difficult.

A vector autoregression (VAR) provides one way to estimate the impact of uncertainty on activity. More details on the VAR presented here are provided in the appendix. A VAR model is a system of equations where every variable is dependent on its own past values and the past values of every other variable in the system. So an advantage of this approach is that it allows uncertainty and economic growth to depend on one another. In this set-up, it is possible to introduce an exogenous 'shock' to the uncertainty equation, then observe how that affects other variables within the system, such as output.

VAR analysis has been used in previous studies using US data. For example, Bloom (2009) used this approach to estimate the

effect of uncertainty on industrial production, and Lee, Rabanal and Sandri (2010) used a VAR to estimate the impact of uncertainty on household precautionary savings. Both studies found that heightened uncertainty can have a (statistically significant) negative impact on demand and output. But the persistence of the effects differ somewhat. Bloom (2009) finds that uncertainty shocks have relatively short-lived effects on activity, with evidence of some recovery in the output that was 'lost' during the period of heightened uncertainty. On the other hand, Lee, Rabanal and Sandri (2010) find a more persistent effect on household consumption, relative to income.

Estimating a similar VAR for the United Kingdom suggests that uncertainty shocks have a negative and statistically significant impact on GDP. In addition, the model controls for other important macroeconomic variables including CPI inflation, employment, Bank Rate and an indicator of credit conditions (see appendix for details on the data used).

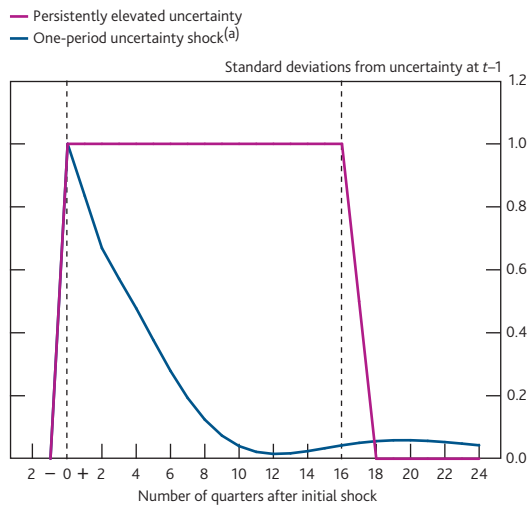
This result is robust to the inclusion of other variables that might also have had large effects on GDP in recent years, such as credit conditions.⁽¹⁾ The effect of uncertainty on output also appears similar, and remains statistically significant, when our confidence measure (as shown on Chart 5) is included. Taken together, these results provide evidence that uncertainty shocks matter, and might be one cause of the United Kingdom's disappointing economic performance since 2008.

In the past, uncertainty shocks have tended to unwind fairly quickly (Chart 3), so their effects on real activity have not been very persistent. The estimates from the model imply that a one standard deviation uncertainty shock unwinds fairly rapidly, with half the rise in uncertainty unwinding within a year (blue line in Chart 6). Consequently, the peak impact on the level of GDP occurs after four quarters (peaking at around -0.5%, shown by the blue line in Chart 7) then the level recovers within three years.

But the experience of the UK economy following the financial crisis suggests that uncertainty shocks can be very large (Chart 3). And their effects on activity are not always so brief (see previous section). While the effects of such unusual events are difficult to quantify, one way of doing so is to consider a thought experiment where uncertainty remains one standard deviation above normal for 16 quarters (magenta line in Chart 6). Unsurprisingly, the model suggests that this would have a larger and more persistent impact on GDP (magenta line in Chart 7). So given evidence of persistently high uncertainty in recent years, uncertainty effects might have played a material role in depressing economic activity since 2008.

(1) The results also suggest that adverse shocks to credit conditions have a negative impact on GDP.

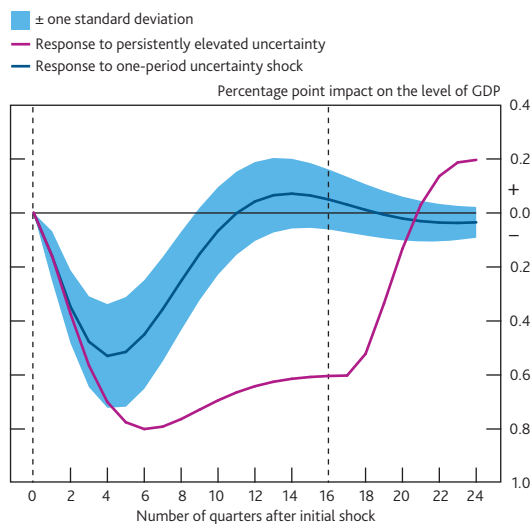
Chart 6 Assumed paths for uncertainty for persistent and one-period shocks



Sources and calculations are detailed in the appendix.

(a) Following shock at time period = 0, uncertainty evolves according to dynamics of the model.

Chart 7 Impact of uncertainty on UK GDP



Sources and calculations are detailed in the appendix.

That said, a rapid fall in uncertainty might lead to a sharp pickup in GDP growth. In the thought experiment in **Chart 6**, uncertainty falls back rapidly to its initial level. That results in a sharp recovery in the level of GDP (magenta line in **Chart 7**). So while the sources of uncertainty currently affecting the United Kingdom, such as the euro-area debt crisis, may be persistent, if they were to dissipate rapidly, that could lead to a period of above-trend growth.⁽¹⁾

Conclusion

A wide range of measures suggest that households and companies have become more uncertain about future economic prospects since the onset of the financial crisis, and these measures have remained much higher in the past five years than in the preceding decade. The sources of this rise in uncertainty appear widespread, and are both domestic and international. The increase in uncertainty has also coincided with a general weakening of confidence in the strength of economic prospects.

Combining our understanding of how uncertainty can affect the decisions made by households and companies with some simple empirical estimates supports the view, often asserted, that elevated uncertainty has been a factor restraining economic recovery in the United Kingdom.

Uncertainty has remained relatively elevated over the past five years. With little recent precedent of such extended periods of high uncertainty, it is difficult to know how this might affect the behaviour of households and companies. Considering different strands of theory and evidence on how households and companies respond to uncertainty suggest that, as long as it remains elevated, some restraining effect on the level of consumer spending and investment may continue.

(1) This is considered as an upside risk to the MPC's forecast in page 41 of the May 2013 *Inflation Report*.

Appendix

Constructing a VAR model to estimate the impact of uncertainty on the UK economy

This appendix sets out how we constructed a vector autoregression (VAR) model to estimate the impact of macroeconomic uncertainty shocks on UK GDP. The approach has been used to identify uncertainty effects on the US economy (see Bloom (2009)). More recently, Denis and Kannan (2013) use a VAR to quantify the (negative) effect of uncertainty shocks on UK industrial production.

Generally speaking, a VAR is a statistical model that allows for an examination of linear interdependencies between variables of interest. For example, it is possible to extract the relationship between uncertainty and GDP, conditional on other variables in the model. The VAR in this article includes six macroeconomic variables, including an uncertainty indicator.⁽¹⁾

The first step in constructing the VAR is to express the variables in terms of a set of equations. In these equations, every variable is dependent on its own past values, the past values of every other variable in the model, plus a contemporaneous 'shock' term, which captures the effect of phenomena unobserved by the model.

For the VAR in this article, each of the six variables in the model depends on the first two lags of itself and every other variable, plus a 'shock' term. The model uses quarterly data and the estimation period is 1989–2012. The set of (six) equations in the model are written below. It shows that the current values of each variable (at time t), on the left-hand side, depends on the first two lags of itself and all other variables (observed values at time $t-1$ and $t-2$), plus a contemporaneous shock, ε_t :

$$\begin{bmatrix} u_t \\ GDP_t \\ L_t \\ CPI_t \\ r_t \\ credit_t \end{bmatrix} = A_1 \begin{bmatrix} u_{t-1} \\ GDP_{t-1} \\ L_{t-1} \\ CPI_{t-1} \\ r_{t-1} \\ credit_{t-1} \end{bmatrix} + A_2 \begin{bmatrix} u_{t-2} \\ GDP_{t-2} \\ L_{t-2} \\ CPI_{t-2} \\ r_{t-2} \\ credit_{t-2} \end{bmatrix} + \varepsilon_t$$

where:

u_t is an uncertainty indicator. It is the first principal component of four of the indicators in **Table B**. These are: the CBI 'demand uncertainty' score, the GfK 'unemployment expectations' balance, FTSE option-implied volatility and number of press articles citing 'economic uncertainty'.

GDP_t is the quarterly level of GDP in log deviations from a statistical trend.⁽²⁾

L_t is the quarterly level of employment in hours worked, in log deviations from a statistical trend.⁽²⁾

CPI_t is the seasonally adjusted⁽³⁾ level of the consumer prices index, in log deviation from a statistical trend.⁽²⁾

r_t is the level of Bank Rate.

$credit_t$ is an indicator of credit conditions. Pre-1995, the credit conditions indicator is taken from Fernandez-Corugedo and Muellbauer (2006). From 1995 onwards, we use a weighted average of interest rates facing households for credit card loans, personal loans and mortgages.

The extent to which each variable is affected by movements in other variables is described by coefficients in the matrices A_1 and A_2 . We estimate the coefficients to 'optimally' describe these data by estimating all six equations using ordinary least squares estimation.

Once the coefficients have been estimated, it is possible to trace through the effect of a shock in the uncertainty equation at time t . This shock raises the uncertainty indicator by one standard deviation at time t , and affects other variables in subsequent time periods. The effect of such an uncertainty shock (of one standard deviation) on GDP is shown in the blue lines in **Charts 6** and **7**. The effect of the shock largely unwinds after around ten quarters.

We can also use the VAR to estimate the effect of persistently elevated uncertainty, as shown in the magenta lines in **Charts 6** and **7**. Rather than applying a single shock in time t and then allowing the effect to unwind, as shown in the blue lines, we applied a series of shocks to the uncertainty equation. We applied shocks such that the uncertainty indicator remained one standard deviation higher than average for 16 quarters.

(1) Data are sourced from the ONS and Bank of England unless otherwise stated.

(2) The trend is estimated using a Hodrick-Prescott filter, where the parameter, lambda, which determines the sensitivity of the trend to short-term fluctuations in the data, is set equal to 1600.

(3) Seasonal adjustment uses the Census X-12 ARIMA methodology.

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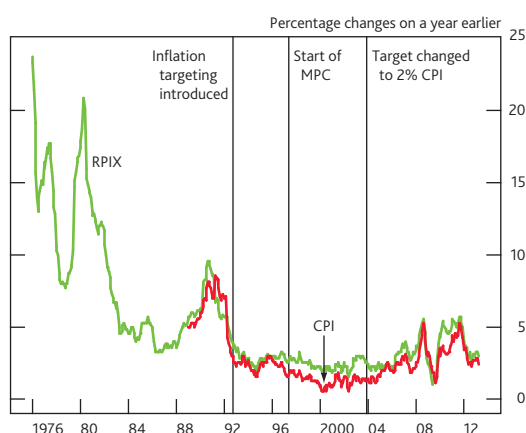
Do inflation expectations currently pose a risk to the economy?

By Becky Maule and Alice Pugh of the Bank's Monetary Assessment and Strategy Division.⁽¹⁾

People's expectations about future inflation play an important role in determining the current rate of inflation. There is a risk that the recent prolonged period of above-target inflation, which the Monetary Policy Committee (MPC) judges is more likely than not to continue over much of the next two years, may cause inflation expectations to become less well anchored. By pushing up wages and prices, higher inflation expectations could lead to inflation becoming more persistent. At the moment, most indicators are consistent with inflation expectations remaining anchored to the target, although there is tentative evidence that financial market measures of inflation expectations have become a little more responsive to developments in the economy. There are currently few signs to suggest that prices and wages have increased as a result of higher inflation expectations. The MPC will continue to monitor and assess indicators closely.

Since 2006, inflation, as measured by the consumer prices index (CPI), has been frequently above the 2% target set by the Government. Between 2010 and April 2012, inflation was at least 1 percentage point above the target (**Chart 1**). And although the rate of inflation has fallen since then, it has remained above 2%. While the outlook is uncertain, the Monetary Policy Committee's (MPC's) latest forecasts contained in the May 2013 *Inflation Report* project that inflation is more likely than not to remain above the target over much of the next two years.

Chart 1 Inflation^(a)



(a) CPI is the consumer prices index, RPIX is the retail prices index excluding mortgage interest payments.

The MPC's remit is to deliver price stability, but to do so in a way that avoids undesirable volatility in output. In the recent past, the MPC has judged that, so long as domestic cost and price pressures have remained consistent with inflation

returning to target in the medium term, it has been appropriate to look through the temporary, albeit protracted, period of above-target inflation. Attempting to bring inflation back to the target too quickly would risk derailing the recovery and undershooting the inflation target in future.

There is a risk, however, that the prolonged period of above-target inflation could lead households, companies and financial market participants to expect inflation to remain above 2% in the medium term. Prolonged above-target inflation could also lead to a change in perceptions of the way in which the MPC responds to deviations of inflation from the target. In particular, it might lead to expectations of a slower return towards the target than is consistent with the MPC's policy stance. If inflation expectations were to become less well anchored in either of these ways, households and companies might change their wage and price-setting behaviour, as well as their spending decisions. That could cause inflation to persist above the target for longer, which could, in turn, require tighter monetary policy than would otherwise be the case in order to return inflation to the target.

It is worth noting, however, that the prolonged period of above-target inflation is unlikely to be the only economic factor influencing inflation expectations. For example, the degree of spare capacity in the economy may act to reduce inflation expectations, since a higher degree of spare capacity is likely to reduce the extent of future price rises as spending increases.

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

A previous article in the 2012 Q2 *Quarterly Bulletin* concluded that, while there was still a risk of inflation expectations becoming less well anchored while inflation remained above the target, there were few signs that the risk had materialised so far.⁽¹⁾ Over the past year, most indicators have not suggested that public perceptions of the MPC's commitment to bring inflation back to the target have altered, and consequently there is little evidence to suggest that wages and prices have changed as a result. But the responsiveness of financial market measures of inflation expectations to developments in the economy seems to have increased a little. The MPC will continue to monitor these indicators and they remain an important factor in policy decisions.⁽²⁾

The first part of this article discusses recent movements in inflation expectations, and assesses the extent to which they remain anchored by monetary policy. The second section analyses the extent to which a change in inflation expectations might encourage inflation to become more persistent through changes in price and wage-setting behaviour, changes in consumption and investment decisions, or via the exchange rate. The final section concludes.

Assessing the extent to which expectations remain anchored

The MPC monitors a range of measures of inflation expectations, including measures from surveys of households, forecasts by professional economists and indicators based on financial market instruments, for both shorter and longer-term horizons.⁽³⁾ Shorter-term inflation expectations might become less well anchored if people believe that the MPC has become more tolerant of deviations of inflation from the target, even if they expect inflation to return to the target eventually. And longer-term inflation expectations might become less well anchored if people doubt the determination of the MPC to return inflation to the target in the long run. At both horizons, expectations becoming less well anchored might become apparent in a few ways:

- The levels of inflation expectations might change in ways that are not consistent with developments in the economy.
- Uncertainty about future inflation might increase.
- Expectations might become more responsive to economic news.

The remainder of this section reviews each of these in turn to assess whether expectations have become less well anchored over the past year.

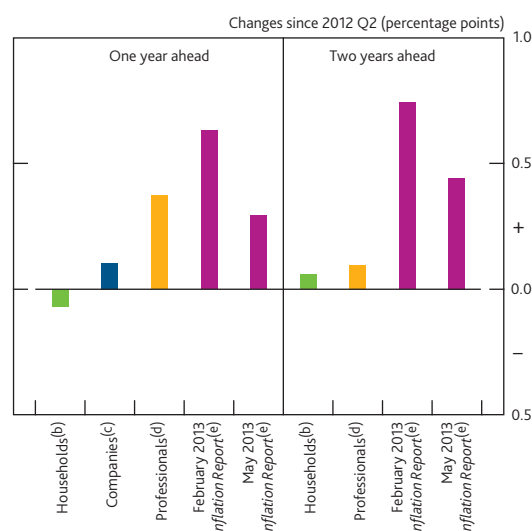
Movements in the level of shorter-term inflation expectations

Shorter-term inflation expectations are likely to move over time. If inflation expectations are anchored, we would expect those movements to reflect news about economic variables —

such as GDP and wages — that are likely to affect prices over the next year or so. One way to assess whether movements in shorter-term inflation expectations reflect economic news is to compare them to changes in the MPC's forecast for inflation, which capture the Committee's judgement about how developments have affected the outlook for inflation.

Over the past year, the MPC's central projection for inflation in the *Inflation Report* has been revised up markedly, especially at the two-year horizon (**Chart 2**). Those revisions partly reflect the MPC's assessment of how economic developments are likely to affect the outlook for inflation. They also reflect the Committee's judgement about the appropriate timeframe over which to bring inflation back to the target, given the persistent nature of the shocks affecting the economy. Given the current economic circumstances, the MPC has judged that it is appropriate to continue to look through the period of above-target inflation in order to support the recovery in growth and employment, subject to meeting the inflation target in the medium term.

Chart 2 Changes in shorter-term inflation expectations since 2012 Q2^(a)



Sources: Bank of England, Bank/GfK NOP, Barclays Capital, Citigroup, Confederation of British Industry (CBI), HM Treasury, YouGov and Bank calculations.

- (a) Some surveys do not contain the latest 2013 Q2 data (see below).
 (b) Based on an average of expectations for inflation from the Bank/GfK NOP, Barclays Basix and, for the one year ahead measure, YouGov/Citigroup surveys. These surveys do not reference a specific price index and are based on the median estimated price changes. Change is between 2012 Q2 and 2013 Q1 for the Basix survey.
 (c) Based on CBI data for the manufacturing, business/consumer services and distribution sectors, weighted using nominal shares in value added. Companies are asked about the expected percentage change over the coming twelve months in the markets in which they compete. Change is between 2012 Q2 and 2013 Q1.
 (d) Based on an average of expectations of CPI inflation from the HM Treasury and Bank of England surveys.
 (e) Based on changes in the modal CPI inflation projections under market interest rates since the May 2012 *Inflation Report*.

In contrast, the levels of shorter-term inflation expectations of households and companies have changed little over the past year (**Chart 2**), and by considerably less than the movement in

(1) See Harimohan (2012).

(2) See May 2013 *Inflation Report*, pages 36–37.

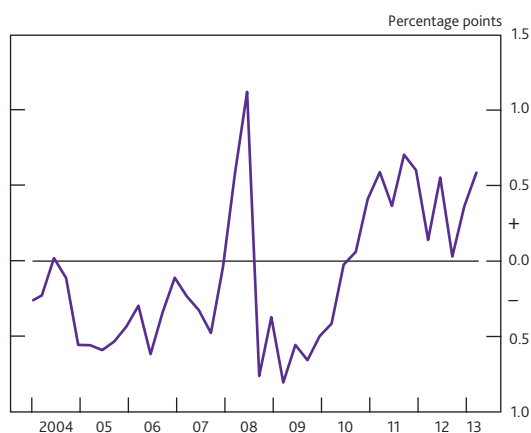
(3) The available measures are described in more detail in the annex.

the MPC's central inflation projection. Survey measures of professional forecasters' one year ahead inflation expectations have risen more substantially, but by less than the revision contained in the February 2013 *Inflation Report*.

An alternative approach to assess whether movements in short-term expectations are consistent with developments in the economy is to use a statistical model, such as a structural vector autoregression (SVAR). The SVAR approach involves estimating a set of equations in which each variable is regressed on past values of itself and the other variables in the system. Under certain economic assumptions,⁽¹⁾ we can decompose the observed movement in inflation expectations into a component explained by movements in the other variables, and an unexplained 'shock' to inflation expectations.⁽²⁾ The other variables included in the model are the ones thought to be most likely to affect inflation expectations: GDP growth, wage growth, CPI inflation, Bank Rate and real oil price inflation.

The unexplained component for two year ahead inflation expectations — using a version of the model estimated between 1993 and 2013 Q1 — has been broadly unchanged over the past year (**Chart 3**), consistent with households not having reassessed the MPC's commitment to bring inflation back to target over that period. But it has been positive since the second half of 2010, suggesting that inflation expectations have been higher than explained by the other economic variables in the model. To the extent that this persists, it might suggest that inflation may return to the target more slowly than it otherwise would. But it could also reflect the impact of factors that have been omitted from the model.

Chart 3 SVAR model estimate of the unexplained component of two year ahead inflation expectations^{(a)(b)}



Sources: Bank/GfK NOP, Barclays Capital, Bloomberg, ONS and Bank calculations.

(a) The SVAR model includes: CPI inflation, GDP growth, Bank Rate, wage growth, real oil price inflation and two year ahead inflation expectations. The model is estimated using data from 1993 Q1 to 2013 Q1. The inflation expectations series is based on the Barclays Basix series until 2009 Q4 and the Bank/GfK estimate from 2010 Q1 onwards. The Bank/GfK measure has been spliced to abstract from recent volatility in the Barclays Basix measure.

(b) With thanks to James Cloyne, who helped with this analysis.

Movements in the level of longer-term inflation expectations

Given that the MPC's remit is to deliver price stability in the medium term, longer-term inflation expectations, provided they remain anchored, would be expected to remain relatively stable at levels consistent with the inflation target. Inflation at longer horizons is also less likely to be affected by current economic developments.

Developments in measures of households' longer-term inflation expectations have been mixed. The Bank/GfK NOP survey measure suggests that households' longer-term inflation expectations have risen a little over the past year and this measure is somewhat above its series average (**Table A**). This series has a very short backrun, however, and covers a period of less stable inflation, meaning that it is not clear whether the average is consistent with inflation being close to the target in the long term. In contrast, the Citigroup survey measure, which has a somewhat longer backrun, is slightly below its series average.

The results from surveys of professional forecasters' longer-term expectations have also varied somewhat. The average of the responses to a survey conducted by HM Treasury is broadly in line with its series average, but the average response to the quarterly survey of external forecasters (SEF) conducted by the Bank has risen since 2012, and currently appears a little elevated.⁽³⁾

Movements in financial market measures of longer-term inflation expectations over the past year are difficult to interpret. These measures reference the retail prices index (RPI), and during the latter part of 2012 they were affected by the possibility that the formulae used to calculate the RPI would be changed. The changes to the formulae that were under consideration would have reduced the wedge between RPI and CPI inflation, and so probably led many market participants to revise down their RPI inflation expectations. Indeed, market-based indicators of inflation expectations drifted down during 2012. And after the National Statistician announced on 10 January 2013 that the RPI would not be changed, they rose sharply.⁽⁴⁾

Abstracting from these movements, the levels of financial market indicators are broadly consistent with inflation expectations remaining anchored. Although both measures are slightly higher than their series averages (**Table A**), there

(1) See Barnett, Groen and Mumtaz (2010).

(2) There are a variety of possible causes of a surprise increase or 'shock' to inflation expectations. One possibility could be an 'inflation scare' whereby household inflation expectations rise due to households having perceived the MPC to be more tolerant of deviations in inflation from target than is the case. Alternatively, inflation expectations may have risen in response to a change in macroeconomic variables not included in the model.

(3) For more information about the SEF, see May 2013 *Inflation Report*, page 50.

(4) For more details, see 'National Statistician announces outcome of consultation on RPI', www.ons.gov.uk/ons/dcp29904_295002.pdf.

Table A The level of longer-term inflation expectations

	Time horizon	Start of data	Series average	Per cent				
				2011 H2	2012 H1	2012 H2	2013 Q1	2013 Q2
Surveys of households (longer-term measures)								
Bank/GfK NOP	5 years	Feb. 2009	3.3	3.5	3.4	3.4	3.6	3.6
Barclays Basix ^(a)	5 years	Aug. 2008	3.8	4.0	4.0	3.8	3.6	n.a.
YouGov/Citigroup ^(b)	5–10 years	Nov. 2005	3.4	3.6	3.4	3.5	3.5	3.3
Surveys of professional forecasters								
Bank	3 years	May 2006	2.0	2.1	2.1	2.0	2.1	2.2
HM Treasury	4 years	Feb. 2004	2.2	2.2	2.4	2.2	2.4	2.2
Measures derived from financial instruments ^(c)								
Swaps	5-year, 5-year forward	Oct. 2004	3.3	3.3	3.3	3.0	3.4	3.5
Gilts	5-year, 5-year forward	Jan. 1997 ^(d)	3.1	3.1	3.1	2.7	3.4	3.3
Memo:								
CPI inflation ^(e)		Jan. 1997	2.1	4.7	3.1	2.6	2.8	2.4

Sources: Bank of England, Bank/GfK NOP, Barclays Capital, Bloomberg, Citigroup, HM Treasury, ONS, YouGov and Bank calculations.

(a) The latest Barclays Basix data is for 2013 Q1.

(b) The 2013 Q2 estimate for the YouGov/Citigroup survey is the average over April and May.

(c) Financial market instruments are linked to RPI inflation. The 2013 Q2 average for financial markets data is taken between 2 April and 17 May.

(d) The series for five-year, five-year forward RPI inflation derived from gilts started in January 1985. But for the purpose of this table, the series average is taken over 1997–2013 to be consistent with the start of the CPI data.

(e) The 2013 Q2 estimate uses CPI data for April 2013.

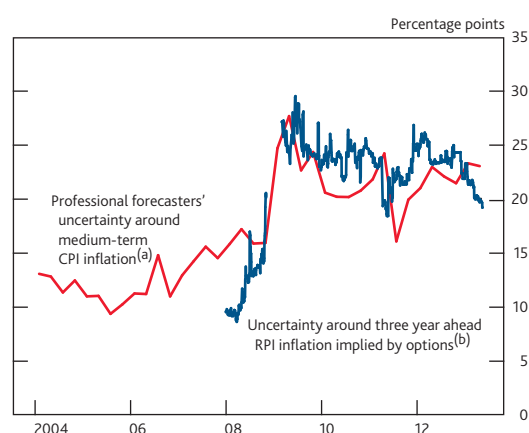
are a number of factors that make such a comparison hard to interpret.⁽¹⁾ And market contacts report that participants expect CPI inflation to be around the target in the long run.

Uncertainty about inflation

If individuals were to become less certain about how the MPC will respond to future shocks which push inflation away from the target, one might expect to see a rise in measures of uncertainty about the future level of inflation. An increase in uncertainty may not necessarily signal that inflation expectations have become less well anchored by monetary policy, however. A change in individuals' views about the size or persistence of shocks that might affect the economy in the future could also raise uncertainty regarding inflation expectations.⁽²⁾

Uncertainty over the future level of inflation can be measured as the dispersion of inflation expectations, for example the interquartile range, derived from surveys of professional forecasters. The Bank's SEF asks each forecaster to attach a specific probability to a range of different outcomes for future inflation. Alternatively, option prices can be used to estimate the weight that market participants collectively attach to different future inflation outcomes.⁽³⁾

Neither uncertainty around professional forecasters' nor financial market measures of inflation expectations suggest that individuals have become less certain about how monetary policy will react to future developments over the past year (Chart 4). The measures remain high compared to their levels at the start of 2008, although that might partly reflect increased uncertainty about future economic shocks in the wake of the financial crisis.

Chart 4 Uncertainty around three year ahead inflation for professional forecasters and financial market participants

Sources: Bank of England, Bloomberg and Bank calculations.

(a) Professional forecasters' uncertainty is calculated as the average probability that inflation will be more than 1 percentage point away from the target, calculated from the probability distributions for inflation in the medium term reported by forecasters responding to the Bank's survey. Forecasters reported probability distributions for CPI inflation two years ahead between February 2004 and February 2006; and for CPI inflation three years ahead from May 2006 onwards.

(b) Standard deviation of the probability distribution of annual RPI inflation outturns for three years ahead implied by options. For technical reasons relating to the very low level of RPI inflation between November 2008 and February 2009, it is not possible to construct a full set of probability distributions for that period. Movements in longer-term option-implied uncertainty have been similar.

(1) For example, higher demand for inflation index-linked market instruments by institutional investors such as pension funds is likely to have increased implied inflation expectations over time. And changes in the price collection methodology for clothing and footwear prices will have affected the CPI and RPI differently and so probably increased market participants' expectations about the rate of RPI inflation consistent with CPI inflation at 2%.

(2) Haddow *et al* (2013) in this edition of the *Quarterly Bulletin* assess how uncertainty matters for economic activity more generally.

(3) See Smith (2012).

Households' uncertainty about inflation being at the target also does not appear to have increased over the past year. The Bank/GfK NOP survey asks respondents how confident they are about inflation being within 1 percentage point of the target in two to three years' time. In 2013, responses were little changed from 2012, with around 30% of households very or fairly confident that inflation would be close to the target.

The responsiveness of inflation expectations to news

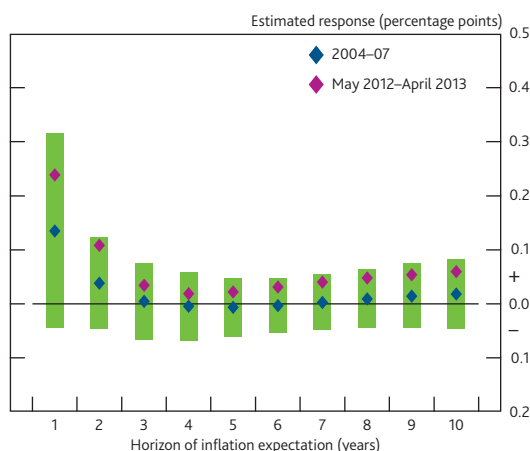
Another way to judge whether inflation expectations remain well anchored is to test their responsiveness to developments in the economy. For example, suppose there were economic news that suggested that CPI inflation was more likely to be away from the target in the near term than was previously anticipated. Individuals' expectations at longer horizons might become more responsive to this news if they expected deviations of inflation from the target to be more persistent or if they were attaching less weight to the MPC's determination to return inflation to the target in the long run.

In particular, inflation expectations might respond to 'news' in CPI inflation outturns. One way to estimate that response is to relate movements in financial market measures of inflation expectations on the day CPI inflation data are published to the news in the outturn. **Chart 5** shows the estimated change in market measures of inflation expectations in response to news in the CPI release, where that news is scaled up or down to equal 1 percentage point, using the difference between the inflation data and the market median expectation for the outturn as an indicator of the news. The higher the average change, the more inflation expectations are estimated to respond to CPI news. The blue diamonds show that during the period from 2004 to 2007, when inflation averaged close to 2%, inflation expectations one and two years ahead tended to increase in response to positive news in CPI inflation releases. Inflation expectations further ahead tended not to react, however.

Over the past year, inflation expectations at all horizons between one and ten years ahead have, on average, tended to move by slightly more in response to inflation news than between 2004–07. This is shown by the magenta diamonds in **Chart 5**, which lie above the blue diamonds. That might reflect an assessment by financial market participants that the MPC has become more tolerant of deviations of inflation from the target, and so is tentative evidence that inflation expectations might have become a little less well anchored. But the size of the changes is small relative to the uncertainty surrounding the estimates, as indicated by the green bars covering two standard errors on either side of the regression coefficients estimated over the 2004–07 period.

A de-anchoring of inflation expectations might also become evident if implied measures of inflation expectations at horizons beyond one year became more positively correlated with changes in one year ahead expectations. Given the MPC's

Chart 5 Estimated changes in instantaneous forward inflation rates derived from swaps in response to CPI news^(a)



Sources: Bloomberg, ONS and Bank calculations.

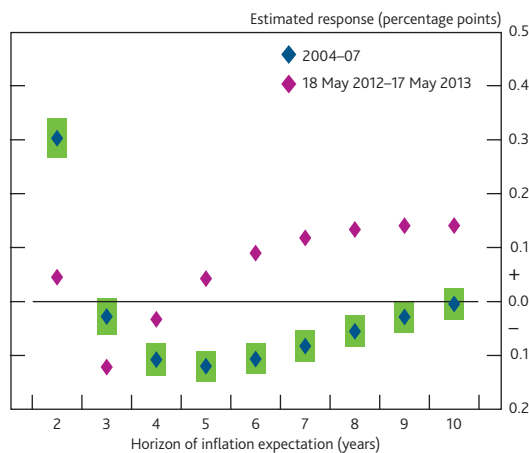
(a) The diamonds show the estimated slope coefficients from regressions of the change in instantaneous forward inflation rates at each horizon on the day on which CPI data were published against news in the CPI release. The instantaneous forward rates are derived from inflation swaps. Swaps data start in October 2004. News in the CPI release is measured as the difference between the data outturn and the Bloomberg median forecast. The bars cover two standard errors either side of the estimated slope coefficients for the 2004–07 period.

remit is to set monetary policy so that inflation can be brought back to the target within a reasonable time period without creating undue instability in the economy, inflation expectations one year ahead might well change in response to economic developments. If individuals believe that these shorter-term developments will also affect longer-term inflation, that would tend to increase the correlation between changes in shorter-term and longer-term expectations. Changes in these correlations could, however, also reflect other factors, including variations in liquidity in the markets for short and long-maturity instruments, for example. Over the past year, they might also have been affected by the consultation about changes to the RPI.

