Quarterly Bulletin

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Foreword

The Bank of England has two core purposes: to maintain monetary stability and to maintain financial stability. Monetary stability means stable prices — as defined by the Government's inflation target — and confidence in the domestic currency. Financial stability entails detecting and reducing threats to the financial system as a whole. This edition of the *Quarterly Bulletin* presents a number of articles pertinent to these two core purposes.

The *Bulletin* begins, as usual, by examining developments in financial markets. The *Markets and operations* article reviews developments in financial markets covering the period between the previous *Bulletin* and 26 August 2011. Conditions in financial markets deteriorated markedly over the review period. Uncertainty increased as worries about the prospects for fiscal policy — both in the euro area and the United States — interacted with concerns about the sustainability of the global economic recovery to cause a worsening in financial market sentiment. Investors responded by seeking refuge in assets that they perceived to be less risky. Expectations for interest rate increases were pared back across the major economies and equity prices fell sharply, particularly for financial companies. Primary capital markets experienced relatively low levels of activity, with little term issuance in public markets by UK banks.

The second article reviews the evidence for the impact of the Bank of England's programme of asset purchases — often called 'quantitative easing' — both on financial markets and more widely on the economy. Between March 2009 and January 2010, the Bank of England purchased £200 billion of assets with the aim of injecting money into the economy to boost nominal spending and inflation in order to meet the inflation target in the medium term. The evidence presented in the article suggests that the effects were economically significant. Drawing on a range of different approaches the analysis suggests a peak effect on the level of real GDP of between 1½% and 2% and a peak effect on annual CPI inflation of between 3¼ and 1½ percentage points. Further analysis suggests that these asset purchases may have had roughly an equivalent impact on inflation as a cut in Bank Rate of between 150 to 300 basis points. But there is considerable uncertainty around these estimates and the precise impact of asset purchases or sales is likely to vary depending on the circumstances in which they are conducted. The Monetary Policy Committee will continue to monitor and assess the impact of its asset purchases to date, in order to inform any future decisions on either selling the assets back, or making further purchases.

The United Kingdom's Special Resolution Regime (SRR) was born out of the difficulties in dealing with the failure of Northern Rock in the autumn of 2007. A bank resolution regime will typically give the resolution authority powers to split the bank into separate parts, transferring to a purchaser those creditors and economic functions that are of systemic importance while leaving the rest to be wound up in insolvency. The article in this edition provides a general overview of the principal objectives and features of a bank resolution regime, drawing in particular on the design of the United Kingdom's SRR. It then discusses the safeguards put in

place to help protect those creditors left behind and discusses the exceptions to those safeguards.

Securities lending plays an important role in supporting market liquidity and helping markets operate smoothly and efficiently. But by increasing the interconnections between institutions such lending can pose potential risks to financial stability, which can be exacerbated by a lack of transparency in the securities lending market. The article in this edition provides an overview of securities lending and discusses the benefits and potential risks to financial stability. It goes on to discuss recent developments in securities lending, including the impact of regulation on the market and the potential introduction of new market infrastructure, such as central counterparties. The Bank of England will continue to monitor closely developments in the securities lending market given its importance to financial stability.

In the decade before the financial crisis, measured growth in UK financial services output was twice that of overall UK GDP. But care must be taken when interpreting these data. Although data on financial services output are produced in accordance with international best practice, estimating financial services output accurately throws up a number of conceptual and practical challenges. The article in this edition explains some of the challenges associated with measuring financial services output and assesses the uncertainty around estimates in the decade leading up to the financial crisis. The analysis suggests that financial services output was probably overstated somewhat in the decade before the crisis, although this is likely to have had only a small impact on the growth rate of overall GDP.

A further article in this edition presents the results of a new biannual survey of the sterling money market, launched in May of this year. The survey was conducted on behalf of the Money Market Liaison Group and is intended to supplement the Bank's long-standing gathering of market intelligence in this market. Over time, the survey is expected to help identify structural trends in the sterling money market, aiding policymakers' assessment of the impact of their actions on the behaviour of market participants. Some of the key results from the inaugural survey showed that in May 2011 reported activity in the sterling money market was greater in the secured market than the unsecured market, and that daily activity was concentrated at short maturities. Banks were, in aggregate, reported to be net borrowers from the non-bank sector in the market. Survey respondents also perceived the secured market was functioning better than the unsecured market.

This edition also contains a summary of the main points made by participants at the most recent Monetary Policy Roundtable, hosted by the Bank of England and the Centre for Economic Policy Research, on 24 June.

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

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The speeches contained in the *Bulletin* can be found at www.bankofengland.co.uk/publications/speeches/index.htm

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.

PROMISE

Recent economic and financial developments

Markets and operations

This article reviews developments in sterling financial markets, including the Bank's official operations, between the 2011 Q2 *Quarterly Bulletin* and 26 August 2011.⁽¹⁾ The article also summarises market intelligence on selected topical issues relating to market functioning.

Sterling financial markets

Overview

Financial market sentiment deteriorated markedly over the review period. Volatility increased across a range of markets, as investors tried to reduce their exposure to risky assets and sought refuge in so-called 'safe haven' assets. Contacts noted that the functioning of some markets had, at times, become impaired.

Fiscal developments continued to be a key influence on financial markets. Existing concerns about the sustainability of fiscal positions and the implications for banking sectors spread to some euro-area economies that had previously been less affected. Spreads between the yields of sovereign bonds of several euro-area countries and those of German government bonds remained elevated, and in some cases rose further. The process around raising the federal debt ceiling in the United States and a subsequent downgrade by the ratings agency Standard & Poor's added to uncertainty among investors.

These developments interacted with, and were compounded by, concerns about the sustainability of the global economic recovery that were reflected in downward revisions to growth forecasts in a number of major economies. As these concerns intensified, equity markets in the United Kingdom and abroad fell sharply and the yields on gilts and government bonds in a number of other countries reached historic lows. There was a sharp increase in the price of assets that were perceived to be relatively safe such as gold and the Swiss franc (Chart 1).

These factors contributed to market participants pushing out expectations for future monetary policy tightening in major economies, including the United Kingdom. Contacts also started to place greater weight on the possibility of further monetary easing in the United Kingdom and elsewhere.

Primary capital markets experienced low levels of activity over the period. Issuance of debt or equity by UK private non-financial corporations slowed. And term issuance in public markets by UK banks fell sharply.



Sources: Bloomberg and Bank calculations

(a) On 10 August 2011, the Swiss National Bank announced additional measures to increase the supply of Swiss franc liquidity.

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 purchased assets at \pounds 200 billion.

UK CPI inflation remained above target throughout the review period. But a slowdown in the pace of economic activity in the United Kingdom and abroad, together with renewed volatility in financial markets, contributed to market participants pushing out their expectations for the timing of an increase in Bank Rate. Contacts also began to place greater weight on the possibility of further monetary easing.

Consistent with this, a Reuters poll released shortly after the end of the review period showed that the majority of economists were not expecting the MPC to begin raising Bank Rate until end-2012. This was one year later than at the time of the previous *Bulletin*. Reuters also surveyed economists about the probability they attached to the MPC conducting further asset purchases at some point. The median respondent attached a 35% probability to this, up from 20% in the 29 June survey, which was the first time since

⁽¹⁾ The data cut-off for the previous Bulletin was 20 May 2011.

February 2011 that Reuters had asked about the prospects for further asset purchases.

Against this backdrop, forward sterling overnight index swap (OIS) rates fell at all maturities (**Chart 2**). According to this measure, by the end of the review period market participants had pushed out their expectations of a 25 basis point increase in Bank Rate by the MPC until the second half of 2013, about a year and a half later than at the time of the previous *Bulletin*.





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

Shorter-term forward sterling OIS rates were at times below Bank Rate in August. Some contacts thought this reflected an increased, though still small, probability of a reduction in sterling overnight interest rates as a result of further monetary easing. But the majority of market participants thought these movements were amplified by reduced liquidity in markets over the summer.

Market participants also pushed out their expectations of monetary policy tightening elsewhere. The European Central Bank (ECB) raised its main policy rate by 25 basis points to 1.5% in July. Forward euro OIS rates ended the period lower, however. This might partly reflect market participants revising their expectations about further policy tightening by the ECB following the intensification of concerns about the global economic outlook and sustainability of fiscal positions in several euro-area countries. Forward euro OIS rates may also have been affected by changes in the ECB's liquidity provision. The ECB conducted a supplementary long-term repo operation with a maturity of approximately six months in August - the first since May 2010. Contacts thought that the provision of additional liquidity in excess of that necessary for banks to meet their reserves targets might keep overnight money market rates below the ECB's main policy rate.

In the United States, the Federal Open Market Committee (FOMC) completed its planned \$600 billion asset purchase

programme. At its August meeting, the FOMC stated that it anticipated that economic conditions were likely to warrant exceptionally low levels for the federal funds rate at least through mid-2013. It also said that it discussed the range of policy tools available to promote a stronger economic recovery in a context of price stability. Forward US dollar OIS rates fell at all maturities (Chart 2) and contacts began to attach a greater probability to the FOMC conducting further asset purchases in the future.

Long-term interest rates

A reappraisal of global growth prospects led to a fall in long-term government bond yields in the major developed economies. Ten-year nominal gilt yields fell by around 80 basis points over the review period (Chart 3) to historically low levels.





⁽a) Spot interest rates derived from the Bank's government liability curves.(b) Derived from government bonds issued by France and Germany.

Part of this fall in longer-term gilt yields reflected lower policy rate expectations in the near term, which has lowered shorter-term interest rates (**Chart 4**). But nominal interest rates also fell at longer horizons, which should be less affected by current cyclical developments (**Chart 4**). The fall in one such measure — five-year nominal interest rates, five years forward — was largely accounted for by a fall in forward real interest rates (**Chart 5**). This might suggest that market participants revised down their views on the longer-term growth potential of major developed economies.

Contacts said a 'flight to liquidity' also contributed towards the decline in gilt yields. This might suggest that investors were more willing to forego returns in order to hold gilts and other highly rated government bonds rather than less liquid bonds at a time when concerns about debt sustainability in some euro-area countries had intensified. This intensification occurred despite the announcement by the heads of state or



Chart 4 International five-year nominal government bond yields(a)

Source: Bank calculations

Spot and forward interest rates derived from the Bank's government liability curves (b) Derived from government bonds issued by France and Germany





Source: Bank calculations

(a) Forward interest rates derived from the Bank's government liability and inflation swap curves Derived from government bonds issued by France and German

government of the euro area and EU institutions on 21 July of an additional support package for Greece, and measures to enhance the European Financial Stability Facility and the European Stability Mechanism.

Existing concerns about the sustainability of fiscal positions and the implications of these for banking sectors spread to some euro-area economies that had previously been less affected. Yields of Italian and Spanish ten-year government bonds rose to over 6%, and their spreads to German government bonds of similar maturity rose sharply (Chart 6). The spread between French and German government bond yields also widened over the period. These moves were mirrored in sovereign credit default swap (CDS) premia, which in some cases exceeded the increase in government bond

spreads. Towards the end of the period, the ECB expanded its purchases of government bonds under its Securities Markets Programme with contacts reporting purchases of Italian and Spanish government bonds. Subsequently, Spanish and Italian government bond yields fell, and spreads to German government bond yields narrowed.

Chart 6 Selected European ten-year government bond spreads(a)



(a) Spreads over ten-year German government bond yields

The process around raising the federal debt ceiling in the United States and a subsequent downgrade by the ratings agency Standard & Poor's to AA+ added to uncertainty among investors.

Bank funding markets

Debt issuance by major UK lenders in public term funding markets fell sharply over the review period (Chart 7). Contacts mainly attributed this change in primary market conditions to the increasing concern about the implications for banks of sovereign default risks in the euro area. UK banks have modest direct exposures to the sovereign debt of the most vulnerable countries in the euro area, but have larger exposures to real-economy lending in those countries and indirect exposures through their links with other major banking systems. Contacts thought that these concerns overshadowed the bank stress-test results published in July by the European Banking Authority.

While public term funding markets had largely closed over the review period, private issuance in June and July had increased above its monthly average earlier in the year according to contacts. Moreover, UK banks have reportedly remained active in private markets in August. Contacts thought this reflected the bespoke nature of the private market, where terms of the deals are tailored to match the preferences of investors. Also, investors in the private market tended to be hold-to-maturity investors and less affected by market volatility.



Chart 7 Term issuance by the major UK lenders in public markets^(a)

(a) Includes debt issued by Banco Santander, Bank of Ireland, Barclays, Co-operative Financial Services, HSBC, Lloyds Banking Group, National Australia Bank, Nationwide, Northern Rock and RBS. Term issuance refers here to securities with an original contractual maturity or earliest call date of at least 18 months. It includes subordinated lower Tier 2 and Tier 3 capital instruments with debt features.

(b) Senior debt issued under HM Treasury's Credit Guarantee Scheme

(c) Medium-term notes.
 (d) Asset-backed securities.

(e) Commercial mortgage-backed securities.
 (f) Residential mortgage-backed securities.
 (g) Data are up to 26 August 2011.

Banks continued to reduce their use of the Bank's Special Liquidity Scheme (SLS) and the results from the Bank's indexed long-term repo (ILTR) operations suggested little change in banks' demand for sterling liquidity from the Bank (see box on pages 188–90).

Contacts were, however, increasingly concerned that the persistence or intensification of worries surrounding the fiscal positions of some euro-area member countries could threaten the reopening of public term funding markets in September, traditionally a month of strong issuance. A prolonged closure of the market could make it harder for banks to improve the resilience of their balance sheets without reducing lending further to the real economy. After the end of the review period there has been some public issuance of covered bonds by UK banks.

Major UK banks' CDS premia, one indicator of longer-term wholesale funding costs, rose markedly over the review period. On average they reached levels last seen in Spring 2009. CDS premia of continental European banks, on average, reached their highest level on record (Chart 8).

Alongside the increase in long-term wholesale funding costs for UK banks, the spread of short-term interbank borrowing rates relative to OIS rates rose slightly for sterling (Chart 9). The spread rose more sharply for euro, largely reflecting the fall in OIS rates. Contacts thought that the increase in the







 (a) Unweighted averages of five-year, senior CDS prices.
 (b) Average of BBVA, BNP Paribas, Crédit Agricole, Credit Suisse, Deutsche Bank, Santander, Société Générale, UBS and UniCredit.

(c) Average of Bank of America, Citi, Goldman Sachs, JPMorgan Chase & Co. and Morgan Stanley
 (d) Average of Barclays, HSBC, Lloyds Banking Group, RBS and Standard Chartered.





Sources: Bloomberg, British Bankers' Association and Bank calculations

 (a) Three-month Libor-OIS spreads derived from Libor fixings and OIS rates.
 (b) Forward spreads derived using data as at 26 August. The squares are implied forward spreads using forward Libors derived from forward rate agreements, and forward OIS rates derived from spot OIS contracts.

Libor-OIS spread reflected broader funding stresses felt by some euro-area banks.

Forward spreads implied by derivatives settling on Libor were consistent with market participants anticipating that short-term bank funding costs might remain elevated in the months ahead (Chart 9). Spot and forward Libor-OIS spreads remained, however, well below the levels reached in late 2008.

Contacts noted that the increase in short-term bank funding costs was accompanied by a further shortening of the maturities at which money market funds (MMFs) were

Operations within the sterling monetary framework and other market operations

Over the review period, the level of reserves held by commercial banks at the Bank continued to be determined by (i) the stock of reserves injected via asset purchases, (ii) the level of reserves supplied by long-term repo open market operations (OMOs), and (iii) the net impact of other sterling ('autonomous factor') flows across the Bank's balance sheet. The box on pages 192–93 provides more detail on the Asset Purchase Facility (APF). This box describes the Bank's operations within the sterling monetary framework over the review period, and other market operations.

Operational Standing Facilities

Average daily use of the Operational Standing Lending Facility was £3 million in the June maintenance period and £13 million in the July maintenance period. The facility had not previously been used since the March 2009 maintenance period. Usage in June and July was consistent with the facility's purpose of keeping market rates in line with Bank Rate by providing a means for banks to manage unexpected frictional payment shocks which might arise.⁽¹⁾

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 maintenance periods under review.

Indexed long-term repo OMOs

As part of its provision of liquidity insurance to the banking system, the Bank conducts indexed long-term repo (ILTR) operations. The Bank offers reserves via ILTRs once each calendar month; typically, the Bank will conduct two operations with a three-month maturity and one operation with a six-month maturity in each calendar quarter. 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'), and the other set contains a broader class of high-quality debt securities that, in the Bank's judgement, trade in liquid markets ('wider collateral').

The Bank offered ± 5 billion via three-month ILTR operations on both 14 June and 12 July, and ± 2.5 billion via a six-month operation on 16 August (**Table 1**).

The stop-out spread — the difference between clearing spreads for wider and narrow collateral — is an indicator of potential stresses in the market. In the June and July three-month operations, this spread reached successive lows of 15 and 12 basis points, continuing a trend since March (**Chart A**). The June operation also had a lower participation

Table 1 Indexed long-term repo operations

	Total	Collateral set summary		
		Narrow	Wider	
14 June 2011 (three-month maturity)				
On offer (£ millions)	5,000			
Total bids received (£ millions) ^(a)	3,100	2,450	650	
Amount allocated (£ millions)	3,050	2,450	600	
Cover	0.62	0.49	0.13	
Clearing spread above Bank Rate (basis points)		0	15	
Stop-out spread (basis points) ^(b)	15			
12 July 2011 (three-month maturity)				
On offer (£ millions)	5,000			
Total bids received (£ millions) ^(a)	5,610	5,365	245	
Amount allocated (£ millions)	5,000	4,755	245	
Cover	1.12	1.07	0.05	
Clearing spread above Bank Rate (basis points)		0	12	
Stop-out spread (basis points) ^(b)	12			
16 August 2011 (six-month maturity)				
On offer (£ millions)	2,500			
Total bids received (£ millions) ^(a)	4,081	2,445	1,636	
Amount allocated (£ millions)	2,500	1,894	606	
Cover	1.63	0.98	0.65	
Clearing spread above Bank Rate (basis points)		0	53	
Stop-out spread (basis points) ^(b)	53			

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

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

than any operation to date, with a cover ratio of 0.62, while the proportion of three-month funds allocated to wider collateral reached a new low in July of 4.9%, slightly lower than in the previous quarter, possibly suggesting that demand for funding, especially against wider collateral, had not increased.