On this measure, there is tentative evidence that longer-term inflation expectations have become more responsive to economic news. Between 2004 and 2007, movements in two year ahead inflation expectations tended to be correlated with those one year ahead, but beyond that horizon, inflation expectations tended to change very little (**Chart 6**). Over the past year, however, inflation expectations at horizons between five and ten years ahead have been more responsive to changes in one year ahead expectations. But again, these movements are quite small.

To conclude this section, developments in households' and professional forecasters' inflation expectations have been mixed, but there is no clear evidence that they have become less well anchored. And while the levels of financial market measures appear broadly consistent with inflation expectations remaining anchored, there are some tentative signs that they have become somewhat more responsive to developments in the economy. That might suggest that

Chart 6 Estimated changes in instantaneous forward inflation rates derived from swaps in response to a 1 percentage point change in the one year ahead inflation rate^(a)



Sources: Bloomberg and Bank calculations.

(a) The average changes are estimated using the slope coefficients from regressions of daily changes in instantaneous inflation forward rates at each horizon on the daily change in the one year ahead instantaneous forward rate. The instantaneous forward rates are derived from inflation swaps. Data start in October 2004. The bars cover two standard errors either side of the estimated slope coefficients for the 2004-07 period.

financial market participants expect deviations of inflation from the target to persist for longer. In order to fully assess the risk posed by these tentative indicators, it is important to consider the extent to which past changes in inflation expectations have fed through into economic activity, as discussed in the next section.

Assessing the ways in which inflation expectations affect economic activity

Inflation expectations play an important role in determining the persistence of inflation. There are various mechanisms

through which this may occur, some of which are outlined in **Figure 1**. These channels always operate to some extent, but are only likely to become a cause for concern if inflation expectations become less well anchored to the target, or if the impact of inflation expectations through these channels becomes larger.

First, higher future prices may indicate lower spending power for households. Consequently, households may demand higher nominal wages in order to compensate for higher inflation expectations, in turn raising companies' input costs (Channel 1). Second, if companies expect prices to rise in the future, they may raise the prices of the goods and services they produce, and may also choose to raise wages (Channel 2). Third, a rise in households' and companies' inflation expectations could lead to a fall in real interest rates, holding monetary policy constant. Provided wage growth was expected to rise by less than the increase in inflation, this might encourage households and companies to bring forward their consumption and investment in order to avoid higher prices in future. In turn, this could result in higher prices in the near term due to increased demand (Channel 3). Finally, a rise in inflation expectations implied by financial markets could cause a depreciation of the nominal exchange rate, and consequently higher import prices (Channel 4).

One way to gain an overview of how inflation expectations have affected inflation over the past is to use a model such as the SVAR highlighted in the first section. A 1 percentage point increase (or shock) to two year ahead household inflation expectations is estimated to have a peak impact on CPI inflation of around 0.6 percentage points after one year. This suggests that, although actual changes in inflation expectations since 1993 have been very small, any future rises in inflation expectations should still be a matter of concern.

Figure 1 Channels through which inflation expectations could affect the persistence of inflation

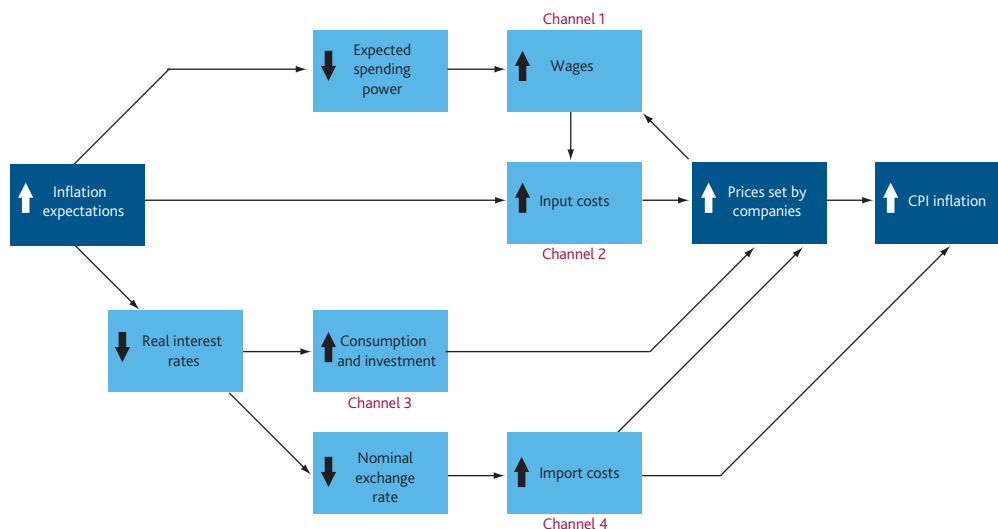
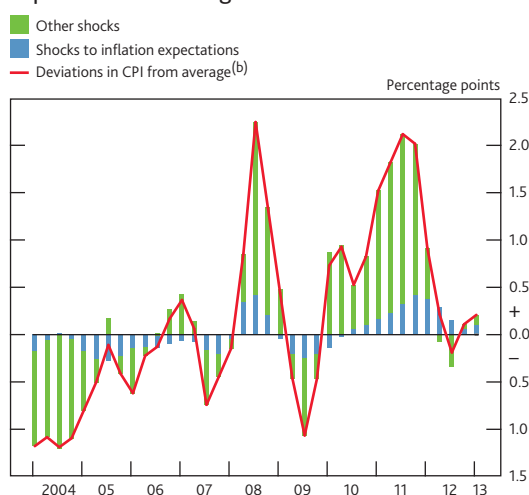


Chart 7 uses the same model to show the extent to which CPI inflation has been affected by the shocks to inflation expectations shown in **Chart 3** over the past decade. The model suggests that shocks to inflation expectations have made a small upward contribution to CPI inflation over the past three years.

Chart 7 Contribution of household inflation expectations to changes in CPI^(a)



Sources: Bank/GfK NOP, Barclays Capital, Bloomberg, ONS and Bank calculations.

(a) See footnotes to **Chart 3**.

(b) The red line represents deviations in CPI from the model-implied average over the period 1993–2013 Q1.

The next two sections use the available indicators to examine the extent to which inflation expectations may have affected CPI inflation through changes in wage and price-setting behaviour since the 1990s and over the crisis period. The third section briefly examines the consumption and investment channel and the nominal exchange rate channel.

Households' wage-seeking behaviour

An increase in households' inflation expectations might cause a change in their wage-seeking behaviour, which could in turn raise the persistence of inflation (Channel 1 in **Figure 1**). And the impact of inflation expectations on wage-seeking might change over time. This section assesses the extent to which changes in households' inflation expectations have fed through into wages.

Wages are determined by a combination of household bargaining and companies' wage-setting decisions. If households expect higher inflation to persist, they might begin to seek higher wages in order to compensate for their increased cost of living. Successful wage bargaining might result in companies being forced to set higher wages. In turn, these firms might charge higher prices to compensate for their higher wage costs, generating more persistent inflation. And higher wages could create further inflationary pressure by raising spending. A rise in companies' own inflation expectations (discussed in the next section) might also encourage them to set higher wages in order to retain staff, for

example if they expect an erosion in real wages to result in a reduced motivation of their workforce.

Quarterly nominal wage growth has been weak since the start of the financial crisis, and has been generally below the rate of inflation. The weakness of nominal wage growth might suggest that households' inflation expectations have not pushed up significantly on wages over the crisis. However, the impact of inflation expectations on wage growth is likely to be obscured by other factors currently pushing down on wages, for example weak productivity and slack in the labour market.

Testing the impact of households' inflation expectations on wage-setting behaviour

One method of determining the historical impact of households' inflation expectations on wage growth is to estimate a simple wage Phillips curve.⁽¹⁾ This approach allows us to isolate the influence of inflation expectations on wage growth, after controlling for other factors which might affect wages. These include changes in employees' productivity, cyclical unemployment and labour's share of income.

Table B shows the relationship between households' inflation expectations and nominal wage growth between 1993 and 2006, a period of relatively stable inflation and economic conditions. Households' two year ahead inflation expectations appear to have had some positive association with wage growth over this period: column 1 suggests that a 1 percentage point rise in two year ahead household inflation expectations was associated with a 0.88 percentage point increase in quarterly nominal wage growth. In contrast, the results for one year ahead expectations — shown in column 2 — are insignificant. The results also suggest that rises in productivity have been positively associated with wage growth, while rises in cyclical unemployment have acted in the opposite direction. However, the fact that the relationship between the labour share and quarterly wage growth becomes less significant when households' two year ahead inflation expectations are used could potentially be evidence of regression misspecification.

These results suggest that households' inflation expectations may have had some impact on wage growth in the pre-crisis period. When the regression sample is extended to cover the crisis period, however, the relationship between inflation expectations and wage growth becomes less significant.

The lack of significance between inflation expectations and wage growth in recent years is consistent with survey evidence from the Bank/GfK NOP inflation attitudes survey. This suggests that households' inflation expectations currently have little impact on their wage-seeking behaviour. The survey asks households whether they are planning to push for higher pay with their current employer in light of their inflation

(1) See Posen (2011) for another recent example.

Table B Relationship between households' inflation expectations and wages^{(a)(b)}

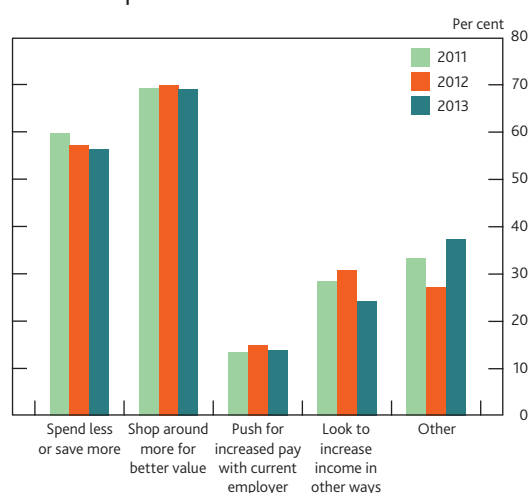
Independent variable	Nominal wage growth	
	(1)	(2)
Nominal wage growth ($t-1$)	-0.38 (0.24)	-0.29 (0.23)
Productivity growth ($t-1$)	0.94** (0.37)	1.13*** (0.37)
Labour share ($t-1$)	-0.30* (0.16)	-0.39** (0.17)
Unemployment gap ($t-1$)	-0.91*** (0.22)	-0.86*** (0.23)
Two year ahead inflation expectations ($t-1$)	0.88*** (0.33)	
One year ahead inflation expectations ($t-1$)		0.53 (0.35)
Observations	56	56
R-squared	0.40	0.35
Robust standard errors in parentheses		
Three stars, two stars and one star denote statistical significance at the 1%, 5% and 10% levels, respectively.		

Sources: Barclays Capital, OECD, ONS and Bank calculations.

(a) Estimated using quarterly data. Sample period is 1993 Q1 to 2006 Q4.

(b) Regressors (all lagged one quarter): nominal wage growth (four-quarter moving average), productivity growth (four-quarter moving average), labour share (real wage/productivity), the unemployment gap, Basix one year ahead expectations, Basix two year ahead expectations.

expectations. In February 2013, only 14% of survey respondents who expected inflation to be more than 1 percentage point above the target over the next twelve months planned to push for higher wages (**Chart 8**), and this proportion had changed very little from the previous two years. When the remaining sample of households was asked why they did not plan to push for higher wages, around half answered that they were unable to influence their pay.

Chart 8 Working households' responses to above-target inflation expectations^{(a)(b)}

Source: Bank/GfK NOP.

(a) Respondents to the Bank/GfK NOP survey were asked which actions they are taking, or planning to take, in light of their expectations of price changes over the next twelve months.

(b) The sample was restricted to working households who expected inflation to be more than 1 percentage point above the target over the next twelve months.

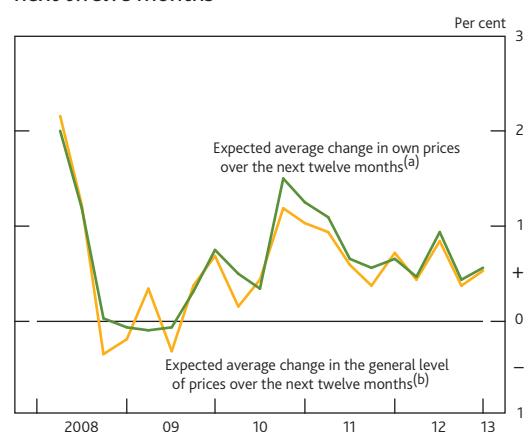
Companies' wage and price-setting decisions

If companies' inflation expectations were to become less well anchored by monetary policy, this might lead to a change in

their wage and price-setting behaviour (Channel 2 in **Figure 1**). There are at least two mechanisms through which a rise in companies' inflation expectations might encourage them to set higher prices. First, if companies and households expect higher inflation in the short term, companies might feel able to charge higher prices without experiencing a drop in demand for the goods and services they produce. Second, if companies perceive that the MPC has become more tolerant of deviations in inflation from the target, they might expect production costs to increase or to persist at a higher level for longer. They may then choose to set higher prices in order to compensate. And as mentioned in the previous section, companies may set higher wages if they expect an erosion in real wages to result in a reduced motivation of their workforce.

Testing the impact of companies' inflation expectations on price-setting behaviour

Indicators of companies' inflation expectations are limited, but the available survey data suggest that these have remained muted over the crisis period. The CBI survey shows that companies' own pricing intentions have broadly tracked their price expectations for the industries in which they compete since 2008 (**Chart 9**). Both indicators have remained fairly stable over the past year. And the net percentage balance of companies in the British Chambers of Commerce (BCC) survey who are expecting to raise their own prices over the next quarter fell in 2013 Q1, to just below its historical average (**Chart 10**).

Chart 9 Companies' expected changes to prices over the next twelve months

Source: CBI.

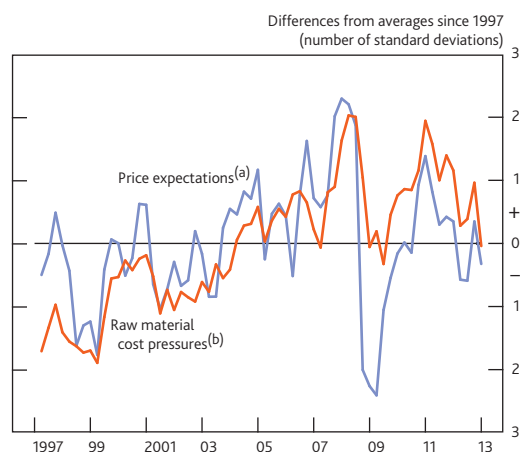
(a) Companies were asked: 'What percentage change is expected to occur over the next twelve months in your own average output price for goods sold into UK markets?'.

(b) Companies were asked: 'What percentage change is expected to occur over the next twelve months in the general level of prices in the markets that you compete in?'.

To assess whether any rise in companies' inflation expectations would pose a risk to inflation, we need to distinguish between changes in price expectations that are a response to changes in observed input prices or levels of competition, and those which are due to higher expectations of future inflation.

The BCC survey provides one way to assess the extent to which firms' price expectations have moved in line with observed input costs. **Chart 10** shows that the net percentage balance of respondents reporting higher price expectations has tended to move in line with the balance reporting that higher raw material prices are putting upwards pressure on prices, suggesting that raw material costs can explain a substantial proportion of the formation of price expectations. However, the balance reporting higher price expectations has been lower than the balance reporting upwards pressure from raw material prices since 2008. This tentatively suggests that rises in input costs have not caused inflation expectations to become de-anchored, although it could be the case that upward pressure from input costs is being offset by continued weakness in demand.

Chart 10 BCC survey measures of companies' price expectations versus cost expectations



Sources: BCC, ONS and Bank calculations.

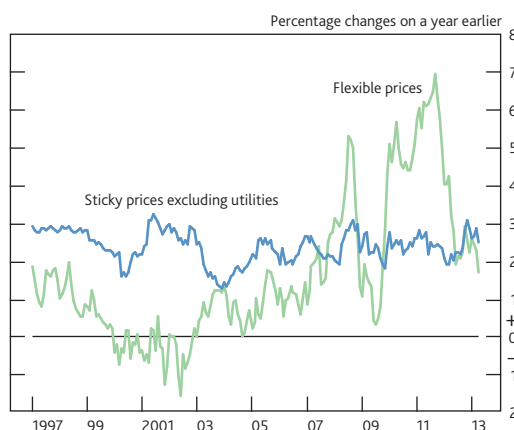
- (a) Net percentage balance. The exact question asked was 'Over the next three months, do you expect the price of your goods/services to: increase/remain the same/decrease?'.
 (b) Net percentage balance. The exact question asked was 'Is your business currently suffering pressures to raise prices from raw material prices?'.

The rate of inflation for goods and services in sectors where prices are changed infrequently provides an alternative way to assess how inflation expectations are affecting price-setting. 'Sticky' prices — those that change less often than average — are more likely to depend on companies' expectations of future inflation, rather than current observed input costs, since sticky prices are likely to incorporate forward-looking information. Sticky price inflation did rise a little in the second half of 2012 (**Chart 11**), but has since fallen back somewhat and is currently only slightly above its average level since 1997.

Testing the impact of companies' inflation expectations on wage-setting behaviour

There is little evidence that companies' inflation expectations have altered their wage-setting expectations over the past year. The CBI survey, which asks companies to state their wage growth expectations for the next twelve months, provides some indication of the relationship between companies' price

Chart 11 Inflation in sticky and flexible price sectors^(a)

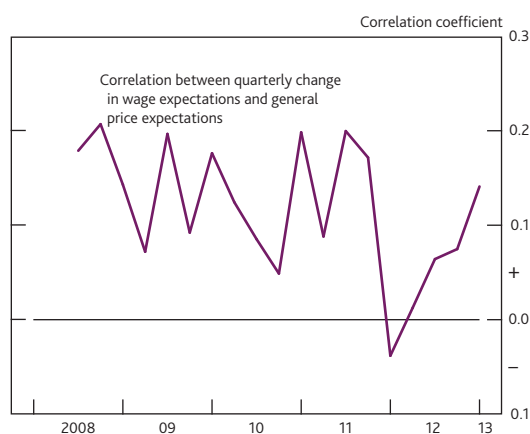


Sources: ONS and Bank calculations.

- (a) The CPI basket is divided into twelve subcomponents, based on the classification of individual consumption according to purpose categories. These twelve subcomponents were divided between flexible and sticky price sectors based on the frequency at which the prices of different types of goods and services change. These frequencies were calculated from the price quotes that underpin the monthly CPI, which the ONS makes available to researchers via its secure Virtual Microdata Laboratory (described in Ritchie (2008)). The flexible price sector comprises those components of the basket in which prices on average change more regularly than the median frequency and the sticky price sector comprises those components of the CPI basket in which prices on average change less often than the median frequency. The sticky price series excludes utility prices, which are more likely to be changed due to changes in gas and other commodity prices rather than developments in the wider economy. Both the flexible and sticky price series include the impact of VAT.

and wage expectations. The correlation between changes in companies' wage growth expectations and their industry-level inflation expectations rose slightly during 2012 (**Chart 12**). But it remains low both relative to the past and in absolute terms. The correlation between changes in companies' wage expectations and expectations for their own prices produces a similar pattern.

Chart 12 Correlation between changes in companies' wage and price expectations^{(a)(b)}



Sources: CBI and Bank calculations.

- (a) Companies were asked: 'What percentage change is expected to occur in your firm's wage/salary cost per person employed (including overtime and bonuses) over the next twelve months?'.
 (b) Companies were asked: 'What percentage change is expected to occur over the next twelve months in the general level of prices in the markets that you compete in?'.

The impact of companies' inflation expectations on wage and price-setting over the crisis

The CBI survey allows us to summarise the average impact of companies' inflation expectations on the survey measures of

their price and wage growth over the crisis period. We run regressions of wage and price growth as reported in the manufacturing survey on companies' inflation expectations, from 2008 Q2 to 2013 Q1.⁽¹⁾ Since these are survey measures of wage and price growth, they may not be completely representative of the UK manufacturing sector. And although the manufacturing sector itself represents a relatively small proportion of UK output, this analysis could nevertheless tell us something about how inflation expectations affect companies' price and wage-setting behaviour.

The regression results in column 1 of **Table C** suggest that companies' inflation expectations (for the industries in which they compete) have a large impact on the prices they set. A 1 percentage point rise in a company's inflation expectations is associated with a 0.81 percentage point rise in the growth in its prices.⁽²⁾

Table C Determinants of price and wage-setting in the manufacturing sector^(a)

Independent variable	Annual reported growth	
	(1) Own prices	(2) Wages
Annual own price growth ($t-4$)	-0.02 (0.04)	
Annual wage growth ($t-4$)		-0.17*** (0.06)
Industry-level price expectations ^(b)	0.81*** (0.15)	0.71 (0.86)
Wage expectations ^{(b)(c)}	-0.57 (1.06)	
Own price expectations ^{(b)(c)}		-0.73 (1.06)
Current rate of operation ^(b)	0.05 (0.04)	
Quarterly change in input costs ^(b)	1.52*** (0.35)	
Annual productivity growth ^(d)		-0.08*** (0.02)
Labour share ^{(b)(d)}		-4.29*** (0.88)
Unemployment gap ^{(b)(d)}		-1.52* (0.81)
Number of observations	1,668	1,607
Number of firms	287	277
Robust	Yes	Yes

Three stars, two stars and one star denote statistical significance at the 1%, 5% and 10% levels, respectively.

Sources: CBI, OECD and ONS.

(a) Estimated using quarterly data over the period 2008 Q2 to 2013 Q1.

(b) Variables are calculated as moving averages over three quarters, under the assumption that conditions in the current quarter and developments over the preceding six months are the main determinants of changes in prices and wages reported in quarter t .

(c) Own price and wage expectations may be determined jointly with actual prices and wages within each firm, and so are endogenous. We therefore instrument own price expectations and wage expectations with their own four-quarter lags.

(d) Variables are formed from aggregate data rather than firm-specific CBI data. Productivity and labour share are based on sectoral data for the manufacturing sector.

In contrast, companies' wage expectations do *not* appear to be directly associated with the prices they set, controlling for the other variables in column 1. And companies' inflation expectations are not significantly associated with wage growth

(column 2) over the sample period. This could suggest that firms in the manufacturing sector have not tended to change wage growth in response to changes in their price expectations. However, given the low labour intensity of the manufacturing sector compared to the service sector, we cannot necessarily extrapolate from these results to the whole economy.

The evidence presented in this section, while limited, suggests that changes in inflation expectations have been associated with movements in price and wage growth in the past. Although recent movements in inflation expectations do not seem to have pushed up on prices and wages, this is likely to be in large part due to the fact that inflation expectations have not increased substantially over the period analysed. If inflation expectations were to rise markedly, it is likely that they would increase the persistence of inflation.

Other channels

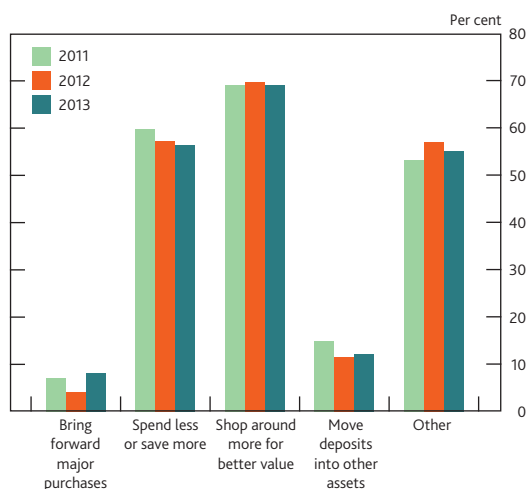
Channel 3 in **Figure 1** outlines the possibility that a rise in inflation expectations encourages households and companies to bring forward consumption and investment, however tentative evidence suggests that other channels might dominate. The Bank/GfK NOP survey reports that only a small proportion of respondents with high inflation expectations expected to bring forward major purchases in response (**Chart 13**). And over 50% of respondents expected to spend less or save more.

Channel 4 in **Figure 1** operates through the exchange rate. If inflation in the United Kingdom is expected to be higher than abroad, one might expect the nominal exchange rate to depreciate in the future in order to maintain a constant real exchange rate — and that could boost import prices and CPI inflation. However, the resultant exchange rate movement will depend on how monetary policy is expected to react. The nominal exchange rate is more likely to fall if policymakers are perceived to be tolerant of higher inflation, resulting in a fall in real interest rates. Simple correlations between inflation expectations implied by financial markets and movements in the nominal exchange rate suggest that inflation expectations are not exerting a significant effect through this channel at present.

(1) The CBI data are in panel form, meaning that the same firms are surveyed each quarter. This means that the regressions can be run using fixed effects, which control for the characteristics of each firm that are constant over time. This allows the impact of the other variables, including price expectations, to be separated from time-invariant factors that are specific to each firm.

(2) This analysis is complicated by the fact that the CBI inflation expectations data refer to expectations for the industry in which the firm competes, rather than expectations for the United Kingdom as a whole. Therefore the coefficient on industry-level price expectations in column 1 might be capturing industry-specific factors such as the level of competition. A preliminary test for this possibility is the significance of industry and industry*time dummies in the regressions: these did not affect the sign or significance of the results in columns 1 and 2.

Chart 13 Working households' spending and saving decisions in response to above-target inflation expectations^{(a)(b)}



Source: Bank/GfK NOP.

- (a) Respondents to the Bank/GfK NOP survey were asked which actions they are taking, or planning to take, in light of their expectations of price changes over the next twelve months.
 (b) The sample was restricted to working households who expected inflation to be more than 1 percentage point above the target over the next twelve months.

Conclusion

CPI inflation has been above the 2% target for a prolonged period and the MPC's latest projection is that it is more likely than not to remain above the target for much of the next two years. In large part, the deviation reflects the impact of energy, other import prices, VAT, and prices that are affected

by government and regulatory decisions. Therefore, the MPC has judged that it has been appropriate to look through the period of above-target inflation, subject to meeting the inflation target in the medium term. In the current economic circumstances, attempting to bring inflation back to the target too quickly would risk derailing the recovery and undershooting the inflation target in future.

There is a risk, however, that the prolonged period of above-target inflation could cause inflation expectations to become less well anchored. That could trigger changes in the nominal exchange rate, and affect consumption and investment decisions, as well as wages and prices, and could cause inflation to persist above the target for longer.

Most of the indicators discussed above are consistent with inflation expectations remaining anchored to the target, although there is tentative evidence that financial market measures of inflation expectations have become a little more responsive to developments in the economy.

Wages and prices would probably be affected if inflation expectations were to increase markedly. But, given the lack of movement in most measures of inflation expectations, there are few signs to suggest that they have affected wage growth and inflation yet. The imperfect nature of the data means, however, that there are large uncertainties around all of these indicators. The MPC will continue to monitor and assess them and they remain an important factor in policy decisions.

Annex

Available indicators of inflation expectations

	Time horizon	Start of data	Survey question/measure of inflation
Surveys of households			
Bank/GfK NOP	1 year 2 and 5 years	Nov. 1999 Feb. 2009	How much would you expect prices in the shops generally to change over the next one, two and five years?
Barclays Basix	1 and 2 years 5 years	Dec. 1986 Aug. 2008	What do you expect the rate of inflation to be over the next twelve months and over the next five years?
YouGov/Citigroup	1 and 5–10 years	Nov. 2005	How do you expect consumer prices of goods and services will develop over the next one and five to ten years respectively?
Surveys of companies			
BCC	3 months	Feb. 1997	Over the next three months, do you expect the price of your goods/services to increase/remain the same/decrease?
CBI	1 year	June 2008	How much would you expect your own prices and prices in the markets you compete in to change over the next year?
Surveys of professional forecasters			
Bank	1, 2 and 3 years	May 2006	Point forecasts for CPI.
HM Treasury	1, 2, 3 and 4 years	Mar. 2006	Point forecasts for CPI.
Consensus	5–10 years	Oct. 2004	Point forecasts for CPI.
Measures derived from financial instruments			
Swaps	1 to 25 years ahead	Oct. 2004	RPI-linked.
Gilts	1 to 25 years ahead	Jan. 1985	RPI-linked.

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Public attitudes to monetary policy

By Michael Goldby of the Bank's Monetary Assessment and Strategy Division.⁽¹⁾

This article examines the latest results from the Bank/GfK NOP survey concerning households' awareness and understanding of monetary policy, and their satisfaction with the way the Bank is conducting monetary policy. Results from the latest surveys indicate that public awareness of the policy framework has remained broadly constant over the past year at a reasonably high level. Satisfaction with the way the Bank sets interest rates in order to control inflation remains much lower than before the financial crisis. While remaining positive over the past year, net satisfaction fell to a series low in 2012 Q3, before recovering a little in subsequent surveys. The extent of satisfaction with the Bank has moved closely with changes in consumer confidence, which in turn is linked to a range of macroeconomic variables including GDP growth, inflation and unemployment.

The Bank of England's monetary policy objective is to maintain price stability. Stable prices are defined by the Government's inflation target, which is currently 2% as measured by the annual change in the consumer prices index (CPI). Subject to that, the Bank is also tasked with supporting the Government's economic objectives, including those for growth and employment.⁽²⁾

The Bank's success in meeting its objective of price stability will depend, in part, on the public's understanding of, and support for, the monetary policy framework. If people understand the Monetary Policy Committee's (MPC's) objective, then they may behave in such a way that deviations of inflation from target are more short-lived: households, for example, may moderate their wage demands and companies may be less likely to raise prices in response to higher costs.⁽³⁾

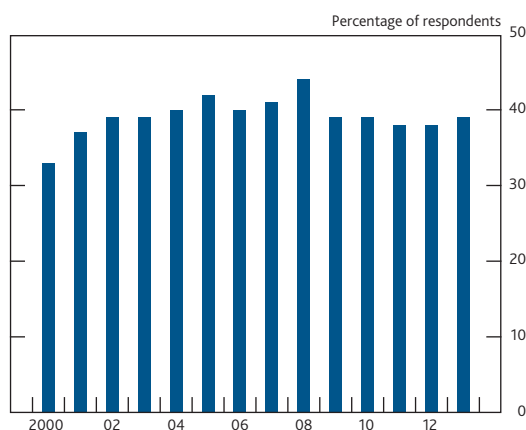
In recognition of the importance of public understanding in determining the effectiveness of monetary policy, the Bank uses a variety of methods to explain to the public the MPC's role of setting monetary policy to meet the inflation target. These methods include the publication of the minutes of their monthly meetings; the quarterly *Inflation Report*; speeches and lectures; research papers; appearances before parliamentary committees; interviews with the media; visits throughout the United Kingdom; and an education programme that includes the 'Target Two Point Zero' competition for schools and colleges. The Bank's twelve regional agencies also hold regular meetings with businesses throughout the United Kingdom, helping to build understanding of the monetary policy framework and the case for low and stable inflation.

The Bank has sought to quantify the impact of its efforts to increase the public's understanding of, and support for, the monetary policy framework. Since 1999, the Bank has commissioned GfK NOP to conduct a quarterly survey of households' attitudes to inflation and monetary policy on its behalf.⁽⁴⁾ This article, the latest in a series published in Q2 of each year, draws on the results from the latest surveys to assess the public's awareness of monetary policy and their satisfaction with the way in which the Bank has set monetary policy to control inflation.

Public awareness of monetary policy

In the February 2013 survey, 39% of survey respondents were able to name, unprompted, the MPC or the Bank of England as the group that sets the United Kingdom's basic interest rate level. That is a similar result to previous surveys (**Chart 1**). Also similar to previous surveys was the finding that 65% of respondents could identify the Bank of England as the group that sets interest rates, when asked to choose from a list which included, among others, government ministers and high street banks.⁽⁵⁾ So public awareness of the institutional arrangements of the monetary policy framework appears to have remained broadly constant over time, at a reasonably high level.

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- (1) The author would like to thank Lewis Kirkham for his help in producing this article.
 - (2) The latest remit for the Monetary Policy Committee reaffirms that monetary policy should be set to meet the 2% inflation target but in a way that avoids undesirable volatility in output. See www.gov.uk/government/publications/monetary-policy-remit-2013.
 - (3) For more information on inflation expectations, see 'Do inflation expectations currently pose a risk to the economy?' on pages 110–21 in this edition of the *Bulletin*.
 - (4) Data from the survey are available on the Bank's website at www.bankofengland.co.uk/publications/Pages/other/nop.aspx. The spreadsheets show the precise wording of the questions.
 - (5) These questions are asked only once a year, in February.

Chart 1 Indicator of public awareness of the monetary policy framework^(a)

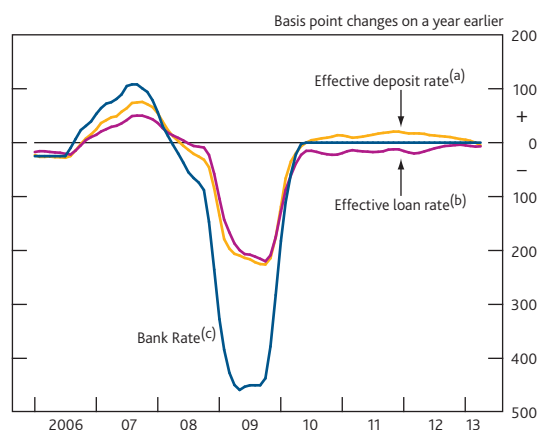
Source: Bank/GfK NOP survey.