Chart A ILTR allocation and clearing spreads



In contrast, the six-month operation in August recorded both the highest cover since November 2010, and the highest stop-out spread to date, at 53 basis points. Contacts did not attribute this to market stress at the time of the operation.

Reserves provided via ILTRs in June, July and August more than offset the maturity of the previous ILTR operations. Consequently, the stock of liquidity provided through longer-term operations increased a little.

The Bank has recently moved to allocating on — or close to — its relative supply schedule, instead of at the lowest accepted bid spread.⁽²⁾

Discount Window Facility

The Discount Window Facility (DWF) provides liquidity insurance to the banking system by allowing eligible banks to borrow gilts against a wide range of collateral. On 5 July 2011, the Bank announced that the average daily amount outstanding in the 30-day DWF between 1 January and 31 March 2011 was £0 million. The Bank also announced that the average daily amount outstanding in the 364-day DWF between 1 January and 31 March 2010 was £0 million.

Eligible collateral in the Bank's operations

On 1 July 2011, the Bank introduced two changes to the eligibility criteria for collateral accepted in its operations. First, the Bank introduced changes to eligibility criteria for sovereign, central bank and supranational debt taken as narrow and wider collateral in its operations on 1 July 2011. This had initially been announced on 11 February 2011.

Second, an amendment requiring transaction documentation to be made available online for asset-backed securities and covered bonds accepted as collateral under the DWF and ILTR came into force on 1 July 2011. This had been initially announced on 30 November 2010.⁽³⁾

Other operations

Special Liquidity Scheme

The Special Liquidity Scheme (SLS) was introduced in April 2008 to improve the liquidity position of the banking system by allowing banks and building societies, for a limited period, to swap their high-quality mortgage-backed and other securities for UK Treasury bills for up to three years. The Scheme was designed to finance part of the overhang of illiquid assets on banks' balance sheets by exchanging them temporarily for more easily tradable assets.

When the drawdown period for the SLS closed at the end of January 2009, £185 billion of UK Treasury bills had been lent under the SLS. In order to prevent a refinancing 'cliff', the Bank held bilateral discussions with all users of the Scheme to ensure that there were funding plans in place to reduce their use of the Scheme in a smooth fashion. The impact of these

expected repayment plans are shown in aggregate in **Chart B**, along with the repayment profile based on counterparties' contractual repayment obligations, and the profile of actual repayments to date. Despite difficult market conditions, participants continued to make repayments over the quarter: by end-August 2011, £168 billion had been repaid, compared with £148 billion at end-May 2011.





US dollar repo operations

From 11 May 2010 the Bank reintroduced weekly fixed-rate tenders with a seven-day maturity to offer US dollar liquidity, in co-ordination with other central banks, in response to renewed strains in the short-term funding market for US dollars at the time. This was subsequently extended to 1 August 2011. On 29 June 2011, the Bank announced a further extension of its temporary swap line with the Federal Reserve to 1 August 2012. As of 26 August 2011, there had been no use of the Bank's facility.

Euro swap agreement

On 25 August 2011, the ECB and the Bank announced an extension of their sterling-euro liquidity swap arrangement to 28 September 2012. This facility was initially established on 17 December 2010. Under the agreement, if requested, the Bank of England will provide the ECB with sterling in exchange for euro up to a limit of £10 billion.

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; nevertheless sales may be made from time to time, reflecting for example, risk management, liquidity management or changes in investment policy. The portfolio currently includes around £3.3 billion of gilts and £0.5 billion of other debt securities. Over the period from 21 May 2011 to 26 August 2011, gilt purchases were made in accordance with the quarterly announcements on 1 April 2011 and 1 July 2011.

prepared to lend to banks. In addition, the largest US prime MMFs reduced their exposures to euro-area banks during the review period; these moves reflected both an overall fall in their assets under management and in the relative weight of European banks in their portfolios.

Signs of stress were also observed in the cross-currency funding markets. The difference between the cost of raising US dollar funding by borrowing in euro and swapping via the foreign exchange market and the cost of direct US dollar borrowing rose markedly (Chart 10). The spread remained well below levels in late 2008, which contacts thought might reflect both a reduced need for dollar funding by euro-area banks as some of their dollar assets have matured or been sold, and the existence of central bank dollar swap facilities. Contacts noted the recent usage of the US dollar repo operations offered by the Swiss National Bank (SNB) and the ECB, albeit that usage was small compared to 2008. The cost of US dollar funding via sterling was little changed.

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



Sources: British Bankers' Association, Reuters and Bank calculations

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

Corporate capital markets

Global equity prices fell sharply from mid-July (Chart 11). In the United Kingdom, the FTSE All-Share index fell by 10% in the first week of August and ended the review period 14% lower. Equity prices fell across a range of sectors, but the falls in financials were particularly large.

- (1) For more information on the facility, see Part 2 of the Bank's *Red Book* at www.bankofengland.co.uk/markets/money/index.htm.
- (2) For further discussion of this issue, see the speech by Paul Fisher, 'Recent developments in the sterling monetary framework', 30 March 2011, available at www.bankofengland.co.uk/publications/speeches/2011/speech487.pdf. (3) Further details are available at
- www.bankofengland.co.uk/markets/money/notices.htm.

Chart 11 International equity indices(a)(b)



Sources: Bloomberg and Bank calculations.

(a) Indices are quoted in domestic currency terms, except for the MSCI Emerging Markets index,

(b) The MSCI Emerging Markets index is a capitalisation-weighted index that tracks the performance of stocks in emerging markets.

According to contacts, these falls predominantly reflected two factors. First, deteriorating financial market sentiment led investors to reduce their exposure to markets where returns were perceived to be more uncertain — such as equity markets — and invest instead in assets that were seen to generate relatively safe returns.

Second, the perceived deterioration in the strength of the global recovery led investors to reassess the outlook for corporate earnings. For example, the Bank of America/Merrill Lynch Fund Manager survey for August reported that the net balance of respondents expecting the global profit outlook to improve over the next twelve months had fallen to -30%, from +9% in May.

The declines in equity prices were accompanied by a marked rise in option-implied volatility, a forward-looking measure of uncertainty (Chart 12). Contacts attributed this in part to the relatively illiquid conditions that prevailed in equity derivatives markets as widening bid-offer spreads discouraged participation.

Perhaps consistent with a re-evaluation of corporate earnings prospects, the spread of corporate bond yields over government bonds rose sharply over the review period. This





Sources: Bloomberg, Chicago Mercantile Exchange, NYSE Liffe and Bank calculations

was particularly noticeable for non-investment grade bonds, which contacts attributed to an investor preference for assets considered safest (**Chart 13**). The increase in corporate bond spreads also coincided with increased activity in purchase auctions of the Bank's Corporate Bond Secondary Market Scheme (see box on pages 192–93 for further detail).





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(a) Option-adjusted spreads over government bond yields.
 (b) Dashed lines: 1997–2007 averages for investment-grade bonds and 1998–2007 averages for non-investment grade bonds.

Despite the rise in spreads, investment-grade non-financial corporate bond yields ended the review period lower, reflecting the falls in yields on government bonds. In contrast, yields on non-investment grade corporate bonds rose (Chart 14).

Turning to primary markets, bond issuance by UK private non-financial corporations (PNFCs) slowed (Chart 15).

Chart 14 International non-investment grade and investment-grade, non-financial corporate bond yields^(a)



Sources: Bank of America/Merrill Lynch and Bank calculations.

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

Contacts in part attributed this to the challenging conditions in secondary markets, although issuance is typically lower during the summer. Reflecting the strong start to the year, cumulative gross issuance in 2011 to date was still above its average between 2003 and 2008. But more recently, contacts raised concerns that weak issuance might persist until the macroeconomic outlook was clearer.

Chart 15 Cumulative gross bond issuance by UK PNFCs^{(a)(b)}



(a) Includes medium-term notes.(b) Includes data up to 26 August 2011

The slowdown in corporate bond issuance was accompanied by ongoing negative net equity issuance in June and July as gross equity issuance remained weak and share buyback activity increased (Chart 16). There had been few initial public offerings in recent months, which contacts attributed to concerns that investors would be unwilling to partake during volatile secondary market conditions. Contacts also suggested other factors such as some substitution into private equity

Asset purchases(1)

The Bank did not undertake any Asset Purchase Facility (APF) gilt purchases over the review period. As a result, the stock of gilts held by the APF in terms of the amount paid to sellers remained at £198.3 billion.⁽²⁾

Purchases of high-quality private sector assets financed by the issuance of Treasury bills and the Debt Management Office's (DMO's) cash management operations continued, in line with the arrangements announced on 29 January 2009.(3)

Table 1 summarises operations under the APF over the review period by type of asset.

Corporate bonds

Week ending(a)

The Bank continued to offer to purchase and sell corporate bonds via the Corporate Bond Secondary Market Scheme. The Scheme continues to serve a useful role as a backstop, particularly during periods of market uncertainty.

Over the review period, activity in the Bank's auctions continued to be driven by broader market conditions. Sales of corporate bonds continued in June, following the pattern observed in the previous Bulletin, while purchases fell. But through July and August the Bank was a small net buyer of bonds. As of 25 August 2011 the Bank's portfolio totalled

Commercial paper

£1,115 million, compared to £1,153 million at the end of the previous review period. Market contacts suggested that this pattern of usage of the Scheme reflected its role as a backstop, given the deterioration of market sentiment over the review period.

Commercial paper

The Bank continued to offer to purchase sterling-denominated investment-grade commercial paper (CP) issued by companies that make a material contribution to UK economic activity. On 15 November 2010, the Bank provided twelve months' notice of its intention to withdraw this scheme, reflecting a sustained improvement in the sterling commercial paper market.

Average spreads on sterling-denominated CP over the review period were broadly stable and remain well below the levels seen in early 2009. Usage of the APF Commercial Paper Facility remained at £0 million over the period.

Secured commercial paper facility

The Bank continued to offer to purchase secured commercial paper (SCP) backed by underlying assets that are short term and provide credit to companies or consumers that support economic activity in the United Kingdom.⁽⁴⁾ The Bank announced on 15 November 2010 that it had made a

Corporate bond

Total^(b)

•							
		paper		Purchases		Sales	
19 May 2011 ^{(c)(d)}	0	30	198,275		1,153		199,458
26 May 2011	0	0	0	3		29	-26
2 June 2011	0	0	0	0		4	-4
9 June 2011	0	0	0	0		5	-
16 June 2011	0	0	0	8		0	8
23 June 2011	0	30	0	0		0	30
30 June 2011	0	0	0	0		0	(
7 July 2011	0	0	0	2		14	-12
14 July 2011	0	0	0	0		0	(
21 July 2011	0	30	0	0		0	30
28 July 2011	0	0	0	0		2	-2
4 August 2011	0	0	0	0		10	-1(
11 August 2011	0	0	0	16		0	16
18 August 2011	0	0	0	0		0	(
25 August 2011	0	30	0	8		0	38
Total financed by a deposit from the $DMO^{(d)(e)}$	-	30	-		271		30
Total financed by central bank reserves ^{(d)(e)}	-	-	198,275		844		199,119
Total asset purchases ^{(d)(e)}	_	30	198.275		1.115		199.420

Gilts

Secured commercial

(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 (a) week-ended amounts are for purchases in terms of the proceeds paid to counterparties, and of sales in 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 19 May 2011.
 (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.

Table 1 APF transactions by type (£ millions)

programme eligible for this facility. This programme has subsequently issued SCP to the APF.

Gilt lending facility(5)

The Bank continued to offer to lend some of its gilt holdings via the DMO in return for other UK government collateral. In the three months to 30 June 2011, a daily average of $\pounds 2,371$ million of gilts was lent as part of the gilt lending facility. This was an increase from an average of $\pounds 1,476$ million in the previous quarter. The increase reflected a perceived lack of availability of particular gilts, which led market participants to borrow from the DMO rather than obtain the gilts in the market.



buyouts and a low number of fast-growing companies seeking equity financing.

Foreign exchange

The sterling exchange rate index (ERI) ended the period broadly unchanged (**Chart 17**). Over the period, sterling appreciated by 1% against the US dollar, but was little changed against the euro. The sterling ERI has remained within a relatively narrow range since the start of 2009.

Although sterling was relatively stable against the United Kingdom's major trading partners, it depreciated significantly against some of the United Kingdom's smaller trading partners. For example, it depreciated by 7% against the Swiss franc, and 5% against the yen, as part of the 'flight to safety' outlined in earlier sections. The broad-based appreciation of these two currencies prompted the SNB and the Bank of Japan to intervene in foreign exchange markets.

- The data cut-off for this box is 25 August 2011, unless otherwise stated. For further discussion on asset purchases see the Asset Purchase Facility Quarterly Report available at www.bankofengland.co.uk/publications/other/markets/apf/quarterlyreport.htm.
 Further details of individual operations are available at
- www.bankofengland.co.uk/markets/apf/gilts/results.htm.
- (3) 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. Since 4 February 2010 all purchases have been financed by the issuance of Treasury bills and the DMO's cash management operations.
- (4) The SCP facility is described in more detail in the Market Notice available at www.bankofengland.co.uk/markets/marketnotice090730.pdf.
- (5) For more details on the gilt lending facility see the box 'Gilt lending facility' in the Bank of England Quarterly Bulletin, Vol. 50, No. 4, page 253.

Chart 17 Sterling ERI and bilateral exchange rates



Sources: Bloomberg and Bank calculations.

Forward-looking measures of exchange rate uncertainty rose over the period, albeit only slightly. Related measures suggested that market participants have placed a greater weight on sterling appreciating over the period (Chart 18). According to contacts, that largely reflected investors being willing to pay a higher price to buy protection against an unexpected depreciation of the euro.

The Bank of England's foreign exchange reserves

The Bank of England uses its balance sheet in pursuit of its policy goals. Ordinarily, this involves changes to the size or composition of its sterling assets and liabilities.⁽¹⁾ But the Bank also holds assets and liabilities denominated in foreign currency. This box describes how the Bank finances and invests its foreign exchange reserves.

Institutional arrangements

Both the Bank and the UK Government hold foreign exchange reserves. But they are held for different purposes and in segregated accounts.

The Government's foreign exchange reserves are held in an account called the Exchange Equalisation Account (the EEA). The Bank manages these reserves as agent for the Government, but they do not appear on the Bank's balance sheet. Decisions on the size and composition of the EEA are taken by the Government. The EEA Act of 1979 defines the possible uses for the Government's foreign exchange reserves, including 'checking undue fluctuations in the exchange value of sterling'.⁽²⁾ The EEA was used to intervene in March 2011 when the G7 nations sold Japanese yen as part of a co-ordinated foreign exchange intervention.

The Bank's foreign exchange reserves appear on its balance sheet. They can be used by the Bank to intervene in the foreign exchange market in pursuit of its monetary policy objectives.⁽³⁾ The MPC has not decided to intervene in the foreign exchange market since the inception of the 1997 monetary policy framework.⁽⁴⁾

Financing of the reserves

Foreign exchange intervention would involve the sale or purchase of sterling in the foreign exchange market with the intention of influencing the sterling effective exchange rate. To be able to purchase sterling the Bank would need foreign currency to sell. In principle, the Bank could borrow foreign currency directly in the capital markets at the time it wished to purchase sterling. The cost of doing so may however be greatly exaggerated at those times. The Bank therefore chooses to hold foreign exchange reserves on its balance sheet on a precautionary basis.

The Bank's foreign exchange reserves are financed through annual foreign currency bond issuance in the international capital markets.⁽⁵⁾ The bond issuance represents a foreign currency liability on the Bank's balance sheet. The currency denomination, maturity and size of each issue reflects the Bank's judgement on where the best value for money may be achieved. Since bond issuance commenced in 2007, they have been denominated in US dollars, because this has been the most cost-efficient currency of issuance.⁽⁶⁾ Each bond issue has been \$2 billion in size and three years in maturity. So at any one point in time, these liabilities have financed foreign currency assets of approximately \$6 billion. The proceeds from bond issuance are invested in suitable assets of similar maturities.⁽⁷⁾

Reserve assets

Currency composition

The reserve assets held by the Bank are denominated in US dollars, euro and yen, which are the three most-traded currencies in the foreign exchange market and together account for the majority of the sterling effective exchange rate index.⁽⁸⁾

There is a currency mismatch between the dollar proceeds from the bond issue, and the euro and yen assets that the Bank wants to hold. Cross-currency basis swaps are used to convert the dollar proceeds to euro and yen, and hedge the resulting foreign exchange risk.

Asset composition

At approximately \$6 billion, the Bank's foreign exchange reserves are modest relative to the size of the sterling foreign exchange market, and the holdings of most other major central banks and the UK Government. As a result it is important that those reserves are highly liquid.

The Bank's reserve assets therefore consist only of high-quality sovereign bonds that trade in consistently deep and liquid markets. These sovereign bonds have remained liquid through recent market volatility, and the Bank judges that they would most likely remain liquid in future periods of market stress too. The Bank will publish more details on its foreign exchange reserves in its *Annual Report and Accounts* in the future.

The Bank regularly reviews its reserve assets to ensure they meet their policy purpose. This requires ongoing assessment of the credit quality and liquidity of the Bank's sovereign bond holdings.

- (1) See for example, Cross, M, Fisher, P and Weeken, O (2010), 'The Bank's balance sheet during the crisis', *Bank of England Quarterly Bulletin*, Vol. 50, No. 1, pages 34–42.
- 2) www.legislation.gov.uk/ukpga/1979/30.
- (3) This was set out in the new Monetary Policy Framework introduced by the Government in 1997. See www.hm-treasury.gov.uk/press_40_97letter.htm.
- (4) Intervention has been discussed on several occasions and those discussions were reported in the relevant minutes of the MPC meeting. See, for example, paragraph 41 in the minutes of the meeting held on 3–4 May 2000, available at www.bankofengland.co.uk/publications/minutes/mpc/pdf/2000/mpc0005.pdf.

⁽⁵⁾ More information on the bonds issued by the Bank can be found on the Bank's website at www.bankofengland.co.uk/markets/reserves/index.htm.

⁽⁶⁾ Prior to 2007, the foreign exchange reserves were funded through a Euro Note programme.

⁽⁷⁾ Assets are chosen with maturities similar to the liability to minimise interest rate risk. Interest rate swaps are also used to hedge interest rate risk.

⁽⁸⁾ The most recent survey by the Bank for International Settlements in April 2010 contains statistics on global foreign exchange turnover: www.bis.org/publ/rpfxf10t.pdf.

Chart 18 Three-month option-implied skewness of foreign exchange returns^(a)



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

(a) Returns are defined as the logarithmic difference between current forward rate and the spot rate at the maturity date of the contract. (b) The simplified sterling ERI places 70% weight on the euro-sterling bilateral exchange rate and

(b) The simplified sterling ERI places 70% weight on the euro-sterling bilateral exchar 30% weight on US dollar-sterling bilateral exchange rate.

Market intelligence on developments in market structure

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

Based on intelligence of this kind, this section describes recent developments in the structured notes market. It also describes changes to the way gilt repo transactions can be settled.

Recent developments in the structured notes market

Structured notes are debt instruments which pay coupons, and a final redemption value, linked to asset prices. Understanding developments in the structured notes market is important from a financial stability perspective.⁽¹⁾ This is because they act as a source of funding for banks that lie at the heart of the financial system. This funding may vary with market conditions. Moreover, structured notes can create risks that banks might find difficult to manage, impacting the functioning of certain markets. And they can provide insights into the extent to which investors are prepared to take greater risks in pursuit of higher returns. This section describes recent developments in the structured notes market, drawing on intelligence gathered from discussions with contacts.

Description of structured notes

A structured note is a debt instrument which pays coupons that are linked to the returns of an underlying asset using derivatives (usually options, futures or swaps). They are typically unsecured debt obligations, meaning that investors are exposed to the risk that an issuer will default. Investors are attracted to structured notes because they allow them to tailor returns to more closely match their preferences. While issuers are mainly attracted to structured notes because they allow them to raise funding from an investor base that is perceived to be diversified, and often at cheaper rates than from conventional medium-term notes.

Most structured notes provide returns linked to interest rates or equity markets (Chart 19). Together they account for approximately 80% of structured notes. But there are also structured notes that provide returns linked to other markets, including commodity and foreign exchange markets.





Structured notes come in a variety of forms, with differing degrees of complexity. But there are broadly three types of structured notes: principal-protected notes, yield-enhancing notes and participation notes.

 Principal-protected notes guarantee that an investor's initial investment will be returned upon maturity, while providing positive returns if asset prices evolve in a pre-specified way (eg the FTSE 100 index increases). In their simplest form, these notes essentially replicate the returns from buying a zero-coupon bond of the issuer, and purchasing an option.

⁽¹⁾ For a more detailed review of financial stability implications, see Rule, D, Garratt, A and Rummel, O (2004), 'Structured note markets: products, participants and links to wholesale derivatives markets', Bank of England *Financial Stability Review*, June, pages 98–117, available at www.bankofengland.co.uk/publications/fsr/2004/fsrfull0406.pdf.

- Yield-enhancing notes pay coupons that exceed those offered by conventional notes provided asset prices evolve in a pre-specified way. But investors can lose all or some portion of their initial investment if asset prices do not evolve in this way. For example, a structured note might pay a coupon of 5% and return the initial investment if the FTSE 100 does not fall in value. But if the FTSE falls in value, only some portion of the initial investment will be returned. In their simplest form, these types of notes essentially replicate the returns from buying a zero-coupon bond of the issuer, while selling an option.
- Participation notes tailor the returns from investing in a specific asset, sometimes by limiting the potential gains and losses. These types of notes often replicate the returns from investing in futures contracts, and buying and selling options with various strike prices.

Structured notes can be complex. For example, some of the embedded options have complicated pay-off profiles, which can create risks that are difficult for banks to manage and may increase the risk of mispricing the security. Some provide returns linked to the evolution of more than one asset price. They include a credit risk exposure to the issuer or counterparty to the transaction. And the ultimate maturity of some types of structured notes are dependent on the evolution of asset prices, perhaps because they can be called by issuers, or put back by investors.

Market participants

Investors in structured notes typically fall in three broad groups: high net worth individuals, retail investors and institutional investors. High net worth individuals and retail investors often invest in structured notes to access return profiles that they cannot achieve using other securities available to them, or because alternatives are more expensive. Institutional investors, such as insurance companies, also invest in structured notes for this purpose. But they also invest in structured notes to more closely align the expected returns from their assets with their liabilities. Perhaps for this reason, institutional investors, which tend to have long-term liabilities, tend to invest in structured notes with maturities exceeding ten years. Retail and high net worth investors tend to invest for shorter maturities, typically less than seven years.

Commercial banks are the largest issuers of structured notes (Chart 20). European banks, including some UK banks, are particularly large issuers, since they are in a strong position to capitalise on the robust demand from European high net worth and retail investors through their branch networks. For example, contacts suggest that in 2010 around 10%–20% of major UK banks' term funding was via structured notes. US banks were prominent issuers prior to 2008, but some have reportedly scaled back their involvement since. Sovereign and supranational agencies are also large issuers.

Chart 20 Issuance of structured medium-term notes by type of issuer



Benefits and drawbacks to issuance of structured notes

Contacts at banks perceive there to be two main benefits from structured note issuance. First, they provide a diversified source of funding, which tends to be cheaper than conventional medium-term notes. Contacts say that investors are willing to forego some returns in order to access the tailored returns that structured notes provide. Second, they allow banks to hedge some risks that arise from the trading of derivatives, thus complementing this part of their business.

But there are also some drawbacks to structured note issuance. Issuers and investors expect banks to buy and sell their own structured notes, or those of other issuers in the secondary market ('market-making'). This means that a bank might have to repurchase its notes during periods of stress, when their need for funding is highest. And second, managing the embedded derivatives positions from complex structured notes can be difficult. These difficulties can be exacerbated in stressed market conditions, when liquidity dries up, or if issuers have sold similar notes in large size.

Recent trends in issuance

Estimating the size of the global structured notes market is difficult because a large portion of issuance is conducted via private placements. And monitoring whether notes have been repurchased, or called by the issuer, is also difficult.

But publicly available data suggest that structured note issuance fell sharply in the second half of 2008, having grown rapidly prior to the collapse of Lehman Brothers in 2008 (Chart 20). Moreover, investors switched from investing in complex yield-enhancing notes towards principal-protected notes, typically issued by those banks deemed the safest. Issuance recovered during 2009, and was increasingly accounted for by commercial banks, as fears about the credit risk of banks abated somewhat (Chart 20). More recently, yield-enhancing notes have once again become the most popular form of structured note.

But contacts noted that structured notes tended to be less complex than was the case prior to 2008. This reduction in complexity is thought to be a result of two factors. First, issuers are pricing complex structured notes less attractively than prior to the crisis. This arose from the difficulties they faced managing the associated risks during late 2008, when liquidity dried up in a number of markets. And second, investors currently demand higher returns to compensate them for taking bank credit risk, negating the need for investors with nominal return targets to engineer higher returns via greater complexity.

Introduction of CREST Term DBV

In the aftermath of the financial crisis, an increased level of regulatory scrutiny has been applied to the settlement and payment arrangements that support repo markets.⁽¹⁾ In these markets, repo transactions can be used for short-term borrowing or lending against collateral. The introduction of 'Term DBV' on 1 July 2011 marks a significant change to the way gilt repo can be settled. Similar risk-mitigating initiatives are being progressed in a number of countries,⁽²⁾ for example to tri-party repo in the United States.⁽³⁾ This section describes Term DBV and how it will benefit the UK gilt repo market.

In the United Kingdom, gilts, equities and money market instruments are settled in CREST — a securities settlement system operated by Euroclear UK & Ireland Limited (EUI), the central securities depository.

Use of Delivery by Value

A high proportion of repo is settled by means of the Delivery-by-Value (DBV) settlement mechanism. It is a low-cost, reliable and efficient way of delivering multiple lines of collateral either to cover cash lending or as a collateral delivery mechanism in its own right to cover exposures between CREST members.

Technically, the transacting parties simply agree on the type of securities to be delivered (using pre-defined sets of securities in the CREST system) and the value of the securities to be delivered. Prior to 1 July 2011, the CREST system settled repo transactions only in overnight DBV. This meant the system selected a package of securities to the required value, delivered it in the afternoon DBV settlement window and returned it the following morning when CREST settlement starts.

Participants

DBV is used by the principal participants in the gilt repo market such as major banks, Gilt-edged Market Makers (GEMMs), interdealer brokers, life assurance and pension funds, the UK Debt Management Office, and by the Bank in its open market operations.⁽⁴⁾ DBV settled in the CREST system has a value of around £180 billion per day, which typically accounts for around 70% of all sterling settlement in CREST.⁽⁵⁾ A large proportion of DBV trades in the gilt repo market are centrally cleared through the LCH.Clearnet Ltd RepoClear service (RepoClear), where two parties submit trades to the clearing house which then nets and settles the trades within CREST. The true size of the DBV market, which would include gross trades prior to netting by RepoClear, is consequently larger than £180 billion. Once netted, DBVs input to CREST by RepoClear account for approximately 40% of daily settled DBV trades.

Disadvantages of overnight DBV

While ideally suited for the settlement of repos with an overnight term, overnight DBV is also used to settle repos with terms of greater than one day. For example, the value-weighted-average term of underlying DBV-based repos submitted to the RepoClear service is around eight calendar days.⁽⁶⁾ The RepoClear service settles these term deals in CREST as a series of daily overnight DBVs.

Use of overnight DBV to settle underlying term repos introduces two main risks. First, the settlement of the trade unwinds each morning and so needs to be re-input (rolled) each day until maturity. This introduces operational risk. For example, the money market would be exposed to potentially significant disruption in the event of either an intraday failure of market infrastructure or the inability of one or more major participants to input their DBV trades for that afternoon's settlement.

Second, the use of overnight DBVs increases the value of intraday liquidity that the Bank provides to settlement banks. The daily unwind of overnight DBV routinely creates an intraday funding requirement that is met by intraday liquidity provision by the Bank until it is offset by DBV re-input each afternoon. The Bank is willing to provide intraday liquidity to settlement banks (subject to provision of eligible collateral) in order to support efficient payment and settlement. However, it seeks that the design of settlement processes should be liquidity-efficient and not require undue reliance on the provision of intraday liquidity by the Bank.

(6) Over the period January to August 2011.

Settlement means that the ownership of an asset is transferred from one party to the other, with a simultaneous transfer of cash in the other direction.

⁽²⁾ For example, see the 2010 BIS Committee on Payments and Settlement Systems (CPSS) recommendations on repo market infrastructure, available at www.bis.org/publ/cpss91.htm.

⁽³⁾ For more information, see www.newyorkfed.org/tripartyrepo/index.html.

⁽⁴⁾ DBV is also much used by the stock lending community to cover borrowing positions with both gilts and equities.

⁽⁵⁾ Data from period June to August 2011.

The extension of intraday liquidity also exposes the Bank to collateralised counterparty credit risk. On average, over the quarter to end-August 2011, the Bank's balance sheet expanded by around 50% during the day.⁽¹⁾ While such intraday liquidity is collateralised by high-quality assets with prudent haircuts, there is always a residual risk that market prices will move significantly at times of stress and the Bank may not be able to recover the full value of a loan in the event of a counterparty default.⁽²⁾ Such risks are judged to be small, but as they are not zero it is prudent for the Bank to keep the amount of intraday liquidity created to the minimum needed to facilitate the flow of liquidity around the system.

Introduction of Term DBV

In order to address these inefficiencies and reduce risk in the repo market, the option to settle term repos using Term DBV was introduced into CREST on 1 July 2011 to complement the existing overnight DBV option. The new mechanism allows trades to be transacted for a period of more than one night without having to be re-input, matched, settled and unwound in the CREST system every day. This is demonstrated in **Figure 1** below.

Consequently, use of Term DBV will reduce the operational risk inherent in settlement activity; it will also reduce demand for intraday liquidity from the settlement banks, which in turn reduces the intraday expansion of the Bank's balance sheet.

The introduction of Term DBV required a number of changes to the CREST system. First, automated mark-to-market processing was introduced so that the value of collateral provided in the transaction would be maintained even if the price of the underlying securities changed over the life of the trade. Second, an automated process was initiated to allow for the substitution of securities to meet the collateral-giver's security liquidity needs during the life of the Term DBV.

Since Term DBV was implemented in July 2011, there has been a steady increase in the market's use of this method of settlement: at end-August, around £7 billion of gilt repo was held in Term DBV, accounting for 4% of the DBV market; eight market participants have chosen to settle gilt repo using Term DBV. Since its launch, several contacts have stated their support of the introduction of Term DBV and have acknowledged the risk-reducing benefits that it brings to the gilt repo market.

At present, it is not possible for Term DBV to be centrally cleared. LCH.Clearnet Ltd and EUI are working with their clients in the repo market to determine the viability and design of a centrally cleared Term DBV product. If that proves possible, it is expected that the market's use of Term DBV will rise further.



Given the risk-reduction benefits of using Term DBV, the Bank is supportive of the market's growing adoption of this method of settlement.⁽³⁾ Since its launch, Term DBV was used in the settlement of the Bank's July and August 2011 indexed long-term repo operations. Of the DBV collateral provided by the Bank's counterparties, over 40% was settled using Term DBV. The Bank is minded to discontinue the use of rolling overnight DBV in its operations at some point in the future.

⁽¹⁾ Over the quarter to end-August 2011, the Bank's balance sheet on average was around £238 billion at close of business, and expanded to around £360 billion during the day in order to provide liquidity for CHAPS and CREST settlement.

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

⁽³⁾ See page 9 of the speech by Chris Salmon on 5 July 2011, available at www.bankofengland.co.uk/publications/speeches/2011/speech508.pdf.

Research and analysis

PROMISE

The United Kingdom's quantitative easing policy: design, operation and impact

By Michael Joyce, Matthew Tong and Robert Woods of the Bank's Macro Financial Analysis Division.⁽¹⁾

In response to the intensification of the financial crisis in Autumn 2008, the Bank of England, in common with other central banks, loosened monetary policy using both conventional and unconventional policy measures. In the United Kingdom, the principal element of these unconventional measures was the policy of asset purchases financed by central bank money, so-called quantitative easing (QE). Over the period March 2009 to January 2010, £200 billion of assets were purchased, overwhelmingly made up of government securities, representing around 14% of annual GDP. This article reviews the motivation for these central bank asset purchases and describes how they were implemented. It goes on to review a range of evidence for the impact of the asset purchases made to date, both on financial markets and more widely on the economy. While there is considerable uncertainty about the magnitudes, the evidence suggests that QE asset purchases have had economically significant effects.

Introduction

After the failure of Lehman Brothers in September 2008, confidence in the world economy collapsed, international financial markets became dysfunctional and credit conditions tightened markedly.

As the crisis intensified, central banks internationally took measures to loosen monetary policy and support demand. In the United Kingdom, the Bank of England's Monetary Policy Committee (MPC) cut interest rates sharply, with cuts of 3 percentage points in Bank Rate during 2008 Q4 and a further 1¹/₂ percentage points in early 2009. In early March 2009, Bank Rate was reduced to 1/2%, effectively its lower bound. But, despite this substantial loosening in policy, the MPC judged that without additional measures nominal spending would be too weak to meet the 2% CPI inflation target in the medium term. The MPC therefore also announced that it would begin a programme of large-scale purchases of public and private assets using central bank money.⁽²⁾ The aim of the policy was to inject money into the economy in order to boost nominal spending and thus help achieve the 2% inflation target.

The policy of expanding the central bank's balance sheet through asset purchases, financed by central bank money is widely referred to as quantitative easing (QE).⁽³⁾ The Bank of

England's asset purchases were overwhelmingly focused on purchasing a large amount of UK government bonds (gilts). Between March 2009 and January 2010, the Bank purchased £200 billion of assets, mostly medium and long-dated gilts. These asset purchases represented nearly 30% of the amount of outstanding gilts held by the private sector at the time and around 14% of annual nominal GDP. Combined with earlier liquidity support measures to the banking sector,⁽⁴⁾ these purchases increased the size of the Bank's balance sheet relative to GDP threefold compared with the pre-crisis period.

The Government also authorised the Bank to pursue a number of activities targeted to improve the functioning of specific financial markets (see Fisher (2010a)). This included purchases of high-quality commercial paper and corporate bonds. The scale of these operations was much less than for the gilt purchases, consistent with the Bank acting as a backstop purchaser/seller with the intention of improving market functioning.

(3) For example, see Bernanke and Reinhart (2004).

The authors would like to thank Nick McLaren, Haroon Mumtaz and Tom Smith for their help in producing this article.

⁽²⁾ Other central banks internationally also lowered monetary policy rates to levels close to the lower bound and introduced unconventional measures. For more information see Borio and Disyatat (2009).

⁽⁴⁾ For more detail on the development of the Bank of England's liquidity insurance facilities, see Cross, Fisher and Weeken (2010).



Figure 1 QE transmission channels

This article provides an overview of the United Kingdom's QE policy. The next section explains the possible channels through which asset purchases may affect the economy. The following section briefly explains the design of the QE programme and how the purchases were implemented. The article then reviews a range of evidence on the financial and wider macroeconomic effects. The final section concludes.

Transmission channels for asset purchases

How do asset purchases affect spending and inflation?

The aim of undertaking asset purchases was the same as a cut in Bank Rate, to stimulate nominal spending and thereby domestically generated inflation, so as to meet the MPC's 2% inflation target in the medium term.⁽¹⁾ As discussed in a previous Quarterly Bulletin article by Benford et al (2009), there are a number of potential channels through which asset purchases might affect spending and inflation.⁽²⁾ Purchases of financial assets financed by central bank money should initially increase broad money holdings, push up asset prices and stimulate expenditure by lowering borrowing costs and increasing wealth. Asset purchases may also have a stimulatory impact through their broader effects on expectations and by influencing bank lending, though this channel would not be expected to be material during times of financial crisis. These channels are considered in more detail below with Figure 1 providing a simple pictorial representation.

Channels working through asset prices

Policy signalling effects: This channel includes anything economic agents learn about the likely path of future monetary policy from asset purchases. For example, asset purchases may have led market participants to expect policy rates to remain low for longer than otherwise by signalling the MPC's determination to meet the inflation target. At the time the MPC decided to initiate asset purchases, policymakers were concerned about the risks of inflation falling significantly below target in the medium term. This could have led to lower inflation expectations, which would have pushed up on real interest rates, even with nominal rates kept at very low levels, and reduced spending in the economy. By helping to ensure that inflation expectations remain well anchored to the target, asset purchases could help to support spending. More generally, policy announcements on asset purchases might contain 'news' about the underlying state of the economy, for example if agents relied on central bank analysis to inform their views on the economy.