(a) Percentage of respondents answering that either the Bank or the MPC set Britain's basic interest rate level. From 2001, this question was only asked in the Q1 survey.

The level of understanding among households of the way in which monetary policy affects inflation — the transmission mechanism of monetary policy — also appears to have been broadly constant over time. According to the standard view in economics, a rise in Bank Rate would be unlikely to affect inflation immediately because many wage and price decisions would already have been made. But a higher level of Bank Rate would tend to push down inflation one or two years ahead, for example by reducing demand and weakening companies' ability to charge higher prices. That view was shared by 35% of respondents to the February 2013 survey, who either agreed or strongly agreed with the statement that 'a rise in interest rates would make prices in the high street rise more slowly in the medium term — say a year or two'. That was a similar result to the February 2012 survey, although slightly below the series average of 39%.

The Bank/GfK NOP survey monitors public awareness of interest rate changes. Households are asked how they think interest rates on things like mortgages, bank loans and savings have changed over the preceding twelve months.⁽¹⁾ During the period from 2010 to 2012, the biggest group of respondents (around one third in each survey, on average) said that interest rates had remained about the same. In February 2013, the proportion of respondents reporting unchanged interest rates rose to a series high of 39%, before falling back slightly to 36% in the May survey. These results may reflect the fact that Bank Rate has remained unchanged since March 2009, and that there has been little change over the past year either in the average interest rate paid on the stock of outstanding household deposits (that is, effective deposit rates), or in the average rate paid on the stock of outstanding household borrowing (that is, effective loan rates) (Chart 2).

Quoted interest rates on *new* borrowing and deposits have fallen markedly over the past year. For example, the average

Chart 2 Bank Rate and effective household interest rates

- (a) Effective deposit rate refers to the average interest rates paid on the outstanding stock of time and sight deposits with banks and building societies, weighted by their share in total outstanding deposits. The measure shown is a three-month moving average.
 (b) Effective loan rate refers to the average interest rates paid on household secured and unsecured borrowing from banks and building societies, weighted by their share in the total loan stock. The measure shown is a three-month moving average.
 (c) Three-month moving average.

quoted rate on a two-year fixed-rate 75% loan to value mortgage has declined by around 100 basis points. But only 20% of respondents to the May 2013 survey reported that interest rates had decreased. As households take new borrowing and savings decisions relatively infrequently, it may take time for the falls in quoted interest rates to be reflected in public perceptions. In the 2012 NMG Consulting survey, for example, only 12% of households in the survey had applied for a loan over the past year.⁽²⁾

The survey also asks households about their expectations for interest rates over the next twelve months. In May 2013, 41% of respondents — close to a series high — reported that they expected rates to stay about the same (Chart 3). Around one third of respondents expected interest rates to rise, with the vast majority of those respondents reporting that interest rates would rise 'a little'.

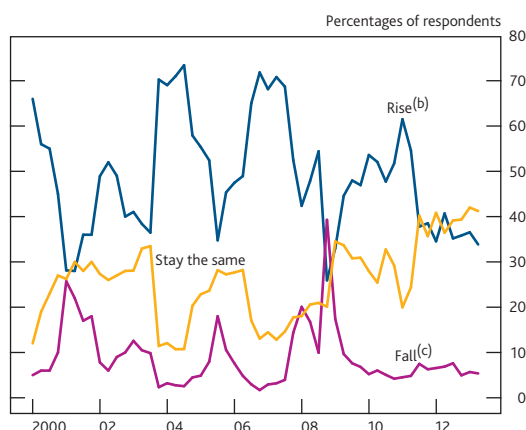
The MPC has historically sought to achieve its objectives by setting the level of Bank Rate. In March 2009, the MPC voted to cut Bank Rate to 0.5%, and, in addition, began a programme of asset purchases, financed through the issuance of central bank reserves, commonly referred to as quantitative easing (QE). QE aims to inject money directly into the economy, boost nominal demand, and prevent inflation from falling below the target in the medium term.⁽³⁾ In July 2012, the Bank and the Government launched the Funding for Lending Scheme (FLS), in order to boost the incentives for banks and building societies to lend to UK households and

(1) These questions are asked in each quarterly survey.

(2) See 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.

(3) For further discussion of QE, see 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. Public awareness of quantitative easing was discussed in last year's *Quarterly Bulletin* article on public attitudes to inflation and monetary policy.

Chart 3 Interest rate expectations over the next twelve months^(a)



Source: Bank/GfK NOP survey.

- (a) Respondents who answered 'no idea' are not shown on the chart. On average, around 15% of respondents answer in this way.
 (b) Percentage of respondents who thought that interest rates would rise 'a lot' or 'a little'.
 (c) Percentage of respondents who thought that interest rates would fall 'a lot' or 'a little'.

non-financial companies. That Scheme has recently been extended. More information on the FLS is available on the Bank's website.⁽¹⁾

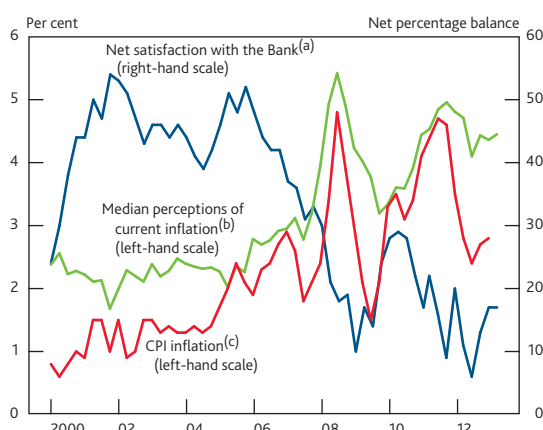
The Bank/GfK NOP survey asks some questions to gauge public support for the Bank's objective of maintaining low and stable inflation. Respondents are asked whether the inflation target of 2.0% is too low, too high or about right. In May 2013, 48% of respondents thought that the target was about right. That is slightly lower than the series average of 53%. But it is much higher than the proportion of respondents who thought the target was too high, which was 22% in May 2013, and the 15% of respondents who thought it was too low.

Satisfaction with monetary policy at the Bank of England

The survey asks respondents how satisfied or dissatisfied they are with the way the Bank is doing its job to set interest rates in order to control inflation. Over the past year, net satisfaction has remained positive, with around 35%–40% fairly or very satisfied, and around 20%–30% fairly or very dissatisfied. Net satisfaction dipped to a series low of +6 in August 2012 before recovering in subsequent surveys to +17 in May 2013 (shown by the blue line in **Chart 4**).

Households' satisfaction with the Bank has tended to be lower when their perceptions of the current rate of inflation, and measured CPI inflation, have been higher (**Chart 4**). Higher rates of both perceived and measured inflation since 2008 are likely to be part of the explanation for why satisfaction with the Bank has fallen. Households' perceptions of inflation have fallen back since 2011, though by less than the decline in measured CPI inflation. The MPC's latest forecast for inflation is set out in the May 2013 *Inflation Report*.

Chart 4 Satisfaction with the Bank, CPI inflation and inflation perceptions



Sources: Bank/GfK NOP survey and ONS.

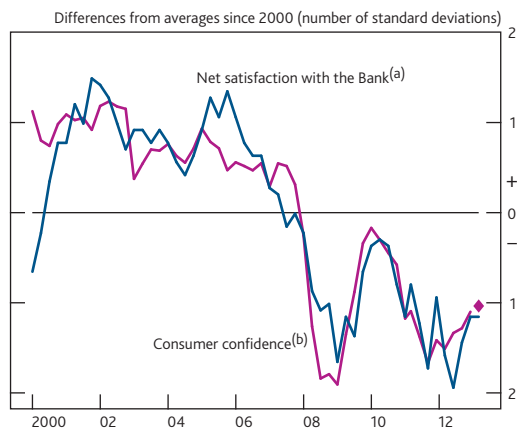
- (a) The percentage of respondents who were fairly or very satisfied with the way in which the Bank of England is doing its job to set interest rates in order to control inflation, less the percentage who were fairly or very dissatisfied. Data are to 2013 Q2.
 (b) Respondents were asked how they thought prices had changed over the past twelve months. Data are to 2013 Q2.
 (c) Quarterly data. Data are to 2013 Q1.

Households' satisfaction with the Bank is also likely to be affected by wider economic conditions, including the prevailing rate of economic growth and the level of unemployment. Surveys of consumer confidence appear to be a fairly good summary of the information in a range of macroeconomic variables.⁽²⁾ And measures of consumer confidence are very closely correlated with satisfaction with the Bank (**Chart 5**). In the recent past, satisfaction with the Bank has been a little more volatile than consumer confidence, but the recent modest improvement in satisfaction has coincided with an increase in the confidence indicator.

Satisfaction with the Bank is likely to vary across groups of respondents. **Chart 6** shows the distribution of responses to this question by age in May 2013. The results show that it is the youngest and, in particular, the oldest age groups who are currently least satisfied with the Bank. For the youngest groups, the lower levels of satisfaction may in part reflect greater uncertainty about employment and income prospects. Alternatively, it could reflect tight credit conditions; the 2012 NMG Consulting survey indicated that these appear to have particularly affected the younger age groups. Lower levels of satisfaction among the oldest age group are likely to reflect, in part, the impact of low interest rates on savers, since this age group tends to have more savings and less debt than their younger counterparts. In May 2013, 45% of people in the oldest age group said it would be best for them personally if interest rates rose over the next few months, but only 21% of that age group thought it would be best for the UK economy if interest rates increased.

(1) See also 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.
 (2) See Berry, S and Davey, M (2004), 'How should we think about consumer confidence?', *Bank of England Quarterly Bulletin*, Autumn, pages 282–90.

Chart 5 Satisfaction with the Bank and consumer confidence

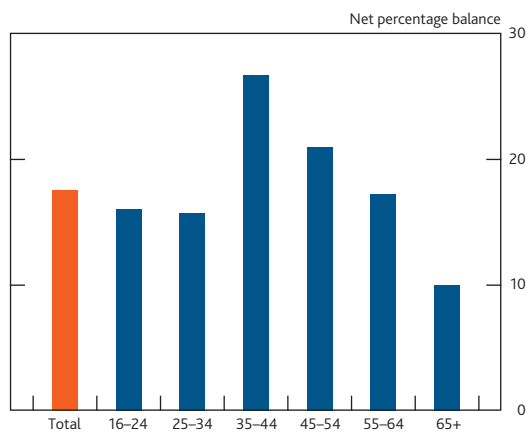


Sources: Bank/GfK NOP survey, research carried out by GfK NOP on behalf of the European Commission and Bank calculations.

(a) See footnote (a) to **Chart 4**.

(b) The aggregate consumer confidence index is derived by averaging the answers to questions 1, 2, 3, 4 and 8 in the GfK NOP survey carried out on behalf of the European Commission. Quarterly averages of monthly data. The diamond is an average of the April and May observations.

Chart 6 Satisfaction with the Bank by age group in May 2013^(a)



Source: Bank/GfK NOP survey.

(a) See footnote (a) to **Chart 4**.

Conclusion

The level of public awareness of the monetary policy framework, and households' understanding of the way in which monetary policy affects inflation, remains at similar levels to those that have prevailed since the survey was introduced in 1999. In the May 2013 survey, more respondents thought that the Bank's inflation target was about right than those who thought it was too high or too low. A relatively high number of respondents reported that interest rates had been unchanged over the past year, and that they expected them to remain so over the next twelve months.

Satisfaction with the way in which the Bank has set interest rates to control inflation remains much lower than before the financial crisis. Net satisfaction, while remaining positive over the past year, fell to a series low in 2012 Q3, before recovering a little in subsequent surveys. Movements in net satisfaction are closely correlated with measures of consumer confidence, which themselves reflect developments in a range of macroeconomic variables.

Cross-border bank credit and global financial stability

By Bob Hills and Glenn Hoggarth of the Bank's International Finance Division.⁽¹⁾

This article looks in detail at one aspect of global liquidity: cross-border credit provided by banks. Cross-border banking can potentially have considerable benefits, especially by diversifying the available sources of lending and borrowing, and by increasing banking competition. But such flows can also amplify risks in times of stress. As this article sets out, cross-border bank lending contributed to the build-up in vulnerabilities before the recent crisis, and exacerbated the bust once the crisis hit. The article then considers possible policy responses, arguing in particular that policymakers need to ensure that they can properly monitor these flows, from the point of view of recipient countries and the global system as a whole.

The concept of 'global liquidity' has played a part in some of the more contentious international policy debates in recent years. Nevertheless, the G20 has made the analysis of global liquidity a key policy priority. Similarly, the Committee on the Global Financial System (CGFS) (a central bank forum for the monitoring and examination of financial markets and systems) has also considered global liquidity in its work. It has distinguished between two types of global liquidity: (i) *official* liquidity, which is created by central banks, and can be accessed cross-border via instruments such as foreign exchange reserves and swap lines between central banks; and (ii) *private sector* liquidity, which is typically created by the cross-border operations of commercial banks and other financial institutions.⁽²⁾ This article looks in more detail at one aspect of private liquidity: cross-border credit provided by banks.

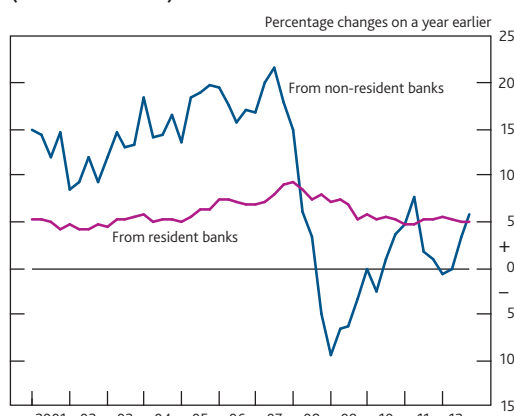
The prudent expansion of cross-border credit can have considerable long-run benefits. It can help to diversify the available sources of borrowing and lending in an economy. To the extent that this reduces the concentration of banks' and non-banks' exposures to domestic shocks, it might reduce the volatility of domestic lending and the vulnerability of domestic banks.⁽³⁾ And cross-border banking tends to increase competition in the domestic banking market, which may also be beneficial for financial stability.⁽⁴⁾ These advantages help explain the structural trend towards greater global banking integration seen in recent decades.

Nevertheless, cross-border bank flows can also give rise to financial stability risks through increasing the vulnerabilities of domestic banks and non-banks to external shocks. Rather than attempting to assess the overall costs and benefits of cross-border banking, this article focuses on the role that it can play in the build-up of risks that come to fruition in times of

stress, and the policy responses to prevent or mitigate such a scenario. This article focuses on the most recent crisis period. It is worth noting, however, that booms and busts in international bank lending have been a feature of many previous crises, for example, the Latin American debt crisis of the early 1980s and the East Asian crisis in 1997–98.⁽⁵⁾

In 2007–09, cross-border lending was a much more volatile form of borrowing for non-banks than credit from domestic banks (**Chart 1**). As such, cross-border bank credit appears to

Chart 1 Annual growth in bank borrowing by non-banks (in 56 countries)^{(a)(b)}



Source: Bank for International Settlements (BIS) international banking statistics.

(a) Exchange rates are fixed at end-2012 Q4 levels.

(b) Sample of 56 BIS-reporting countries. Credit in all currencies. Non-banks include other financial companies, government and the non-financial private sector. 'Non-resident' includes lending by all BIS-reporting banks, except domestic banks for each country.

(1) The authors would like to thank Shaheen Bhikhu and Jack Grigg for their help in producing this article.

(2) See CGFS (2011) for a more detailed discussion of the different types of global liquidity.

(3) The term 'non-banks' is used here to cover the household, government and financial and non-financial corporate sectors.

(4) See, for instance, the discussion in Chapter 2 of Allen *et al.* (2011).

(5) See, for example, Sachs and Huizinga (1987) and IMF (2009), respectively.

have played an important role in contributing to vulnerabilities prior to the recent crisis, and exacerbating the bust once the crisis hit (despite the fact that it accounts for a small part of the stock of lending in most countries). This makes cross-border credit flows particularly important for domestic policymakers to monitor. Yet national authorities find it more difficult to track cross-border bank flows than domestic ones. And, in any case, their policy tools tend not to apply directly to lenders resident abroad.

The effects of cross-border bank flows, in tranquil periods as well as in booms and busts, are international by nature. The United Kingdom nevertheless plays a particularly important role, both as the recipient of cross-border banking flows and as an originator: the UK private sector raises a material share of its bank financing, either directly or indirectly via domestic banks, from abroad. Moreover, internationally focused banks based in the United Kingdom — both UK and foreign-owned — are large gross providers of credit to the global economy.

This article is structured as follows. The first section defines cross-border bank credit and identifies some key stylised features of its cyclicity at the global level. The second section looks in more depth at the ways in which cross-border bank credit can impact on financial stability. It makes specific reference to the role these flows played in the recent pre-crisis and crisis periods, focusing in particular on the activities of European banks. The third section examines the implications for policy: improving surveillance of these flows, drawing lessons for the use of national policy tools, and considering a possible role for global tools and policy co-ordination. A box sets out the data currently available and some planned improvements.

What is cross-border bank credit?

Domestic and cross-border credit supply

A broad definition of bank credit is the stock of credit available to finance spending.⁽¹⁾ The supply of bank credit depends on a number of factors, principally:

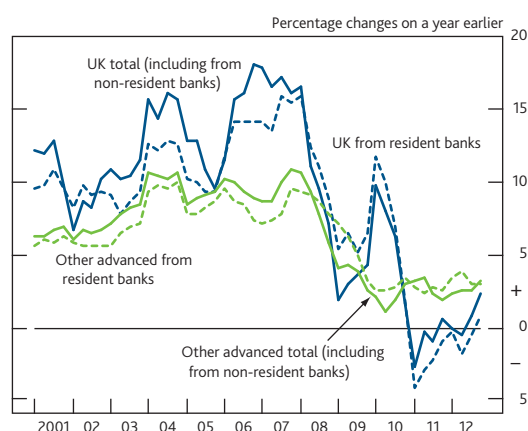
- (i) lenders' decisions about credit supply, which are typically based on a range of underlying factors, including: the perceived likelihood that the borrower will repay, linked to the quality of the borrower and expectations about macroeconomic conditions; microprudential and macroprudential policies and regulations; and the lender's 'risk appetite', for a given borrower quality;
- (ii) the lender's ability to fund those decisions; and
- (iii) conventional or unconventional monetary policy, which also affects banks' funding costs.⁽²⁾

What is the distinctly cross-border element of this? Many banks operate internationally, and make decisions on credit provision on a global basis. So conditions in one country (for instance, easier access to wholesale funding) can affect the bank's lending decisions in another country. And since regulatory and monetary policies are typically set to meet domestic objectives, they may have unintended spillovers, through banks' behaviour, onto other countries.

The cyclicity of cross-border borrowing

Globally, the growth in borrowing by non-banks directly from abroad has, over the past decade, been a lot more cyclical than their borrowing from domestic banks (**Chart 1**). Focusing in particular on the United Kingdom, United States and the euro area, **Chart 2** shows that the strong pre-crisis bank borrowing by non-banks, and the weakness during the crisis, were both more pronounced when cross-border lending is included — as shown by the solid lines generally being more volatile than the dashed lines. This is despite the fact that resident banks account for a considerably larger share of the stock of bank borrowing by domestic non-banks (for the United Kingdom, about 80%).

Chart 2 Annual growth in bank borrowing by non-banks in advanced economies^(a)



Sources: BIS international banking statistics, European Central Bank, Federal Reserve and Bank calculations.

(a) Other advanced economies: euro area and the United States. Credit in all currencies. Non-banks include other financial companies, government and the non-financial private sector.

Like non-banks, domestic banks also borrow from banks abroad. This includes borrowing from within their own banking groups, which they often lend on to domestic non-banks. This interbank component has been even more volatile than cross-border lending directly to non-banks.

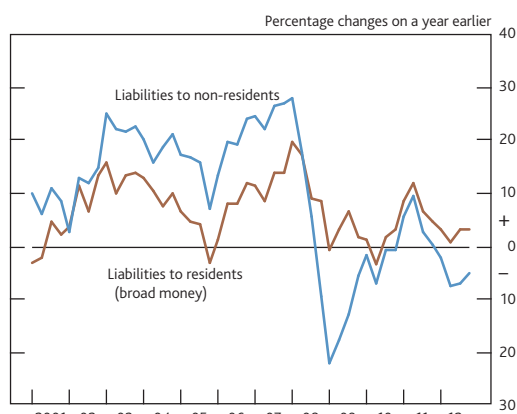
To fuel their lending activities in the run-up to the recent crisis, banks, in aggregate, in advanced economies relied heavily on wholesale funding — much of which may have come from

(1) For more detail on the drivers of credit supply, see for instance Bell and Young (2010).

(2) For more detail on the United Kingdom's quantitative easing policy and Funding for Lending Scheme, see Joyce, Tong and Woods (2011) and Churm *et al* (2012), respectively.

abroad. The evidence for this is suggestive: there are no cross-country data that split banking system wholesale liabilities into those funded from abroad rather than domestically. But separate data show that the share of advanced-economy banks' total liabilities that are external and wholesale both rose sharply in the run-up to the crisis and fell sharply subsequently.⁽¹⁾ To be more specific, advanced-economy banking systems' liabilities to non-residents grew more rapidly than their domestic liabilities in the pre-crisis period (**Chart 3**). And two commonly used measures of the importance of wholesale funding — the ratio of banks' domestic loans to deposits, and the ratio of wholesale funding to total liabilities, both rose sharply (**Chart 4**).⁽²⁾

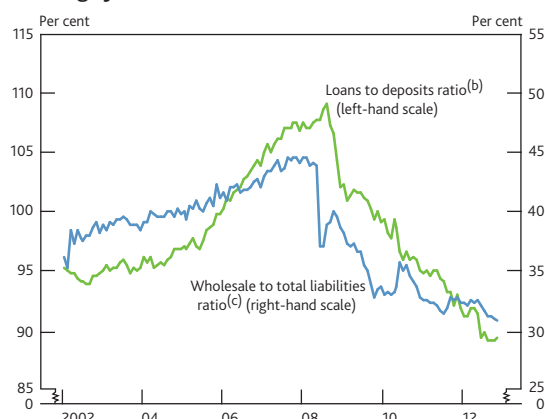
Chart 3 Growth in advanced-economy banking systems' liabilities to residents and non-residents^{(a)(b)(c)}



Sources: BIS international banking statistics, IMF *International Financial Statistics* and Bank calculations.

- (a) Advanced economies included are: Australia, Canada, Denmark, euro area, Japan, Sweden, United Kingdom and the United States.
 (b) Broad money: domestic M2 (M3 for Australia and M4 for the United Kingdom) converted to US dollars. Broad money is in local currency only, so excludes banks' holdings of foreign currency denominated deposits (and domestic wholesale liabilities).
 (c) Liabilities to non-residents: includes retail and wholesale deposits and securities issued.

Chart 4 Key funding ratios for advanced-economy banking systems^(a)



Sources: BIS international banking statistics, IMF *International Financial Statistics* and Bank calculations.

- (a) Countries include: Australia, euro area, Japan, Switzerland, United Kingdom and the United States.
 (b) Loans to deposits ratio: loans made by the banking sector to the private sector divided by customer deposits at banks; weighted average by the size of each country's total deposits. A higher loan to deposit ratio shows that more liquidity is provided by the banking sector to the private sector.
 (c) Wholesale to total liabilities ratio: bank liabilities (excluding equity) minus customer deposits divided by total liabilities; weighted average by the size of each country's total liabilities. The ratio measures the degree to which banks finance their assets using non-deposit funding: a higher ratio indicates that a higher portion of banks' assets is funded by non-core liabilities.

This cyclical nature of the growth in borrowing by domestic banks and non-banks from banks abroad has a number of implications. It emphasises that, in the pre-crisis period, the growth in domestic banks' deposits from and credit to residents diverged significantly, since the latter was increasingly financed from wholesale markets. So, in many countries, the growth in domestic credit and monetary aggregates were giving different signals of monetary conditions. In turn, the growth in non-banks' borrowing from domestic banks was slower than the growth in their total bank borrowing, given the increasing share of cross-border borrowing.

The importance of cross-border bank credit for financial stability

Cross-border banking flows in the run-up to the crisis also had important implications for the risks faced by international banks. This section focuses on three aspects. First, on the asset side, large banks markedly increased their foreign exposures, which increased their vulnerability to credit risk — all the more so, to the extent that this reflected higher leverage. Second, on the liability side, banks' increasing reliance on borrowing from abroad, especially from other banks, made them more vulnerable to funding risk. And third, the normal maturity risk that banks face — by borrowing 'short' and lending 'long' — was exacerbated by the fact that much of the expansion of banks' balance sheets abroad was in foreign currency. So banks, and in some cases economies more broadly, were vulnerable to shortages in foreign currency. To illustrate this, we focus on the role of European banks, since the expansion of their cross-border activity prior to the crisis was particularly notable.⁽³⁾

Vulnerabilities in the recent crisis

Growth of cross-border exposures

In the run-up to the crisis, major European banks, in aggregate, increased their cross-border assets sharply. Although banks from other countries also increased their cross-border lending, as shown in **Chart 5**, this trend was particularly pronounced for banks resident in Europe. A similar picture emerges when measured instead on a consolidated banking group basis.⁽⁴⁾

There are a number of potential explanations for the expansion of banks' cross-border assets during the pre-crisis period. One possibility is that it reflected banks' perception that the global macroeconomic environment had improved. Another possibility is that as the environment became more stable and uncertainty fell, banks' appetite for risk-taking increased.

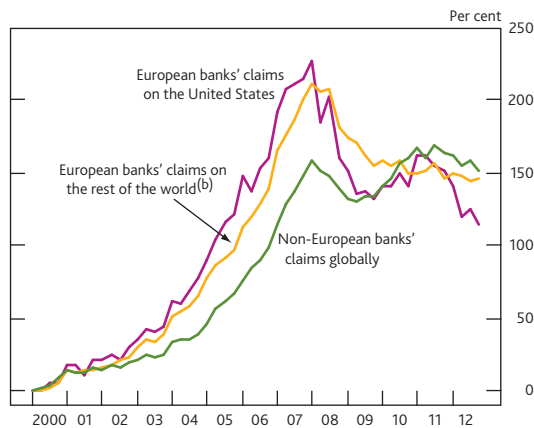
(1) On the cross-border dimension, see Hoggarth, Mahadeva and Martin (2010).

(2) For definitions used here, see the footnotes to **Chart 4**.

(3) Unless otherwise stated, 'European' refers to banks from Denmark, euro area, Sweden, Switzerland and the United Kingdom.

(4) See the box on pages 134–35 for the distinction between measuring banking system external claims on a resident versus a consolidated basis.

Chart 5 Cumulative growth in BIS-reporting resident banks' gross cross-border claims^(a)

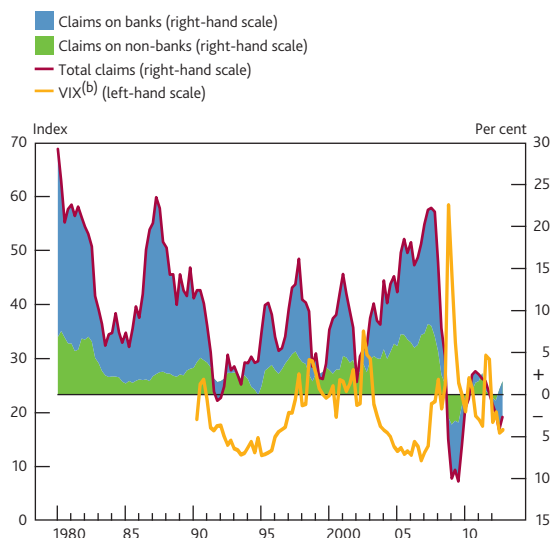


Sources: BIS international banking statistics and Bank calculations.

(a) Exchange rates are fixed at end-2012 Q4 levels.
(b) Includes intra-European cross-border claims.

Lower volatility in financial asset prices also reduced banks' measured market risk and, therefore, the amount of capital they needed to hold to meet regulatory requirements. This would imply, among other things, a greater appetite for cross-border assets. As shown in **Chart 6**, there was a strong, negative relationship between the growth in global banks' cross-border lending and the VIX index — a frequently used proxy for creditor aversion to risk.⁽¹⁾ Bruno and Shin (2012) find empirically that a decline in the VIX was a key explanatory factor in determining global banks' large increase in cross-border borrowing.

Chart 6 Contribution to the annual growth in aggregate cross-border claims of all BIS-reporting banking systems^(a)



Source: CGFS (2011).

(a) Claims: financial assets (on balance sheet items only) including, as a minimum, deposits and balances with other banks, loans and advances to non-banks as well as banks, and holdings of debt securities.
(b) Quarterly average.

Many banks also increased their leverage — their assets relative to equity. This enabled them to achieve a higher return on equity, for a given operating performance, but it intensified losses in the downturn. Some banks had to rely, in particular, on cross-border lending and wholesale funding to achieve this increased leverage, especially banks from countries with a limited local lending and depositor base. Rapid balance sheet growth also seems partly attributable to the perception that financial innovation had reduced the risks on certain assets, but not the return. The strong credit ratings of major banks also meant they had access to cheap funding on international markets. Greater leverage, therefore, implied larger cross-border exposures.

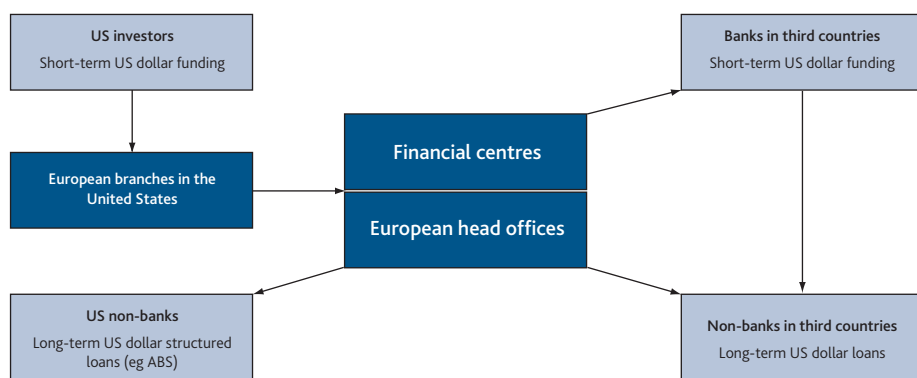
But why was the pre-crisis growth in cross-border lending particularly high, in aggregate, for European banks? One possibility is that, in the early 2000s, European creditors started off with a low share of foreign exposures, and so may have wanted to diversify their portfolios geographically.⁽²⁾ In addition, the depreciation in the dollar against the euro and other European currencies from mid-2001 onwards meant that European creditors needed to increase their lending to the United States if they wanted to maintain the relative share of US exposures unchanged in their portfolios. Also, given the generalised search for returns, it was in the United States that the vast majority of new financial assets, such as asset-backed securities (ABS), were being produced. These assets were offering higher returns, while apparently being as safe as Treasury bonds. They were usually AAA-rated.

So-called 'regulatory arbitrage' is also likely to have played a role. Banks were holding these assets off balance sheet via special purpose vehicles. The regulatory capital requirements were lower than if they had been held on balance sheet, which is likely to have encouraged the demand for these products.⁽³⁾ It is also possible that, pre-crisis, European commercial banks faced weaker restrictions on leverage than US ones. European banks may thus have had both the ability and the desire to expand their balance sheets in the United States and elsewhere.

Financing the balance sheet expansion

This balance sheet expansion was partly financed via the branches of European banks located in the United States. These, in turn, increased their short-term dollar liabilities. Moreover, most foreign branches in the United States are legally prevented from raising insured deposits. Instead, they relied on short-term wholesale funding — especially from money market funds. This meant that in the pre-crisis period, European banking groups increased both their borrowing from,

(1) The VIX is the Chicago Board Options Exchange Market Volatility Index. This measures the implied volatility of S&P 500 index options and is a commonly used indicator of the market's expectation of equity market volatility over the next month.
(2) See Bertaut *et al.* (2011) for estimates of the degree of European creditors' 'home bias'.
(3) See Acharya and Schnabl (2010).

Figure 1 The global transmission mechanism of liquidity during the pre-crisis boom via European banks^(a)

(a) Arrows denote lending flows.

and lending to, the US non-bank private sector, via the shadow banking system.⁽¹⁾

Figure 1 shows a stylised representation of these flows. European banks raised wholesale funds from their affiliates in the United States. Via their head offices and/or financial centres, they lent those funds back to non-banks in the United States or in third countries, either directly or by funding local banks.