Portfolio balance effects: Central bank asset purchases, through this channel, push up the prices of the assets bought and also the prices of other assets. When the central bank purchases assets, the money holdings of the sellers are increased. Unless money is a perfect substitute for the assets sold, the sellers may attempt to rebalance their portfolios by buying other assets that are better substitutes.⁽³⁾ This shifts the excess money balances to the sellers of those assets who may, in turn, attempt to rebalance their portfolios by buying further assets — and so on. This process will raise the prices of assets until the point where investors, in aggregate, are willing to hold the overall supplies of assets and money. Higher asset prices mean lower yields, and lower borrowing costs for firms and households, which acts to stimulate spending. In addition, higher asset prices stimulate spending by increasing the net wealth of asset holders.

While policy signalling effects affect expected policy rates, portfolio balance effects work by reducing the spreads of

⁽¹⁾ For discussion of the other factors affecting inflation more recently, see Section 4 of the August 2011 *Inflation Report*.

⁽²⁾ The channels through which QE may affect the economy are the subject of a lot of debate. In conventional New Keynesian models, asset purchases can only work to the extent that they change agents' expectations of the future path of policy rates (see, for example, Eggertsson and Woodford (2003)). Asset purchases on their own do not change behaviour because the assumptions made imply the distinction between public and private asset holdings is unimportant. But in other models with credit constraints, distortionary taxes or incomplete markets, and with imperfect substitutability between different assets, asset purchases may also affect asset prices by changing the relative supplies of different assets (see, for example, Andrés, López-Salido and Nelson (2004) and Harrison (2011)).

⁽³⁾ The concept of imperfect substitutability goes back to Tobin (1958). Dale (2010) and Joyce et al (2011) discuss some of the related theoretical background. Various factors may affect the degree of substitutability between assets, including duration, credit risk and liquidity.

longer-term interest rates over expected policy rates (term premia) and the required return on risky assets relative to risk-free assets (risk premia) more generally.⁽¹⁾

Liquidity premia effects: When financial markets are dysfunctional, central bank asset purchases can improve market functioning by increasing liquidity through actively encouraging trading. Asset prices may therefore increase through lower premia for illiquidity. The effects of this channel may, however, only persist while the monetary authority is conducting asset purchases.

Other channels

Confidence effects: Asset purchases may have broader confidence effects beyond any effects generated through the effect of higher asset prices. For example, to the extent that the policy leads to an improved economic outlook, it might directly boost consumer confidence and thus people's willingness to spend. Some of this more general improvement in confidence may also be reflected back in higher asset prices, especially by reducing risk premia.

Bank lending effects: When assets are purchased from non-banks (either directly or indirectly via intermediate transactions), the banking sector gains both new reserves at the Bank of England and a corresponding increase in customer deposits. A higher level of liquid assets could then encourage banks to extend more new loans than they otherwise would have done. But, given the strains in the financial system at the time and the resultant pressures on banks to reduce the size of their balance sheets, the MPC expected little impact through this channel.⁽²⁾

How does the economy adjust to asset purchases?

The overall effect of asset purchases on the macroeconomy can be broken down into two stages: an initial 'impact' phase and an 'adjustment' phase, during which the stimulus from asset purchases works through the economy, as illustrated in Chart 1. As discussed above, in the impact phase, asset purchases change the composition of the portfolios held by the private sector, increasing holdings of broad money and decreasing those of medium and long-term gilts. But because gilts and money are imperfect substitutes, this creates an initial imbalance. As asset portfolios are rebalanced, asset prices are bid up until equilibrium in money and asset markets is restored. This is reinforced by the signalling channel and the other effects of asset purchases already discussed, which may also act to raise asset prices. Through lower borrowing costs and higher wealth, asset prices then raise demand, which acts to push up the consumer price level.

In the *adjustment phase*, rising consumer and asset prices raise the demand for money balances and the supply of long-term assets. So the initial imbalance in money and asset markets shrinks, and real asset prices begin to fall back. The boost to Chart 1 The qualitative economic impact of QE



demand therefore diminishes and the price level continues to increase but by smaller amounts. The whole process continues until the price level has risen sufficiently to restore real money balances, real asset prices and real output to their equilibrium levels. Thus, from a position of deficient demand, asset purchases should accelerate the return of the economy to equilibrium.

Design and operations

How did the transmission channels affect the design of the programme?⁽³⁾

The Bank of England's asset purchase programme has attached particular importance to the *portfolio balance channel*. That is why purchases have been targeted towards long-term assets held by non-bank financial institutions, like insurers and pension funds, who may be encouraged to use the funds to invest in other, riskier assets like corporate bonds and equities.⁽⁴⁾

Before asset purchases began, the main holders of gilts were UK non-bank financial institutions and overseas investors. Gilts only represented a modest part of UK non-bank financial institutions' overall portfolios, suggesting they might be prepared to reinvest some of the money from gilt sales in other assets. Overseas investors might be more inclined to choose to invest in foreign assets. However, to do so they would need to change their sterling for foreign currency, putting downward pressure on the exchange rate. And, since all central bank money has to be held by someone, those who received the sterling might then choose to invest in other sterling assets.

The evidence considered in this article suggests that the larger effect was through lower premia. This is also consistent with the US evidence, eg Gagnon *et al* (2010).

⁽²⁾ See minutes of the Monetary Policy Committee meeting for the 4 and 5 March 2009, published on 18 March 2009.

⁽³⁾ For more information on the design of the Bank's asset purchase programme see Fisher (2010a,b).

⁽⁴⁾ Fisher (2010b) notes that the Japanese QE programme over 2001–06 purchased government bonds which had been mostly held by banks, who used the proceeds to deleverage without obviously increasing the demand for other assets.

At the end of 2008, UK banks held only about 4% of the total stock of gilts, and these tended to be shorter-maturity ones. As **Chart 2** shows, the banking sector actually increased its holdings of gilts during the period that the Bank was conducting asset purchases, suggesting that the main impact was to reduce the gilt holdings of the non-bank private sector relative to what would otherwise have happened.



(a) Purchases by the non-bank private sector exclude repos.
(b) Gilts acquired through asset purchases are held by the Asset Purchase Facility, a subsidiary of the Bank of England.

The MPC has not used the asset purchase programme explicitly to *signal future intentions* about the likely path of policy rates. It emphasised its ongoing commitment to meet the inflation target using its normal communication channels, for example, the minutes of MPC meetings and the *Inflation Report*.⁽¹⁾ That said, asset purchases gave a clear signal that the Bank would continue to be able to loosen monetary policy and stimulate demand even when Bank Rate is effectively at its lower bound, which could have had strong expectations effects. This signal could have substantially changed the distribution of future macroeconomic outcomes, reducing the chance of further large falls in asset prices and hence reducing risk premia more generally, as well as having the sort of broader *confidence effects* discussed above.

For the Bank's purchases of gilts, the liquidity premia channel was not expected to be very important. The gilt market continued to function effectively throughout the crisis, although even here the strains in financial markets could be discerned at times. The liquidity premia channel was more important in the design of the Bank's (relatively small-scale) purchases of private sector assets. This programme sought to improve the availability of capital market finance to companies more directly, by improving the liquidity in certain markets.⁽²⁾ In this case, purchases provided confidence to investors and issuers that they could find buyers for these assets if they needed to sell quickly without incurring an excessive price discount.

Operational considerations

The Bank of England Asset Purchase Facility (APF) was announced on 19 January 2009, with the details set out in an exchange of letters between the Governor of the Bank of England and the Chancellor of the Exchequer later in the month. Initially the APF bought private sector assets funded by the issuance of Treasury bills and the cash management operations of the Debt Management Office (DMO). The APF became a vehicle for monetary policy when, in March 2009, the MPC decided to purchase assets financed by the creation of central bank money.

While the MPC reviewed the appropriate scale of the programme each month, due to the large size of the programme, it tended to conduct policy in terms of a target level of purchases over periods longer than a month. This allowed purchases to be conducted at a pace that would not generate additional market disorder. At the March 2009 meeting, the MPC decided to purchase £75 billion of assets over a three-month period. A monthly rate of purchases of £25 billion was maintained until the August MPC meeting when it fell to just over £16 billion a month, falling again to just over £8 billion a month over the three months following the November MPC meeting. In total £200 billion of assets were purchased, mostly comprising gilts. Charts 3 and 4 show the amounts purchased of gilts, commercial paper and corporate bonds. Further details of the key announcements related to asset purchases are given in Table A.

The Bank of England executed the MPC's decisions with a concern to avoid unnecessary disruption to the gilt market. As the Bank accumulated a large percentage of some gilts in issue, there was a risk that segments of the gilt market might become dislocated. To alleviate this, in August 2009 the Bank announced it would start to lend out a proportion of the gilts it had bought, through the DMO, in exchange for other gilts that had readier availability.⁽³⁾ At the same time, the maturity of conventional gilts the Bank would purchase was extended from 5–25 years to all conventional gilts with maturities of three years or more. This simply reflected the fact that by this stage the Bank was holding a large proportion of some of the gilts in issue in the 5–25 year maturity range. **Chart 4** illustrates the composition of APF gilt purchases by maturity.

Given the shortest residual maturity of gilts purchased was three years, the earliest redemption is not until 2013. Interest

⁽¹⁾ See Bean (2011).

⁽²⁾ Tucker (2009) and Fisher (2010a) describe the Bank's role in these private sector asset markets as acting as a 'market maker of last resort' and set out some guiding principles for such operations.

⁽³⁾ They were not lent out against cash as that would have undone some of the intended impact of the initial asset purchases.



Chart 3 Cumulative APF purchases of commercial paper and corporate bonds





receipts from gilts purchased accumulate in the APF, and so will repayments of principal when they fall due. They are not automatically reinvested unless the MPC decides to do so.

Evidence on the impact

This section describes some of the evidence on the impact of the Bank's QE asset purchases on the economy, shedding some light on the importance of the different transmission channels discussed above. It is difficult to measure directly the effects of monetary policy measures such as QE and so estimates of those effects are highly uncertain.

Asset prices and quantities Gilt yields

The bulk of the Bank of England's asset purchases were of conventional gilts, so it might be expected that the largest initial impact would have been on the gilt market. A natural starting point for assessing the effect of the policy is to look at

Table A APF and QE-related announcements

Date	Event
2009	
19 January	The Chancellor of the Exchequer announces that the Bank of England will set up an asset purchase programme.
30 January	Asset Purchase Facility Fund established. Exchange of letters between the Chancellor of the Exchequer and the Governor on 29 January 2009.
5 February	Bank Rate reduced from 1.5% to 1%.
11 February	February Inflation Report and the associated press conference give strong indication that QE asset purchases are likely.
13 February	First purchases of commercial paper begin.
5 March	Bank Rate reduced from 1% to 0.5%. The MPC announces it will purchase £75 billion of assets over three months funded by central bank money. Conventional bonds likely to constitute the majority of purchases, restricted to bonds with residual maturity between 5 and 25 years.
11 March	First purchases of gilts begin.
25 March	First purchases of corporate bonds begin.
7 May	The MPC announces that the amount of QE asset purchases will be extended by a further \pm 50 billion to \pm 125 billion.
3 August	Secured commercial paper facility launched.
6 August	The MPC announces that QE asset purchases will be extended to \pm 175 billion and that the buying range will be extended to gilts with a residual maturity greater than three years. The Bank announces a gilt lending programme, which allows counterparties to borrow gilts from the APF's portfolio via the DMO in return for a fee and alternative gilts as collateral.
5 November	The MPC announces that QE asset purchases will be extended to £200 billion.
22 December	The Bank announces that it will act as a seller, as well as a buyer, of corporate bonds in the secondary market.
2010	
8 January	First sales of corporate bonds.
4 February	The MPC announces that QE asset purchases will be maintained at \pm 200 billion. The Chancellor authorises the Bank to continue to transact in private sector assets, with further purchases financed by issuance of Treasury bills. The MPC's press statement says that the Committee will continue to monitor the appropriate scale of the asset purchase programme and that further purchases will be made should the outlook warrant them.

Shading denotes announcements used in the event study analysis by Joyce et al (2011) referred to in the following section.

the immediate reaction of gilt yields to announcements about QE, as ordinarily market prices would be expected to respond directly to news about asset purchases, rather than waiting for the purchases themselves to occur.

Chart 5 (taken from Joyce *et al* (2011)) shows the average reaction of medium to long-term gilt yields to the six pieces of QE news highlighted in **Table A**.⁽¹⁾

By far the largest gilt market reaction was in March 2009 (75 basis points) when the QE programme was first announced, but there were also large reactions after the February 2009 *Inflation Report* and associated press conference, which suggested that a policy of asset purchases was likely, and after the August announcement of a further extension of the programme. All these reactions were statistically significant in relation to the normal volatility over the pre-crisis period. Summing over the reactions in gilt yields

The reaction is measured by the change in yields over a two-day window from close of business the day before each announcement to the day after.



Chart 5 Announcement impact on gilt yields, OIS rates and gilt-OIS spreads^(a)



to each of the QE news events gives an overall average fall of just under 100 basis points.

Most of the fall in gilt yields was not reflected in corresponding interest rates implied by overnight index swap (OIS) contracts, which fell by less than 10 basis points in total over the six events. To the extent that OIS rates can be used as a benchmark for default risk-free rates,⁽¹⁾ this suggests that the fall in gilt yields cannot primarily be attributed to signalling effects about future policy rates, or more broadly to macroeconomic news. Instead, it is consistent with the main effect coming through portfolio rebalancing.⁽²⁾

As an alternative measure of the impact of QE purchases on gilt yields, Joyce et al (2011) make use of a Reuters survey of economists' expectations regarding the total size of QE purchases to calculate the amount of asset purchase news in each announcement. Chart 6 shows there was a strong negative relationship between two-day changes in zero-coupon gilt yields and the amount of QE news in each announcement. A simple regression of the two suggests a fall in gilt yields of 0.62 basis points for each additional £1 billion of unanticipated QE purchases announced. Separate OLS regressions of QE news on OIS rates and gilt-OIS spreads were also estimated. Scaling up the estimates suggests an overall impact from £200 billion of unanticipated purchases of 125 basis points on yields, split between about 45 basis points on OIS rates (policy signalling channel) and 80 basis points on gilt-OIS spreads (portfolio balance channel).

As discussed above, the portfolio balance effect of QE on gilt yields would be expected to show up in lower term premia (the spread of long-term interest rates over expected policy rates). Using a term structure model of the nominal and real gilt yield curves (based on Joyce, Lildholdt and Sorensen



Chart 6 Size of surprise and average gilt yield changes

Sources: Joyce et al (2011), Thomson Reuters Datastream and Bank calculations.

(2010)), **Chart 7** shows the decomposition of gilt yields into expected future short rates and term premia over a two-month window from the start of February 2009 to the end of March 2009, the period when most of the news about the United Kingdom's asset purchases occurred. According to the model decomposition over this period, term premia were compressed by around 25 basis points at medium and longer maturities, but expected real short-term rates also declined and there was a modest increase in expected inflation. However, the fact that the fall in yields at long maturities is not fully explained could be consistent with an additional supply effect on term premia (of a further 25 to 35 basis points) that the model does not capture.



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 Since OIS contracts settle on overnight rates and are collateralised they should contain minimal credit risk. For more information, see Joyce and Meldrum (2008)

⁽²⁾ Portfolio rebalancing might be expected to affect gilt yields but not OIS rates, as the latter are inferred from derivatives contracts which are less likely to be affected by supply constraints. The Bank's market contacts suggest that institutional investors would be unlikely to use OIS contracts as a substitute for their gilt holdings, implying that there is some segmentation between the two markets.

Other asset prices

The portfolio balance effect suggests that, to the extent that investors regarded other assets — such as corporate bonds and equities, and foreign assets — as closer substitutes for gilts than money, they would have wanted to reduce their money holdings associated with QE purchases and buy those other assets. This would be expected to have put upward pressure on the prices of those assets, and perhaps downward pressure on the sterling exchange rate. Quite apart from this effect, announcements about QE might have contained information about the economy that had implications for perceptions of future corporate earnings and the uncertainty around them; and changes in the prices of gilts may have affected the rate at which investors discount future cash flows. All of these effects might be expected to have taken time to feed through, as it took time for investors and asset managers to rebalance their portfolios and asset prices are unlikely to have anticipated this process fully (particularly given the novelty of the QE policy).

Indeed, as summarised in **Table B**, the announcement reactions of some other asset prices were less unequivocal than those for gilt prices. Corporate bond yields, however, did show a clear reaction. Summing over the immediate reaction to the six QE news announcements, sterling investment-grade corporate bond yields fell by 70 basis points, with spreads relative to gilt yields remaining broadly flat. Sterling non-investment grade corporate bond yields fell by 150 basis points, with spreads narrowing by 75 basis points.⁽¹⁾ Over the same announcement windows, international investment-grade bond yields fell by less than sterling-denominated bonds, suggesting that there was a UK-specific effect.

Table B. Summary of asset price movements

rable b builting of asset price movements					
Asset	Change around announcements	Change 4 March 2009– 31 May 2010	Comments		
Gilts	-100 basis points (bp) (<i>of which -</i> 90bp in gilt-OIS spreads)	+30bp (<i>of which</i> +15bp in gilt-OIS spreads)	Portfolio balance channel dominates the signalling effect.		
Gilts (reaction to QE 'news')	-125bp (<i>of which -</i> 80bp in gilt-OIS spreads)	+30bp (<i>of which</i> +15bp in gilt-OIS spreads)	Portfolio balance channel dominates when controlling for QE news using Reuters survey.		
Corporate yields (investment grade	-70bp)	-400bp	Smaller fall than gilts perhaps due to shorter average duration. Spreads flat around announcements but significantly down over the period.		
Corporate yields (high yield)	-150bp	-2,000bp	Larger announcement effects, possibly reflecting the removal of tail risk.		
FTSE All-Share	-3%	+50%	No announcement effects, but prices up during the period.		
Sterling ERI	-4%	+1%	Small announcement effect.		

Equity prices did not react in a uniform way in response to QE news. The FTSE All-Share index fell slightly following the publication of the February *Inflation Report* and more sharply following the March MPC announcement. Over the same period, however, international equity prices fell by even more, suggesting that there might have been a small positive UK-specific effect. Following the next three QE announcements, UK equity prices increased somewhat, but fell after the February 2010 announcement, though this is unlikely to have been a QE effect, as the February decision was widely expected.

Sterling's reaction was more in line with what might have been expected. Uncovered interest parity would predict a depreciation in response to lower domestic interest rates. Summing over the immediate reactions to the six QE news announcements, the sterling ERI did indeed depreciate by around 4%.

Of course, as already discussed, these initial market reactions are unlikely to have reflected the full effects of QE. **Table B** and **Chart 8** show that, over a longer period from March 2009 to May 2010, there were sustained rises in asset prices. But it is not possible to know how much of those rises were directly attributable to QE in the United Kingdom, as this was part of a more general pickup in international asset prices, reflecting the large fiscal and monetary stimulus across the advanced economies.

Chart 8 Changes in major UK asset prices





Econometric model estimates based on applying a portfolio balance approach to historical (pre-crisis) data suggest that the initial reaction of gilt and corporate debt markets shown in **Table B** was broadly in line with what might have been expected. The equity price response might, however, have been expected to be much larger (of the order of 20%),

(1) These numbers imply corresponding gilt yields fell by around 75 basis points. This is different from the 100 basis point average fall in gilt yields discussed above, as sterling corporate bonds have a shorter average duration.

Source: Joyce et al (2011).

though this is subject to great uncertainty (see Joyce et al (2011)).(1)

Corporate bond and equity issuance

Firms might have been expected to respond to higher equity and corporate bond prices by increasing their use of capital markets to raise funds and there is some evidence of this. Net equity issuance by UK private non-financial corporations was particularly strong in 2009, reversing the negative net issuance observed over 2003–08. Net corporate bond issuance by UK private non-financial corporations in 2009 was also stronger than over the 2003-08 period. It is not possible to know what would have happened in the absence of QE, but the Bank's market contacts suggest that there was strong institutional investor demand for corporate bonds during the second half of 2009.

Inflation expectations

Inflation expectations might be expected to increase in response to the monetary stimulus associated with QE. Chart 9 shows that short to medium-term RPI inflation breakeven rates derived from gilts fell sharply in late 2008 to unusually low, and even negative, levels before subsequently rising (though long-term breakeven rates remained more stable). This pattern is consistent with a fall and subsequent increase in market participants' inflation expectations, although it is hard to draw a direct signal from these measures, as they will have been affected by market functioning and will also incorporate premia for uncertainty around inflation.



⁽a) Data refer to RPI spot rates

The various survey-based measures of longer-term household and economist inflation expectations shown in Chart 10 also suggest some evidence of falls during late 2008, which then reversed gradually during 2009. This suggests that QE may have helped reduce the weight that agents placed on outcomes of persistent low inflation, though a number of other external factors (such as energy and other import prices)

Chart 10 Indicators of long-term inflation expectations

- YouGov/Citigroup five to ten years ahead^(a)
- Bank/NOP five years ahead^(a)

Barclays Basix five years ahead^(a)

- HM Treasury survey of forecasters: CPI inflation four years ahead



Sources: Barclays Capital, Bloomberg, Citigroup, GfK NOP, HM Treasury, YouGov and Bank calculatio

are likely to have influenced inflation expectations over this period.

Money and borrowing rates

From the onset of the financial crisis in 2007, broad money growth slowed dramatically in the United Kingdom, falling from around 10% a year to below 1% a year in early 2010. Since then, money growth has picked up slightly but remains below nominal GDP growth (Chart 11). This pattern reflects, in part, a sharp slowdown in lending to the non-bank private sector. Aggregate credit flows have reached an unusually low





⁽a) Recession periods are shown in grey. Recessions are defined as at least two consecutive quarters of falling output (at constant market prices) estimated using the latest data. The recessions are assumed to end once output began to rise

⁽a) Bank/NOP. Barclays Basix and YouGov/Citigroup household measures do not reference a specific price index and are based on the median estimated price change

 ⁽b) Nominal GDP is measured at current market prices.
 (c) Broad money is constructed as headline M4 growth prior to 1998 Q4 and M4 growth excluding intermediate OFCs thereafter. Intermediate OFCs are: mortgage and housing credit corporations; non-bank credit guarantors; bank holding companies; and those carrying out other activities auxiliary to financial intermediation. Banks' business with their related 'other financial intermediaries' is also excluded, based on anecdotal information provided to the Bank of England by several banks.

⁽¹⁾ To provide an idea of plausible magnitudes, a 100 basis points fall in risk-free rates would, all else equal, be expected to increase equity prices by 15%, using a dividend discount model (as in Inkinen, Stringa and Voutsinou (2010))

level relative to nominal GDP. But also net issuance of equity and long-term debt by banks, as they have sought to deleverage and rebuild their capital bases, and net repayments of bank debt by non-banks have both detracted from broad money growth (see Bridges, Rossiter and Thomas (2011) for more details).

Offsetting those trends somewhat has been the increase in the money supply generated by asset purchases by the Bank. To the extent that those purchases were made from non-banks or that banks used the money to buy other assets from the non-bank sector, purchases by the Bank would initially have increased the level of broad money relative to nominal GDP.

Higher asset prices may then have encouraged firms to increase the extent to which they use capital markets for finance, rather than banks. This may have resulted in higher growth of nominal spending relative to broad money than would have been the case in the absence of central bank asset purchases. Chart 12 shows that there is evidence that UK firms in aggregate did, to an extent, disintermediate the banking sector during 2009 through higher issuance of capital market equity and debt relative to bank borrowing.



Chart 12 Net external finance raised by UK private

 (a) Non seasonally adjusted.
 (b) Monetary and financial institutions. Three-month moving averages. Includes sterling and foreign currency funds. (c) The total may not equal the sum of its components.

To the extent that it facilitated a rebuilding of banks' balance sheets, QE purchases may, through lower borrowing costs, have also helped to ensure that bank lending growth fell less rapidly than would otherwise have been the case. There is, however, little evidence that effective new bank lending rates for households or firms fell significantly following QE purchases, even though there were substantial falls in the spread between interbank lending rates and OIS rates over the period (Chart 13). But it is hard to estimate what the counterfactual would have been.



Chart 13 Sterling three-month Libor-OIS spreads



Sources: Bloomberg and Bank calculations

Confidence

It is very hard to disentangle the effect of QE from that of other factors affecting confidence. There is circumstantial evidence, however, that confidence improved during the period in which asset purchases were taking place. One source of evidence can be found in the distributions around future asset prices implied by options markets. Chart 14 shows that the option-implied distribution around the FTSE 100 equity index twelve months ahead did not just shift horizontally in line with the increase in the index in the period following QE purchases but also narrowed markedly, with investors placing much less weight on large downside risks. This change in the shape of the distribution is consistent with investors being more confident about the outlook for future equity prices, though it is also likely to reflect other international developments in addition to QE in the United Kingdom.



index twelve months ahead

Chart 14 Option-implied distribution of the FTSE 100

Similarly, measures of confidence for households and firms also improved markedly in 2009 following QE purchases. Chart 15 shows that confidence for both consumers and firms fell to between two and four standard deviations below recent historical averages during 2008. However, those falls were

Chart 15 Survey-based measures of consumer and business confidence



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

(b) Overall prosperity index derived from the answers to questions 1, 2d, 4 and 5 of the YouGov

(c) This aggregate confidence index is derived by averaging the answers to questions 2, 4, 7 (with inverted sign) and 11 in the GK NOP survey carried out on behalf of the European Commission. Data are seasonally adjusted.

(d) Business confidence.

(e) CIPS/Markit services business expectations. Data are seasonally adjusted.

almost entirely reversed during 2009, as QE purchases were being made. Again, it is hard to know how much of that increase was due directly to QE purchases, given that there was a global recovery in confidence during the period and action to stimulate global demand from a range of countries. But the movements are consistent with QE having reduced the perceptions of large downside risks and uncertainty in the economy as a whole during 2009.

Wider macroeconomic effects

The wider macroeconomic effects of QE are difficult to quantify. A host of other factors have been important in influencing the UK economy during the crisis period, making it almost impossible to isolate the incremental effects of QE. But despite these difficulties, a growing number of studies have begun to evaluate the macroeconomic effects of unconventional monetary policies in the United Kingdom and elsewhere using a variety of approaches.⁽¹⁾ What follows is an assessment of the macroeconomic effects of the United Kingdom's asset purchases drawing on the latest Bank of England research.

Model-based estimates

SVAR approach: A common approach is to characterise QE solely through its effects on longer-maturity government bond yields. The simplest starting point for this kind of analysis is to use a small structural vector autoregression (SVAR) containing the policy rate, a government bond yield (the ten-year spot rate), real GDP growth and CPI inflation. A 'QE shock' can be identified by assuming that a negative shock to bond yields leads to a contemporaneous rise in GDP and CPI inflation, but has no effect on policy rates (which are constrained at the zero bound). Estimating this model using quarterly UK data over a

sample period predating the crisis (1992 Q1 to 2007 Q2), and shocking the ten-year gilt yield by 100 basis points, results in a peak impact on the level of real GDP of just under 1.5% and a peak effect on annual CPI inflation of about ³/₄ percentage points. These effects should be taken as illustrative, given the simplicity of the model and the fact that it has been estimated on a sample predating the crisis. Furthermore, in looking at an impulse response, the assumption is that QE is similar to a typical one-period shock to bond yields. This implies rather less persistence than might be expected if QE has operated primarily through a portfolio balance effect. Despite these caveats, the effects on key macro variables appear economically significant.

Multiple time-series models approach: It is also possible to use more sophisticated econometric models to look at this issue. Kapetanios et al (2011) use three different time-series models of varying complexity to conduct counterfactual forecasts of the effects of QE. The approach (broadly similar in spirit to Lenza, Pill and Reichlin (2010)) is to use these models to conduct conditional forecasts under 'policy' and 'no policy' scenarios and then to attribute the difference in the resulting forecasts to the effects of the policy. In the no policy scenario, it is assumed that without QE five and ten-year gilt yields would have been 100 basis points higher, although a variety of alternative scenarios are also examined. Averaging across the models suggests that QE had a peak effect on the level of GDP of around 11/2% and a peak effect on annual CPI inflation of about 11/4 percentage points.⁽²⁾ These estimates vary considerably across the individual model specifications, and with the assumptions made to generate the counterfactual forecasts, suggesting they are subject to considerable uncertainty.

Monetary approach: An alternative method of estimating the effects of QE is to focus on its impact on the money supply. Bridges and Thomas (2011) first calculate the impact of QE on the money supply, allowing for the various other influences on broad money over the period. They then apply their estimates to two econometric models — an aggregate SVAR model and a linked set of sectoral money demand systems — that allow them to calculate how asset prices and spending need to adjust to make money demand consistent with the increase in broad money supply. Their preferred model estimates suggest that the higher money supply resulting from QE may have boosted the level of GDP by around 2% and CPI inflation by about 1%, though again these estimates are subject to a lot of uncertainty.

Bottom-up approach

Ideally one would want to make an assessment using a properly specified structural model. But no such model

⁽a) Consumer confidence.

Papers on the effects of other central bank's unconventional policies include: Lenza, Pill and Reichlin (2010) on the European Central Bank's policy actions and Chung et al (2011) on the Federal Reserve's policy actions.

⁽²⁾ These numbers refer to the lower of the two 'no policy' variants given in the paper.

embodying all the relevant transmission channels discussed earlier appears to exist. The forecasting model used by the Bank of England, in common with most large-scale macroeconomic models, does not explain risk premia and therefore does not embody a portfolio balance channel. But, to make a rough calculation, one can take a more bottom-up approach. More specifically, the effects of the QE policy can be broken down into two main elements: (1) the impact of asset purchases on gilt prices and other asset prices and (2) the effect of asset prices on demand and hence inflation.

A number of ways of estimating (1) were already discussed above. The analysis of the QE announcement effects suggested that asset purchases pushed down medium to long-term gilt yields by about 100 basis points. The effect of QE on a broader range of asset prices is much more uncertain, but there was an immediate 70 basis points fall in investment-grade corporate bond yields and a 150 basis points fall in sub-investment grade yields. There is considerable uncertainty about the effect on equity prices and the immediate market reaction is unlikely to provide an accurate guide, but an estimated portfolio balance model would suggest an impact of around 20%.⁽¹⁾ Combining these effects on government and corporate bonds and equity prices suggests an overall boost to households' net financial wealth of about 16%.

To quantify the next leg in the transmission mechanism, between asset prices and demand, a range of simple models may be used. To calculate the impact on consumer spending, it is necessary to calculate the wealth elasticity of consumption. One way of doing this is to make an annuity calculation, assuming that households perceive the policy's effects as long-lasting and want to spend their extra wealth evenly over their lifetimes. To calculate the effects on business and dwellings investment, one can use Q models, where the incentive to invest depends on the market value of capital relative to its replacement cost. Higher asset prices should raise the market value of capital and reduce the cost of finance, boosting investment spending. Allowing for reasonable uncertainty about the initial impact on asset prices, the result of these sorts of calculations would suggest a peak impact on the level of real GDP of between 11/2% and 21/2%.

The timing of the output effects from a change in asset prices might be expected to be slower than from a normal interest rate cut, which has a peak effect on output after a year. This reflects the fact that, unlike a conventional interest rate shock, QE is not associated with an immediate change in household and corporate interest rate payments. Of course, there are major uncertainties here and this sort of calculation ignores some of the transmission channels discussed earlier. It makes no allowance for any effect through confidence or any effect through the exchange rate. So it might well understate the effects.

To quantify the impact on inflation a Phillips curve relationship can be used. A typical rule of thumb from a Phillips curve relationship might be expected to imply that a 1% increase in GDP would lead to a subsequent rise in inflation of 1/2 to 1 percentage point after a year. Obviously this is highly uncertain and might provide a poor guide if QE were to lead to higher inflation expectations or have large effects on the exchange rate. Nevertheless, applying this mapping to the estimated impact of asset purchases on GDP would suggest there could have been a subsequent impact on inflation of between ³/₄ to 2¹/₂ percentage points.

Summary of the macro effects

If we compute the range across the different estimation methods, using the middle of the ranges of the bottom-up estimates, this would suggest that QE may have raised the level of real GDP by 11/2% to 2% and increased inflation by between ³/₄ to 1¹/₂ percentage points (as shown in the bottom row of Table C).⁽²⁾ These estimates are clearly highly uncertain, particularly as none of the methods used to produce them fully capture all the likely transmission channels set out earlier, but they do suggest that the effects of QE were economically significant.

Table C Estimates of the macroeconomic impact of QE, peak impact on the level of output and inflation

Method	Level of GDP (per cent)	CPI inflation (percentage points)
SVAR	11/2	3⁄4
Multiple time-series models average impact ^(a)	11/2	11⁄4
Monetary approach ^(b)	2	1
Bottom-up approach	11/2-21/2	3/4-21/2
Range across methods ^(c)	11/2-2	3/4-11/2

(a) Kapetanios et al (2011) (these estimates are based on the lower variant reported by the authors). (b) Bridges and Thomas (2011).
 (c) Calculated using the mid-point of the reported range for the bottom-up approach.

As another metric on how large these effects are, they can be compared with the cut in Bank Rate that would be required to produce a similar rise in CPI inflation. The Bank's forecasting model suggests that a 100 basis point cut in Bank Rate increases CPI inflation by about 1/2 percentage point after 18 to 24 months. Applying the Bank model ready-reckoner to the estimated 3/4 to 11/2 percentage point impact on inflation would therefore suggest that the effect of QE was equivalent to a 150 to 300 basis point cut in Bank Rate, a significant reduction. Of course, there are large uncertainties even with this range, and the true number could plausibly be either

⁽¹⁾ This figure is also consistent with an approach based on modelling money demand (eg Bridges and Thomas (2011)).

⁽²⁾ For comparison, Chung et al (2011) estimate that phase one of the large-scale asset purchase programme in the United States boosted the level of real GDP by almost 2%, while inflation is a percentage point higher than it would have been if the Federal Open Market Committee had never initiated the programme. According to their estimates, the full programme of asset purchases will raise GDP by almost 3%.

smaller or larger, but it provides a rough order of magnitude of the monetary stimulus implied by the QE policy.

Conclusion

This article provides an overview of the design, operation and impact of the Bank's asset purchase programme that began in 2009 in response to the intensification of the financial crisis.

The scale and speed of the programme was intended to reverse declining confidence and the increasing risk of inflation falling significantly below target in the medium term. In large part, the design of the scheme was intended to target purchases of medium to long-dated gilts from the non-bank financial sector.

The most clear-cut evidence on the impact is from asset prices. Gilt yields were depressed by around 100 basis points. Effects on a broader range of asset prices can be discerned but with greater difficulty, reflecting the lags involved and the wider range of influences. These changes in asset prices were expected to have conventional effects on output and then inflation. The article reviews a range of approaches taken in recent Bank of England research to quantify the possible impact of those asset price changes on output and inflation. This evidence suggests that the policy had economically significant effects — equivalent to a 150 to 300 basis point cut in Bank Rate — but there is considerable uncertainty around the precise magnitude of the impact.

The MPC may decide in the future to increase asset purchases or to begin the process of selling assets back. The economic and financial circumstances in which further asset purchases or sales are made may be very different from those that prevailed in early 2009, so it cannot be assumed that the magnitude of the effects will necessarily be the same.

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Bank resolution and safeguarding the creditors left behind

By Geoffrey Davies and Marc Dobler of the Bank's Special Resolution Unit.⁽¹⁾

Not for the first time, the global banking crisis illustrated the vulnerability of banks to a loss of confidence by their depositors, other creditors and counterparties. The experience highlighted the need to have special arrangements for dealing with failing banks — a 'special resolution regime' — that provides the authorities with the tools necessary to reduce the systemic risks arising from a bank's failure while at the same time limiting the taxpayers' exposure to the costs. The United Kingdom's own Special Resolution Regime for dealing with failing banks and building societies was born out of the difficulties in dealing with the failure of Northern Rock in the autumn of 2007.

This article is in two parts. The first provides a general overview of the principal objectives and features of a bank resolution regime, drawing in particular on the design of the United Kingdom's Special Resolution Regime (SRR).

The second part of the article considers the measures adopted in the design of the SRR to provide appropriate protection to uninsured creditors and counterparties of a failed bank. These creditors could typically include bondholders and wholesale depositors as well as market counterparties owed sums by the bank under derivatives and other financial contracts. These protective measures — referred to as 'creditor safeguards' can be broadly divided into two categories: *ex-ante* restrictions on the ways in which resolution tools can be deployed and *ex-post* rights to compensation.

This second part aims to show why these safeguards are necessary and how their design requires a careful balance between providing an appropriate degree of market certainty on the one hand and retaining sufficient flexibility to effect an orderly resolution on the other. Finally, it offers some examples from the resolution of the Dunfermline Building Society to show why getting the balance of creditor safeguards right is so important to effective resolution.