Importantly, increases in European banks' assets and liabilities in the United States largely netted out. So the marked increase in their gross lending to (and borrowing from) the United States in the pre-crisis period was not readily apparent from the net bilateral external balance sheet and current account positions.⁽²⁾ Europe had an almost balanced current account position bilaterally with the United States prior to the crisis. Using the language of Shin (2012), there was — between major western advanced economies, at least — a (gross) bank 'credit glut' rather than a (net) 'savings glut'.⁽³⁾

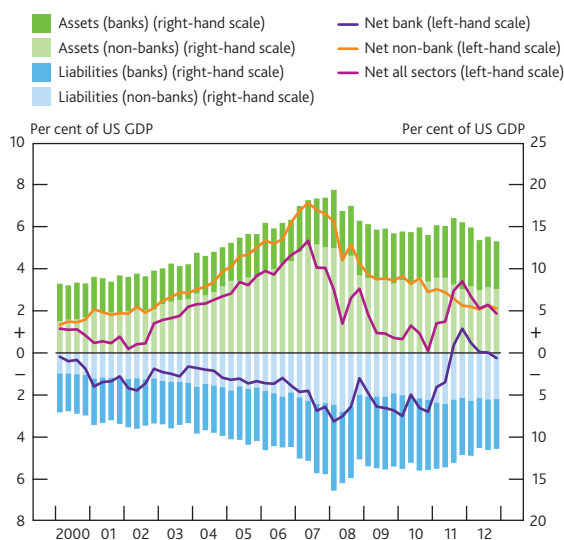
Maturity and currency mismatches

These developments generated mismatches on banks' balance sheets of both currency and maturity — vulnerabilities that often materialise during times of stress. European banks had expanded their balance sheets, in foreign currency substantially, in the United States. But their borrowing was mainly at a short-term maturity and their lending was long term. This made them vulnerable to a dollar liquidity shortage.

At the time, data limitations made it difficult to assess the precise scale of these foreign currency maturity mismatches. Still, with the benefit of hindsight, there were some signs from the limited available data of emerging risks during the boom period. And there were clear parallels to episodes of banking crises in emerging market economies (EMEs) that involved the realisation of liquidity and currency mismatches.⁽⁴⁾

What data were available? There was a sharp increase in the net cross-border assets of foreign affiliates in the United States

held with the rest of their banking groups outside the United States over the 2005–08 period. These assets were most likely held mainly by European-owned banks.⁽⁵⁾ It is also clear that, during the pre-crisis period, European banks increased sharply both sides of their external balance sheets with counterparties in the United States — by around 10% of annual US GDP. This is shown by the stacked bars in **Chart 7**.

Chart 7 European-resident banks' gross and net cross-border claims on the United States^{(a)(b)}

Sources: BIS international banking statistics, US Bureau of Economic Analysis and Bank calculations.

(a) Annualised quarterly values.

(b) Assets and liabilities to banks abroad include foreign central banks.

(1) See Bertaut *et al.* (2011) for a more detailed description.

(2) See Borio and Disyatat (2011).

(3) This is not to deny that, in a number of other countries at this time, there was also a build-up of large current account imbalances that contributed to the vulnerability of the global financial system (see, for example, Astley *et al.* (2009)).

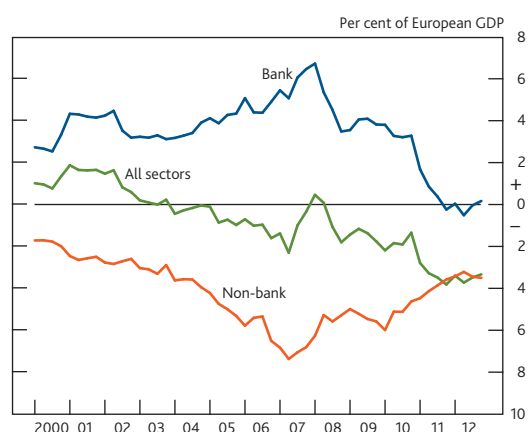
(4) Many of the policy recommendations in Financial Stability Forum (2000), written in the wake of the East Asian crisis, could have been written today after the recent global crisis, for example 'one of the central lessons of crises in EMEs over the past few years is the importance of prudent management of liquidity', page 1.

(5) Time-series data on exposures to a country split by nationality of individual foreign banking system are not available.

In addition, **Chart 7** shows a growing divergence during the pre-crisis period between European banks' *net lending to non-banks*, on the one hand, and their *net borrowing from banks* in the United States, including from their own affiliates, on the other. This sectoral mismatch was indicative of a maturity mismatch, because lending between banks is usually at shorter-term maturities than lending to non-banks. In other words, this suggests that European banks were acquiring longer-term dollar assets, funded by shorter-term dollar borrowing.⁽¹⁾

A similar picture emerges when looking at European banks' global cross-border net liabilities (including intra-Europe ones) denominated in dollars. There was a growing divergence in advance of the crisis between their net borrowing from banks and net lending to non-banks in dollars (**Chart 8**).

Chart 8 European-resident banks' net US dollar-denominated liabilities to all countries^(a)



Sources: BIS international banking statistics, IMF *World Economic Outlook* (April 2013) and Bank calculations.

(a) Includes intra-European cross-border claims.

When the crisis hit, European banks faced problems on both sides of their external balance sheets. Credit risks materialised on the asset side as, in particular, their ABS assets fell sharply in value. On the liabilities side, European banks operating in the United States began to see a withdrawal of their access to wholesale funding from 2007, and particularly after the failure of Lehman Brothers in the autumn of 2008. In addition, the functioning of the dollar foreign currency swap market was impaired at the time. This meant that many European banks faced a large global dollar shortage. Overall, they had financed longer term, or at least illiquid, dollar assets abroad through short-term dollar liabilities and through the swap market. This caused a dollar funding crisis, which ultimately resulted in the Federal Reserve stepping in to offer a temporary dollar swap facility to a number of major central banks.⁽²⁾ This did not, however, prevent a reduction in European banks' dollar-denominated assets.⁽³⁾

Since 2008–09, European banks have continued to unwind their pre-crisis positions abroad. Just as they had helped to ease credit conditions in the United States and other countries before the crisis, European banks' cross-border retrenchment since has contributed to a tightening in global credit conditions (**Chart 5**).

Policy implications

In this section, we examine some possible policy responses that could either prevent the build-up of the vulnerabilities discussed above, or mitigate their impacts. We focus first on actions that can be taken by national policymakers alone, and then turn to multilateral responses.

Domestic surveillance and policy

Any assessment of a country's domestic credit conditions that excludes credit provided cross-border may understate its cyclicity significantly. Yet in practice, partly due to data availability, policymakers often pay less attention to lending to the domestic economy provided by foreign banks from abroad.⁽⁴⁾ So it is important for national authorities to monitor inward cross-border bank credit closely.⁽⁵⁾

Since the onset of the crisis, national supervisors have become much more aware of the liquidity risks posed by maturity and currency mismatches, both at the individual bank and system-wide level.⁽⁶⁾ In the European Union, the European Systemic Risk Board has recommended that national supervisors should better monitor liquidity risk denominated in dollars.⁽⁷⁾ In the United Kingdom, the Prudential Regulation Authority is now able to set minimum liquidity requirements by major currency, and the new Financial Policy Committee has a mandate to address any emergent systemic liquidity risks.⁽⁸⁾ Reflecting a greater awareness of cross-border funding risks, the US authorities have recently proposed raising the required liquidity ratio at

(1) As a proxy for maturity, McGuire and von Peter (2009) use the counterparty split by sector, with interbank positions typically having a shorter maturity than positions *vis-à-vis* non-bank entities. They estimate that European-owned banks, in aggregate, had in mid-2007 a short-term dollar funding gap of at least US\$1 trillion, and possibly a lot more.

(2) See CGFS (2010) for more details.

(3) Ivashina, Scharfstein and Stein (2012) show how the dollar funding shock resulted in European banks cutting back their dollar-denominated lending more than their euro-denominated lending.

(4) Part of the reason is that domestic and cross-border credit is reported at different frequencies and levels of timeliness and detail. Data on credit from domestic banks are produced by the domestic central bank. In the United Kingdom these data are reported by the Bank of England monthly, with a one-month lag and with detailed coverage (for example by sector). Cross-border bank lending is reported to the BIS by all (44 BIS-reporting) countries. These data are published quarterly with a four-month lag and only at very broad sectoral coverage.

(5) The Bank of England's new *Bank Liabilities Survey* covers the maturity and currency of banks' funding, although it does not specifically distinguish the cross-border element. See Bell, Butt and Talbot (2013).

(6) More generally, at the international level, the Basel Committee has proposed new liquidity rules — the Liquidity Coverage Ratio and the Net Stable Funding Ratio. See BCBS (2010).

(7) The European Systemic Risk Board published recommendations on lending in foreign currencies. See www.esrb.europa.eu/news/pr/2011/html/pr111011.en.html.

(8) See Tucker (2012) for a discussion of authorities monitoring and managing national balance sheet vulnerabilities more generally.

foreign branches and subsidiaries and moving them more in line with US-owned banks.⁽¹⁾

Central banks may also have an important role to play in providing foreign currency liquidity as a last resort to their banking systems in a crisis. This can serve as a backstop against currency mismatches, once banks' own foreign currency liquidity buffers have been depleted. National authorities in principle can provide foreign currency to the domestic banking system in various ways: running down foreign exchange reserves; borrowing in financial markets or from the international official sector; or, if available, by accessing swap lines with reserve currency central banks (as discussed below, this proved very effective during the recent crisis).

It is difficult to assess the appropriate level of reserves for a country to hold, given that there is an opportunity cost to not using foreign exchange reserves. Judged against the standard metrics used to assess the appropriate level of foreign currency reserve cover in EMEs, most advanced economies fall a long way short.⁽²⁾ This might not be very relevant: during a financial crisis, advanced economies have tended to be more able to access foreign currency from financial markets or through swap lines. Despite this, though, some advanced economies have recently increased their reserves holdings.

Multilateral surveillance and policy

Better surveillance and use of financial stability liquidity policy tools at the **national** level might not be sufficient to address the full set of **global** risks. In fact, national policies that reduce domestic risks may, in some cases, indirectly increase risks in other countries and banking systems.

In terms of surveillance, it is principally the job of national authorities to monitor cross-border credit to and from foreign banks into their own economies. But, at the global level, it is important that international bodies assess the risks from cross-border bank inflows and outflows.

Global data availability is critical here. The most comprehensive data on national banking systems' cross-border positions is provided by the BIS. An important programme is under way to improve the coverage of these data in response to the data limitations highlighted in the recent crisis (see the box on pages 134–35). Once fully implemented this should make a big difference. In an ideal world, further improvements could be made. In particular, it would be useful if national authorities were able to collect and report to the BIS additional data on exposures split by maturity as well as currency, which are available only to a very limited extent.⁽³⁾ This would help in assessing a resident banking system's vulnerability to maturity mismatches in different currencies. The possible future development of these international banking statistics is discussed in more detail in CGFS (2012).

A second important area of focus is to improve the *analysis* of overall cross-border bank lending inflows and outflows, and the implications for global growth and financial stability. The IMF's comparative advantage means that it is well placed to monitor how these gross cross-border credit flows interact multilaterally, the role of national policies in affecting these spillovers, and the consequent impact on the global economy and financial system. The IMF has begun to do this, for example, in its innovative Spillover Reports. This analysis could usefully be developed.

A further possibility could be for the source and recipient countries of cross-border bank credit, including within banking groups, to work together to understand better the multilateral consequences of their policy actions. This would be intended to support rather than compromise national authorities' objectives, by helping them to take account properly of cross-border linkages and spillovers. Discussions of this sort already occur in the European Union, via the European Systemic Risk Board. There is an open question as to whether this could usefully be extended on a more global basis. If so, an appropriate forum might be an existing gathering of central bank governors, such as at the BIS, given that central banks are usually responsible for setting domestic monetary and macroprudential policies, which directly affect banks' global credit provision.⁽⁴⁾

More formal global policy mechanisms may also be beneficial. For example, in the provision of foreign currency liquidity, if countries *collectively* take as a lesson from the recent crisis the need to build up their foreign currency reserves, this could have adverse effects in both the short and long run: if all countries increase national savings at the same time, in an attempt to improve their current account position and thereby build up foreign currency reserves, this could dampen world demand and GDP. Since this would tend to push down on global government bond yields, higher global savings over time could also encourage pockets of excessive borrowing.

Multilateral mechanisms, such as formal international foreign currency liquidity arrangements, could potentially address this issue. For example, following the failure of Lehman Brothers, the temporary provision of dollars via a swap line from the US Federal Reserve to fourteen other central banks played an important role in stabilising the global financial system.

(1) The liquidity ratio is the size of a bank's high-quality liquid assets available to meet the expected amount of outflows in the short term under stress conditions. For the proposed changes in the US treatment of foreign banks, see Tarullo (2012).

(2) See IMF (2011).

(3) Some data are available on the maturity of claims on a consolidated immediate borrower basis (see Table 1). But these data are not split by currency, and there are no data on maturity of liabilities on this basis. So these data do not help much in assessing a banking system's asset and liability maturity mismatch (including by currency).

(4) The Committee on International Economic Policy and Reform (2011) makes a similar point.

Currently, there are temporary bilateral foreign currency swap lines in place between a number of major central banks.⁽¹⁾ Use of a swap line will expand the supplying country's money supply unless it takes offsetting policy action, so it may not always be a mutually acceptable strategy. For some countries that may not have access to foreign currency swap lines, the IMF's precautionary lending facilities could also play an important role as a global liquidity insurance mechanism.

Conclusion

This article has presented evidence that, notwithstanding its potential considerable long-run benefits, cross-border bank

credit has in the past been especially procyclical and volatile. It played a material part in the build-up of vulnerabilities in advance of the recent crisis, and in transmitting the impact of the bust.

This suggests that policymakers need to take steps to ensure that they can properly monitor these flows, both from the point of view of the recipient country and of the global system as a whole. National and international authorities could also consider whether new facilities or greater international policy co-ordination might be warranted, both to prevent and respond to the vulnerabilities that cross-border bank credit can generate.

(1) See, for example, www.federalreserve.gov/monetarypolicy/bst_swapfaqs.htm.

BIS international banking statistics — definitions and planned data improvements

Locational versus consolidated data

The Bank for International Settlements (BIS) is the main source of data on the external balance sheet positions of national banking systems, at the aggregate level. Banking systems are defined on both a locational and consolidated basis. The BIS's **locational** data report resident banks' cross-border assets and liabilities (including intragroup). Resident banks consist both of domestically owned banks and locally operating foreign subsidiaries and branches. These data are consistent with the balance of payments and national accounts. Such financial flows may provide an indication of risks to the domestic economy arising, for example, from an externally funded credit boom in the domestic economy. We have primarily focused on these locational data in this article.

The consolidated data cover the foreign claims of banking groups globally, aggregated according to the nationality of the parent bank. So, from the perspective of a given country, these data exclude resident foreign banks but include the positions of subsidiaries and branches of domestically owned banking groups operating abroad. Data are consolidated, so they net out any intragroup claims. The consolidated data are most useful as a guide to the credit risks in individual foreign countries, for example vulnerable ones, faced by domestically owned banking groups as a whole. But data are not, for the most part, available for the external liabilities of banking systems on a consolidated basis.

Taken together, these data provide quite a comprehensive indication of changes in the external balance sheets of national banking systems. They are released on a quarterly basis, with a four-month lag. Some of the main features of the data are shown in **Table 1**.

The BIS and national central banks have been working together to enhance the scope of these data, and progress is already well under way. Ongoing and planned changes to the data that will be collected are highlighted in red in **Table 1**. There are plans to collect some additional data by maturity of cross-border liabilities by currency of banking systems, albeit only for liabilities of debt securities. The BIS-reporting banking systems have also agreed, starting from the end of this year, to collect more data along a number of other dimensions that should help in assessing banking system cross-border liquidity conditions.⁽¹⁾

Planned improvements to the locational data

The granularity of the locational data by sector will be more detailed than the current broad split between banks and non-banks.

On the liability side, this should provide information on the likely flightiness of funding. Data on liabilities (and assets) of non-banks will be split into non-bank financial companies and the non-financial sector, which banks will be encouraged to disaggregate further into government, non-financial corporations and households. These additional sectoral breakdowns will be further broken down by major currency. This would help to separately identify the deposit liabilities from foreign bank-like institutions, such as money market funds. Banks' external liabilities to banks will also be disaggregated, allowing a distinction to be made between cross-border intragroup and interbank funding (and assets).

On the asset side, this greater sectoral granularity will help recipient countries know whether cross-border lending to the domestic economy is going to households and corporates — which is more likely to have direct implications for the domestic real economy — rather than to non-bank financial companies. So it should help national authorities to better monitor total credit growth from banks — both cross-border and domestically — to the real economy. As discussed in the main text, currently available data suggest that in many countries, cross-border lending to the domestic economy was much more cyclical than lending from domestic banks in the recent boom and bust.

Resident banks will also be split into domestically owned, foreign subsidiaries and foreign branches. This will help to assess how the funding and lending structure of these bank types differ.

Planned improvements to the consolidated data

On a consolidated basis, there will also be more granular reporting of claims. Currently, these data have a broad sectoral split — banks, government (including the central bank) and the non-bank private sector. The non-bank private sector data will also be split on a required basis into non-bank financial institutions and non-financial private sector. These more granular foreign claims data will help official and private sector analysts better able to assess the credit risk faced by each nationally owned banking system in different foreign markets and sectors.

Also, in the future, on a consolidated (immediate borrower) basis, banking groups will report some basic breakdown of their total — that is, external plus domestic — liabilities and assets.⁽²⁾ This will help considerably in comparing across countries the vulnerabilities of the balance sheet as a whole, for example to liquidity and credit risk, of different nationally owned banking systems.

(1) For further details see CGFS (2012).

(2) Total liabilities will be reported split into deposits, debt securities, derivatives, other liabilities and total equity (and on an encouraged basis Tier 1 capital). In addition, securities will be split into those with less or more than one-year residual maturity. On the asset side, banks will report on a best-efforts basis their total and risk-weighted assets. And on both an immediate and ultimate risk basis, banks will report their domestic and thus total claims.

Table 1 Comparison of (actual and prospective) BIS external banking statistics^(a)

	Locational (by residence)	Consolidated
Reporters	Resident bank offices split into domestic banks, foreign subsidiaries and foreign branches.	Banks headquartered in the reporting home country.
Reporting countries	44	31 ^(b) /24 ^(c)
Reporting basis	Unconsolidated including intragroup.	Worldwide consolidated excluding intragroup but including positions of affiliates operating abroad.
Reporting positions	Cross-border claims and liabilities, local claims and liabilities in foreign currency and domestic currencies.	Claims: cross-border and of local offices. Liabilities: no cross-border data, liabilities of local offices in local currency. ^(b)
Vis-à-vis countries	More than 200.	More than 200.
Currencies	Domestic, US dollar, euro, Japanese yen, sterling, Swiss franc.	Not available.
Sector	Banks of which interbank, intrabank and central banks. Non-banks of which financial and non-financial sectors of which (on a best-endavours basis) households, non-financial corporations and government.	Banks, official sector, non-bank private sector of which financial and (on a best-endavours basis) non-financial corporations and households.
Type of instrument	Loans and deposits, debt securities, other financial instruments.	Total claims. Other exposures: ^(c) of which derivatives, guarantees extended and credit commitments.
Maturity	Not available. For liabilities: debt securities less than one-year residual maturity.	Claims one year or less, one to two years, and more than two years (residual maturity). ^(b)

(a) Text in red is the planned changes to the cross-border data reported by the BIS. On a consolidated basis, banking groups will also report some basic breakdown of their total — external plus domestic — liabilities and assets (for further details see footnote (2) on the previous page and CGFS (2012)).

(b) On an immediate borrower basis.

(c) On an ultimate risk basis. The latter transfers the risk to the ultimate bearer.

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The Old Lady of Threadneedle Street

By John Keyworth, curator of the Bank's Museum (and the Old Lady's oldest and longest-serving employee).⁽¹⁾

The popular nickname for the Bank of England dates back to a caricature of the institution from the 1790s. An exhibition in the Bank's Museum celebrates two centuries of visual comment, some of which is discussed in this short article.

More than two centuries ago a caricature was published that gave birth to a phrase that was to become (and remain) the popular nickname of the Bank of England: *The Old Lady of Threadneedle Street*. The picture was the work of James Gillray (1756–1815), an artist who had been apprenticed to an engraver specialising in security documents — including banknotes — and who went on to study engraving at the Royal Academy.

Gillray is widely regarded as one of the greatest British satirists and his work continues to inspire modern cartoonists. *Cartoons and Caricatures* is an exhibition consisting of published and unpublished material from the Bank of England's own collection of prints and drawings. It runs in the Bank of England Museum until 31 December 2013. Encompassing more than two centuries of visual comment, focusing mainly on the Bank and its activities, the exhibition includes the work of consummate artists such as Gillray, John Tenniel and, more recently, Steve Bell.

Typically, *Quarterly Bulletin* articles include information about how the institutional structure of the Bank helps it to meet its objectives for monetary and financial stability. The subject of this article, which promotes the *Cartoons and Caricatures* exhibition at the Bank's Museum, is less serious — but these pieces of art represent an inescapable facet of the institution's history and it is hoped that their satirical depictions of the Bank, in the various environments in which it has operated, may be of interest. This topic can even be linked back to the *Bulletin* itself: the image to the right, taken from a staff magazine in 1978, satirises a fictional discrepancy in the statistics published in the *Bulletin*.

The following two pages provide some historical context both for the original depiction of 'The Old Lady' as well as more recent interpretations of this symbol of the Bank. The article then examines three themes directly associated with the Bank which have attracted the attention of satirists over the past 200 years. It begins with the controversy over the convertibility of the Bank's notes which, from its foundation in 1694, had always been exchangeable into gold. The images here cast Prime Minister Pitt as the villain of the piece, abusing his power to deny the man in the street his right to gold. That familiar Bank product (then and now), the banknote, is next — and in particular, the ease with which the early notes could be, and often were, forged. This, together with the severity of the penalties for forgery, provided a rich source for the satirist. And finally, cartoonists captured the promise (or threat) of nationalisation in the 1930s — and its realisation in 1946. In one of the images, the Old Lady is shown haughtily ignoring a politician's invitation to her nationalisation and, it is suggested, her demise.

'We'd better say it's seasonally adjusted...'

By Ben Shailo*. Published March 1978 in
The Old Lady staff magazine (now defunct).



Two members of the Bank's Economic Intelligence Department (EID), the forerunner of today's Monetary Analysis Directorate, discuss a fictional discrepancy in their statistics for the *Quarterly Bulletin*.

* Pen name of Basil Hone, Bank staff from 1943–80 and a regular cartoon contributor to *The Daily Telegraph*.

(1) The author would like to thank Amber Evans for her help in producing this article.

The Old Lady

The popular nickname of 'The Old Lady' for the Bank of England comes from an iconic cartoon by James Gillray published on 22 May 1797. Entitled 'Political Ravishment or The Old Lady of Threadneedle Street in danger', it was drawn three years after France had declared war on Britain.

The original 1797 Gillray cartoon

The cartoon shows the Prime Minister of the day, William Pitt the Younger, pretending to woo an old lady, the personification of the Bank, but what he is really after is the Bank's reserves, represented by the gold coin in her pocket, and the money-chest on which she is firmly seated.⁽¹⁾ At the time, the Bank was a joint-stock company⁽²⁾ operating under Royal Charter, and therefore essentially a private company — and so it was perceived as having been taken advantage of by the politicians. A series of events beginning with a landing in February 1797 by several hundred French troops at Fishguard on the Welsh coast and ending with an accusatory speech in the House of Commons by the opposition MP Richard Sheridan had prompted Gillray to produce the cartoon.⁽³⁾

The Fishguard incident was perceived by many as a precursor to the long-expected French invasion and sparked a panic. The Bank was inundated by holders of notes wanting to exchange them for gold and its reserves were reduced within a fortnight from £16 million to less than £2 million. This situation could not be sustained and an order was passed releasing the Bank from its obligation to pay its notes in gold. Known as the 'Restriction of Cash Payments' or simply 'The Restriction Period', it had the effect of reserving the gold in circulation and the Bank's vaults for the war effort. The Restriction Period continued until 1821. Unsurprisingly, this action was seen by the Government's detractors as outrageous and Sheridan, representing the Whig opposition, described the Bank as 'an elderly lady in the City who had... unfortunately fallen into bad company'.⁽⁴⁾

Gillray, from his workplace in St James's, latched onto Sheridan's words. Dressed in a gown made of the new £1 and £2 notes issued to supplant the gold coin in circulation, an old lady sits protectively on a chest representing the Bank's reserves, declaiming against the unwanted attentions of the skeletal, freckle-faced, pointy-nosed Pitt. The scene is set in the Rotunda, a well-known public office in the Bank's Threadneedle Street building. Clerks seated at their desks can just be discerned in the background. A document headed 'Loans' refers to the Pitt administration's continual demands on the Bank for funds.⁽⁵⁾

Modern interpretations

The concept of the Bank as an old lady was maintained by artists such as Sir John Tenniel (1820–1914) in the 19th century and Bernard Partridge (1861–1945) in the 20th in *Punch* magazine where she is shown as the archetype of a maiden aunt: prudent, secure and with a nest egg — the person to go to in a crisis. In other words, the lender of last resort, a role which the Bank adopted in the late 19th century. And this tradition of portraying the Bank as an old lady continues in today's news media.

Steve Bell (1951–) is one of the leading modern political cartoonists in the United Kingdom. His work is published regularly and his satirical style, like Gillray's before him, shocks some, informs others and amuses the rest of us. In a modern version of Gillray's original cartoon, he depicts the Bank, in the form of an old lady with the unmistakable features of its Governor, Sir Mervyn King, surrounded by 'fat cat' bankers greedily consuming the financial liquidity provided by the Bank. Entitled 'The Old Lady of Threadneedle Street meets Oliver Twist', this cartoon was published in *The Guardian* newspaper on 21 March 2008 following a meeting in which Britain's big banks appealed to the Bank of England to pour more cash into the money markets.⁽⁶⁾

(1) See Godfrey (2001).

(2) The Bank remained privately owned until it was nationalised in 1946.

(3) See, for example, Clapham (1944) or Marston Acres (1931).

(4) See Sheridan (1842).

(5) For further background on James Gillray and the art of caricature, see Evans and Wright (1851) and Feaver (1981).

(6) See www.guardian.co.uk/business/2008/mar/21/creditcrunch.bankofenglandgovernor.

Political Ravishment or The Old Lady of Threadneedle Street in danger

By James Gillray. Published 22 May 1797.



The Old Lady of Threadneedle Street meets Oliver Twist

By Steve Bell. Published 21 March 2008 in The Guardian.



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On gold versus paper money

27 February 1797 marked the first time in the Bank's history that banknotes were no longer convertible into gold — the start of the so-called 'Restriction Period'. Prime Minister Pitt's raid on the Bank's reserves and the consequent issue of paper money opened up a rich debate on monetary and banking policy. It spawned a wealth of articles, letters and publications on the issue, as well as a parliamentary inquiry, the Bullion Committee of 1810. This inquiry eventually led to the resumption of gold convertibility in 1821 and it was in this context, arguably, that monetarism was born. Banknotes remained exchangeable for gold until 1914.⁽¹⁾

Banknotes, paper money and French alarmists

By James Gillray. Published 1 March 1797.

The Prime Minister, William Pitt the Younger, in the role of a Bank of England teller, dispenses paper money, not gold coin, to the public as personified by John Bull, who is dressed in unfashionable country clothes. Gold coin is kept out of sight, securely locked under the counter. On the left, representatives of the legislature carry bundles of low-denomination notes to the counter, at the end of which is pinned the Order of the Privy Council instructing the Bank to cease gold coin payments until further notice. On either side of John Bull two members of the opposition, MP Richard Sheridan to the left, wearing a French revolutionary-style cap, and on the right, Charles James Fox with a tricolour rosette in his hat, urge John Bull to insist on gold, not paper. Fox suggests that he should have gold 'to make your peace with the French when they come'.

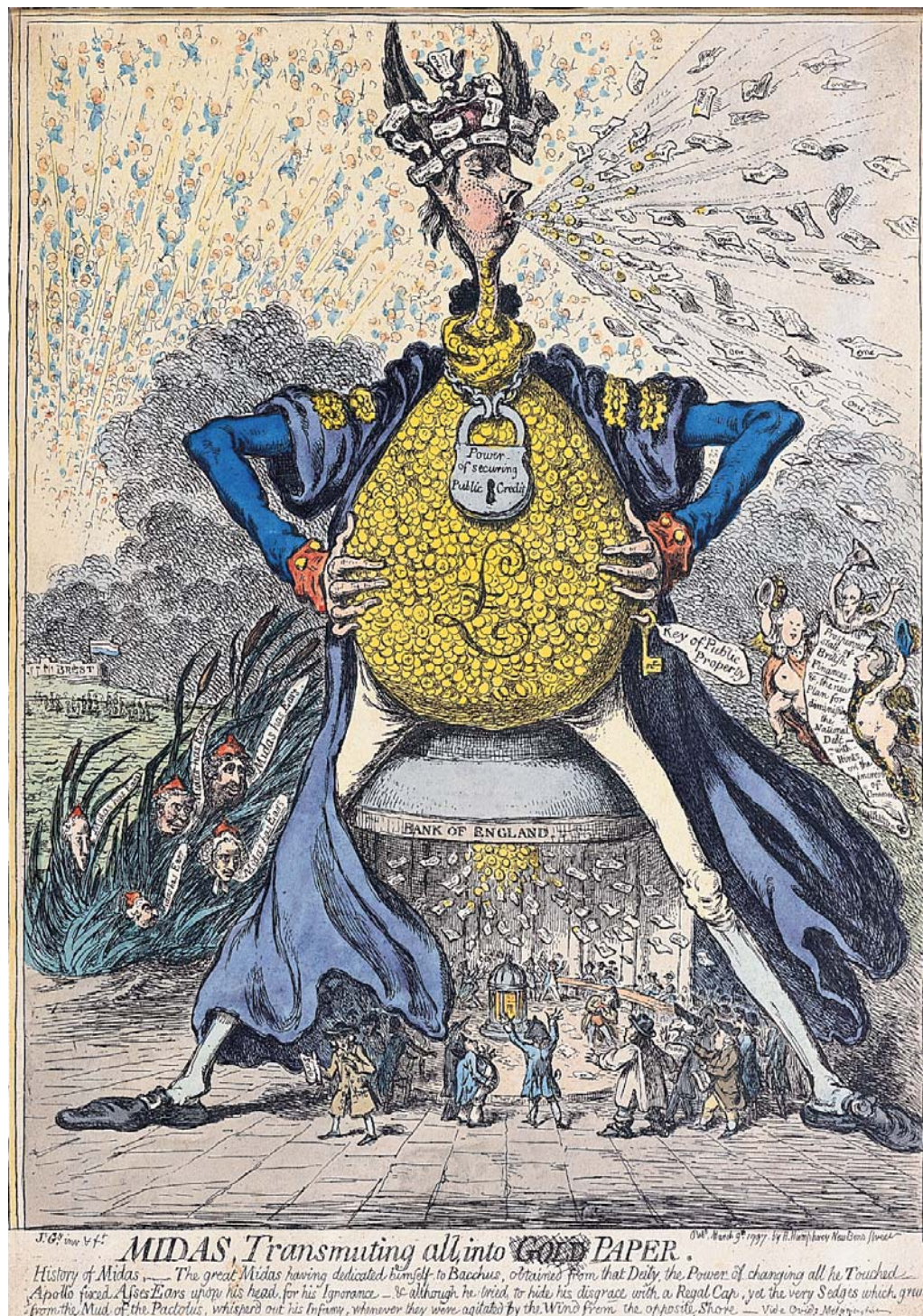


(1) In the interwar period between 1925 and 1931, there was partial convertibility of notes to gold while Britain was a member of the International Gold Standard.

Midas, Transmuting all into Gold Paper

By James Gillray. Published 9 March 1797.

Pitt as the legendary King Midas turns all he touches, not into gold but paper. His skeletal figure, belly bulging with gold, straddles the Rotunda, a public office of the Bank of England which was unofficially used until the early 1800s by stockbrokers as a stock exchange. He wears the robes of the Chancellor of the Exchequer, carries the 'Key of Public Property' in his left hand and the lock with the 'Power of securing Public Credit' on a chain around his neck. The dark clouds in the distance foreshadow the imminent French invasion. The invasion fleet can be seen outside the port of Brest. Members of the opposition party in the reeds whisper that the great King Midas has (ass's) ears.⁽¹⁾ This cartoon represents a powerful attack on the suspension of the convertibility of notes into gold and Pitt's ever-increasing stature. Fox described the suspension as 'the first day of our national bankruptcy' (see Godfrey (2001)).



(1) This refers to the Greek myth in which Midas disputed the supremacy of Apollo in a musical contest, in response to which Apollo said that he 'must have ears of an ass!' and turned Midas's ears into the ears of a donkey.
See www.theoi.com/Text/HyginusFabulae4.html#191.