Part 1: An overview of bank resolution

Bank failures have the potential to occur very quickly. The 'maturity transformation' which banks undertake, ie funding long-term assets such as mortgages with short-term liabilities such as deposits payable on demand, makes them inherently vulnerable to a rapid loss of confidence by their creditors. A run by depositors to withdraw their funds can swiftly put pressure on the bank's ability to repay these debts. And while a bank that is solvent and still viable may look to the central bank to provide liquidity as lender of last resort, the herd effect of a run can leave little time to stabilise the situation and avoid a downward spiral into insolvency.

Why have a bank resolution regime?

Generally when a company fails and it cannot restructure its debts or be sold in order to continue as a going concern, its owners or creditors will wind it up. The company's assets are sold over time, with the proceeds used to satisfy, as far as possible, its creditors' claims in a fixed order of priority. That is an approach common to most countries and generally operates successfully for firms large and small, regulated and unregulated.

Prior to the adoption of the SRR, insolvent banks in the United Kingdom were subject only to normal corporate insolvency law. The insolvency process allows losses to fall on creditors who have assumed the risk of lending to the bank, removes uncompetitive banks from the market place and makes space for new competition. Assuming it is successfully combined with rapid payout of compensation by a deposit insurance scheme, insolvency provides some protection to the bank's retail depositors, while ensuring that depositors with deposits in excess of the insurance limit retain responsibility for the investment choices they make.⁽²⁾

But the insolvency of a bank, particularly one with a large number of depositors and financial counterparties, has the

⁽¹⁾ The authors would like to thank Kushal Balluck and Sagar Shah for their help in producing this article.

⁽²⁾ The liquidation on 16 June 2011 of Southsea Mortgage & Investment Company is an example of how a small deposit-taker may be wound up using the SRR's bespoke insolvency tool that permits rapid payout of insured depositors, without the resolution having wider systemic effects.

potential to generate wider costs or 'negative externalities' for society extending well beyond the losses to a bank's immediate creditors. Banks play an essential role in the payments system, they provide credit for goods and services and act as repositories for public savings and cash balances. Banks also play an essential role in the transmission of monetary policy.⁽¹⁾ But unlike other types of business, it is very difficult for banks to operate once in insolvency.

Commencement of insolvency leads to a freeze in the bank's ability to make payments, which effectively results in the end of its business.⁽²⁾ The sudden severing of these interconnections between a bank and the rest of the financial system and wider economy can have highly undesirable systemic effects. Individuals and small companies are entitled to compensation by the Financial Services Compensation Scheme (FSCS) for the first £85,000 of their deposits. But even a relatively short delay in the time needed by the FSCS to process and pay many deposit insurance claims can lead to hardship for households and businesses left temporarily without access to their savings. Disruption of this kind can undermine depositor confidence, potentially triggering contagion to other banks and endangering financial stability.

The insolvency practitioner appointed to manage the insolvency has neither responsibility nor powers to address these wider risks — their duty is limited to acting in the financial interests of the creditors. For these reasons corporate insolvency law can be ill-suited for resolving failed banks. In the absence of a bank resolution regime, the alternative to insolvency is stark. As the run on Northern Rock in 2007 and its subsequent nationalisation in February 2008 graphically demonstrated, the provision of liquidity to a failing bank may fail to stabilise the balance sheet. In such circumstances, and when the failure presents a systemic risk, the authorities can be left with little option but to use public money to support the bank and keep it open to prevent systemic disruption.

Bailing out a bank in this way transfers the cost and risk of a bank failure from its creditors to taxpayers.⁽³⁾ In addition to these direct costs, the anticipation of such action can create an ongoing risk to the system. The lack of a credible resolution regime encourages a 'moral hazard' problem. The management, shareholders and creditors of the largest banks come to operate under the assumption that the bank will not be allowed to fail and that they will not be required fully to account for the risks that they take. This implicit guarantee of state support generates a subsidy for banks that are considered too big or important to fail, allowing them to fund themselves more cheaply than small banks.⁽⁴⁾ In turn this can lower incentives for market discipline and encourage the sorts of risky behaviour that may increase the likelihood that this public support may eventually be required.

Given these risks, the principal objective of a bank resolution regime is to give the authority responsible for its operation (the 'resolution authority') a range of options for dealing with a failing bank beyond normal insolvency. To be effective, these options must be capable of preserving financial stability by sustaining any vital economic functions performed by the bank while ensuring that the bank's losses are borne by its shareholders and creditors and not by the taxpayer.⁽⁵⁾ This is the rationale for the 'stabilisation' or directed transfer powers available to the authorities under the SRR.

Transfer powers: splitting the balance sheet of the bank

The legal power to transfer some or all of the business of a failed bank to another company lies at the core of the United Kingdom's SRR and of most other bank resolution regimes around the world.⁽⁶⁾ Transfer powers may be used to split the balance sheet of a failed bank into at least two parts (a 'partial transfer'):

- one part, typically including the retail deposits⁽⁷⁾ plus any marketable assets and liabilities from the failed bank — is immediately transferred to a buyer, which would likely be another bank. If a buyer cannot be found quickly enough, the business is transferred to a temporary 'bridge bank' specially set up by the resolution authority to manage the business until it can be sold; and
- another part, comprising the remaining assets and liabilities, is not transferred and stays on the balance sheet of the failed bank, which typically enters a special form of insolvency (in the UK SRR this is termed the 'bank administration procedure' to distinguish it from the bespoke whole bank liquidation process in which insured depositors receive compensation from the FSCS, which is known as the 'bank insolvency procedure').

The purpose of splitting the balance sheet in this way is to transfer to a solvent and stable entity, creditors and financial counterparties of the bank deemed a systemic risk and which therefore need to be protected to maintain financial stability.

(3) See Parker (2011) and Herring (2011) for further discussion of the risks of open bank assistance.

- (5) The Financial Stability Board (FSB) has recently published a consultation paper setting out what it considers to be the key attributes that should be part of a resolution regime for financial institutions (FSB (2011)).
- (6) The transfer powers are called 'stabilisation powers' in the United Kingdom's SRR and a 'purchase (of assets) and an assumption (of liabilities)' in the United States. The United States has had a bank resolution authority since 1933 and Canada since 1967. Transfer powers have also existed in Italy for some time and have been recently adopted in Germany.
- (7) This could potentially be limited only to the insured amount of any deposits, ie up to the current limit of £85,000 for each eligible depositor, with the remainder of the balance being left in insolvency.

See H
 üpkes (2005) for a more in-depth discussion of the essential role in the economy that banks play.

⁽²⁾ See Huertas (2011).

⁽⁴⁾ Research has suggested that 'too big to fail banks' benefit from an implicit subsidy in their cost of funding worth between 10 and 50 basis points (see Claessen *et al* (2010)). The Bank of England has estimated that the implicit funding subsidy to UK banks and building societies in 2009 amounted to £100 billion (Bank of England (2010)).

In addition, good-quality assets and business lines that may attract a going concern sale premium may be transferred. Creditors whose claims do not satisfy these criteria are left in the residual bank, thereby removing the need for public funds to support them. By providing the resolution authority with flexibility to decide how the balance sheet should be divided, the transfer powers thereby offer a range of alternative options that sit between insolvency and nationalisation.

The key features of the United Kingdom's SRR⁽¹⁾

The bank resolution regime in the United Kingdom evolved in two steps. Initially, broad powers were set out in emergency legislation introduced in February 2008 and conferred on the Treasury primarily for the nationalisation of Northern Rock.⁽²⁾ The power to use this legislation for new bank failures automatically expired after one year, and was replaced by a permanent bank resolution framework set out in the Banking Act 2009. The SRR sought to draw on best practice internationally. It provides roles for the Financial Services Authority (FSA) in triggering the SRR and for the Treasury, principally in retaining its nationalisation powers and its control of the use of public funds in resolution. The largest role is reserved for the Bank of England which, as resolution authority, can operate its transfer powers within the following framework:

Scope of application: The SRR extends to all UK-incorporated firms that are authorised by the FSA to accept deposits.⁽³⁾ Investment banks and other financial institutions therefore fall outside its scope if they do not have a deposit-taking licence. The UK branches of foreign banks also fall outside of the resolution regime's scope as they form parts of companies incorporated overseas.⁽⁴⁾

Trigger for use: Transfer powers are most effective in preserving franchise value and expediting orderly resolution if they can be used before a bank enters insolvency and its financial transactions are suspended. But the prospect of intervention at too early a stage in a bank's decline can further destabilise it, hastening its demise and reducing the prospects of a private sector solution to its problems. The United Kingdom's SRR seeks to avoid this risk by specifying two triggers for using the SRR tools. First, the FSA must decide that the bank is failing, or likely to fail, the regulatory requirements it must meet in order to be authorised to take deposits. And second, the FSA must also determine that it is not reasonably likely that action (outside the SRR) may be taken by or in respect of the bank that would enable it once again to meet these regulatory requirements. These determinations can therefore be reached by the FSA before the bank is insolvent, but once the realistic prospect of recovery has gone.

authority, must balance when determining the selection and use of the resolution tools. These are:

- to protect and enhance UK financial stability;
- to protect and enhance public confidence in the stability of the UK banking system;
- · to protect depositors;
- to protect public funds; and
- to avoid interfering with property rights in contravention of the United Kingdom's Human Rights Act 1998.

The Bank of England is entitled to balance these statutory objectives as it sees fit. Before using a transfer power it must first satisfy itself (following consultation with the Treasury and FSA) that use of the power is necessary for one or more of the first three of these objectives. This necessity test serves the purpose of ensuring that there is sufficient public interest to justify interfering with the property rights of the failing bank or its shareholders (see the box on page 216 for why this is necessary).

The SRR also gives the Treasury power to take into temporary public ownership a bank or the bank's parent company (if incorporated in the United Kingdom) through the compulsory acquisition of shares from its shareholders. This is a last resort measure for use where, for example, it is considered that the complexity, scale and urgency of the crisis would make the Bank of England's powers to transfer part or all of the failing bank's business to another buyer or bridge bank unworkable or insufficient to protect financial stability. The threshold for its use is consequently higher than for the other powers; the Treasury must be satisfied that this action is necessary to resolve or reduce a serious threat to financial stability or to protect public funds that have been provided for that purpose.

Making the transfer: The SRR is an 'administrative' rather than 'judicial' process; the Bank of England does not need court approval to exercise its transfer powers and can do so once the SRR has been triggered simply by issuing a written transfer document (the 'transfer instrument'). The transfer instrument sets out the terms of the transfer and the time at which the transfer becomes automatically effective.

Insolvency of the 'residual bank': In a partial property transfer, the part of the failed bank not transferred to a bridge bank or commercial purchaser (called the 'residual bank') is likely to be placed into an insolvency process managed by an insolvency practitioner (the 'bank administrator'). This process (called the 'bank administration procedure') departs from a

Objectives for choice and use of the tools: The Banking Act sets out five objectives that the Bank of England, as resolution

⁽¹⁾ For further discussion see Bailey (2009) and Brierley (2009).

⁽²⁾ The Banking (Special Provisions) Act 2008.

⁽³⁾ Credit unions are explicitly excluded on the grounds that their size makes resolution through normal insolvency procedures sufficient.(4) Since the introduction of the SRR, the FSB, European Commission and IMF have all put

⁽⁴⁾ Since the introduction of the SRR, the FSB, European Commission and IMF have all put forward proposals to extend the transfer powers available in bank resolution regimes more broadly to other systemically important financial institutions.

Bank resolution and the protection of property rights

For a resolution to be effective, the resolution authority must be able to transfer a failed bank's business or, in the case of temporary public ownership, acquire the bank's shares without the need to obtain the consent of the bank, its counterparties or the relevant shareholders. Similarly, the resolution authority requires certain powers to modify or override contractual terms in order to allow for the transferred business to continue operating. To the extent that these powers involve the expropriation of, or interference with, property rights, they must be consistent with Article 1 Protocol 1 of the European Convention of Human Rights. Article 1 Protocol 1 (which is incorporated into domestic law by the Human Rights Act 1998) prevents individuals and legal entities within the European Union from being deprived of their possessions and property rights except in the public interest. Care was therefore taken when developing the United Kingdom's SRR to impose certain of the public interest objectives as pre-conditions to the use of the transfer powers and to establish mechanisms for compensating persons for the value of the property or property rights that were taken away or interfered with.

normal insolvency process in certain key respects. Perhaps most significantly, it makes it the priority of the bank administrator to ensure that the residual bank provides services (eg the continued provision of IT infrastructure, or the servicing of mortgages) on a temporary basis to the new owner of the transferred business to allow the owner to operate the business effectively until successor arrangements can be implemented. The bank administrator is also required to obtain the consent of the Bank of England before it takes a number of actions in relation to the residual bank's business.

All these modifications are designed to facilitate the transfer of business. They also reflect the fact that the purchaser may not have had an opportunity to agree on some of the transitional arrangements that usually accompany the sale of a banking business and therefore is likely to need this general assurance of support. For similar reasons, the Bank of England is also given powers to impose, cancel or modify certain obligations owed between the transferred business and companies that were formerly part of its group before it was transferred.

Use of public funds: While the SRR is designed to minimise the need for public funds, a resolution may still require their use,⁽¹⁾ albeit in circumstances where the risk of loss to the taxpayer is much lower than in a bailout. The Treasury retains a controlling hand in the use of public funds in the United Kingdom's SRR and the Bank must therefore obtain the Treasury's consent before exercising a resolution tool that is likely to have implications for public funds.

Since the introduction of the United Kingdom's SRR a great deal of further progress has been made both within Europe and globally to identify the key attributes of an effective resolution regime.⁽²⁾ These initiatives recognise the importance of ensuring that broad transfer powers are combined with adequate safeguards. The remainder of this article considers the different types of safeguards and the reasons behind adopting them.

Part 2: Protections afforded to creditors and counterparties in the SRR

Compensation safeguards: the 'No Creditor Worse Off' principle

Depositors and other creditors whose claims are transferred out of a failed bank in a resolution clearly benefit from the use of the transfer powers. They are able to continue as depositors of a new bank with all of their transferred funds intact and with little, if any, disruption in their access to banking services. Counterparties of the bank whose contracts are transferred to the buyer are similarly able to carry on as before rather than deal with the consequences of the bank's insolvency.

Creditors, such as bondholders or other wholesale funders, that the resolution authority may have decided to leave behind in the residual bank do not enjoy these benefits. They must claim instead for repayment of their debts in the bank's insolvency. But as is shown in the box on page 217, a decision to split the balance sheet in a way that fully protects depositors and certain other creditors could, on the face of it, put those creditors left behind in a potentially worse position than had the transfer powers never been used and the bank had been left to go through normal insolvency.

One reason for this lies in the fact that, under UK insolvency law, depositors in the United Kingdom rank equally — or '*pari passu*' — with other ordinary senior creditors and therefore should share any losses equally between them.⁽³⁾

⁽¹⁾ For example, the Treasury may be required to provide funds upfront to facilitate a transfer of liabilities (as in the case of the Dunfermline Building Society resolution) and will later seek to recover some or all of these costs from the FSCS as described in Part 2 of this article.

⁽²⁾ For example, the European Commission's consultation on technical details of a possible European crisis management framework, 6 January 2011; the FSB Consultative Document on effective resolution of systemically important financial institutions, 19 July 2011.

⁽³⁾ This contrasts with some other jurisdictions, most notably the United States, where depositors rank ahead of the other creditors (so-called 'depositor preference').



The potential effect of transfer powers on creditors left in the insolvent bank

This example shows how a partial property transfer could prejudice creditors whose claims are left behind in the residual bank, especially in a country (such as the United Kingdom) where retail deposits rank equally with wholesale deposits and other ordinary creditors in insolvency. Panel A shows a simplified balance sheet of a bank which is insolvent as a result of a £30 write-down of its bad assets. Panel B shows the estimated recoveries creditors might receive in a normal insolvency, while panel C shows recoveries if a partial transfer was carried out instead. In panel C, all retail deposits (not just those amounts insured by the FSCS) are transferred to a commercial purchaser, along with higher-quality assets. C.i assumes that the purchaser accepts £2 more of liabilities than assets in the partial transfer, with the difference effectively constituting a purchase price for acquiring the failed bank's deposit franchise. Equity, subordinated debt and wholesale deposits, together with lower-quality assets, are left behind in the residual bank, which goes into the bank administration procedure (C.ii). If the bank's £100 book value

But the decision to transfer retail depositors along with higher-quality assets of an equivalent, or nearly equivalent,⁽¹⁾ amount to another bank can result in the creditors left in the insolvency (with the remaining lower-quality assets) effectively subsidising the depositors that have been transferred. Any shortfall between the assets and liabilities of the bank, which would have been shared equally among depositors and the other unsecured ordinary creditors in insolvency, falls to be borne exclusively by the creditors left behind. And while the immediate sale of the banking business as a 'going concern' is more likely to retain its value and achieve a greater price than a sale out of insolvency, this may be insufficient to make up the difference (see the example above). of assets were worth only £70 in insolvency, the percentages in grey represent the net recoveries as a proportion of the original claims for each type of creditor. Wholesale creditors incur an extra loss of £7 directly as a result of the transfer as compared to a normal insolvency. This is because in insolvency of the whole firm they would have had an equal claim over the £70 remaining value of the assets with the transferred depositors and would have received £39 (78% of £50) instead of £32 (64% of £50) in the bank administration procedure. The FSCS can be required to contribute towards reducing this shortfall by providing an amount up to the net loss the FSCS would have incurred if it had paid out insured depositors and sought to recover their claims in the insolvency of the whole bank. Any remaining shortfall (for example, arising from the decision to transfer significantly more liabilities than just insured deposit balances) may entitle the wholesale creditors to compensation by the Treasury under the creditor safeguards. Treasury consent to such a transfer is required if it is likely to lead to compensation.

The unsecured creditors left behind in the residual bank would therefore have to bear the extra costs of saving a bank's retail depositors, effectively disrupting the normal ranking of these creditors. Quite how much extra these creditors could lose would depend upon the split determined during the resolution. Without this information, creditors would have no means of assessing in advance their likely 'loss given default' in a resolution. And exposing these creditors to additional losses beyond what they could expect to incur in an ordinary insolvency would go further than necessary to address the

⁽¹⁾ The purchaser may pay a premium for acquiring the new customers and the franchise of the deposit business. This premium for the deposits amounts to the difference between the deposit liabilities and the assets transferred with them.

problems of moral hazard. These are all outcomes that the SRR has sought to avoid by the introduction of the so-called 'No Creditor Worse Off' (NCWO) safeguard.