On banknotes and counterfeiting

Following the suspension of notes being convertible to gold and the virtual disappearance of the guinea gold coin (worth £1.05) and its fractions, in 1797 the Bank introduced £1 and £2 notes for the first time. Until then, the lowest-denomination note had been £5. However, this attempt to keep the wheels of everyday commerce turning had unexpected results. People who were unused to handling paper money now did so for the first time. Although capable of telling a counterfeit from a genuine coin, given their general lack of reading skills, it was a different matter with banknotes. The less educated were therefore the natural dupes of the forger and unwittingly became the 'utterers' (passers) of forged notes. The forgery of Bank of England notes had been a capital or hanging offence since 1697 and during the 'Restriction Period' between February 1797 and May 1821, some 600 unfortunates were convicted — half of whom were hanged.⁽¹⁾

A peep into the old rag shop in Threadneedle Street

Anonymous. Coloured engraving. Published 28 September 1818.

An unfortunate man, accompanied by friends or relations, is dragged before a committee of the Bank's directors charged with possessing a forged note. But the directors cannot decide whether it is genuine or not! The Bank director wearing spectacles and examining a banknote declares 'Upon my Soul. I have my doubts but at all events. We had better declare it bad [forged].' While another proclaims 'Take him out... he has a d...d hanging look.' The cartoon is an indictment of the poor quality of the Bank's notes at that time and the fact that two notes of the same denomination were not always identical in appearance.



(1) Maintaining confidence in the currency is a key objective of the Bank. Each of the four Bank of England notes currently in circulation have a number of security and design features to help them to be identified as genuine. For a guide to these features, and more information on Bank of England notes, visit www.bankofengland.co.uk/banknotes/Pages/current/default.aspx.

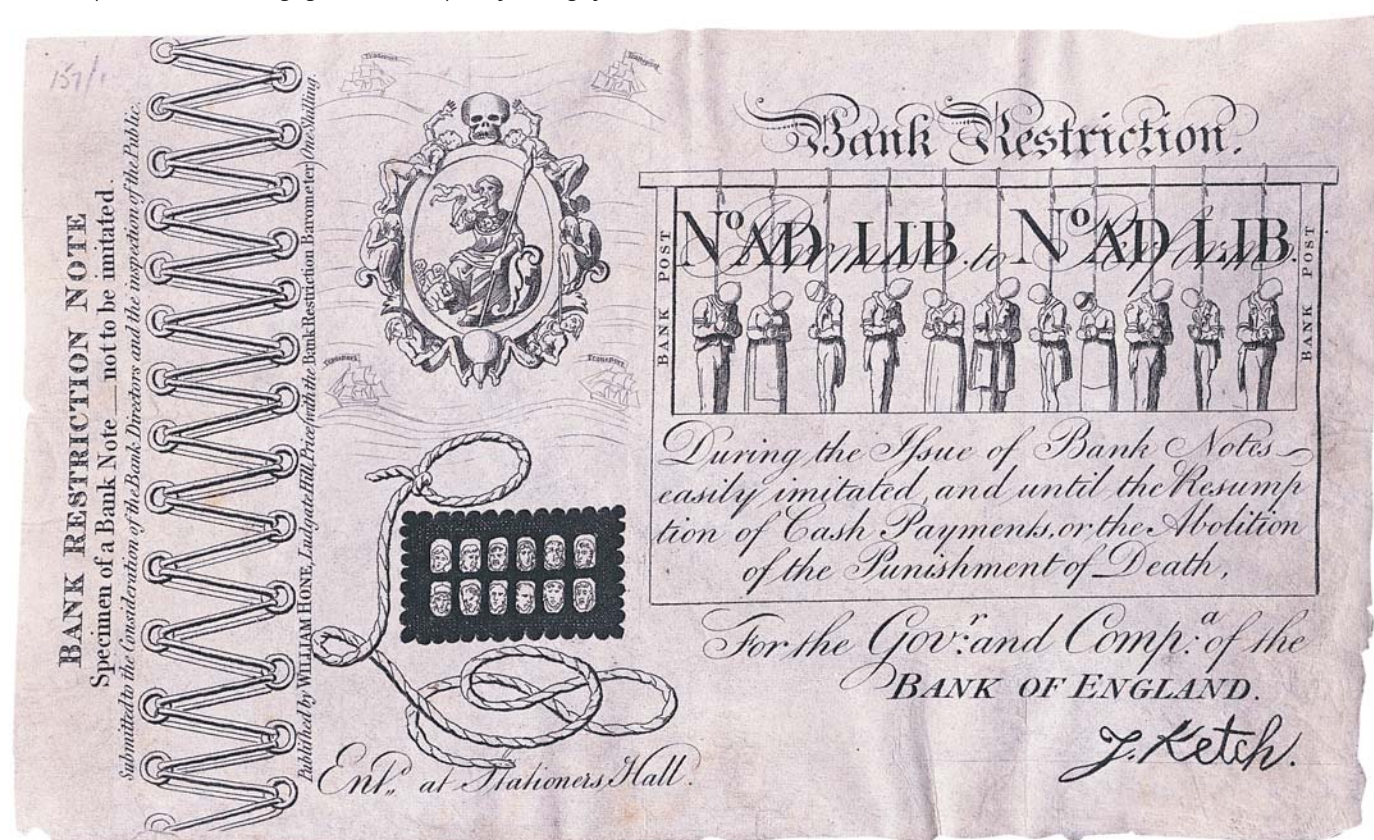
Bank Restriction Note

By George Cruikshank. Published 1819.

This grim parody of a Bank of England note was published as a protest against the severity of the anti-forgery laws. It bears the statement 'During the Issue of Bank Notes easily imitated and until the Resumption of Cash Payments, or the Abolition of the Punishment of Death.' As with banknotes of that time, it is uniface and monocolour. Using this banknote template, Cruikshank's satire on punishments for forgery can be seen through a number of features:⁽¹⁾

- On the Bank Restriction Note, Britannia, the Bank's corporate seal, becomes a child-devouring monster.
- The black sum block, below the seal, which would normally state the value of the note in white Gothic letters, carries instead portraits of those executed.⁽²⁾
- The pound sign is transformed into the hangman's noose.
- On the left, the zigzagged leg shackles, together with the ships in the background, point to the fate of note forgers who were sent to penal colonies overseas.
- The note has no number, instead it is printed 'Ad Lib' in reference to the number of forgery convictions being without constraint or 'number'.
- The gibbet from which convicts are hanged is supported by a 'Bank Post' on either side — a reference to Bank Post Bills, a financial instrument akin to a banknote but payable three or seven days after a stated date for security in transit.
- The signature on the note is that of Jack Ketch, the traditional name of the hangman.

The forging of a Bank of England note remained a capital offence until 1832. Cruikshank believed that his Restriction note was an important factor in changing the Draconian penalty for forgery.



(1) See also Hewitt and Keyworth (1987).

(2) The sum block was a device to prevent erasure and subsequent alteration of the denomination of the note. This type of crime — altering the value of a note — was more common in the 18th century than the later, more sophisticated counterfeiting or creating a note from scratch.

On nationalisation

The Bank had been founded as a joint-stock company⁽¹⁾ with a Royal Charter, an unusual combination. Its first transaction, in fact its reason for being, was to loan money to the Exchequer in order to finance a war with France. From the beginning it had kept the state's banking accounts and by 1781 was regarded by many as a department of state. In 1781, Lord North, Prime Minister, had described the Bank as 'a part of the constitution... to all important purposes the public exchequer'. Even so, the idea of taking the institution into public ownership was not seriously considered until the 1930s when the Governor of the day, Montagu Norman, became involved in the post-war nationalisation of industry. The Bank was nationalised on 1 March 1946.⁽²⁾

Not This Time!

By Bernard Partridge. Pen and ink drawing. Published 20 November 1935 in Punch magazine.

Citizen Attlee asks the Old Lady of Threadneedle Street: 'Cab, lady?' The 'cab' is in fact a tumbril with a banner proclaiming 'Nationalisation of Banks'. A signpost points 'To the Guillotine'. In a speech at Accrington on 13 October 1935, Clement Attlee, leader of the Labour Party, said 'If the Labour party resumed power the first thing they would invade would be the 'Temple of the Golden Calf' in Threadneedle Street — the Bank of England'.⁽³⁾



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(1) A joint-stock company is a business entity owned by its stock or shareholders, that is, those who have invested in it. Investors can transfer their stock or shares to others without any effect on the existence of the company.

(2) See Forde (1992).

(3) See Hennessy (1992).

So much for Nationalisation

By Joseph Lee. Pen and ink drawing. Published 13 March 1946 in The Evening News.

The cartoon depicts a tramp being ejected from the main entrance of the Bank and protesting 'So much for nationalisation. This is wot 'appens when one o' the owners asks for a few quid till Friday.' In other words, a payday loan.



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Central counterparties: what are they, why do they matter and how does the Bank supervise them?

By Amandeep Rehlon of the Bank's Market Infrastructure Division and Dan Nixon of the Bank's Media and Publications Division.⁽¹⁾⁽²⁾

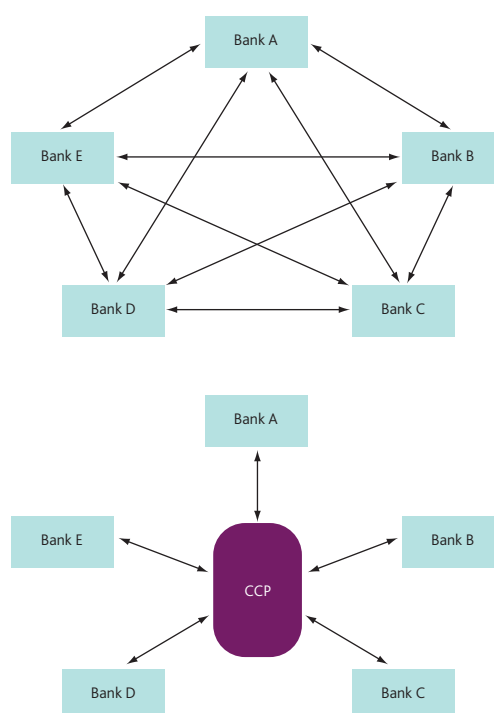
The Government introduced major changes to the system of financial regulation in the United Kingdom in April 2013, including creating the Financial Policy Committee and transferring significant new supervisory responsibilities to the Bank. As part of this, the Bank is now responsible for the supervision of central counterparties, or CCPs. This article explains what CCPs are, setting out their importance for the financial system — including the benefits they bring and some of the risks they could present if not properly managed. It also summarises the Bank's approach to supervising CCPs and describes some of the key priorities the Bank will be pursuing.

Financial market infrastructures lie at the heart of the financial system. Some facilitate the movement of cash and securities needed to settle transactions. Others intermediate exposures between market participants, guaranteeing that financial obligations are met. In essence, these market infrastructures are sets of rules, processes and operational arrangements for managing, reducing and allocating the inherent risks arising from transactions between market participants. As such, they play a crucial role in helping the economy and financial markets to function.

For these reasons, central banks have a long-standing interest in financial market infrastructures, which include payment systems, securities settlement systems, and central counterparties (CCPs). Responsibility for the supervision of securities settlement systems and CCPs in the United Kingdom transferred to the Bank of England from the Financial Services Authority (FSA) in April 2013 as part of a wider reform of financial regulation in the United Kingdom.⁽³⁾ The focus of this article is on CCPs, also known as clearing houses. It is intended as a primer on the economic functions they serve as well as the risks they carry for the financial system.

CCPs place themselves between the buyer and seller of an original trade, leading to a less complex web of exposures (**Figure 1**). CCPs effectively guarantee the obligations under the contract agreed between the two counterparties, both of which would be participants of the CCP. If one counterparty fails, the other is protected via the default management procedures and resources of the CCP.

Figure 1 A complex 'web' of bilateral exposures is reduced to a more simple network via a CCP



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

(2) To watch a short video explaining some of the key points from this article, see: www.youtube.com/watch?v=DC-PHNYcmr0.

(3) This includes the microprudential supervision of banks, insurers and major investment firms by the newly established Prudential Regulation Authority (PRA); and the macroprudential regulation of the financial system as a whole through the Financial Policy Committee. See Murphy and Senior (2013).

CCPs run what is described as a 'matched book': any position taken on with one counterparty is always offset by an opposite position taken on with a second counterparty. This means CCPs do not take on market risk — an exposure to a change in the market value of the trades that they enter into — in their normal course of business.

But CCPs are greatly exposed to the risk that a counterparty defaults on outstanding contracts. This potentially leaves their book 'unmatched' and subject to market risk. CCPs manage this counterparty credit risk in a number of ways, including by taking collateral (or 'margin') from counterparties.

Clearing trades centrally means that CCPs themselves become crucial nodes in the financial network. It is estimated, for example, that almost half of all outstanding interest rate swap transactions are centrally cleared.⁽¹⁾ The systemic importance of CCPs is expected to increase further as the central clearing of standardised over-the-counter (OTC)⁽²⁾ derivatives becomes mandatory in line with commitments made by G20 leaders following the crisis. This makes it essential for CCPs to manage properly the risks they face.

This article is split into three sections. The first section describes the key functions and economic benefits of central clearing. The second outlines some of the risks CCPs could pose to the financial system. The final section describes the Bank's approach to supervising CCPs and some current policy issues.

Central counterparties: what are they and why are they used?

A key risk attached to financial market transactions is **counterparty credit risk** — the risk that one party to a contract defaults and cannot meet its obligations under the contract. This can lead to a loss for the counterparty on the other side of the contract. If those losses are severe enough, they may cause the affected parties financial distress which, in turn, can have a knock-on effect for their creditors. In this way, counterparty credit risk is an important channel for contagion and can be a potential source of systemic risk.

CCPs are financial market infrastructures that can reduce and 'mutualise' — that is, share between their members — counterparty credit risk in the markets in which they operate. Their origins as clearing houses can be traced back to the late 19th century, when they were primarily used to net payments in commodities futures markets. Clearing via CCPs initially grew through exchange-traded products including bonds, equities, futures and options contracts.⁽³⁾ During the first decade of this century, clearing became important for OTC products as well as those traded on exchanges.

The mandate for greater central clearing

The recent financial crisis served as a reminder of the impact an impaired financial system can have on the economy at large. In the early stages of the crisis in 2007–09, a lack of transparency over large bilateral positions between counterparties, combined with potentially insufficient collateral, had the effect of exacerbating other problems, such as the significant reduction in market liquidity. This was demonstrated in the market dislocation that followed the collapse of Lehman Brothers and near-collapse of AIG in September 2008, both of whom were major participants in OTC derivatives markets, including credit default swaps.

In response to the events of 2007–09, the G20 leaders mandated reform of the structure and transparency of OTC derivatives markets. Specifically, in September 2009 the G20 leaders agreed in Pittsburgh that all standardised OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through CCPs.

The markets covered by the G20 mandate are used by businesses and, through investment managers, by households to insure against a range of financial risks. The Financial Stability Board reported in April 2013 that, as at the end of February 2013, around US\$158 trillion of interest rate swaps and over US\$2.6 trillion of OTC credit derivatives were centrally cleared, representing 41% and 12% respectively of total outstanding notional amounts.⁽⁴⁾ These figures — as well as the range of products that can be centrally cleared — are expected to continue to increase, as mandatory clearing takes effect.

The key functions and benefits of CCPs

CCPs offer a number of economic and risk-reducing benefits. A key benefit of central clearing is the 'multilateral netting' of transactions between market participants, which simplifies outstanding exposures compared with a complex web of bilateral trades. Perhaps the most important benefit, however, is the role that a CCP plays in the event of one of its members defaulting: CCPs have a number of rules and resources in place to manage such a default in an orderly way.⁽⁵⁾

These benefits are explained in more detail below. In addition, the box on page 149 provides an example of a trade cleared through a CCP that is linked to economic activity. The box also lists the five CCPs in the United Kingdom that are currently supervised by the Bank.

(1) See Financial Stability Board (2013), pages 28–42.

(2) An OTC trade involves a direct transaction between two counterparties, rather than through an exchange.

(3) See Norman (2011).

(4) Financial Stability Board (2013), page 36.

(5) Some, but not all, of these default management benefits relate back to the reduced liquidity needs of CCPs' members that follow from multilateral netting.

Example of a trade cleared by a CCP

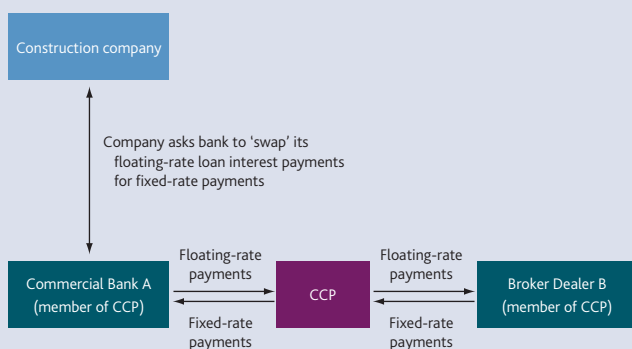
G20 leaders agreed in 2009 that all standardised OTC derivative contracts should be cleared through CCPs. This box gives an example of such a trade. It also provides information on the five Recognised Clearing Houses in the United Kingdom that are supervised by the Bank.

Trading via a CCP

An interest rate swap (IRS) is an example of an OTC derivative with important real-economy uses, and that may be centrally cleared. Consider a construction company that takes a loan from a bank for a period of three years to finance building a new housing development. This loan is a liability for the construction firm. If the interest rate charged on the loan varies in line with Bank Rate (or some other floating rate), the construction company may wish to 'swap' these variable (hence uncertain) interest payments for pre-agreed, fixed-interest payments: especially if its assets — rental incomes from residential properties, say — are also fixed over the period of the loan.

The company therefore approaches its commercial bank to arrange this interest rate swap (**Figure A**). The commercial bank enters into the market to find another financial institution that is willing to enter into a contract for the swap. If this transaction is cleared via a CCP then the CCP becomes the 'buyer' and 'seller' of the contract to the two counterparties. The CCP will calculate the amount of collateral ('initial margin') it requires from each counterparty — Commercial Bank A and Broker Dealer B in **Figure A** — and this collateral is held to mitigate against counterparty credit risk.

Figure A Example of a construction company entering into an IRS contract via a CCP



What happens if one of the counterparties default?

Suppose Broker Dealer B defaults before the end of the three-year contract, so is unable to make good its outstanding obligations to offer fixed-rate payments in return for floating-rate ones. The CCP must manage this exposure. For example, it may use an auction process to find another

counterparty to take on the swap contract. In this event, the collateral pledged to the CCP by Broker Dealer B could be used to cover losses the CCP might incur while arranging this. If this collateral proves insufficient to cover the losses, the CCP has access to a number of other financial resources, summarised by the 'default waterfall' shown in **Figure 3** of the main text.

Central counterparties in the United Kingdom

There are currently five CCPs in the United Kingdom that are supervised by the Bank of England as Recognised Clearing Houses under the Financial Services and Markets Act 2000. **Table 1** provides some information on those CCPs, including the main markets they serve, which include markets for equities, commodity derivatives, repos and interest rate swaps. The column on the right-hand side lists the number of members of each CCP.

Table 1 UK CCPs supervised by the Bank as at June 2013^{(a)(b)(c)}

Clearing house	Main products cleared	Number of members
European Central Counterparty (EuroCCP) Ltd	European equities.	24
CME Clearing Europe Ltd	OTC commodity derivatives and interest rate swaps.	18
ICE Clear Europe Ltd	Energy and commodity contracts and European credit default swap transactions.	69
LCH.Clearnet Ltd	Clears a range of asset classes including interest rate swaps, repos, equities and commodities.	170
LIFFE Administration and Management	Exchange-traded interest rate products, equities, index and commodities derivatives, currently through an outsourcing agreement with LCH.Clearnet Ltd, though it is due to transfer clearing to ICE Clear Europe in Summer 2013.	46

(a) The London Metal Exchange Ltd has also made public its intention to establish a UK CCP, aiming to commence clearing in September 2014. Trades in its exchange are currently cleared through LCH.Clearnet Ltd.

(b) EuroClear UK & Ireland Ltd is also a Recognised Clearing House (RCH) under the Financial Services and Markets Act 2000 but does not offer central counterparty clearing services.

(c) A list of RCHs can be found at www.bankofengland.co.uk/financialstability/Pages/fmis/supervised_sys/rch.aspx#13.

A number of CCPs incorporated in overseas jurisdictions currently operate in the United Kingdom as Recognised Overseas Clearing Houses (ROCHs). The ROCH regime will continue for these CCPs until a decision on their application for authorisation under European Market Infrastructure Regulation is taken. That authorisation process will be led by the relevant national supervisory authority for EU-incorporated CCPs, and by the European Securities and Markets Authority for CCPs incorporated outside the EU. In the meantime, the Bank will continue the existing model of close co-operation with the home supervisor, together with annual reporting to the Bank by the ROCH in question. As at 1 June 2013, CCPs with ROCH status in the United Kingdom are: Cassa di Compensazione e Garanzia SpA; Eurex Clearing AG; European Multilateral Clearing Facility NV; ICE Clear US Inc.; LCH.Clearnet SA; SIX x-Clear Ltd; and the Chicago Mercantile Exchange.

Multilateral netting

CCPs can reduce **counterparty credit risk** by netting exposures across their members: that is, offsetting an amount due from a member on one transaction against an amount owed to that member on another, to reach a single, smaller net exposure. When trades are centrally cleared, the original counterparties' contracts with one another are replaced or 'novated' — with a pair of equal and opposite contracts with a CCP. Hence the CCP becomes the buyer to the original seller, and the seller to the original buyer.⁽¹⁾

Figure 2 provides a simplified example of this. Bank A enters into a contract that requires it to pay £8 million to Bank C; Bank C has a contract requiring a payment of £10 million to Bank B; and Bank B has a contract with Bank A where it must pay Bank A £6 million. The arrows in the top panel of **Figure 2** represent the gross exposures on these bilateral trades when these are not cleared centrally.

Following novation of trades, the CCP sits between the buyer and seller of each bilateral transaction (middle panel). This allows gross exposures to be 'netted' (bottom panel), reducing exposures in the event of default. For example, Bank B is exposed to potential losses of £10 million if trades are not cleared, but clearing means it has a single net exposure of £4 million to the CCP. The CCP also holds collateral, known as 'initial margin', to mitigate against the risk of default. This is explained further in the following subsection.

The netting of the payment obligations can also reduce the **liquidity needs** of members arising from those contractual obligations. Whether payment obligations arise only on a single settlement date or over the life of a contract, the CCP can calculate a single, net amount due from (or to) each member. So using the example in **Figure 2**, Bank A is obligated to make a gross payment of £8 million and receive a payment of £6 million if trades are not cleared. But with central clearing and net settlement, this is reduced to a single net payment obligation of £2 million.

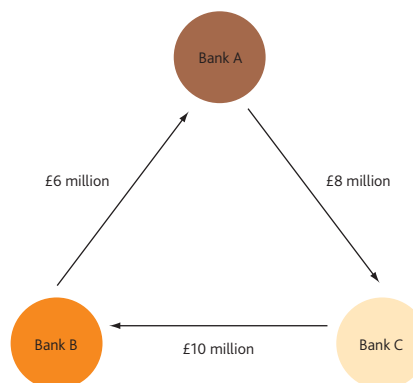
For some financial products, members' net payment obligations to or from the CCP are settled on a daily basis (or more frequently if there are large movements during the course of the day) to prevent the build-up of large exposures. Payments that become due because of changes in financial market prices are known as '**variation margin**' payments.⁽²⁾

Managing defaults in an orderly way

In taking on the obligations of each side to a transaction, a CCP has equal and opposite contracts. That is, payments owed by the CCP to a member on one trade are exactly matched by payments due to the CCP from the member on the matching trade. But if one member defaults, the CCP needs resources to draw on to continue meeting its obligations to surviving members.

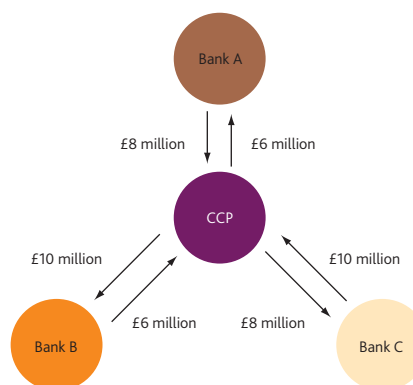
Figure 2 Netting efficiencies of central clearing

Non-cleared, bilateral trades...

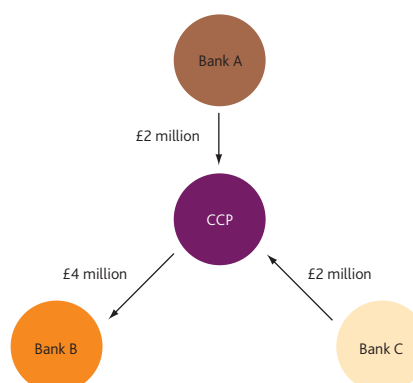


Note: Arrows and figures represent the direction and size of financial obligations from one bank to another.

...are centrally cleared using a CCP...



...allowing gross exposures to be netted.



CCPs have rules, arrangements and resources to ensure that they can respond in an orderly and efficient way to a member defaulting. For example, it might seek to find new counterparties to take on the positions of the defaulting member and return the CCP to a matched book of contracts.

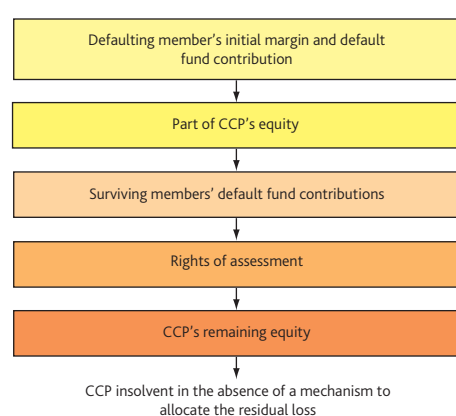
(1) Some CCPs become counterparties to trades via an open-offer system, whereby the CCP is automatically and immediately interposed in a transaction at the moment the buyer and seller agree on the terms. But the outcome is the same as novation.

(2) Members whose contracts have declined in value are obligated to pay the CCP an amount equal to this change in market value. Meanwhile, the CCP is obligated to pay those whose contracts have increased in value (Pirrong (2011)).

This is sometimes achieved through an 'auction' of the defaulter's positions among surviving members. In terms of resources to cover its obligations, CCPs typically have access to financial resources provided by the defaulting party, the CCP itself and the other, non-defaulting members of the CCP. The order in which these are drawn down helps to create appropriate incentives for all parties (members and CCPs) to manage the risks they take on.

These funds are collectively known as the CCP's 'default waterfall': **Figure 3** illustrates the resources — and the order in which they are called upon — for a typical waterfall.

Figure 3 A stylised CCP default waterfall



Collateral (or 'initial margin')

The first line of defence is collateral provided by the defaulting member. CCPs require a pre-set amount of collateral — referred to as 'initial margin' — to be posted to the CCP by each party in a transaction. In the event of default, the defaulting member's initial margin can then be used (or liquidated) to cover any losses or obligations that are incurred (top row of **Figure 3**). In addition, the 'variation margin' payments mentioned previously are important in limiting the build-up of exposures arising from changes in market prices over the life of the contract. This is done by the CCP calculating the gains and losses on each client member's portfolio — either on a daily basis or, sometimes, more frequently.

CCPs set margin policies and requirements such that the probability of sums owed by a defaulting member to the CCP on its cleared positions exceeding the amount of margin held is very small. CCPs seek to achieve this by setting initial margin to reflect their estimate of the riskiness of the underlying transaction. For instance, they typically charge higher margins on instruments with more volatile prices and on less liquid instruments that are expected to take a CCP longer to auction or 'close out' in the event of a default. Hence a defaulting member provides the initial margin as collateral to cover the first tranche — and ideally all — losses faced by the CCP should that member default.

The experience of UK CCPs following defaults such as those of Lehman Brothers and MF Global has been that initial margin provided by those firms was sufficient to cover losses.

The default fund and use of the CCP's equity

If the collateral posted by the defaulter to the CCP is insufficient to meet the amount owed, the CCP can then draw on the defaulting party's contribution to the CCP's 'default fund'. Usually, all members are required to contribute to this fund in advance of using a CCP. A key feature of CCPs is that losses exceeding those initial sums provided by the defaulter are effectively shared (mutualised) across all other members of the CCP.

Before using the default fund contributions of surviving members the CCP may contribute some of its own equity resources towards the loss (shown in the second row of **Figure 3**). This incentivises the CCP to ensure that losses are, as far as possible, limited to the resources provided by the defaulting member rather than being passed on to other members.

If the CCP's own contribution is fully utilised, the CCP then mutualises outstanding losses across all the other (non-defaulting) members. First, the CCP draws on default fund contributions from non-defaulting members (third row of **Figure 3**). If these loss-absorbing resources (which up to this point are all pre-funded) are exhausted, many CCPs may call on surviving members to contribute a further amount, usually up to a pre-determined limit. This is sometimes termed 'rights of assessment' (fourth row in **Figure 3**).

In the absence of a mechanism to allocate any further losses among its members, the CCP's remaining equity then becomes the last resource with which to absorb losses, though this is often quite a small sum when compared with initial margin and the default fund. If losses exceed this remaining equity, the CCP would become insolvent.

Historically, there have been few incidences of CCPs failing, but when this has happened, the impacts on financial markets have been significant. In 1974, the Caisse de Liquidation failed due to trades put forward by members without the consent of their clients and high volatility in the Paris White Sugar Market, leading to large margin calls that participants were unable to meet. More recently, the Kuala Lumpur Commodity Clearing House failed in 1983 after large defaults on palm oil contracts following a market squeeze. The Hong Kong Futures Guarantee Corporation failed in the aftermath of the stock market crash of 1987 which led to the closure of stock and futures exchanges in Hong Kong for four days.⁽¹⁾

(1) See, for example, Hills *et al* (1999).

To avoid insolvency and ensure the continuity of critical services, CCPs should also have explicit rules and procedures that allocate losses left uncovered after drawing on initial margin and the default fund. Some of these issues are discussed in more detail in the final section of this article.

In summary, **the reduction (through netting and collateralisation), the mutualisation and the orderly distribution of losses are the key differences between trades that are centrally cleared compared to non-cleared transactions.** The netting benefits reduce the size of exposures at default, and also the liquidity demands on traders during what could be stressed market conditions. Losses in excess of collateral provided by the defaulters are mutualised and allocated in a transparent and orderly fashion, reducing some of the uncertainty that would otherwise arise in the event of a firm's failure.

Risks associated with CCPs

Despite the economic benefits of central clearing, CCPs could also pose significant risks to the stability of the financial system if not properly managed. This section summarises some of the key systemic risks associated with CCPs. The final section then sets out how these risks are being addressed, including through establishing recovery and resolution frameworks for CCPs.

Systemic impact of a CCP failing

A consequence of central clearing is that CCPs themselves become crucial links in the financial network, especially where an individual CCP is the sole or dominant clearer for a particular market.⁽¹⁾ A large CCP that fails could act as a channel of contagion. The markets for the products it clears may even need to close for a period, hence the importance of establishing effective recovery rules and resolution regimes to minimise the disruption to clearing services that are critical to the financial system.

Past instances of CCP failures have typically been triggered by the default of one or more members. As described in the default waterfall in **Figure 3**, absent fresh injections of capital or other funds (or resolution actions by the authorities), a CCP without other loss-allocation arrangements becomes insolvent after all available financial resources have been exhausted, forcing the CCP to default on its own obligations to other members. CCPs may also fail for other reasons, for example, due to losses on investment of collateral, or the failure of a payment bank (used for collecting and distributing margin on the CCP's behalf) to which it has unsecured exposures. In these instances, the CCP would only be able to use its own capital to absorb losses, and not other parts of the default waterfall, since initial margin and the default fund are usually only available to cover member default.

CCPs as amplifiers of other shocks

In some instances, CCPs actions may have 'procyclical' effects by exacerbating other stresses in the financial system. For example, CCPs typically adjust initial margin demands in response to changes in market conditions. This is important for their own risk management. But if sufficiently large, these margin changes could have a destabilising impact on the CCPs' members.

For instance, a CCP may increase initial margin requirements in response to high price volatility. This could occur if initial margin had previously been set at too low a level when market conditions were benign, necessitating a big adjustment when conditions deteriorate. This increased burden may force the CCP's members into liquidating positions or else attempting to access other sources of funding to meet margin calls. Given that these events may occur at a time when financial markets are already illiquid (and credit conditions are tight), this can exacerbate price volatility.⁽²⁾ A better solution is for margins to remain at higher levels in good times even if this may be above the minimum level required by regulation.

Access to central clearing

In order to manage risks effectively, a CCP must place strict requirements upon its members. These relate to members' creditworthiness (solvency); their ability to meet margin calls within short periods (liquidity); and their operational reliability. This is important due to the role members play in the mutualisation of risks by CCPs. Clearing trades via a CCP is therefore limited to members with adequate financial and technical resources. Firms that are not members of CCPs (including non-financial institutions) can nevertheless benefit from central clearing as **clients** of clearing members. Client clearing is becoming an increasingly important part of central clearing.

How does the Bank supervise CCPs?

If CCPs are operated only in the private interests of their managers, owners, or even their members, they may underinvest in the mitigation of risks to the wider system. The Bank's role as supervisor is to ensure that these infrastructures are managed in a way that is consistent with the public interest, which includes reducing systemic risk. The Bank's aim is to establish a framework that creates incentives for the operators of CCPs and other financial market infrastructures (FMIs) to manage and mitigate systemic risk.

Responsibility for the supervision of central counterparties sits alongside the Bank's responsibilities for the oversight of payment systems and securities settlement systems in the

(1) For a discussion of the risk-reducing benefits in single CCPs versus multiple CCPs, see Duffie and Zhu (2010).

(2) It is similar for variation margin: members suffering large losses following a large price shock may struggle to liquidate positions in order to meet margin obligations. See Committee on the Global Financial System (2010).

Financial Stability Directorate of the Bank. **Table 1** in the box on page 149 provides a brief overview of the existing CCPs in the United Kingdom that are supervised by the Bank.

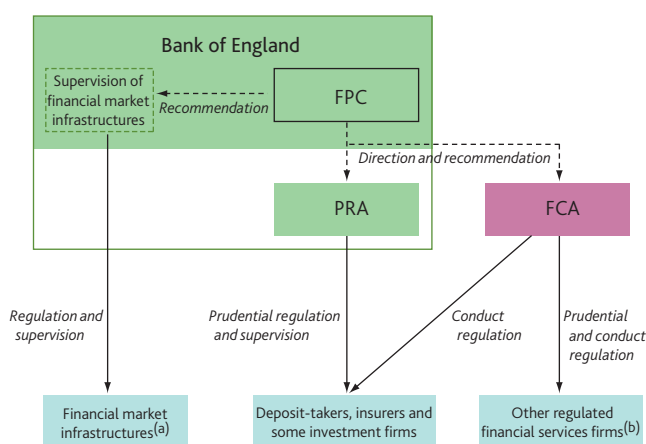
The framework for supervision

The Bank exercises its supervision of CCPs within the framework of a UK legal regime⁽¹⁾ that itself sits within directly applicable EU regulations.⁽²⁾

These regulations, in turn, follow global standards drawn up by the Committee on Payment and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO). The 'Principles for financial market infrastructures' (hereon, the Principles) published by CPSS-IOSCO in April 2012 consolidate previous requirements and raise minimum standards, reflecting the increasing systemic importance of CCPs.⁽³⁾ These Principles form a keystone for the Bank's supervisory approach.

The Financial Policy Committee (FPC), established in April 2013 to monitor and take actions to reduce the build-up of systemic risk in the financial system, may also make recommendations in relation to supervision of FMIs. **Figure 4** shows how this fits in with the wider changes to the UK regulatory framework for the financial system.⁽⁴⁾

Figure 4 The Bank's role in the new framework for financial regulation in the United Kingdom



(a) Excludes regulation of trading platforms, which is the responsibility of the Financial Conduct Authority (FCA).

(b) Includes asset managers, hedge funds, exchanges, insurance brokers and financial advisers.

Conducting supervision

Risk assessments

Supervised institutions themselves have primary responsibility for meeting the minimum standards of the CPSS-IOSCO Principles and regulatory requirements. Consistent with that, the Bank expects CCPs to complete their own self-assessments against the Principles, and provide these to the Bank. CCPs will be expected to review their self-assessment at least annually.

Self-assessment does not, however, mean self-regulation. The CCP's self-assessment does not replace the Bank's own

judgement, but is used as one input to its supervision. The Bank seeks to reach forward-looking judgements on whether a CCP's governance, operational design, policies or actions pose unacceptable risks to financial stability. Where the Bank judges such risks unacceptably high, it expects the FMI to take action to reduce them.

Key policy areas

The Bank of England has identified certain areas that it considers to be important and will focus on these as part of supervision. Some key topics are considered below. For more detail, see Bank of England (2013).

Governance

CCPs have considerable scope and discretion to influence how risk is managed in the markets they serve through their margin requirements and other binding rules; in effect they are systemic risk managers. A CCP should demonstrate that its governance and decision-making processes reflect the risk management purpose of the institution. This means having adequate regard not only to the management of microprudential risks to the institution itself, but also the interests of the financial system as a whole.

A strong user representation in the FMI's governance and the inclusion of independent directors, on both the board and the risk committee, is one way to help to ensure that the approach to managing risks is suitably broad in scope.

Financial risk mitigants: loss absorbency

Given that competitive incentives may result in pressure to lower margin requirements, the Bank carefully supervises where and how discretion is used in the modelling of margin requirements.

To mitigate credit risk, all UK CCPs are required to hold sufficient resources to cover the simultaneous default of their two largest members.

In addition to minimum standards in relation to credit risk, FMIs are also required to meet minimum standards in relation to liquidity risk. The Bank requires FMIs to demonstrate that they hold liquid resources above certain thresholds (as set out by EMIR and the Principles) in order to withstand extreme but plausible stresses. They must also have rules and procedures for allocating any liquidity shortfalls among their participants, should these resources prove insufficient.

(1) CCPs are regulated under Part 18 of the Financial Services and Markets Act 2000 (FSMA) and are subject to the UK 'recognition requirements' as Recognised Clearing Houses.

(2) Specifically, the European Regulation on OTC derivatives, central counterparties and trade repositories, commonly known as the European Market Infrastructure Regulation (EMIR).

(3) Committee on Payment and Settlement Systems and International Organization of Securities Commissions (2012).

(4) See Murphy and Senior (2013).

Recovery and resolvability

While CCPs must hold a prudent level of pre-funded resources, it remains possible these will be insufficient, threatening the viability of the CCP itself if there are no plans to manage and to recover from this situation.

Given that many markets rely on the services of CCPs, a high priority is attached to CCPs demonstrating that they have plans to ensure the continuity of critical services should risks to the CCP crystallise. This will in part hinge on the clarity, credibility and comprehensiveness of plans to distribute any uncovered credit losses — that is, losses that remain after pre-funded resources in the default waterfall and any assessment rights have been exhausted — among CCP members in a way that means that service closure can be avoided.

The Principles require explicit rules and procedures on how any losses in excess of pre-funded resources would be allocated.

The Bank has set out how it will assess the suitability of these arrangements. These include principles relating to clarity and transparency; awareness of the impact of loss-allocation rules on the incentives of members during other parts of the default management process (for example, participation in an auction); and that any provisions to close a service or 'tear up' contracts — that is, to cancel contracts (but to compensate for this via a 'cash sum' payable from one party to another) should be very much a last resort. These criteria are set out more fully in the *Bank of England Financial Stability Paper* on central counterparties and loss-allocation rules.⁽¹⁾

Should these recovery plans prove inadequate, the Bank must be able to resolve the FMI in a way that prevents or limits systemic disruption without calling on public funds. The Financial Services Act 2012 amends the Banking Act 2009 to establish a resolution regime for CCPs in the United Kingdom, as part of which the Bank is the resolution authority for CCPs. But further changes are required internationally to ensure that failing CCPs can be resolved safely and effectively,⁽²⁾ and the Financial Stability Board and CPSS-IOSCO are leading further work on this.

Transparency and disclosure

Transparency is important to enable CCP participants and other stakeholders in the stability of the financial system to assess risk exposures. All FMIs' plans for managing risk must be suitably transparent to those that rely on the FMIs' services, including members, indirect participants, the authorities and the general public. The Bank attaches importance to public disclosure by FMIs so that market discipline can reinforce internal and regulatory incentives for effective risk management.

More detail on all of these policy areas, and other aspects of supervision in the United Kingdom, can be found in 'The Bank of England's approach to the supervision of financial market infrastructures'.⁽³⁾

Co-operation with overseas authorities

Some CCPs operate across borders, reflecting the global nature of many financial markets. A single CCP operating across multiple jurisdictions and currencies can provide efficiencies and reduce risk through multilateral netting of exposures across counterparties in different jurisdictions. Conversely, fragmentation of business across multiple CCPs is likely to result in greater costs and greater liquidity demands for market participants. Relevant overseas authorities from those jurisdictions, including relevant central banks and market and prudential supervisors, are important stakeholders in oversight and supervision. This is recognised both under the Principles and in the detailed 'college' arrangements established under EMIR.⁽⁴⁾ Further, the Financial Stability Board has identified four safeguards as key to establishing a resilient and efficient global framework for CCPs. These are summarised in the box on page 155.

For UK-based CCPs that serve global markets, the Bank accepts particular responsibility for ensuring effective co-operative oversight. As well as ensuring that the regulatory colleges required under EMIR for CCPs yield all intended benefits, the Bank will also involve authorities from beyond the EU in co-operative oversight of relevant CCPs. The Bank is convinced of the benefits of working with the relevant international authorities and will actively seek their input, going beyond the minimum levels of co-operation set out in the Principles. This contributes to the effectiveness of supervision of UK CCPs by ensuring other authorities can contribute insights, challenge assumptions and influence outcomes in ways that reduce risks. The Bank also stands ready to contribute to co-operative arrangements established by other authorities for FMIs in their jurisdictions.

CCPs that are part of group companies

Some CCPs supervised by the Bank also form part of groups that include other FMIs, other regulated financial institutions or indeed non-regulated firms.

An individual FMI entity remains responsible for meeting the standards and regulations applicable to its particular function. But the Bank needs to understand how the institutions that it supervises relate to the rest of any group of which they form a part.⁽⁵⁾ This will help to ensure that critical UK CCP services are not at risk of contagion from disruptions in other parts of the group and can meet all applicable regulatory requirements on a standalone basis.

(1) See Elliott (2013).

(2) See Tucker (2013).

(3) See Bank of England (2013).

(4) 'College' refers to a working group of relevant authorities (including central banks and supervisors) which enhances the consolidated supervision of an international financial institution.

(5) A number of existing UK CCPs form part of a group which also includes a Recognised Investment Exchange that is supervised by the Financial Conduct Authority (FCA). The Bank co-operates closely with the FCA, under a published Memorandum of Understanding, available at www.bankofengland.co.uk/about/Documents/mous/moumarket.pdf.

International policy work

The G20 commitment on central clearing of standardised OTC derivatives has increased recognition of the importance of the role of CCPs in the financial system.

As part of ongoing international efforts to enhance the resilience of the financial system, the Financial Stability Board has identified four safeguards as key to establishing a resilient and efficient global framework for CCPs within which the G20 commitment can be met. These are:

- i. **Fair and open access** by market participants to CCPs, based on transparent and objective criteria.
- ii. **Co-operative oversight arrangements** between relevant authorities, both domestically and internationally and on either a bilateral or multilateral basis, that result in robust and consistently applied regulation and oversight of global CCPs. This is enshrined in Responsibility E in the CPSS-IOSCO Principles. Co-operative arrangements are also an important part of CCP regulation under EMIR.
- iii. **Resolution and recovery regimes** that aim to ensure that the core functions of CCPs are maintained during times of

crisis and that consider the interests of all jurisdictions where the CCP is systemically important. CPSS-IOSCO published a consultation document on recovery and resolution of financial market infrastructures in July 2012. In the United Kingdom, a specific resolution regime for UK CCPs has been introduced under the Financial Services Act 2012.

- iv. **Appropriate liquidity arrangements** for CCPs in the currencies in which they clear.

In addition, CPSS and IOSCO are also working on a disclosure framework for FMIs, including CCPs. The Committees released a disclosure framework in 2012 and continue to work to develop requirements on key quantitative information to be provided by FMIs. This is intended to enable all stakeholders to evaluate the systemic importance of FMIs in the markets they serve, as well as the risks they might bring to these markets and the risks associated with being, or becoming, a participant.

The Bank will work in consultation and co-operation with other authorities to ensure that UK-based CCPs, and the supervision of UK CCPs, satisfy all four safeguards as well as the other agreed international principles and standards.

Enforcement

The Financial Services Act 2012 confers on the Bank a set of powers to ensure it can deliver on its supervisory responsibilities for UK CCPs, known as Recognised Clearing Houses (RCHs). These include both tools for intervention and for sanctions in the event that RCHs fail to satisfy supervisory requirements. This provides a more graduated 'sliding scale' of options to enforce supervisory requirements than was previously available to the FSA. The powers fall into four main areas: information gathering; imposing requirements and rules; powers of direction; and sanctions and warning notices. The Bank may also gather information from qualifying parent undertakings and has a power to direct them in defined circumstances.

The Bank aims to supervise with the support of CCPs and their participants, having clearly explained the risk rationale for its supervisory priorities and actions. The Bank's supervision is, however, conducted in the shadow of the powers granted by Parliament, and these powers will be used where necessary to effect change.

Conclusion

By enabling transactions to be settled smoothly, financial market infrastructures are a key ingredient to the stability of the financial system. Central counterparties — one type of financial market infrastructure — sit between the buyer and seller of a trade, taking on the obligations of each counterparty. In the event that one counterparty fails, CCPs can reduce counterparty credit risk, through the default management procedures and resources of the CCP as well as the 'netting' of exposures that would arise from a world of non-cleared trades.

As a consequence of clearing trades centrally, however, CCPs themselves become crucial points in the financial network. For this reason, it is important for CCPs to manage properly both risks to themselves and risks stemming from their activities to the markets they serve; and for supervisors to ensure that CCPs are managed and operated effectively in a way that takes account of their systemic importance.

Since 1 April 2013, the Bank of England has had new responsibilities for the supervision of CCPs as well as securities settlement systems — one part of a wider reform of financial regulation in the United Kingdom.

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Recent economic and financial developments



Markets and operations

This article reviews developments in financial markets between the 2013 Q1 *Quarterly Bulletin* and 24 May 2013, drawing on the qualitative intelligence gathered by the Bank in the course of meeting its objectives of monetary and financial stability. The article also sets out usage of the Bank's operations since the previous *Bulletin*.

In discharging its responsibilities to ensure monetary stability and protect and enhance the stability of the financial system, 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 Bank also conducts occasional surveys of market participants in order to gather additional information on certain markets.

Financial markets

Overview

Financial market sentiment continued to be heavily dependent on investors' expectations of central bank policy. The broad increase in risky asset prices across much of the review period was in part driven by the belief that monetary policy would remain accommodative in the medium term. That belief also contributed to further reductions in sovereign bond yields for countries in the euro-area periphery, despite uncertainty about the resolution of fiscal difficulties within the currency block.

Expectations of a continuation of loose monetary policy were confirmed to some extent by the actions of central banks. The Bank of Japan doubled the size of its asset purchase programme, leading to a sharp fall in the yen and a rise in the volatility of yields on Japanese government bonds (JGBs). The European Central Bank (ECB) also loosened policy, lowering its main policy rate by a further 25 basis points, to 0.5%. And the Federal Reserve indicated that it was prepared to increase the pace of its asset purchases.

But subsequent improvements in the outlook for the United States, and statements from the Federal Reserve Chairman regarding the possible timing of a slowing in the pace of monetary expansion by the central bank, led to rises in US Treasury yields and an appreciation of the dollar.

In the United Kingdom, Bank Rate and the stock of asset purchases were unchanged over the review period, while the Funding for Lending Scheme (FLS) was extended to allow

participants to borrow from the facility until January 2015 and to skew incentives toward lending to small and medium-sized enterprises (SMEs).⁽¹⁾ The Scheme was also expanded to include lending by participating banks to certain other non-bank providers of credit.

Monetary policy and short-term interest rates

The Bank of England's Monetary Policy Committee (MPC) maintained Bank Rate at 0.5% and the stock of asset purchases financed by the issuance of central bank reserves at £375 billion. During the review period, the MPC reinvested the cash flows of £6.6 billion associated with the Asset Purchase Facility's (APF's) holdings of the maturing March 2013 gilt.

A Reuters poll conducted shortly after the review period indicated that the median of economists' expectations was for the MPC to increase the final stock of asset purchases to £400 billion. Bank Rate was expected to stay at 0.5% over the coming two years.

Sterling overnight interest rates remained slightly below Bank Rate during the review period (**Chart 1**). Contacts reported that this was due to a combination of factors: overnight lending of cash at rates below Bank Rate by non-bank institutions; reduced demand for overnight liquidity among UK banks; and a reluctance of banks to increase the size of their balance sheets to arbitrage the difference between the cost of borrowing from non-bank suppliers of overnight liquidity and Bank Rate.⁽²⁾ Sterling forward overnight rates implied by overnight index swap (OIS) contracts were little changed over the review period (**Chart 2**).

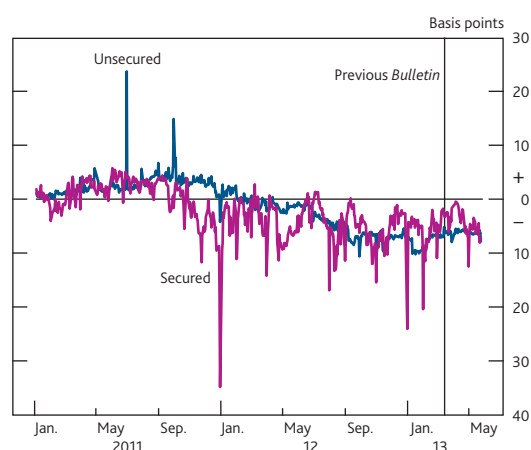
In the secured overnight market, turnover in overnight brokered gilt repo recorded by RONIA⁽³⁾ fell to its lowest level since 2007 (**Chart 3**). Contacts suggested that this may have been because banks were trading repo bilaterally instead, as brokered trades are usually centrally cleared and so typically require larger haircuts than bilateral trades.

(1) For more detail, see the box on page 14 of the May 2013 *Inflation Report*.

(2) For a more detailed discussion see 'Markets and operations', *Bank of England Quarterly Bulletin*, Vol. 52, No. 4, pages 290–303.

(3) Repurchase overnight index average. For further details, see www.wmba.org.uk.

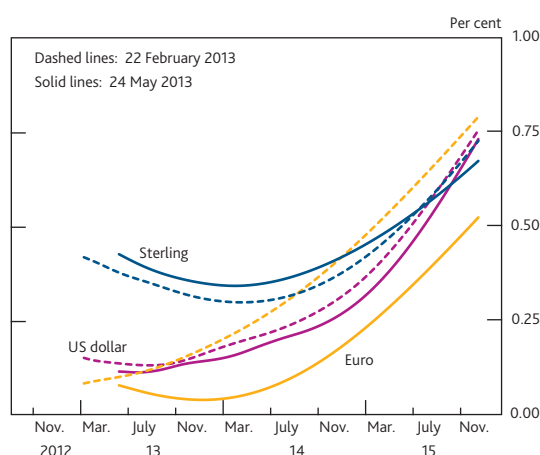
Chart 1 Spread to Bank Rate of weighted average sterling overnight interest rates^(a)



Sources: Wholesale Markets Brokers' Association and Bank calculations.

(a) The unsecured overnight interest rate is measured by the sterling overnight index average (SONIA). The secured overnight interest rate is measured by RONIA.

Chart 2 Instantaneous forward interest rates derived from OIS contracts^(a)



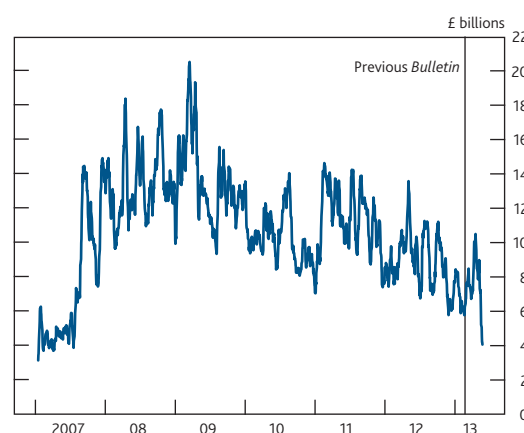
Sources: Bloomberg and Bank calculations.

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

Elsewhere, there was further loosening of monetary policy by a number of central banks. In April, the Bank of Japan announced a major monetary stimulus package designed to raise inflation to meet its 2% inflation target. The central pillars of the programme, known as 'quantitative and qualitative easing', involve a doubling of the monetary base, lengthening of the expected average maturity of JGB purchases from less than three years to around seven years, and an increase in its purchases of risky assets. Contacts thought that while markets had anticipated a significant change in monetary policy, the scale and scope of the changes was much larger than expected, with resulting volatility in JGB yields (see the box on page 160).⁽¹⁾

The ECB cut its main refinancing rate by 25 basis points to 0.5%. According to contacts, by reducing the cost to banks of participating in the ECB's longer-term refinancing operations (LTROs), the cut in the main refinancing rate led market

Chart 3 Turnover in brokered overnight gilt repo trades^(a)



Source: Wholesale Markets Brokers' Association.

(a) Turnover is a ten working day average of activity recorded by RONIA.

participants to revise down their expectations for the pace of LTRO repayments, slowing the speed of withdrawal of central bank liquidity. Some contacts also started to place a greater weight on the likelihood that the ECB would cut its deposit rate below zero, although this was not their central expectation. Forward OIS rates ended the period around 25 basis points lower (Chart 2).

In the United States, the Federal Open Market Committee (FOMC) continued its policy of open-ended purchases of agency mortgage-backed securities and government bonds, at a rate of US\$40 billion and US\$45 billion per month, respectively. Early in the review period, contacts reported that some market participants were concerned about the possibility of a sudden rise in yields. But contacts also thought that investors generally did not expect the pace of tightening of US monetary policy to proceed more quickly than was priced into the yield curve. And a change to the text of the April minutes of the FOMC indicated that the Federal Reserve was prepared to increase the scale of asset purchases if necessary.

Later in the review period, strong US employment data caused renewed speculation among market participants about the prospect of withdrawal of policy stimulus by the Federal Reserve. The suggestion by the Federal Reserve Chairman that such a decision might be taken 'in the next few meetings', was taken to confirm this. But while some contacts report that they now expect the Federal Reserve to stop purchasing additional assets sooner than the middle of next year, they do not anticipate a rise in the federal funds target rate until 2015, consistent with forward OIS rates.

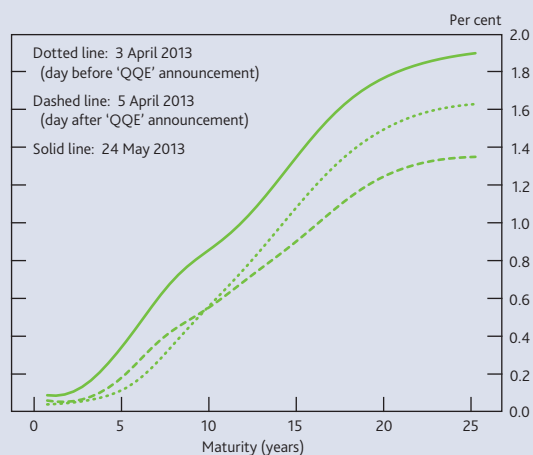
(1) See the box on page 10 of the May 2012 *Inflation Report* for discussion of changes in Japanese asset prices around the time of the announcement.

Changes in Japanese bond yields following QQE

In April 2013, the Bank of Japan announced a programme of 'quantitative and qualitative easing' (QQE), involving a doubling of the monetary base, lengthening of the expected average maturity of Japanese government bond (JGB) purchases, and an increase in its purchases of risky assets.

Japanese government bond yields initially fell on the announcement. But this movement was later reversed, with yields ending the review period at levels above those prior to the announcement (**Chart A**). While this subsequent move in yields differs in direction to those seen following increases in the scale of quantitative easing by the Bank of England and Federal Reserve, it is consistent with the Bank of Japan's desire to raise nominal GDP growth and inflation expectations, following a period of extraordinarily low inflation.

Chart A Japanese nominal government bond spot yield curve^(a)



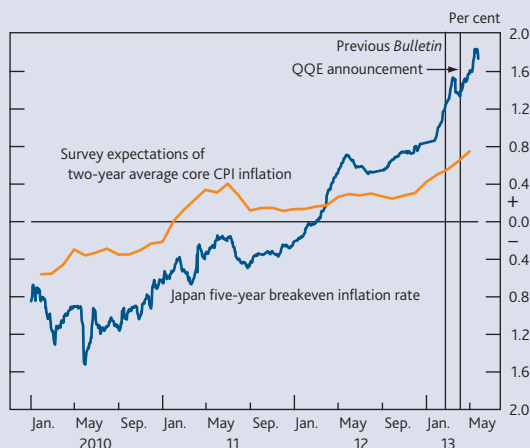
Sources: Bloomberg and Bank calculations.

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

Indeed, both market and survey-based measures of Japanese inflation expectations moved higher following the Bank of Japan's announcement (**Chart B**). That said, contacts report that Japanese inflation-linked markets are very illiquid, with the majority of transactions in recent years involving the repurchase of Japanese government debt by the Japanese Ministry of Finance. And the market for JGBs is dominated by a small number of large financial institutions, which implement changes in their asset allocation decisions only gradually. As a result, it is likely to take time for changes in inflation expectations to be fully reflected in market prices.

Along with a rise in the yield curve since the announcement of QQE, there has been an increase in the volatility of JGB yields. In part, that is because the frequency of JGB issuance limits the number of days on which purchases can occur (as in the case of

Chart B Japanese five-year breakeven inflation rate and survey expectations of core CPI inflation



Sources: Bloomberg and QUICK QSS Report.

the Bank of England and the Debt Management Office, the Bank of Japan seeks to avoid purchasing assets on the same days as issuance under the financing schedule of the Ministry of Finance). Combined with the large size of the monetary expansion, that means that asset purchases tend to be of sufficient scale that they can cause significant moves in JGB yields.

Contacts also note that the Bank of Japan does not announce the dates or other details of QQE operations in advance. As a result, JGB dealers may be unsure about their ability to sell inventories of bonds to the Bank of Japan. And that might make them less inclined than otherwise to hold JGBs, or lead them to charge a premium to other market participants for bearing that risk. That will have tended to lower market liquidity and contribute to volatility in JGB yields. In turn, reduced liquidity and higher volatility has reportedly led some other investors not to participate in the market.

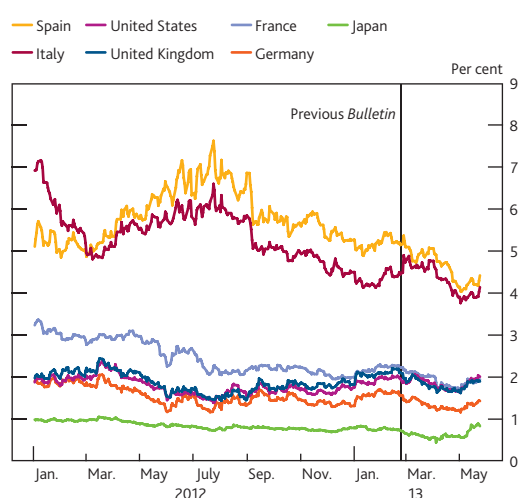
The rise in the volatility of JGB yields causes marked variation in the value of the JGB holdings of domestic banks. Since JGBs comprise around a quarter of the balance sheet of the sector as a whole, such variation in the value of banks' assets could have material implications for their capital buffers.

Following the initial announcement of QQE, the Bank of Japan announced several operational changes to lessen volatility, including an increase in the number of operations from six to eight per month, and the relaxation of rules on the timing of purchases, which allowed the Bank to purchase JGBs on issuance days, provided that the tenor of purchases differed from that of new bonds. Shortly after the data cut-off, the Bank of Japan announced further operational changes, including an increase in the number of operations to up to ten per month.

Long-term interest rates

Major euro-area sovereign bond yields fell over the review period as a whole (**Chart 4**). Financial market sentiment had deteriorated following an inconclusive election result in Italy and the emergence of banking sector problems in Cyprus. And contacts perceived an increase in uncertainty among investors regarding the prospects for the resolution of fiscal difficulties within the euro area. Markets soon overcame their concerns, however, with contacts citing investors' belief that central banks would act to insulate financial markets from major downside risks to the economy.

Chart 4 Selected ten-year government bond yields^(a)



Source: Bloomberg.

(a) Yields to maturity on ten-year benchmark government bonds.

Contacts also noted that the substantial monetary stimulus announced by the Bank of Japan at the beginning of April had reduced borrowing costs for euro-area sovereigns. Yields had fallen as international investors took market positions in anticipation of a reallocation by Japanese investors away from domestic and into foreign assets, although as yet there was little sign of this shift.

Governments in the euro-area periphery continued to take advantage of improved conditions in sovereign debt markets, extending the maturity and size of some of their auctions. For example, Ireland and Portugal both issued ten-year bonds for the first time in over two years.

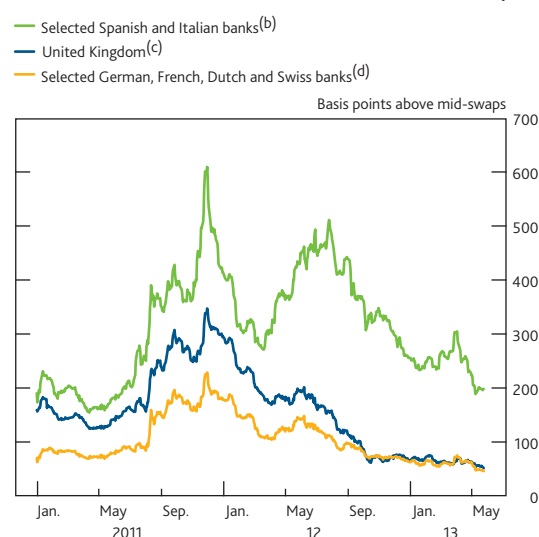
Yields on UK, US and German sovereign debt declined a little during the first half of the review period, reflecting increased demand for government bonds perceived to carry the least risk. But they subsequently rose, following positive surprises in economic data, including better-than-expected UK GDP data for 2013 Q1 and strong employment data in the United States. As for short-term interest rates, stronger US data and statements by FOMC members were taken by markets to increase the likelihood that the Federal Reserve would begin to 'taper' its asset purchases sooner than previously expected.

Bank funding markets

The Bank and HM Treasury announced a one-year extension to the FLS on 24 April 2013. This will allow participants in the Scheme to borrow until January 2015, and provides incentives to increase lending to SMEs. The FLS will also be expanded to cover lending by participating banking groups to certain non-bank providers of credit to the real economy. Contacts' reactions were positive, with many noting it would also provide a welcome 'backstop', should funding conditions deteriorate.

Despite strong demand from investors, public term unsecured debt issuance by UK banks remained subdued during the review period. The lack of primary issuance continued to make it difficult to gauge the price at which UK banks would be able to issue new debt. But secondary market spreads suggest that UK bank wholesale funding costs continued to show modest declines (**Chart 5**). Secured market issuance was limited during the review period, but West Bromwich Building Society issued the first significant public UK residential mortgage-backed security of 2013.

Chart 5 Indicative senior unsecured bank bond spreads^(a)



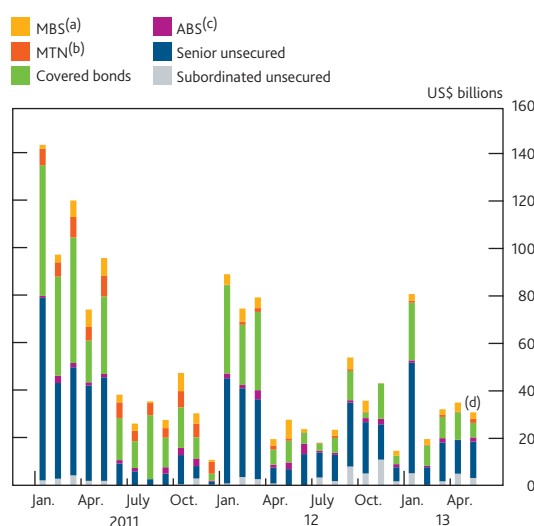
Sources: Bloomberg, Markit Group Limited and Bank calculations.

- (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) Peripheral European banks: BBVA, Intesa, Santander and UniCredit.
 (c) UK banks: Barclays, HSBC, Lloyds Banking Group, Nationwide, Royal Bank of Scotland and Santander UK.
 (d) Core European banks: BNP Paribas, Crédit Agricole, Credit Suisse, Deutsche Bank, ING, Rabobank, Société Générale and UBS.

During the first half of the review period there was a rise in wholesale funding costs for some lenders in the euro-area periphery (**Chart 5**). Contacts suggested that this was due to a perception that the approach to the resolution of banking difficulties in Cyprus had made it more probable that future bank bailouts would involve a greater share of losses being borne by creditors than had previously been thought. Since then, however, spreads have fallen back to below levels seen prior to the resolution of Cypriot banking problems.

European term funding markets were fairly subdued during the review period (**Chart 6**). But issuance by European and US banks of short-dated floating-rate notes (FRNs) had picked up. On the supply side, contacts pointed to appetite among issuers to use two to three-year funding, rather than relatively more expensive longer-term debt. Also, some banks had become less inclined to expand their balance sheets in order to enter swap arrangements associated with converting long-term borrowing — typically at a fixed rate — into a floating-rate liability. Among investors, there was demand for FRNs from money market funds and bank treasuries seeking to improve returns.

Chart 6 Term issuance by European lenders in public markets



Sources: Dealogic and Bank calculations.