The NCWO safeguard applies to bank resolutions that involve a partial transfer. It entitles creditors to compensation from the state if it is determined that the amount they end up recovering in the residual bank's insolvency is less than what it is estimated they would have recovered if the whole bank had simply been placed into insolvency. An independent valuer is appointed to make this assessment and the compensation is effectively the shortfall between the actual amount they have recovered and the estimated recovery had no split occurred. By placing a floor on their losses based on this counterfactual, the safeguard permits creditors of a bank to assume that the losses they could be exposed to will be either the same or better than in insolvency.

One consequence of a transfer of insured depositors in a resolution is to remove the need for the FSCS to pay them compensation; the insured depositors simply become the depositors of the bank that has acquired the deposit business so the need for compensation does not arise. But as is shown in the diagram in the box on page 217, a transfer of all depositors along with matching assets can also create a greater loss for those creditors left behind. If so, compensation from the state may become payable and the effectiveness of a resolution regime in reducing the risk to public funds is diminished.

To avoid a situation where the Treasury is required to pay public funds as compensation while the industry-funded FSCS effectively avoids having to pay compensation, the Treasury is entitled to ask the FSCS to contribute to the cost of the resolution. In a normal payout the FSCS would be required to pay compensation upfront to the insured depositors and then seek to recover as much as possible of this amount by taking their place as a creditor in the bank's insolvency. In order to replicate this, the FSCS can be asked to contribute an amount equal to the estimated loss the FSCS would have incurred had the transfer never taken place and it had instead been required to pay out compensation in insolvency and assume their claims in the insolvency.

Calculating how much of its payout the FSCS would have failed to recover is again the job of the independent valuer. Once calculated, the FSCS can be required by the Treasury to contribute up to this amount to meet the costs of the resolution. The FSCS contribution could be provided *ex ante*, eg to inject cash into the transfer, or *ex post*, eg to reimburse the Treasury or the Bank of England for any costs incurred in the course of the resolution, eg a cash payment to support the transfer of assets and liabilities to another person.

In this way, the FSCS continues to cover the costs of protecting insured depositors whether in a payout in insolvency or in a

non-payout resolution using the transfer powers. Only where it is deemed necessary for financial stability reasons to protect liabilities other than insured deposits, does it become more likely that funds or compensation paid by the Treasury may not be fully recouped.

Safeguards that restrict the use of resolution powers

The NCWO safeguard provides the first level of protection to assure creditors that their ranking will be respected and allows the resolution authority to act more swiftly and decisively in the knowledge that actions that might otherwise upset the ranking of creditors in insolvency can be offset by compensation.

By contrast, the second type of safeguard acts to constrain the resolution authority's discretion in the use of its powers. As has already been described, the SRR provides the resolution authority with broad powers to transfer property and contracts in a way that best meets its resolution objectives. These powers could potentially be used in a manner that splits up the contractual rights and obligations that collectively make up a financial arrangement in a way that undermines its economic purpose.

Preserving these arrangements sets up a tension between providing certainty to market counterparties that their contractual arrangements will be respected in a resolution, and giving the resolution authority sufficient flexibility to split the balance sheet. Balancing these competing interests is crucial as significant uncertainty could negatively impact upon the price of debt or other financial contracts issued by banks in the United Kingdom, potentially generating an ongoing deadweight loss for the economy. For this reason the safeguards were the subject of close scrutiny and comment by financial market participants throughout the development of the SRR.⁽¹⁾

The result was the introduction of rules that prevent the resolution authority from using its transfer powers to split up certain defined types of financial arrangement (see the box on page 219). These types of protected arrangement are broadly speaking arrangements whose purpose is to reduce the counterparty's loss in the event of the failure of the bank. Netting and set-off arrangements that allow each party to reduce the amounts they owe to each other into one net sum are therefore covered. So too are arrangements that use collateral assets to protect against the risk of non-payment. If these arrangements cannot be relied upon, the counterparty has no way of measuring what loss it may suffer in a resolution. Retaining the effect of these arrangements the ranking of creditors.

⁽¹⁾ The Treasury consulted a panel of experts to provide it with advice during the development and drafting of the safeguards. The Banking Act established a permanent statutory panel of experts (the Banking Liaison Panel) that meets quarterly to advise on the safeguards and other aspects of the SRR.

Creditor safeguards that restrict the use of transfer powers

- Netting, set-off and title transfer arrangements (eg repos): Netting and set-off arrangements are used by banks and their counterparties to mitigate credit risk. These arrangements operate to allow each party to calculate and set-off amounts owed by and to each other under one or more contracts to produce a single net sum. Title transfer arrangements similarly work to reduce credit risk by linking an obligation to repay one or more debts with the obligation of the lender to redeliver collateral. To work as intended the relevant rights and obligations must remain owing to and from the parties to the arrangement at the point at which the netting, set-off or redelivery takes place. The UK legislation therefore operates to prevent the transfer instrument from being used to split up rights and liabilities under such arrangements save in the case of certain 'excluded rights and liabilities' (eg retail deposits and loans).
- Secured liabilities: Where a debt is secured against collateral assets (eg a mortgage), the UK legislation prevents the transfer powers from transferring this collateral separately from the debt that the collateral secures.
- Capital market arrangements: Securitisation programmes, covered bonds and other structured finance arrangements can comprise many separate contracts, each of which is necessary for the arrangement to operate as a whole and many of which serve a purpose only in relation to that wider

The need for certainty lies at the heart of these safeguards. By setting them out in legislation,⁽¹⁾ financial participants are able to continue to rely on these risk mitigation techniques and assume that they will provide the same protection in a resolution as in insolvency. Similarly, regulators and credit rating agencies are able to accept the legal enforceability of netting and other protected arrangements when determining whether they satisfy various regulatory requirements.⁽²⁾

The legislation also sets out the remedial steps which must be taken if the resolution inadvertently breaches the safeguards, perhaps as a result of incomplete information at the time of the resolution. If a transfer incorrectly separates rights and obligations under a netting or set-off arrangement, the legislation permits the counterparty to continue to exercise its rights to set-off or net an amount it owes against the failed bank to reduce its exposure to the continuing business. Whereas if other types of arrangement are disrupted, the resolution authority must instead restore the protected arrangement by carrying out a further transfer of rights and liabilities in order to cure the breach. arrangement.⁽¹⁾ As a result, the legislation seeks to define these types of capital market arrangement and to require that they be kept whole in a resolution. To allow some of these contracts to be left in the insolvency (where they could be terminated) while moving others to a new entity would risk the arrangement breaking down.

- Financial market arrangements: Certain rules and arrangements within investment exchanges and clearing houses are designed to minimise the effect of the default by a participant. These arrangements are protected by legislation in the United Kingdom that is designed to ensure the financial stability and the smooth running of the system. The United Kingdom's SRR avoids upsetting these statutory protections by preventing the transfer instrument from modifying them or rendering them unenforceable.
- Termination rights: The transfer powers give the resolution authority the power to prevent counterparties from relying on the resolution as grounds for terminating a contract. This power to override termination rights cannot however be used to prevent a counterparty triggering netting or set-off arrangements where the arrangements relate to a wide range of financial contracts.

(1) A mortgage securitisation programme, which pools mortgage loans as security for bonds issued to investors, will have many contractual arrangements, for example, between the bank which sells the mortgages, an issuer which purchases and structures the portfolio of mortgages and issues the bonds, a trustee which represents the interests of investors which purchase the bonds, a servicer which performs the usual functions of collecting mortgage receipts, a cash manager, swap counterparties etc.

Why the safeguards must have exceptions

The resolution authority will generally want to retain as much discretion as possible to disentangle the liabilities that need to be supported in the resolution (particularly the insured retail deposits) from those that can be left in insolvency. In addition, commercial purchasers may be interested only in purchasing some assets and liabilities of the business of the failed bank and not others. The safeguards, by requiring certain assets and liabilities to be kept together, operate instead to limit the resolution authority's freedom to determine this split.

Ensuring that a transfer does not breach the safeguards also significantly increases the need for detailed and up-to-date information about a firm's protected arrangements. This in turn increases the amount of time required for planning by the resolution authority in advance of the resolution. How much

⁽¹⁾ They are contained in the (amended) Banking Act 2009 (Restriction of Partial Transfers) Order 2009 (SI 2009/322).

⁽²⁾ If Bank X lent Bank Y £50 million and Bank Y deposited £20 million with Bank X, and these contracts are covered by a netting arrangement, the regulator would only require Bank X to hold regulatory capital to support the net exposure of £30 million rather than £50 million on a gross basis.

time is needed for this due diligence will be a function of the number of such contracts, which may increase exponentially with the size and complexity of the firm. And this due diligence exercise is further complicated by the need to conduct it in a way that reduces the risks that news of the contingency planning is leaked, potentially further destabilising the bank.

There is a risk that in complying with these creditor safeguards, the operational challenges become so onerous that the resolution authority is incapable of undertaking a resolution of anything other than a small and simple bank. That would undermine the effectiveness of a bank resolution regime and tip the balance too far in favour of market certainty and away from the public interest in protecting financial stability and curbing moral hazard.

To avoid this outcome, the SRR contains a number of exceptions from the requirement that protected arrangements should always remain undisturbed. The most important category of exception applies to FSCS-insured deposit accounts or accounts which are mainly used or marketed to these insured depositors.⁽¹⁾ The Bank of England is able to transfer these without the need to confirm whether or not they form part of a protected arrangement (eg an offset mortgage linking a retail deposit with a mortgage). This is necessary to ensure that a retail deposit book can be transferred to prospective purchasers within the time needed for effective and expeditious resolution.

Practical experience of using the tools and applying the safeguards

The resolution of Dunfermline Building Society (DBS) in March 2009 was the first, and so far the only time, that the transfer powers have been used by the Bank of England under the United Kingdom's SRR; previous bank resolutions were carried out under the earlier, temporary legislation (see **Table A** for details of all uses of property transfer powers in the United Kingdom). The resolution of DBS provides an illustration of the practical challenges faced by a resolution authority in seeking to comply with the creditor safeguards. It also shows the effect these safeguards can have in shaping the assets and liabilities transferred in the resolution.

While the resolution of DBS was not the biggest of the resolutions undertaken in the United Kingdom (**Table A**), it was the most complex in terms of splitting assets and liabilities between three different legal entities — the original building society which went into administration, the purchaser (Nationwide) and the bridge bank. It was the only partial transfer to date in the United Kingdom where financial assets (the own-originated mortgage portfolio) from the failed firm were transferred along with the retail deposits⁽²⁾ and wholesale depositors (eg larger companies).⁽³⁾

The treatment in the resolution of derivatives contracts covered by netting arrangements offers a good example of the challenges faced by a resolution authority. As typical for even a small and relatively simple banking operation, DBS had entered into a number of swap contracts to hedge different parts of its business, which were subject to a netting agreement. The netting safeguards required the Bank of England to keep all the swap contracts under each netting agreement together even though the underlying assets and liabilities that they hedged were split between Nationwide and the residual bank. In addition, some of the netting agreements included general 'sweep up' clauses that unexpectedly captured rights and liabilities that neither party expected to be included when calculating their net exposures.⁽⁴⁾

As a result of these complications a mismatch arose between the location of swaps and the exposures they hedged. That resulted in some parts of the business being unhedged until it could be determined which swap contracts covered which exposures. This took time to resolve by identifying which swaps to close out (at cost) and which to leave open, resulting in a delay before the Bank of England was able to inform swap counterparties how they were treated in the resolution.⁽⁵⁾

Finally, DBS highlighted the difficulties faced by the resolution authority in splitting a balance sheet with precision, especially when the accuracy of the information provided by the failed bank cannot be assured. Following the resolution of DBS, it was possible to undertake a further more detailed audit which identified that the definition of 'commercial loans' used in the transfer documentation had unintentionally transferred a number of additional commercial loans to Nationwide. These loans had not formed part of the agreed transaction and had been managed by the bank administrator in the period following the resolution on the assumption that they had not been transferred to Nationwide.

The issue was resolved by the Treasury using its powers under the Banking Act⁽⁶⁾ to amend the definition of 'commercial loan' in the transfer document with retrospective effect to align the legal effect of the transfer with the transaction that had been agreed. While such retrospective powers are to be exercised

Loans to retail depositors are similarly carved out of the exceptions to allow for residential mortgages and other loans to depositors to be transferred alongside retail deposits.

⁽²⁾ In one other case, Bradford & Bingley, fixed assets in the form of the branch network were transferred.

⁽³⁾ The ranking of retail depositors of building societies differs from that of banks in insolvency; the retail depositors are treated as shareholder members and rank below other depositors in priority. The wholesale deposits would have recovered in full in the insolvency and therefore transferring them did not risk increasing resolution costs.

⁽⁴⁾ These included bonds issued by some swap counterparts that were held as investment assets by DBS. Following the resolution of DBS, it was decided to change the statutory safeguards to exclude transferable securities such as bonds and other listed securities from netting protection unless the parties explicitly indicate in the netting agreement that they should be included.

⁽⁵⁾ This type of mismatch will typically arise except in simple cases, such as when only deposits and cash are transferred. It should also be noted that the safeguard does not require all swap counterparties to be treated alike. Some can be left in insolvency and others transferred to the purchaser.

⁽⁶⁾ Section 75 of the Banking Act 2009.

Time and date of resolution ^(a)	Failed institution	Which statute ^(b)	Details of assets and liabilities transferred in the transfer instrument ^(c)	Other information
7.40 am on Monday 29 Sept. 2008	Bradford & Bingley plc	B(SP)A	All c.3.6 million retail deposit accounts and the branch network were transferred to Abbey National plc (part of the Santander group). The FSCS provided c.£15.7 billion of funds to back the deposits and HM Treasury (HMT) provided c.£2.7 billion (total c.£18.4 billion).	Shares in the bank were transferred to HMT and, once nationalised, the deposits and network of the bank were transferred to Abbey. The mortgage book remains in the nationalised company to allow for a managed rundown. As of 1 January 2010, total assets of the nationalised company were £49.4 billion, of which £39 billion were mortgages.
9.27 am on Tuesday 7 Oct. 2008	Heritable Bank plc which was a UK subsidiary of Landsbanki Islands hf Iceland	B(SP)A	22,344 retail deposit accounts with balances of c.£547 million backed by funds of c.£457 million from FSCS and c.£90 million from HMT were transferred to ING Direct Bank.	The firm and the remainder of its balance sheet including loan assets with a book value of c.£1.1 billion went into administration. About 340 FSCS-eligible deposit accounts (value c.£8 million) were not transferred and were paid in full by the FSCS and HMT.
12.05 pm on Wednesday 8 Oct. 2008	Kaupthing Singer & Friedlander Limited which was a UK subsidiary of Kaupthing Bank hf Iceland	B(SP)A	c.157,000 online (marketed as 'Edge') accounts with balances of c.£2.7 billion were transferred to ING Direct Bank backed by c.£2.5 billion of funds from the FSCS and c.£0.2 billion from HMT.	The firm and the remainder of its balance sheet including loan assets with a book value of c.£3 billion were placed into administration. c.7,000 FSCS-eligible deposit accounts (value c.£360 million) not transferred were paid in full by the FSCS and HMT.
8.00 am on Monday 30 March 2009	Dunfermline Building Society	Banking Act	Retail deposits (c.£2.3 billion), wholesale deposits (c.£0.8 billion), fixed assets including 34 branches, liquid assets (c.£0.6 billion) and the own-originated residential mortgage portfolio (book value c.£1 billion) were transferred to Nationwide Building Society. HMT injected cash of £1,555 million to back the retail deposits transferred.	The remainder of the liabilities, including subordinated debt (c.£50 million), and assets (total book value c.£1.1 billion) primarily the commercial loans and the acquired mortgage portfolios went into a building society administration procedure.
			A second partial transfer was undertaken to transfer social housing mortgages (c.£0.5 billion book value) and associated deposits (c.£5 million) into a bridge bank owned by the Bank of England. This allowed more time for a competitive tender of this specialised portfolio, which was subsequently sold to Nationwide on 1 July 2009.	1

Table A Details of resolutions in the United Kingdom which have used partial transfer powers

(a) The time and date the transfer was made.

(b) Banking (Special Provisions) Act 2008 (B(SP)A) or Banking Act 2009.

(c) In all partial transfers to date, total retail deposit balances including amounts above the amount insured by the FSCS have been transferred. The resolutions were undertaken when banks and FSCS did not have the information required — most importantly a 'single customer view' — to make an insurance determination quickly enough to effect a transfer of insured deposits only. They also took place during a systemic crisis when concerns about depositor contagion were acute.

only where there are serious difficulties in using other means to address such errors, they remain a necessary tool to address information limitations that are symptomatic of bank failures.

Conclusion

Bank special resolution regimes are designed to address systemic risks caused by bank failure while freeing the public authorities from the dilemma of having to use public funds to bail out all of a bank's creditors. By doing so, they offer benefits to a financial system not only at the point of use but more generally through their effect on the behaviour of banks and their creditors.

But using transfer powers in a resolution to split a balance sheet can potentially have significant adverse implications for creditors left behind in insolvency as well as for counterparties of a bank if their financial arrangements are unpicked. These implications can generate uncertainty for creditors, regulators and rating agencies with knock-on effects on the cost of bank debt, risking an ongoing deadweight loss for the economy. The approach adopted in the United Kingdom's SRR to address these risks has been to develop limited but legally binding constraints on the resolution authority's powers together with formal mechanisms for compensating creditors. These safeguards provide counterparties with an appropriate level of certainty as to their treatment in a resolution and allow creditors not transferred to another solvent bank to estimate their loss given default along the same lines as in normal insolvency. The UK experience in developing a comprehensive set of safeguards has been reflected in recent proposals by the European Commission and the FSB for the safeguards which could apply under their proposals for resolution regimes for the EU and for systemically important financial institutions, respectively.