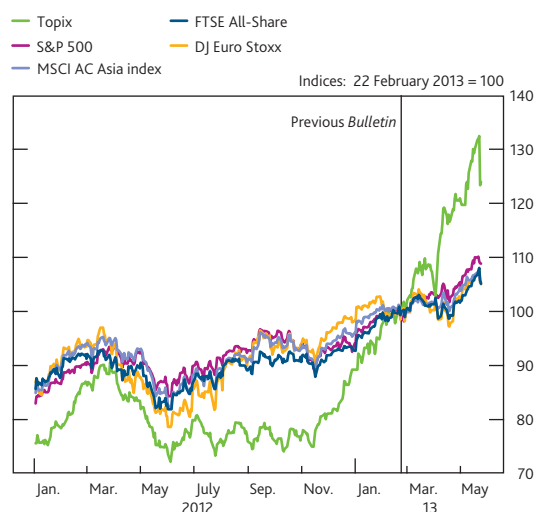
- (a) Commercial and residential mortgage-backed securities.
 (b) Medium-term notes.
 (c) Asset-backed securities.
 (d) Data up to 24 May 2013.

Corporate capital markets

Major international equity indices rose over the review period (**Chart 7**), and both the FTSE 250 and the S&P 500 reached all-time nominal highs. Moves since the start of the year appeared to have been driven by a combination of a decline in the risk premium required by investors to hold risky assets, as well as some improvement in expectations for earnings. The Topix rose sharply following the announcement of QQE by the Bank of Japan, but fell back somewhat in the final days of the review period.

Meanwhile, corporate bond spreads edged lower still (**Chart 8**), as strong demand from investors more than offset record issuance of new debt. In the US high-yield corporate bond market, new issuance in 2013 was greater than that over the same period in 2012 — itself the strongest year on record. Year-to-date issuance in the European high-yield market had already exceeded that for the whole of 2012, although volumes remained lower than in the United States.

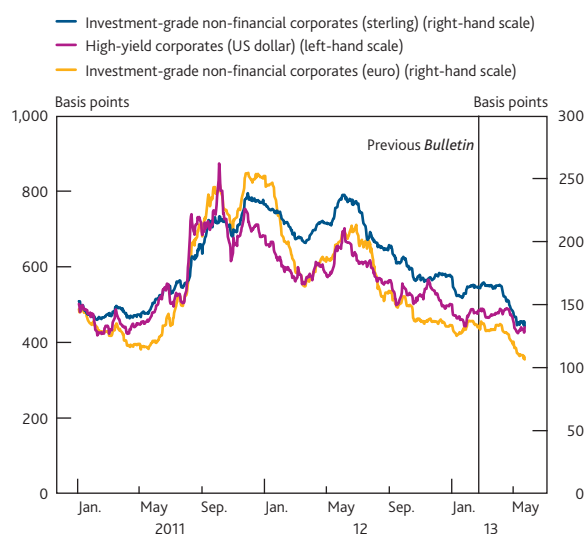
Chart 7 International equity indices^{(a)(b)}



Sources: Bloomberg and Bank calculations.

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

Chart 8 International corporate bond option-adjusted spreads



Source: Credit Suisse.

A number of contacts expressed the view that some asset prices were becoming disconnected from underlying economic fundamentals, but that while policy remained accommodative these trends were expected to continue. Growing speculation about the future path of US monetary policy had introduced a more cautious mood, however, and there was a pause in the rally of asset prices in some markets towards the end of the review period. That was particularly evident in Japanese equity prices, which fell sharply (**Chart 7**).

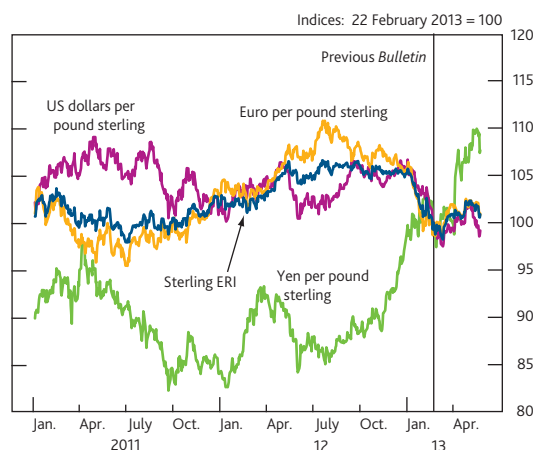
US issuance of collateralised loan obligations (CLOs) slowed in April, having grown rapidly earlier in the year. Contacts attributed the decline in the pace of issuance to the introduction of a capital surcharge on banks' CLO holdings by the Federal Deposit Insurance Corporation, which came into

effect on 1 April. A significant compression in lending margins was also reported to have made it difficult for arrangers of CLOs to engineer the returns typically expected of such instruments, tempering investor appetite. In Europe, CLO issuance continued to show signs of increasing, with the launch of the fourth European CLO in 2013, taking total issuance to US\$2 billion. But this remained a long way from the level of issuance at the peak of the market in 2006, and contacts reported that prospective changes by the European Banking Authority to rules on CLO origination would constrain the market from growing to pre-crisis levels.

Foreign exchange

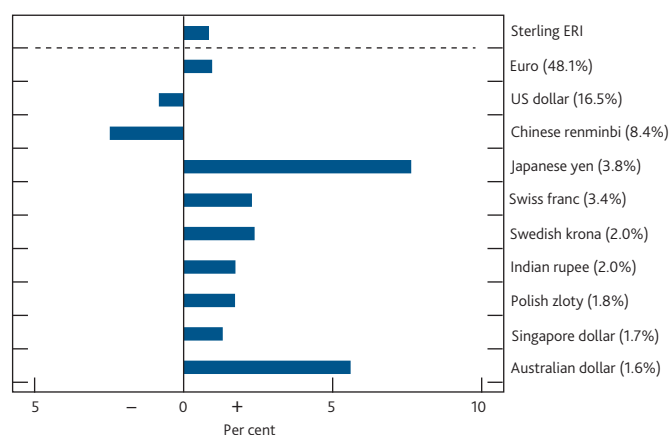
The sterling exchange rate index (ERI) remained at around the same level as it had been over the past few years (**Chart 9**). Changes in sterling exchange rates were relatively small, with the pound appreciating by 0.6% on a trade-weighted basis during the review period (**Chart 10**). The currency was down slightly against the dollar, reflecting the relatively robust improvement in US economic data compared with that of the United Kingdom, and growing expectations that the Federal Reserve might soon begin to slow the pace of monetary expansion. In contrast, and in common with a broad basket of currencies, sterling appreciated against the yen, following policy loosening by the Bank of Japan.

Chart 9 Sterling ERI and bilateral exchange rates



Sources: Bloomberg and Bank calculations.

Chart 10 Changes in sterling ERI and selected bilateral exchange rates since previous *Bulletin*^(a)



Sources: Thomson Reuters Datastream and Bank calculations.

(a) Numbers in parentheses indicate the trade weight of each bilateral exchange rate in the sterling ERI.

Operations

Operations within the Sterling Monetary Framework and other market operations

This section describes the Bank's operations within the Sterling Monetary Framework over the review period, and other market operations. 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 indexed long-term repo (ILTR) operations and the Extended Collateral Term Repo (ECTR) Facility; and (iii) the net impact of other sterling ('autonomous factor') flows across the Bank's balance sheet.

Operational Standing Facilities

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

Indexed long-term repo open market operations

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

During the review period, the Bank offered £5 billion via three-month ILTR operations on both 12 March and 9 April 2013, and £2.5 billion via a six-month operation on 14 May (**Table A**).

Table A Indexed long-term repo operations

	Total	Collateral set summary	
		Narrow	Wider
12 March 2013 (three-month maturity)			
On offer (£ millions)	5,000		
Total bids received (£ millions) ^(a)	10	0	10
Amount allocated (£ millions)	10	0	10
Cover	0.00	0.00	0.00
Clearing spread above Bank Rate (basis points)		n.a.	5
Stop-out spread (basis points) ^(b)	n.a.		
9 April 2013 (three-month maturity)			
On offer (£ millions)	5,000		
Total bids received (£ millions) ^(a)	5	0	5
Amount allocated (£ millions)	5	0	5
Cover	0.00	n.a.	5
Clearing spread above Bank Rate (basis points)		n.a.	5
Stop-out spread (basis points) ^(b)	n.a.		
14 May 2013 (six-month maturity)			
On offer (£ millions)	2,500		
Total bids received (£ millions) ^(a)	50	0	50
Amount allocated (£ millions)	50	0	50
Cover	0.02	0.00	0.02
Clearing spread above Bank Rate (basis points)		n.a.	15
Stop-out spread (basis points) ^(b)	n.a.		

(a) Due to the treatment of paired bids, the sum of bids received by collateral set may not equal total bids received.

(b) Difference between clearing spreads for wider and narrow collateral.

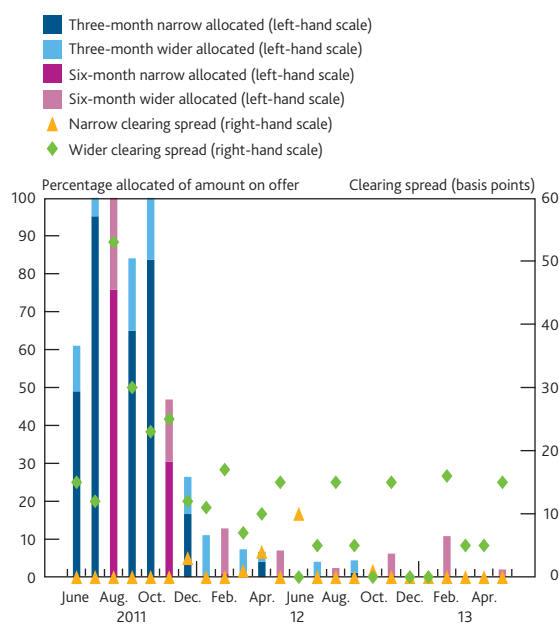
Usage remained limited and cover ratios continued to be at very low levels, in line with recent quarters. Short-term secured market interest rates remained below Bank Rate — the minimum bid rate in the ILTR operations — making repo markets a potentially cheaper source of liquidity. And the stock of outstanding APF gilt purchases financed by the creation of central bank reserves continued to provide a high level of liquidity in the banking system, reducing the need for counterparties to use the ILTR operations to meet their short-term liquidity needs (**Chart 11**).

Extended Collateral Term Repo Facility

The ECTR Facility is a contingent liquidity facility, designed to mitigate risks to financial stability arising from a market-wide shortage of short-term sterling liquidity.⁽¹⁾ The Bank reviews demand for use of the Facility on a monthly basis, in consultation with ECTR eligible institutions.⁽²⁾ Should the Bank determine that there is sufficient demand, it will hold an auction, normally on the third Wednesday of the month. Auctions will be pre-announced by the Bank on the preceding business day at 4 pm. In the three months to 24 May 2013, the Bank did not conduct any ECTR auctions.

Discount Window Facility

The Discount Window Facility (DWF) provides liquidity insurance to the banking system by allowing eligible banks to borrow gilts against a wide range of collateral. The average daily amount outstanding in the DWF between 1 October 2012

Chart 11 ILTR reserves allocation and clearing spreads

and 31 December 2012, lent with a maturity of 30 days or less, was £0 million, unchanged from the same period a year earlier.

Other operations

Funding for Lending Scheme

The Funding for Lending Scheme (FLS) was launched by the Bank and the Government on 13 July 2012. The FLS is designed to incentivise banks and building societies to boost their lending to UK households and non-financial companies, by providing term funding at low rates. The quantity each participant can borrow in the FLS, and the price it pays on its borrowing, is linked to its performance in lending to the UK real economy. The initial drawdown period for the FLS opened on 1 August 2012 and will run until 31 January 2014.

The Bank and HM Treasury announced an extension to the FLS on 24 April 2013. This will allow participants to borrow from the FLS until January 2015, with incentives to boost lending skewed towards SMEs. Participants' borrowing allowances will also be expanded to include lending by participating banking groups to certain non-bank providers of credit to the UK real economy. The extended drawdown period will run from 3 February 2014 to 30 January 2015, following the initial drawdown period.⁽³⁾

Feedback from market participants regarding the extension of the FLS has been positive. The Bank expects that a significant number of eligible banks and building societies will sign up to the extension.

(1) Further details are available at www.bankofengland.co.uk/markets/Pages/money/ectr/index.aspx.

(2) Further details are available at www.bankofengland.co.uk/markets/Documents/marketnotice121120.pdf.

(3) Further details of the extension to the FLS are available at www.bankofengland.co.uk/markets/Documents/marketnotice130424.pdf.

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

Week ending ^(a)	Secured commercial paper	Gilts	Corporate bond		Total ^(b)
			Purchases	Sales	
28 February 2013 ^{(c)(d)}	0	374,949	23		374,972
7 March 2013	0	0	0	0	0
14 March 2013	0	3,300	0	8	3,292
21 March 2013	0	2,200	0	3	2,197
28 March 2013	0	1,140	0	3	1,137
4 April 2013	0	0	0	0	0
11 April 2013	0	0	0	0	0
18 April 2013	0	0	0	6	-6
25 April 2013	0	0	0	0	0
2 May 2013	0	0	0	0	0
9 May 2013	0	0	0	0	0
16 May 2013	0	0	0	0	0
23 May 2013	0	0	0	0	0
30 May 2013	0	0	0	0	0
Total financed by a deposit from the DMO ^{(d)(e)}	–	–	–		0
Total financed by central bank reserves ^{(d)(e)}	–	374,984	2		374,986
Total asset purchases ^{(d)(e)}	–	374,984	2		374,986

(a) Week-ended amounts are for purchases in terms of the proceeds paid to counterparties, and for sales in terms of the value at which the Bank initially purchased the securities. All amounts are on a trade-day basis, rounded to the nearest million. Data are aggregated for purchases from the Friday to the following Thursday.

(b) Weekly values may not sum to totals due to rounding.

(c) Measured as amount outstanding as at 28 February 2013.

(d) In terms of proceeds paid to counterparties less redemptions at initial purchase price on a settled basis.

(e) Data may not sum due to assets maturing over the period and/or due to rounding.

The Bank publishes quarterly data showing, for each group participating in the FLS, the amount borrowed from the Bank, the net quarterly flows of lending to UK households and firms, and the stock of loans as at 30 June 2012. On 3 June 2013 the Bank published data showing that a total of 40 groups had signed up to the FLS, and a total of £16.5 billion had been drawn under the FLS as at 31 March 2013.⁽¹⁾

US dollar repo operations

Since 11 May 2010, in co-ordination with other central banks, the Bank has offered weekly fixed-rate tenders with a seven-day maturity to offer US dollar liquidity, and will continue to do so until further notice. Since 12 October 2011, the Bank has also offered US dollar tenders with a maturity of 84 days. This arrangement is currently scheduled to end on 1 February 2014, following an extension to these temporary arrangements on 13 December 2012. 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. The portfolio consists of sterling-denominated securities. Securities purchased by the Bank for this portfolio are normally held to maturity, though sales may be made from time to time, reflecting, for example, risk or liquidity management needs or changes in investment

policy. The portfolio currently includes around £3.5 billion of gilts and £0.4 billion of other debt securities. Over the review period, gilt purchases were made in accordance with the quarterly announcements on 2 January and 2 April 2013. See the box on page 167 for details.

Asset purchases⁽²⁾⁽³⁾

As of 24 May 2013, outstanding asset purchases financed by the issuance of central bank reserves under the APF were £375 billion, in terms of the amount paid to sellers. On 9 May, the MPC voted to maintain the stock of asset purchases financed by the issuance of central bank reserves at £375 billion. **Table B** summarises asset purchases by type of asset.

Gilts

On 7 February, the MPC voted to reinvest the cash flows of £6.6 billion associated with the redemption of the APF's holdings of the March 2013 gilt. This reinvestment was completed over six reverse auction operations between 11 March and 25 March 2013.⁽⁴⁾

(1) For further details see www.bankofengland.co.uk/markets/Pages/FLS/data.aspx.

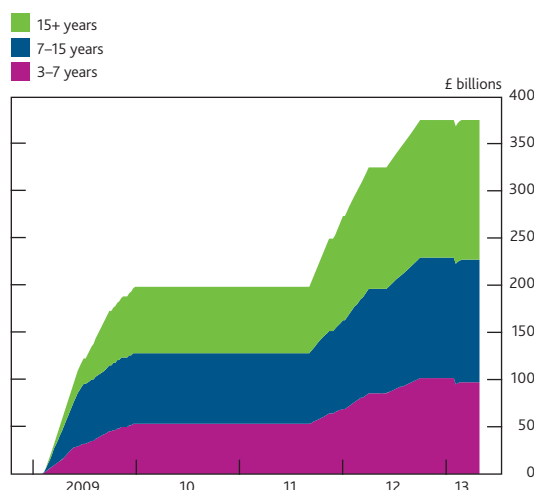
(2) For further discussion on asset purchases see the *Asset Purchase Facility Quarterly Report* available at www.bankofengland.co.uk/publications/Pages/other/markets/apf/quarterlyreport.aspx.

(3) Unless otherwise stated the cut-off date for data is 24 May 2013.

(4) Details of individual operations are available at www.bankofengland.co.uk/markets/Pages/apf/gilts/results.aspx.

The total amount of gilts purchased since the start of the asset purchase programme in March 2009, in terms of the amount paid to sellers, was £375.0 billion, of which £97.1 billion of purchases were in the 3–7 year residual maturity range, £129.9 billion in the 7–15 year residual maturity range and £149.9 billion with a residual maturity greater than 15 years (Chart 12).

Chart 12 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.

Gilt lending facility⁽¹⁾

The Bank continued to offer to lend some of its gilt holdings via the Debt Management Office (DMO) in return for other UK government collateral. In the three months to 31 March 2013, a daily average of £287 million of gilts was lent as part of the gilt lending facility. Average daily lending in the previous quarter was £283 million.

Corporate bonds

The Bank continued to offer to purchase and sell corporate bonds via the Corporate Bond Secondary Market Scheme, with purchases financed by the issue of Treasury bills and the DMO's cash management operations, in line with the arrangements announced on 29 January 2009.⁽²⁾

There were no purchases of corporate bonds during the review period. Sales of £20 million reduced the Bank's holdings of eligible corporate bonds to zero. The remaining £2 million of holdings have residual maturity of less than twelve months so will be allowed to mature. The Bank therefore placed sale operations on hold from 19 April 2013, with the intention of restarting them in the event of further purchases being made.

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⁾ The facility remained open during the review period but no purchases were made.

(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.

(2) The APF was initially authorised to purchase private sector assets financed by Treasury bills and the DMO's cash management operations. Its remit was extended to enable the Facility to be used as a monetary policy tool on 3 March 2009. All purchases of assets between 6 March 2009 and 4 February 2010 were financed by central bank reserves. All purchases of private sector assets since 4 February 2010 have been financed by the issuance of Treasury bills and the DMO's cash management operations. All purchases of gilts since 10 October 2011 have been financed by central bank reserves. The Chancellor's letter is available at www.hm-treasury.gov.uk/d/chx_letter_050712.pdf.

(3) The SCP facility is described in more detail in the Market Notice available at www.bankofengland.co.uk/markets/Documents/marketnotice120801.pdf.

Management of the Bank's sterling bond portfolio

The Bank of England Act 1998 requires eligible banks and building societies to hold a percentage of their eligible liabilities, above a minimum threshold, as non interest bearing deposits with the Bank. These are known as cash ratio deposits (CRDs). The Bank then invests CRDs in interest-yielding assets. The income generated by the CRD scheme is used by the Bank to fund its policy functions (though the Prudential Regulation Authority is funded separately).

The bulk of CRDs and the Bank's free capital and reserves are invested in a portfolio of sterling bonds. Holdings of gilt securities are currently £3.4 billion and holdings of other supranational sterling bonds were £0.4 billion as of 24 May 2013. Purchases related to the CRD scheme do not involve any increase in central bank reserves in the system, and are wholly unrelated to the exercise of monetary policy and the Asset Purchase Facility.

The Bank normally invests CRDs via regular trades with its gilt open market operations counterparties. Purchases are usually relatively small. This is because eligible liabilities do not vary much, so operations are largely driven by the need to invest maturing bonds and coupons inflows. The Bank announces a schedule for these purchases on a quarterly basis, publishing details of the amounts of the securities it will purchase on the first working day of each quarter of the Bank's financial year (September, December, March and June). Securities are typically acquired on a buy-and-hold basis in normal circumstances, though sales may be made from time to time, reflecting, for example, risk or liquidity management needs or changes in investment policy.

There is a requirement that the CRD scheme be reviewed every five years. The most recent review, conducted in early 2013, recommended that the ratio under the scheme be increased to 0.18%, from 0.11%. This change was approved by Parliament on 21 May 2013, and came into force on 3 June 2013.⁽¹⁾

The Government's decision to increase the CRD ratio was driven by two primary considerations. First, the change reflects the increased responsibilities of the Bank, including its role in the Special Resolution Regime, the introduction of new operational facilities and the associated management of risk and collateral, and the creation of the Financial Policy Committee. Second, it takes into account the impact of the current low level of gilt yields on the income generated by the scheme.

The changes set out in the 2013 review of the CRD scheme resulted in an increase in deposits of £1.53 billion. When

taking into account other flows, the Bank will need to invest up to an additional £1.6 billion in gilts during June 2013. As a result of the large amount to be invested, the Bank has decided to invest these additional deposits via a series of four reverse auctions. Under these auctions, the Bank will buy gilts across a 3–22 year range, with a view to match the broad maturity profile of the Government's existing gilts in issuance. The format of these auctions is similar to that used for gilt purchases conducted between January 2008 and March 2009.

These auctions are one-off operations and the Bank will revert to its regular approach to investing CRDs once they have been completed.

(1) For more information, see (1) The Cash Ratio Deposits (Value Bands and Ratio) Order 2013 (SI 2013/1189) made on 21 May 2013 and the related (2) The Bank of England (Call Notice) (Benchmark Rate of Interest) Order 2013 (SI 2013/721) made on 26 March 2013.

Report



A review of the work of the London Foreign Exchange Joint Standing Committee in 2012

This article reviews the work undertaken by the London Foreign Exchange Joint Standing Committee during 2012.

Introduction

The London Foreign Exchange Joint Standing Committee (FXJSC — hereon, 'the Committee') was established in 1973, under the auspices of the Bank of England, as a forum for banks and brokers to discuss broad market issues. The Committee comprises senior staff from many of the major banks operating in the wholesale foreign exchange (FX) market in London, representatives from brokers, trade associations including the Wholesale Markets Brokers' Association, the Association of Corporate Treasurers — representing corporate users of the foreign exchange market, the British Bankers' Association and the Financial Conduct Authority. A list of the members of the Committee as at end-2012, and a high-level organogram, can be found at the end of this article. The Committee held six meetings during 2012.

The evolving regulatory landscape for over-the-counter derivatives internationally, and the possible implications for the structure of FX markets, remained a key theme for the FXJSC in 2012. Guest speakers from Rolls Royce discussed the impact of the proposed regulatory changes on non-financial companies, while Currenex focused on non-wholesale FX markets. Developments in high-frequency trading were another area of discussion. The Committee also reviewed changes to the UK regulatory framework, in particular the creation of the new Prudential Regulation Authority and the remit of the Financial Policy Committee.

Non-Investment Products (NIPs) Code

The NIPs Code is a voluntary code of good market practice drawn up by market practitioners covering the FX market in the United Kingdom as well as the markets for wholesale bullion and wholesale deposits. The Code is published by the FXJSC, with contributions from the FXJSC operations and legal subgroups, the Sterling Money Markets Liaison Group and the Management Committee of the London Bullion Market Association for the relevant sections. The current version of the Code was published in November 2011.⁽¹⁾

Work of the FXJSC operations subgroup

The operations subgroup was established in 2002. Its members are operational managers from many major banks active in the London wholesale FX market as well as representatives from service providers and trade associations.

In 2012, the operations subgroup sponsored a variety of workstreams including reviewing FX option confirmation and affirmation timelines (and their relation to emerging regulations) as well as improving its own understanding of the details of FX settlement processes.

Over the course of the year, the subgroup received presentations on themes relating to regulatory developments relevant to the FX market; on the FXJSC's turnover survey; and on business continuity planning.

Work of the FXJSC legal subgroup

The legal subgroup was established in 2004 with some fourteen professional members providing in-house legal counsel for many of the major institutions involved in the wholesale FX market in London. The group met three times in 2012. It continued to make an important contribution through its provision of legal support to the work of the FXJSC main Committee and its operations subgroup. During 2012, the legal subgroup welcomed guest speakers on topical issues of regulatory change affecting the FX markets from the Federal Reserve Bank of New York, Allen & Overy and Clifford Chance as well as member firms. The group also discussed recent developments in the global FX market.

The legal subgroup continued to liaise with a range of other domestic and foreign legal committees to keep abreast of developments in FX markets.

(1) The NIPs Code can be accessed at:
www.bankofengland.co.uk/markets/Documents/forex/fxjsc/nipscode.pdf.

Work of the FXJSC chief dealers' subgroup

The chief dealers' subgroup was established in July 2005. Its membership in 2012 comprised twelve chief dealers active in the London FX market.

The subgroup met three times during 2012 to discuss conjunctural and structural developments in the FX market. Topics of discussion included market conditions, particularly in the euro area, the evolution of the offshore renminbi market and regulatory developments impacting on FX markets globally.

International co-operation

Liaison between the eight FX committees based in different international financial centres (London, Frankfurt for the euro area, Hong Kong, New York, Tokyo, Singapore, Sydney and Toronto) continued during the year. In March 2012, the ECB Foreign Exchange Contact Group hosted the fifth global meeting of the FX committees. Topics discussed included developments in FX best practices, international regulatory reform initiatives, and developments in FX transaction reporting, including the semi-annual turnover surveys.

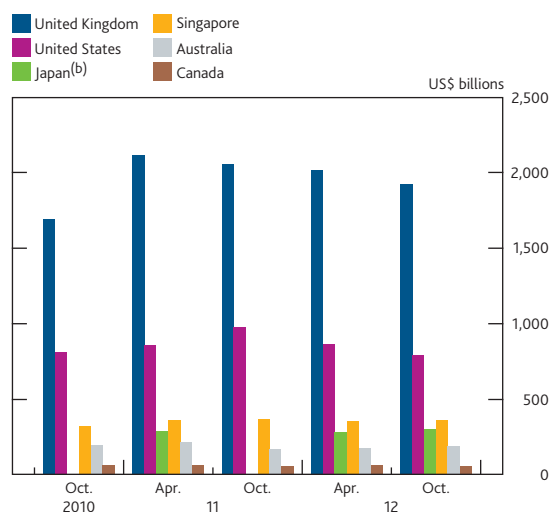
International survey results overview

Thirty banks representing the most active participants in the London FX market contributed to the 16th and 17th semi-annual surveys of FX turnover in London in April and October 2012. Total turnover fell 7% in the year to October 2012, 9% below the April 2011 survey high. This extended the fall recorded between April and October 2011 and took total turnover to its lowest level since October 2010, at US\$1.9 trillion per day (**Chart 1**).

Similarly, most other global centres reported a fall in total turnover in the year to October 2012: the United States registered the largest fall (down 19%), followed by the United Kingdom (down 7%), Canada (down 3%) and Singapore (down 2%). In contrast, turnover in Australia rose by 11%, driven by increased FX swap volumes. Between April and October 2012, global turnover trends were less consistent: the United States, United Kingdom and Canada reported falls in turnover, while slight increases were recorded in Singapore, Japan and Australia. Overall, global volumes between April and October 2012 were down 4%.

The broad upwards trend in FX spot turnover over the past few years showed signs of reversing in 2012. Average daily spot turnover in the United Kingdom fell to US\$678 billion in October 2012, 17% lower than the previous year (**Chart 2**). This was echoed in other global centres, and US spot turnover fell 33% in the year to October 2012. UK FX swaps turnover rose close to survey highs in April 2012, before falling 4% in

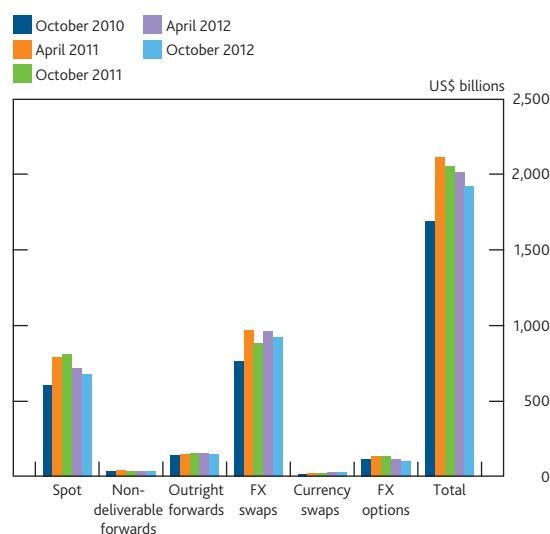
Chart 1 Global FX^(a) daily average turnover



Sources: Australian Foreign Exchange Committee, Canadian Foreign Exchange Committee, London Foreign Exchange Joint Standing Committee, New York Foreign Exchange Committee, Singapore Foreign Exchange Market Committee and Tokyo Foreign Exchange Market Committee.

- (a) This includes spot, non-deliverable forwards, outright forwards, FX swaps, currency swaps and FX options.
 (b) The Tokyo Foreign Exchange Market Committee began reporting turnover data on a semi-annual basis from October 2012. Previously they collected data annually in April.

Chart 2 UK daily average turnover by product

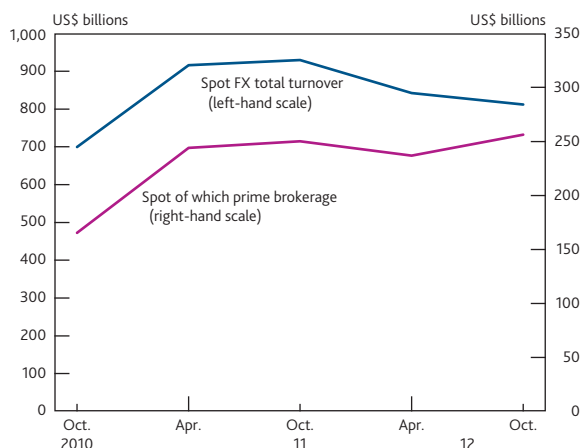


Source: London Foreign Exchange Joint Standing Committee.

October to US\$920 billion per day. FX option turnover fell 24% in the year to October 2012. Turnover in other products was little changed.

The fall in FX spot turnover can be partly attributed to a decline in deals with 'other banks', a category that includes smaller banks not participating in the FXJSC survey. The proportion of spot deals accounted for by other banks fell to 24% in October 2012, from 28% a year earlier. FX spot deals with 'other financial institutions' — such as hedge funds, central banks and sovereign wealth funds — also declined after rising markedly in recent years. Despite the overall fall in spot volumes, reported prime brokered spot transactions rose to a record high in October, accounting for almost a third of all spot trades during the month (**Chart 3**).

Chart 3 UK average daily spot and prime brokered spot turnover^(a)

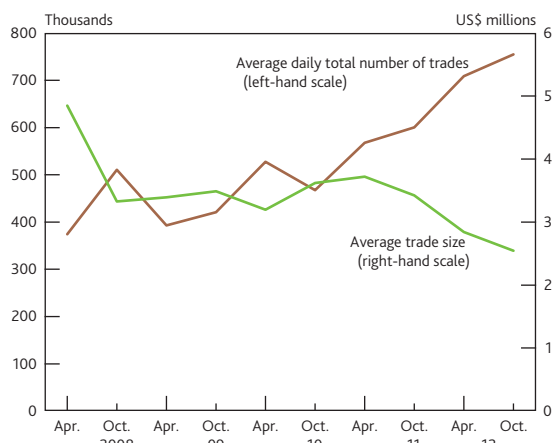


Source: London Foreign Exchange Joint Standing Committee.

(a) Prime brokerage data are not adjusted for double counting of reporting dealers.

The average daily number of trades continued to rise, increasing 6% in the six months to October 2012 (**Chart 4**). This was driven by an 8% increase in the number of spot trades, which combined with lower turnover reduced the average spot trade size to US\$1.0 million in October 2012 (from US\$1.5 million a year earlier), a survey low.

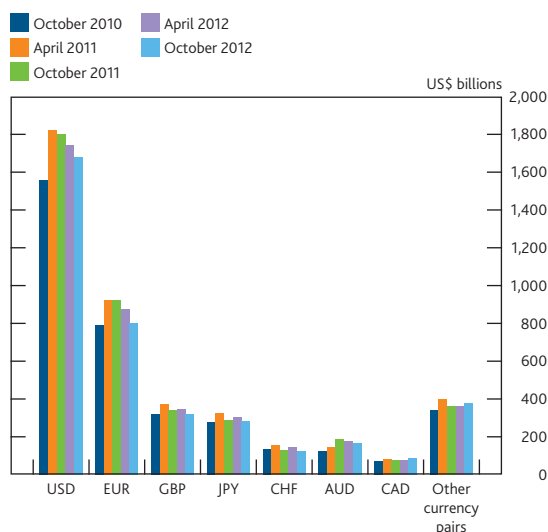
Chart 4 Average daily number of trades and average trade size (all products)



Source: London Foreign Exchange Joint Standing Committee.

Turnover in most major currencies fell broadly in line with the headline fall in FX turnover (**Chart 5**). The largest change was turnover in transactions against the euro, which as a proportion of total turnover, fell to a record survey low (41.7% of deals involved the euro in October 2012, versus 44.8% in October 2011). Turnover in sterling and US dollar pairs was little changed. Canadian dollar activity rose markedly: turnover in USD/CAD increased 10% from a year earlier. A number of emerging market currencies' turnover rose to record survey highs in October 2012, with particularly strong growth in the Indian rupee (up 71% from a year earlier) and

Chart 5 UK daily average turnover by currency



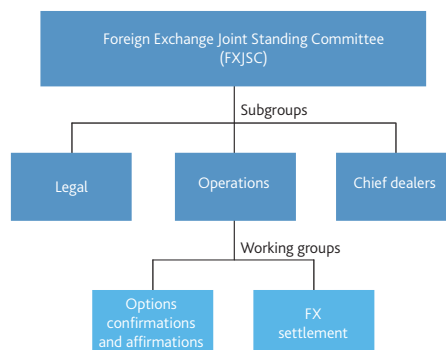
Source: London Foreign Exchange Joint Standing Committee.

South Korean won (up 48%). But turnover in some emerging market currencies fell, in particular the Turkish lira (down 31%).

Overall turnover concentration for the survey was broadly similar to that recorded in October 2011; the top five banks participating in the survey accounted for 51% of overall turnover. Between April and October 2012 there was a marked increase in turnover concentration for spot trades, and for the first time since the survey was launched in 2004, the top three spot contributors accounted for over half of total turnover.

The forthcoming FXJSC survey results for April 2013 will be published in Summer 2013.

Figure 1 Foreign Exchange Joint Standing Committee: structure



Tables of membership at end-2012

Members of the London Foreign Exchange Joint Standing Committee as at December 2012

Name	Firm/organisation
Brian Welch	Association of Corporate Treasurers
Christopher Bae	Bank of America Merrill Lynch
Rob Loewy	Bank of China
Richard Gill	Bank of New York Mellon
Mike Bagguley	Barclays
Eric Auld	BNP Paribas
Andrew Rogan	British Bankers' Association
James Bindler	Citi
Vincent Leclercq	Crédit Agricole CIB
Zar Amrolia	Deutsche Bank
Heather Pilley	Financial Services Authority
Phil Weisberg	FXAll
Nick Burgin	Goldman Sachs
Frederic Boillereau	HSBC
Gil Mandelzis	ICAP
Troy Rohrbaugh	JPMorgan Chase
Tim Carrington	Royal Bank of Scotland
James Potter	Tullett Prebon
George Athanasopoulos	UBS
Alex McDonald	Wholesale Markets Brokers' Association
Chris Allen	Barclays, Chair, legal subgroup
Jacqueline Joyston-Bechal	Bank of England, Secretariat, legal subgroup
Graeme Munro	JPMorgan Chase, Chair, operations subgroup
Nick Cox	BlackRock, Chair, FX investor subgroup
Michael Cross (Chair)	Bank of England
Elizabeth Wrigley	Bank of England
Grigoria Christodoulou, Jack Garrett-Jones and Sumita Ghosh (Secretariat)	Bank of England

Members of the London Foreign Exchange Joint Standing Committee chief dealers' subgroup as at December 2012

Name	Firm/organisation
Tatsuro Mitsui	Bank of Tokyo-Mitsubishi UFJ
Bob De Groot	BNP Paribas
Rohan Ramchandani	Citi
Danny Wise	Credit Suisse
Jon Pierce	Goldman Sachs
Stuart Scott	HSBC
Richard Usher	JPMorgan Chase
Ed Monaghan	Royal Bank of Canada
James Pearson	Royal Bank of Scotland
Chris Freeman	State Street
Niall O'Riordan	UBS
Martin Mallett (Chair)	Bank of England
James O'Connor	Bank of England

Members of the London Foreign Exchange Joint Standing Committee operations subgroup as at December 2012

Name	Firm/organisation
Nigel Brigden	Association of Foreign Banks
Louise Lee	Bank of England
Pamela Bald	Bank of New York Mellon
Duncan Lord	Barclays
Andrew Rogan	British Bankers' Association
Leigh Meyer	Citi
John Hagon	CLS Services
Nick Doddy	Deutsche Bank
Luke Cunningham	HSBC
Craig Stirling	Morgan Stanley
Stephen Nankivell	Nomura
Jeremy Hill	Royal Bank of Scotland
Ian Cowell	State Street
Joe Halberstadt	SWIFT
Daniel Haid	UBS
Graeme Munro (Chair)	JPMorgan Chase
Jacqueline Joyston-Bechal	Bank of England, Secretariat, legal subgroup
Grigoria Christodoulou, Andrew Forrest, Jack Garrett-Jones and Sumita Ghosh (Secretariat)	Bank of England

Members of the London Foreign Exchange Joint Standing Committee legal subgroup as at December 2012

Name	Firm/organisation
Gaynor Wood	Bank of America
Helen Oldfield	Barclays
Richard Haynes	Citi
Simon Goldsworthy	Deutsche Bank
Anne Moore-Williams	Financial Services Authority
Dan Parker	Goldman Sachs
Christian Bettley	HSBC
Patrick Palmer	JPMorgan Chase
Barra Little	Morgan Stanley
Joanna Wormell	Royal Bank of Scotland
Alistair Cleverly	Standard Chartered
Richard Lamb	UBS
Chris Allen (Chair)	Barclays
Jacqueline Joyston-Bechal (Secretariat)	Bank of England

Summaries of speeches and working papers



Bank of England speeches

A short summary of speeches and *ad hoc* papers made by Bank personnel since publication of the previous *Bulletin* are listed below.

Rebalancing

Charlie Bean, Deputy Governor, May 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech662.pdf

Speaking at the Official Monetary and Financial Institutions Forum, Deputy Governor Charlie Bean considered the imbalances that led to the global financial crisis and reviewed progress in returning to balance. He described three types of imbalance: those within the UK economy, those between eurozone members and those across the global economy. It remained to be seen whether a new balance would be achieved through persistently weak demand in deficit countries, or by stronger domestic demand in surplus countries and a realignment of exchange rates. In part that would depend upon how much damage the crisis had inflicted on economies' supply capacity. It would also depend upon the effectiveness of G20 attempts to co-ordinate economic policies. That process had been hampered because participating countries did not take account of spillovers to other economies. But some aspects had worked well, including the progress made in redrawing the scope of global financial regulation.

A new regulatory relationship: the Bank, the financial system and the wider economy

Paul Tucker, Deputy Governor, May 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech661.pdf

Paul Tucker reviewed the changing relationship between central banks and the business community. He focused on three facets of the relationship. First, the supervision of the safety and soundness of banks, and the roles of rules and discretion in relation to that. Second, expectations of what the central bank can and should achieve as a macro policymaker, and how society can monitor that role. And third, he considered how the central bank's relationship with the business community plays out in a global setting. Concluding, he said central banks need to be clear about what they can and cannot do: 'we need to operate consistently within our remit; and above all we must be sufficiently transparent to make proper accountability realistic. That is what trust requires, and we are in the business of trust — trust in the value of money'.

The outlook for the UK economy

Paul Fisher, Executive Director for Markets, May 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech659.pdf

Paul Fisher discussed why the recovery from recession is likely to continue to be prolonged. It is as if the different sectors in society — households, businesses, banks and the government — have decided that their future financial positions (their 'permanent income') on average will be worse than anticipated before the crisis. The process of balance sheet repair will weigh on growth until more of the real adjustments have been made. Paul's best guess was that the United Kingdom is around two thirds to three quarters of the way through that adjustment process, varying both across and within sectors.

One particular reaction to the weaker prospects for income has been for people to price themselves in to work to avoid unemployment. This helps explain why unemployment has stayed lower than expected given the weakness of output growth and why real wage growth has been weak.

He argued that inflation has been above target for several years because of cost shocks, rather than excess domestic demand growth. In his view, if quantitative easing has contributed to inflation being somewhat over target now that was preferable to the alternative of a deeper recession and a greater risk of deflation.

Going forward, monetary accommodation should be helpful to balance sheet rebuilding, but there are limits to the extent that monetary policy can stimulate real growth. In conclusion, Paul said his recent policy votes have been driven by the need to continue supporting the required real adjustments, but cautiously, so as not to risk de-anchoring inflation expectations.

Resolution and future of finance

Paul Tucker, Deputy Governor, May 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech658.pdf

Paul Tucker outlined the key steps necessary to further the progress already made by the international regulatory community on the orderly resolution of large and complex financial firms since the crisis. He explained how resolution is essential to solving the problem of 'too big to fail'. Over recent months there has been marked convergence in how the world's key authorities plan to approach resolution. In bringing

this to fruition, first, the authorities are going to need to decide how much gone-concern loss-absorbing debt systemically important financial institutions need to have in issue and from which parts of the group. Second, regulation limits on holdings of bank bonds is needed to ensure that the imposition of losses on bond holders does not cause systemic distress through contagion. Third, bespoke restructurings of many financial groups are needed in order to achieve resolvability. Fourth, there is need for clarity about where different types of creditor stand, particularly whether uninsured deposits should rank alongside senior unsecured bonds or whether they should have preferential status. But, in the short term, the most important next step is to finalise the EU resolution directive.

Monetary policy and monetary policy making

Martin Weale, Monetary Policy Committee member, May 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech656.pdf

In a speech delivered at the British-American Business Council Transatlantic Conference, Martin Weale set out his thoughts on monetary policy making in the current circumstances. He looked at the new remit, in particular the trade-off between controlling inflation and avoiding undue fluctuations in output, and considered how this is currently impacting the actions of the Monetary Policy Committee. He concluded that 'a reasonable trade-off between inflation volatility and output volatility means that, in making our policy decisions, we are very conscious that policy affects output as well as inflation and that periods of below-normal output have very substantial costs associated with them'. However, he also reiterated that a long period of above-target inflation may lead to people losing confidence in the policy: 'Failure to damp sufficiently any new shock pushing up on inflation would result in inflation expectations becoming more entrenched. That, in my view, limits the scope we have to support demand at the current juncture.'

Constraining discretion in bank regulation

Andrew Haldane, Executive Director for Financial Stability, May 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech657.pdf

In this speech, Andrew Haldane called for an end to self-regulation in the financial sector. He likened banks' use of internal models for determining their capital needs to students marking their own exams.

Since the original Basel Accord in 1993, risk weights have been on a persistent downward trend, while leverage has been on the rise. And the variation between banks is stark: some banks

are shown to hold orders of magnitude less capital than their competitors for identical portfolios. Banks have got no better at managing risk, but they have got better at gaming the system. If anything, this has become easier as regulation has got more complex.

This has had a number of unintended consequences: 'red tape' costs to society; unequal regulatory standards between small and large banks; and reduced transparency and increased uncertainty over banks' true capital adequacy. Fortunately, the international regulatory community has slowly begun to recognise and address these problems. Three elements of reform are needed: increased bank transparency, including the Enhanced Disclosure Task Force; imposing floors as a constraint on banks' internal models; and increasing the prominence of leverage ratios as a simpler, more robust metric.

Making greater use of simple, prudent regulatory metrics could restore faith, hope and clarity to the financial system to the benefit of banks, investors and regulators alike.

Forecast errors

Ben Broadbent, Monetary Policy Committee member, May 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech653.pdf

In a speech to the Mile End Group of Queen Mary, Ben Broadbent explained why a fair assessment of forecasts takes time and cannot be made after a few observations. This is particularly true if economic series are noisy and unpredictable, or if one is trying to predict rare events such as financial crises. Such genuine unpredictability means forecasting errors are unavoidable and may at times be large. Limited information about structural breaks also means that forecasting errors could be serially correlated. Because of these constraints, he argued that forecasters should always be aware of their limitations, and those who judge forecasts less inclined to view each forecast 'error' as a mistake. Instead, forecasters should be continually challenged to improve their techniques. He concluded by pointing out that forecasts — being judgements about future risks — are unavoidable in policymaking, and have a key role in the Monetary Policy Committee's communication to the public.

The new approach to financial regulation

Andrew Bailey, Deputy Governor, May 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech654.pdf

Andrew Bailey spoke at the Chartered Banker Dinner in Edinburgh regarding 'the new approach to financial regulation'.

In this speech, Andrew spoke about the importance of the services provided by retail banks, and their purpose in supporting activity in the real economy.

Andrew gave an overview of the model for supervision, and how it was important to learn the issues from the past crisis about ensuring the right balance between prudential and conduct supervision. Finally, Andrew spoke about the recommendation of the Bank of England's Financial Policy Committee that the major UK banks, as a group, should increase their equity capital resources. In this context, Andrew explained the objectives of this exercise: to increase the resilience of the UK banking system and to support the creation of credit in the UK economy.

The UK economy: the road ahead?

Ian McCafferty, Monetary Policy Committee member, April 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech651.pdf

In this speech, Ian McCafferty reflected on the recovery and the role of policy. Ian noted that UK economic growth had disappointed, turning out even weaker than forecast in 2010, although the economy would have fared significantly worse if the Bank had not responded with unconventional easing.

But a number of factors made Ian hopeful for a modest pickup in growth. First, credit conditions were improving, in part due to the Funding for Lending Scheme. Second, there was evidence of an improvement in business sentiment, which would help to support investment. And third, the international outlook was improving.

Ian considered the outlook for inflation to be more concerning. In particular, the combination of a slow recovery with persistent above-target inflation posed a real challenge to the Monetary Policy Committee (MPC). An assessment of the current shocks to inflation showed that it was appropriate to look through them, thus bringing inflation back to target only slowly, and that this was entirely consistent with the MPC's flexible inflation target.

Monetary policy: many targets, many instruments. Where do we stand?

Sir Mervyn King, Governor, April 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech649.pdf

The Governor began by noting the lessons learnt during the crisis about the objectives of monetary policy. The crisis had shown that financial vulnerabilities could build even while output was growing steadily and inflation was low and stable.

That meant that macroeconomic policy could face an additional trade-off between ensuring the soundness of the financial system in the medium term, and keeping output in line with potential output and inflation on target in the near term.

The Governor went on to reflect on the role of central banks and challenges to central bank independence. Despite there being limits to what they could achieve in current circumstances, central banks had taken extraordinary measures in response to the crisis. Such measures could risk moving into territory more usually associated with fiscal policy and, in doing so, put at risk hard-won central bank independence.

The Governor noted three threats to central bank independence. First, there was the risk of appearing to promise too much, or allowing too much to be expected of central banks. Second, at the zero lower bound there was no clear distinction between monetary and fiscal policy. And third, the discharge of new responsibilities for macroprudential policy, and in the case of the Bank of England, microprudential regulation, could not be divorced from the government in the same way as is possible for monetary policy.

In responding to this more complex post-crisis environment, central banks should keep sight of three important principles. First, it was right that elected politicians and parliaments should decide on the objectives of policy. Second, if the central bank was to achieve price stability, it needed to be sufficiently independent. And third, in order to protect that independence, its limits should be very clearly circumscribed and central banks should be exceptionally careful with decisions that put public funds at risk. The challenge remained to make 'constrained discretion' work in practice.

Inflation, employment and monetary policy in the United Kingdom and the United States

David Miles, Monetary Policy Committee member, April 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech647.pdf

In a speech delivered at the 2013 Economic Conference of the Federal Reserve Bank of Boston, Professor Miles considered how significant might be the differences in central banks' objectives in shaping monetary policy. He discussed differences in the remits of the Federal Reserve, which explicitly has a dual mandate targeting both inflation and employment, and of the Bank of England, which does not. He argued that in the current economic environment, monetary policy may be rather insensitive to the way in which a central bank's objectives over growth and employment sit alongside an inflation target. With the help of an economic model,

Professor Miles concluded that a wide range of weights placed on real variables — output and employment — in the central bank's objectives can today give rise to rather similar monetary policies. In his view this explained 'why the Fed and the Bank of England, two central banks with rather different formal objectives, have set monetary policy in such similar — and extraordinary — ways'.

Turning the red tape tide

Andrew Haldane, Executive Director for Financial Stability, April 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech646.pdf

In these remarks, Andrew Haldane drew parallels between regulatory and legal frameworks. He highlighted the path dependence of such complex, evolutionary systems and suggested that they sometimes resulted in suboptimally complex outcomes.

Financial regulation has been shaped by events through history and the cumulative consequence of each response is a steadily rising tide of red tape and regulation — an increasingly complex rulebook. Maintaining such frameworks is a high-cost activity and they tend ultimately not to solve the problems for which they were a response. Evidence from the tax code suggests that in filling old cracks, complex rulebooks may in fact increase the likelihood of new loopholes emerging. Moreover, complex regulatory frameworks tend to be inequitable. This is why big banks typically hold far less capital than smaller banks.

In the light of the financial crisis, there are signs of the red tape tide beginning to turn in the area of financial regulation. Tax reform has been successful when it has started simple and afresh, rather than removing layers of complexity one at a time. Financial regulation is no different.

Inflation and growth: what role for monetary policy?

Spencer Dale, Executive Director and Chief Economist, March 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech643.pdf

In a speech to the Asian and Chinese Business Associations of the London Chamber of Commerce, Spencer Dale discussed the flexibility of monetary policy in the United Kingdom to support growth and employment as well as to control inflation.

Spencer cited the extraordinary monetary stimulus imparted by the MPC over recent years, in the context of rates for CPI inflation that have typically been above the mandated

2% target, as evidence that the Committee has gone to great lengths to support output growth. This was entirely consistent with the remit given to the MPC by the Government. But such flexibility was only possible while the MPC's commitment of returning inflation to target was credible. A focus on price stability therefore remains as important as ever.

Spencer went on to explain why he is wary of arguments for why additional demand stimulus may not have much effect on inflation at present.

Nominal income targets: an old wine in a new bottle

Charlie Bean, Deputy Governor, February 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech640.pdf

Speaking at the Institute of Economic Affairs State of the Economy Conference, Deputy Governor Charlie Bean considered the arguments for and against a nominal income target. Given how inflation targeting had operated in practice, he suggested that nominal income growth and inflation targets generated similar responses to both aggregate demand and aggregate supply shocks. The main difference between the two related to communication. Targeting the level of nominal income would, however, involve rather different policy settings to an inflation target. Such a target may be a useful way to influence expectations, but its merits were less clear in the presence of negative supply shocks. Moreover, it meant tolerating periods of higher-than-normal inflation and risked generating financial imbalances. He concluded that it was sensible to review the monetary framework from time to time, but there was a danger in expecting too much from monetary policy.

Current issues in monetary policy

Paul Fisher, Executive Director for Markets, February 2013.

www.bankofengland.co.uk/publications/Documents/speeches/2013/speech639.pdf

Paul Fisher explained the role of the Bank of England's balance sheet in enabling it to deliver its core functions. The ability to control the amount of narrow money in the economy, and/or its price, is the fundamental tool the Bank has to implement monetary policy. He also noted that the Bank can influence the supply and price of credit. For example, by acting as 'market maker of last resort', it has supported the commercial paper and corporate bond markets. But the power to intervene is one to use cautiously given the risk of creating distortions.

Paul said he did not believe that quantitative easing is noticeably less powerful than previously. Having voted for a £25 billion extension of asset purchases at the February 2013

MPC meeting, he thought that could be the first instalment of a more prolonged run of purchases, which could be accelerated or stopped as the economic outlook developed.

On the Funding for Lending Scheme, he said that the first stage — cutting banks' funding costs — had been remarkably successful. The next stage — lower funding costs feeding through to lower borrowing rates — was also happening. The final stage — increases in the quantity of credit — would take

time to work through from applications to approvals to actual lending. The eventual impact will depend on credit demand and the creditworthiness of borrowers.

Although such policies can help provide the foundations for growth by easing the path for necessary real adjustments, ultimately growth will depend on real factors such as expectations of real income and productivity.

The Bank of England's forecasting platform: COMPASS, MAPS, EASE and the suite of models

Summary of Working Paper No. 471 Stephen Burgess, Emilio Fernandez-Corugedo, Charlotta Groth, Richard Harrison, Francesca Monti, Konstantinos Theodoridis and Matt Waldron

Since Autumn 2011 the Monetary Policy Committee (MPC) has used a new forecasting platform to help put together its quarterly economic forecasts. The MPC's judgement is paramount when agreeing their forecasts, but the process also relies on a range of economic models. The new forecast platform includes a central organising model (called COMPASS),⁽¹⁾ an enhanced suite of forecasting models and new IT tools to assist the forecast process. This paper provides detailed documentation of each of these components of the platform and has been published to elicit comments and further debate.

COMPASS is a 'New Keynesian' general equilibrium model and shares many features with similar models in use at other central banks and policy institutions. Prices and wages are assumed to be sticky, so monetary policy affects output and employment in the short to medium term. Expectations of future events, including the actions of monetary policy makers, can also affect current output and inflation. COMPASS provides the basic set of relationships that articulate core macroeconomic mechanisms and provides a disciplining framework by ensuring that forecasts are internally consistent. COMPASS itself only provides forecasts for fifteen variables: 'key' macroeconomic series such as GDP, inflation, interest rates, trade, wages and consumption.

COMPASS is smaller and simpler than previous central models used at the Bank of England. This makes it easier to estimate and to use, enabling Bank staff to produce timely updates to the MPC's forecast in the weeks ahead of an *Inflation Report*.

But it also implies some sacrifice of detailed economic structure. To compensate for that, the suite of models is very much an equal partner in the new forecasting platform. The suite contains over 50 separate models, covering a huge range of different frameworks and ways of thinking about the economy. Different models can be selected from the suite, depending on what insight is required. The suite provides the means to cross-check the projections in COMPASS, expand the forecast to cover more variables, and challenge the key judgements in the forecast.

This paper offers various illustrations of how the suite of models can be used to inform the forecast. Although COMPASS does not include an explicit role for a banking sector, there are several models in the suite that can be used to consider the impact of credit on the economy, and so explore the effects of an impaired banking sector. The forecast platform can be used to estimate the underlying shocks driving the economy and that can be a useful framework to interpret recent events. It is also possible to use the platform to explore the impact of different paths for monetary policy on the economy.

The forecasting platform is likely to evolve over time. The parameter values in COMPASS will be re-estimated on a regular basis, and the structure of the model may be modified as Bank staff learn more about its performance. The Bank's vision for the suite of models is also a dynamic one: models should be added or removed as economic modelling progresses and also as the questions facing policymakers change.

(1) The Central Organising Model for Projection Analysis and Scenario Simulation.

Appendices



Contents of recent Quarterly Bulletins

The articles and speeches that have been published recently in the *Quarterly Bulletin* are listed below. Articles from May 1994 onwards are available on the Bank's website at:

www.bankofengland.co.uk/publications/Pages/quarterlybulletin/default.aspx.

Articles and speeches

Speeches are indicated by (S)

2008 Q3

- Market expectations of future Bank Rate
- Globalisation, import prices and inflation: how reliable are the 'tailwinds'?
- How has globalisation affected inflation dynamics in the United Kingdom?
- The economics of global output gap measures
- Banking and the Bank of England (S)
- The Governor's speech at the Mansion House (S)
- A tale of two cycles (S)
- The financial cycle and the UK economy (S)
- The credit crisis: lessons from a protracted 'peacetime' (S)
- Financial innovation: what have we learnt? (S)
- Global inflation: how big a threat? (S)
- Remarks on 'Making monetary policy by committee' (S)

2008 Q4

- The financial position of British households: evidence from the 2008 NMG Research survey
- Understanding dwellings investment
- Price-setting behaviour in the United Kingdom
- Monetary Policy Roundtable

2009 Q1

- Price-setting behaviour in the United Kingdom: a microdata approach
- Deflation

2009 Q2

- Quantitative easing
- Public attitudes to inflation and monetary policy
- The economics and estimation of negative equity
- A review of the work of the London Foreign Exchange Joint Standing Committee in 2008

2009 Q3

- Global imbalances and the financial crisis
- Household saving
- Interpreting recent movements in sterling

- What can be said about the rise and fall in oil prices?
- Bank of England *Systemic Risk Survey*
- Monetary Policy Roundtable

2009 Q4

- The financial position of British households: evidence from the 2009 NMG survey
- Accounting for the stability of the UK terms of trade
- Recent developments in pay settlements

2010 Q1

- Interpreting equity price movements since the start of the financial crisis
- The Bank's balance sheet during the crisis
- Changes in output, employment and wages during recessions in the United Kingdom
- Monetary Policy Roundtable

2010 Q2

- Collateral risk management at the Bank of England
- The impact of the financial crisis on supply
- Public attitudes to inflation and monetary policy
- A review of the work of the London Foreign Exchange Joint Standing Committee in 2009

2010 Q3

- Understanding the price of new lending to households
- Interpreting the world trade collapse
- What can we learn from surveys of business expectations?
- Residential property auction prices
- Chief Economists' Workshop: state-of-the-art modelling for central banks
- Monetary Policy Roundtable

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

Bank of England publications

The Bank of England publishes information on all aspects of its work in many formats. Listed below are some of the main Bank of England publications. For a full list, please refer to our website:

www.bankofengland.co.uk/publications/Pages/default.aspx.

Working papers

An up-to-date list of working papers is maintained on the Bank of England's website at:

www.bankofengland.co.uk/publications/Pages/workingpapers/default.aspx

where abstracts of all papers may be found. Papers published since January 1997 are available in full, in portable document format (PDF).

No. 459 Inflation and output in New Keynesian models with a transient interest rate peg (July 2012)
Charles T Carlstrom, Timothy S Fuerst and Matthias Paustian

No. 460 Too big to fail: some empirical evidence on the causes and consequences of public banking interventions in the United Kingdom (August 2012)
Andrew K Rose and Tomasz Wieladek

No. 461 Labour market institutions and unemployment volatility: evidence from OECD countries (August 2012)
Renato Faccini and Chiara Rosazza Bondibene

No. 462 Reputation, risk-taking and macroprudential policy (October 2012)
David Aikman, Benjamin Nelson and Misa Tanaka

No. 463 The international transmission of volatility shocks: an empirical analysis (October 2012)
Haroon Mumtaz and Konstantinos Theodoridis

No. 464 International policy spillovers at the zero lower bound (October 2012)
Alex Haberis and Anna Lipińska

No. 465 Size and complexity in model financial systems (October 2012)
Nimalan Arinaminpathy, Sujit Kapadia and Robert May

No. 466 QE and the gilt market: a disaggregated analysis (October 2012)
Martin Daines, Michael A S Joyce and Matthew Tong

No. 467 Factor adjustment costs: a structural investigation (October 2012)
Haroon Mumtaz and Francesco Zanetti

No. 468 Using Shapley's asymmetric power index to measure banks' contributions to systemic risk (October 2012)
Rodney J Garratt, Lewis Webber and Matthew Willison

No. 469 High-frequency trading behaviour and its impact on market quality: evidence from the UK equity market (December 2012)
Evangelos Benos and Satchit Sagade

No. 470 Long and short-term effects of the financial crisis on labour productivity, capital and output (January 2013)
Nicholas Oulton and María Sebastián-Barriel

No. 471 The Bank of England's forecasting platform: COMPASS, MAPS, EASE and the suite of models (May 2013)
Stephen Burgess, Emilio Fernandez-Corugedo, Charlotta Groth, Richard Harrison, Francesca Monti, Konstantinos Theodoridis and Matt Waldron

External MPC Unit discussion papers

The MPC Unit discussion paper series reports on research carried out by, or under supervision of, the external members of the Monetary Policy Committee. Papers are available from the Bank's website at:

www.bankofengland.co.uk/publications/Pages/externalmpcpapers/default.aspx.

The following papers have been published recently:

No. 38 Estimation of short dynamic panels in the presence of cross-sectional dependence and dynamic heterogeneity (December 2012)
Robert Gilhooly, Martin Weale and Tomasz Wieladek

No. 39 Fiscal multipliers and time preference (January 2013)
Gilberto Marcheggiano and David Miles

Monetary and Financial Statistics

Monetary and Financial Statistics (Bankstats) contains detailed information on money and lending, monetary and financial institutions' balance sheets, banks' income and expenditure, analyses of bank deposits and lending, external business of banks, public sector debt, money markets, issues of securities, financial derivatives, interest and exchange rates, explanatory notes to tables and occasional related articles.

Bankstats is published on a monthly basis, free of charge, on the Bank's website at:

www.bankofengland.co.uk/statistics/Pages/bankstats/default.aspx.

Further details are available from: Leslie Lambert, Statistics and Regulatory Data Division, Bank of England: telephone 020 7601 4544; fax 020 7601 5395; email leslie.lambert@bankofengland.co.uk.

Articles that have been published in recent issues of *Monetary and Financial Statistics* can also be found on the Bank's website at:

www.bankofengland.co.uk/statistics/Pages/ms/articles.aspx.

Financial Stability Report

The *Financial Stability Report* is published twice a year under the guidance of the Financial Policy Committee (FPC). It covers the Committee's assessment of the outlook for the stability and resilience of the financial sector at the time of preparation of the *Report*, and the policy actions it advises to reduce and mitigate risks to stability. The Bank of England intends this publication to be read by those who are responsible for, or have interest in, maintaining and promoting financial stability at a national or international level. It is of especial interest to policymakers in the United Kingdom and abroad; international financial institutions; academics; journalists; market infrastructure providers; and financial market participants. The *Financial Stability Report* is available at:

www.bankofengland.co.uk/publications/Pages/fsr/default.aspx.

Payment Systems Oversight Report

The *Payment Systems Oversight Report* provides an account of how the Bank is discharging its responsibility for oversight of recognised UK payment systems. Published annually, the *Oversight Report* identifies the most significant payment system risks to financial stability and assesses progress in reducing these risks. Copies are available on the Bank's website at:

www.bankofengland.co.uk/publications/Pages/psor/default.aspx.

Handbooks in central banking

The series of *Handbooks in central banking* provide concise, balanced and accessible overviews of key central banking topics. The *Handbooks* have been developed from study materials, research and training carried out by the Bank's Centre for Central Banking Studies (CCBS). The *Handbooks* are therefore targeted primarily at central bankers, but are likely to be of interest to all those interested in the various technical and analytical aspects of central banking. The *Handbook* series also includes '*Technical Handbooks*' which are aimed more at specialist readers and often contain more methodological material than the *Handbooks*, incorporating the experiences and expertise of the author(s) on topics that address the problems encountered by central bankers in their day-to-day work. All the *Handbooks* are available via the Bank's website at:

www.bankofengland.co.uk/education/Pages/ccbs/handbooks/default.aspx.

The framework for the Bank of England's operations in the sterling money markets (the 'Red Book')

The 'Red Book' describes the Bank of England's framework for its operations in the sterling money markets, which is designed to implement the interest rate decisions of the Monetary Policy Committee while meeting the liquidity needs, and so contributing to the stability of, the banking system as a whole. It also sets out the Bank's specific objectives for the framework, and how it delivers those objectives. The framework was introduced in May 2006. The 'Red Book' is available at:

www.bankofengland.co.uk/markets/Documents/money/publications/redbookjune2012.pdf.

Cost-benefit analysis of monetary and financial statistics

The handbook describes a cost-benefit analysis (CBA) framework that has been developed within the Bank to ensure a fair balance between the benefits derived from good-quality statistics and the costs that are borne by reporting banks. Although CBA is a well-established approach in other contexts, it has not often been applied to statistical provision, so techniques have had to be adapted for application to the Bank's monetary and financial statistics. The handbook also

discusses how the application of CBA has enabled cuts in both the amount and the complexity of information that is required from reporting banks.

www.bankofengland.co.uk/statistics/Pages/about/cba.aspx.

Credit Conditions Survey

As part of its mission to maintain monetary stability and financial stability, the Bank needs to understand trends and developments in credit conditions. This survey for bank and non-bank lenders is an input to this work. Lenders are asked about the past three months and the coming three months. The survey covers secured and unsecured lending to households and small businesses; and lending to non-financial corporations, and to non-bank financial firms. Copies are available on the Bank's website at:

www.bankofengland.co.uk/publications/Pages/other/monetary/creditconditions.aspx.

Trends in Lending

This quarterly publication presents the Bank of England's assessment of the latest trends in lending to the UK economy. The report draws mainly on long-established official data sources, such as the existing monetary and financial statistics collected by the Bank of England. These data have been supplemented by the results of a new collection, established by the Bank in late 2008, to provide more timely data covering aspects of lending to the UK corporate and household sectors. The report also draws on intelligence gathered by the Bank's network of Agents and from market contacts, as well as the results of other surveys. Copies are available on the Bank's website at:

www.bankofengland.co.uk/publications/Pages/other/monetary/trendsinlending.aspx.

Quarterly Bulletin

The *Quarterly Bulletin* 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 2013 are as follows:

Quarterly Bulletin

Q1	14 March
Q2	13 June
Q3	17 September
Q4	17 December

Inflation Report

February	13 February
May	15 May
August	7 August
November	13 November

Financial Stability Report

26 June
28 November

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