Splitting a complex balance sheet can be challenging, particularly if there is only limited time for due diligence. These challenges increase with the size, complexity and international nature of the bank's operations. The DBS resolution involved a relatively small and simple bank, yet raised a number of complications. The complications highlight the fact that care must be taken when developing

Measures which could ease the practical pressures of complying with safeguards

- Ensure that banks continue to develop their capability to provide more detailed and accurate data on a real-time basis. This is a key focus of the Resolution and Recovery Plans which the FSA and the Bank of England have been developing with banks. The FSA has also introduced new systems and information requirements for deposit-takers, which require the majority (those with more than 5,000 insured accounts) to be able to provide a single figure representing the aggregate amount of an eligible claimant's deposit accounts held with a deposit-taker. This single customer view (SCV) information will be in an electronic format readily transferable to and compatible with FSCS's systems.
- Develop similar information requirements with respect to derivatives portfolios. The Federal Deposit Insurance Corporation introduced a rule in 2009 to require US deposit-takers to provide detailed and up-to-date information in electronic format on their derivatives

safeguards to ensure that the resolution authority's ability to carry out a successful resolution is not undermined by the practical challenges of compliance. To the extent that measures can be taken in the future to reduce these practical positions within a set period after being pre-notified.⁽¹⁾ The FSA has published a Consultation Paper proposing new information requirements for derivatives and securities transactions.⁽²⁾

• Augment the existing SRR by developing ways to restructure a firm's balance sheet without splitting it into separate parts. There is currently much discussion around the possible use of a 'bail-in' tool to write down or convert into equity some classes of unsecured debt of a firm in resolution. This would enable the resolution authority to allow losses to fall on some creditors by reducing the value of their claims on the firm without having to deal with the operational and legal consequences of transferring some of the business to a purchaser. The practical benefits of such an approach may be significant particularly when dealing with large and complex banks with huge numbers of counterparties and contracts governed by different laws.⁽³⁾

- (2) See Financial Services Authority, CP11/16: Recovery and Resolution Plans.
- (3) The FSB's Consultative Document on effective resolution of systemically important financial institutions sets out its proposed essential elements of a bail-in regime.

challenges, so it will become easier to accommodate statutory safeguards without compromising the effectiveness of bank resolution tools (see the box above).

See www.federalregister.gov/articles/2008/12/22/E8-30221/recordkeepingrequirements-for-qualified-financial-contracts#h-5.

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Developments in the global securities lending market

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Securities lending plays an important role in supporting financial markets. For example, it can improve market liquidity, potentially reducing the cost of trading and increasing market efficiency. But by increasing the interconnections between institutions it can pose potential risks to financial stability, which are exacerbated by a lack of transparency in the securities lending market. Since the onset of the financial crisis, market participants have attempted to address some of these risks, and fundamental changes to market infrastructure are being discussed, such as the use of central counterparties. New regulations under way to improve the resilience of the financial system may also impact both the risks to financial stability from securities lending and its benefits.

Introduction

Securities lending is the temporary transfer of financial securities, such as equities and bonds, from a lender to a borrower. The lender usually requires the borrower to provide cash or securities to collateralise the loan.

Securities lending is important for financial markets. Institutions, such as banks, borrow securities for a variety of reasons. For example, it helps them facilitate trade settlements when a purchased security fails to be delivered but has already been sold on to another party. In this way, securities lending can improve market liquidity, potentially reducing the cost of trading and increasing market efficiency. Institutions also borrow securities so that they can use them as collateral in other transactions, such as repo or derivatives transactions. Lenders, including pension funds and insurance companies, typically lend out their securities to generate an additional income on their asset portfolios.⁽²⁾

The global securities lending market is large. At its height in early 2008, around \$3.5 trillion of securities were on loan (Chart 1); by way of comparison, this is equivalent to around 1.4 times the current market capitalisation of the FTSE 100 companies. After Lehman Brothers failed the market contracted, partly due to some lenders reducing their securities lending activity due to concerns about the credit risk of borrowers. Around \$2 trillion of securities are currently on loan.

The first section of this article provides an overview of securities lending, describing the key features of securities





(a) Data are based on market value of securities.(b) Chart uses daily data that are converted to a ten-day moving average

(c) Securities available for loan are all securities that beneficial owners have specified they are

willing to lend subject to specific transaction terms. (d) Lehman Brothers announced bankruptcy on 15 September 2008.

loans and the main participants in the market. The second section discusses not only the benefits of securities lending but also the potential risks to financial stability. The third section discusses recent developments in securities lending, including the impact of regulation on the market and the potential introduction of new market infrastructure, such as central counterparties.

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

⁽²⁾ The Bank plays an active role in facilitating discussion among the major participants in the UK securities lending market as chair of the Securities Lending and Repo Committee (SLRC). The terms of reference for the Committee and the minutes from the meetings can be found on the Bank's website at www.bankofengland.co.uk/markets/gilts/slrc.htm

Overview of securities lending

The securities lending market involves various types of financial institutions. This section describes the key participants in the securities lending market and their motivations for borrowing and lending securities. It also discusses the basic mechanics and key features of a securities lending transaction.

Participants in securities lending

Figure 1 shows the main participants and their relationships in a securities lending transaction.



Borrowers

Borrowers of securities are typically large financial institutions, such as banks. Often they act as a 'principal intermediary' and borrow securities on behalf of smaller institutions such as hedge funds.

Institutions borrow securities for a variety of reasons, including:

- (1) To facilitate the buying and selling of securities. This activity is commonly known as 'market-making'. Market makers stand ready to buy and sell securities on a regular and continuous basis. In order to meet customer demand to buy securities, they hold an inventory of securities and also borrow securities.
- (2) To facilitate trade settlement. Settlement failure occurs when a seller fails to deliver a security, such as an equity, to a buyer on an agreed date. This may happen due to incorrect settlement instructions being exchanged between parties. In some cases, the institution that is waiting to receive the equity has already agreed to sell it on. In order to avoid the costs and penalties that can arise from failing to deliver the equity, they can borrow an equivalent equity in order to complete the transaction. Once the equity is received from the original seller, this can be delivered to the securities lender in order to terminate the securities loan.
- (3) **To access high-quality and liquid collateral.** Institutions, usually banks, may borrow high-quality and liquid

securities, such as government bonds, against which they pledge relatively lower-quality and less liquid securities, such as corporate bonds or asset-backed securities (ABS), as collateral. These transactions are often referred to as 'collateral upgrade trades'. The borrowed securities can then be used to raise cash in the repo market or as collateral for swap and derivative transactions.

(4) For trading strategies. An institution may borrow securities to sell them — so-called 'short-selling'. Short-selling is used in a number of trading strategies. For example, an investor may think that an equity is overvalued and expects its price to fall. They borrow and then sell the equity, with a view to buying it back later at a lower price, in order to make a profit from the price difference.

Other motivations for short-selling include arbitrage and hedging strategies. In an arbitrage strategy, an investor believes there is an opportunity to profit by exploiting a price difference between two instruments that should have identical values. For example, this may occur when an equity trades on different exchanges in different currencies.

Hedging can involve taking a short position in a security to protect against specific potential losses from an investment. For example, an investor in corporate bonds may want to protect themselves against general interest rate moves. The investor can hedge this risk by short selling government bonds against their investment in corporate bonds. In this way, their exposure to general interest rate risk is reduced.

(5) **Dividend tax arbitrage**. This involves an institution lending their security to a borrower in a jurisdiction subject to more favourable dividend tax treatment over a dividend payout period. The tax benefit is often shared between the lender and the borrower.

Lenders

Lenders of securities are commonly referred to as 'beneficial owners'. Beneficial owners are typically investors such as pension funds and insurance companies. They lend out securities to generate additional income on their asset portfolios. This income can help offset expenses associated with maintaining a portfolio of assets, such as paying a custodian to safeguard and administer the assets.

According to Data Explorers, revenue from securities lending peaked at \$14.3 billion in 2008, falling to \$6.5 billion in 2010. This represents a small proportion of beneficial owners' total returns but for some beneficial owners, such as exchange-traded funds (ETFs), their securities lending activities can represent a significant proportion of their revenue. According to Deutsche Bank, securities lending may account for up to a third of ETF providers' revenue.⁽¹⁾

Beneficial owners usually use an agent lender, such as a custodian or third-party specialist, to manage their securities lending programmes. Agent lenders sometimes offer the beneficial owner protection against losses on their lending activity. Some large beneficial owners manage their own securities lending programmes.

Mechanics of a securities lending transaction

The key steps in a securities lending transaction are:⁽²⁾

- (1) The loan is initiated and terms are agreed between the lender and the borrower. The agent lender usually negotiates the terms on behalf of the beneficial owner. Terms may include the duration of the loan, borrowing fees, eligible collateral and collateral margins.
- (2) The lender delivers the securities to the borrower and the borrower delivers the collateral to the lender.
- (3) During the life of the loan, the collateral required from the borrower may vary as the values of the collateral and of the securities lent change.
- (4) When the loan is terminated, securities are returned to the lender and the collateral is returned to the borrower.

Key features of securities loans

There are four key features of a securities loan transaction: collateral, ownership of securities, duration and fees.

Collateral

Securities loans are collateralised by cash or other types of securities. In Europe, securities, such as bonds or equities, are mostly taken as collateral in preference to cash (Chart 2).

Chart 2 Percentage of securities on loan against cash collateral



Sources: Data Explorers and Bank calculations.

In the United States, cash is usually taken as collateral. This difference in accepted collateral between regions may be partly due to variances in regulation. For example, the US Securities and Exchange Commission Rule 15c3-3 prevents broker dealers from pledging equity as collateral when borrowing equities.

In both Europe and the United States, cash collateral is reinvested in other assets. The box on page 228 discusses how the nature of these cash reinvestments have changed over the past few years.

The market value of the collateral posted is typically greater than that of the lent securities. This margin (sometimes referred to as a 'haircut') is intended to protect the lender from potential loss should the borrower default and reflects the potential variation in both the market value of the collateral and of the securities lent. To maintain sufficient levels of overcollateralisation, the collateral and the lent securities are valued regularly and the margin required is increased or decreased accordingly. The beneficial owner's agent lender usually manages this process.

As has been seen during the financial crisis, margins on securities loans and other types of securities financing, such as repo, can increase significantly. This could be due to lenders' concerns about individual borrowers or concerns about certain types of collateral. For example, typical margins on AAA-rated structured products increased from around 10% in June 2007 to 100% in June 2009. The practice of increasing margins as institutions or markets become more stressed is procyclical and can lead to further stress.⁽³⁾

Ownership

In most securities lending transactions, legal ownership over both the securities on loan and the collateral is transferred between the beneficial owner and the borrower. Transactions are structured such that the economic benefits associated with ownership, such as dividends and coupons, are paid back to the original owners. But a beneficial owner surrenders other rights of ownership, such as voting rights, when lending equities. If the beneficial owner wants to vote on equities it has lent out, it needs to recall them.

Duration

Securities are usually lent on an open basis with no fixed maturity date. This gives beneficial owners the flexibility to recall their securities at any time if, for example, they are concerned about the creditworthiness of the borrower or if

⁽¹⁾ For further information, see Deutsche Bank (2011).

⁽²⁾ More detail on the mechanics of a securities lending transaction, including examples, are shown in Faulkner (2010).

⁽³⁾ For further discussion on the procyclical nature of margin requirements and the role of macroprudential policy in addressing this, see Haldane (2011) and a paper by the Committee on the Global Financial System (2010).

they want to vote on the equities. Borrowers may also find it useful to be able to return the security at any time, if, for example, they decide to terminate a short position that utilises the security. In some cases, loans will be agreed for a specified term, giving borrowers more certainty that they will be able to cover their short positions, for example.

Lending fees

In return for lending its securities, the beneficial owner receives a fee from the borrower. Lending fees can vary greatly depending on the nature, size and duration of the transaction and the demand to borrow the securities.

Agent lenders are compensated for their services through an agreed split of the lending fees. Fee splits may vary depending on a number of factors such as the services provided by the agent lender and the type and size of the beneficial owner's portfolio of assets.

Securities lending and repurchase agreements

Securities lending is part of a larger set of interlinked securities financing markets. Repurchase agreements (commonly known as 'repo') and securities loans collateralised against cash are economically equivalent. A repo is the sale of securities for cash, with an agreement for the seller to buy back the securities at an agreed future date. Similar to securities loans, in a repo transaction the legal ownership of the securities passes from the seller to the buyer and the economic benefits are paid back to the original owners of the securities.

But there are two key differences between a securities loan and a repo:

- (1) The purpose of the transaction. Securities loans are usually motivated by an institution's demand to borrow a security for purposes such as short-selling or trade settlement. Repo is sometimes used to borrow or lend securities, but generally the motivation is to borrow or lend cash.
- (2) Transaction structure. In a repo transaction there is an outright sale of the securities accompanied by a specific price and date at which the securities will be bought back. Securities loans are often open-ended, which makes them more flexible for lenders and borrowers.

Securities lending and financial stability

Securities lending plays an important role in supporting financial markets and brings positive benefits to the financial system. But some characteristics of securities lending can create fragilities that may pose risks to financial stability.

Benefits of securities lending Market liquidity

Securities lending can improve market liquidity, potentially reducing the cost of trading and increasing market efficiency. This enables better price discovery and can reduce price volatility, which can facilitate financial institutions and non-financial companies in raising funding and capital and also helps investors to buy and sell securities.

By creating access to securities already outstanding in a market, securities lending has the effect of increasing the total supply of securities available to support activities such as market-making and trade settlement.

Market makers stand ready to buy and sell securities on a regular and continuous basis, which can enhance market liquidity. Being able to borrow securities helps them to meet customer demand for securities. In 2008, market contacts said that the reduction in securities available for loan (Chart 1) — alongside capital pressures on banks acting as market makers to reduce their balance sheets and inventories of securities — led to a reduction in market-making activity. This contributed to impaired market liquidity for certain types of securities and exacerbated funding issues for banks and non-financial companies.

Securities lending improves the reliability of the trade settlement process as institutions' ability to borrow securities helps to reduce settlement failures. This can enhance market liquidity indirectly as it contributes to efficient settlement and investor confidence when trading.

Funding for banks

Banks hold securities in order to make a return and because they act as market makers for clients who want to buy and sell securities. They sometimes fund these securities by pledging them as collateral in the repo market. But for some securities, such as ABS, this may be difficult as providers of funding, such as money market funds, may have restrictions on the type of collateral they accept. Instead, banks can undertake collateral upgrade trades that allow them to swap these securities for higher-quality and more liquid securities, such as government bonds, that can be used to access funding in the repo market.

There are two potential funding advantages to banks from these types of transactions. First, provided the combined cost of the repo interest rate and the securities lending fee is less than other types of funding, the bank can obtain cheaper funding. Second, this represents an additional funding source for a bank, allowing them to diversify their funding. The wider the range of funding sources a bank can access, the lower the impact from a shock to one of these funding sources. Also, repo markets for high-quality securities are typically more robust than markets for repo of low-quality securities.

Reinvestment of cash collateral from securities lending

Beneficial owners that accept cash collateral pay interest to the borrower and therefore reinvest the cash to make a return. This activity is referred to as 'cash collateral reinvestment' and is particularly prevalent in the United States where cash collateral is more commonly accepted in securities lending transactions.

Cash collateral reinvestment during the financial crisis

Global cash collateral reinvestments were around \$2.5 trillion at their peak in mid-2007. Agent lenders managed the majority of these cash reinvestments. They often managed 'pooled' programmes that grouped cash collateral from a number of beneficial owners together and reinvested the cash according to a set of investment guidelines regarding credit and liquidity risks. Some large beneficial owners that managed their own securities lending programmes reinvested their own cash collateral.

In order to generate returns, many cash collateral reinvestment programmes invested in relatively long-duration and illiquid assets such as floating-rate notes and asset-backed securities (ABS) (Table 1). This created a maturity mismatch between their assets and liabilities as most securities borrowers could return the borrowed securities and request their cash collateral back at any time.⁽¹⁾

Table 1 Cash collateral reinvestments(a)(b)

Per cent		
	2007 Q2	2011 Q2
Debt securities and securitisations		
Asset-backed securities	26	6
Floating-rate debt securities	19	14
Fixed-rate debt securities	0	7
Money market and repo		
Repo	26	33
Certificates of deposits and bank deposits	15	18
Commercial paper	6	9
Money market funds	2	11
Other	5	2

Sources: Data Explorers, Risk Management Association and Bank calculations

(a) Data are based on a sample of US dollar cash collateral reinvestment programmes with total assets \$809 billion in 2011 Q2.

(b) Asset-backed commercial paper is included in asset-backed securities

Some of these programmes have made large losses as a result of declining market values of these securities during the financial crisis. Some have also suffered liquidity problems as beneficial owners attempted to terminate their securities lending programmes and borrowers demanded their cash collateral back. In some cases, managers of cash reinvestment programmes put 'gates' on withdrawals to limit the outflows and give them time to unwind the cash reinvestments in an orderly way.

The case of American Insurance Group (AIG)

AIG ran a particularly risky cash collateral reinvestment programme, with a significant maturity mismatch. It lent out securities owned by its insurance subsidiaries. At its height, AIG's cash collateral reinvestment portfolio was around \$76 billion. Around 60% of AIG's cash collateral was invested in residential mortgage-backed securities (RMBS).

As the credit concerns about AIG deepened, borrowers of AIG's securities began terminating their transactions, demanding a return of cash collateral. As that collateral was tied up in illiquid securities, this meant that AIG had great difficulty meeting these requirements. Alongside a number of other issues, this contributed to the failure and subsequent bail out of the group.(2)

Recent developments in cash collateral reinvestment

Cash collateral reinvestment programmes have been scaled back to around \$1 trillion. This is due to fewer securities on loan (Chart 1) and less appetite to take on cash reinvestment risks (Chart 2).

Beneficial owners still involved in cash collateral reinvestment have taken some steps to reduce the risks of their programmes. According to market contacts, larger and more sophisticated beneficial owners have shifted away from pooled reinvestment programmes towards 'segregated' programmes. These segregated programmes can reduce the risk of liquidity runs from other beneficial owners. Also, beneficial owners can specify the investment guidelines for the programme.

Most beneficial owners have adopted more conservative investment strategies, for example by reducing their investments in ABS (Table 1), and reducing the maturity of their investments (Chart A).



(a) Data are based on a sample of US dollar cash collateral reinvestment programmes with total (b) Based on final maturity of investments.

(1) The role of cash collateral reinvestment programmes in the shadow banking sector are discussed in Tucker (2010) and Pozsar et al (2010)

(2) For further information on the bailout of AIG see the US Congressional Oversight Panel report (2010).

Risks from securities lending Interconnectedness⁽¹⁾

Financial transactions that result in chains of counterparty exposures increase interconnections within the financial system. Securities lending creates additional interconnections between various types of financial institutions, as shown in **Figure 1**.

During episodes of stress, interconnectedness can cause contagion when problems at one or few institutions are transmitted across networks, impacting counterparties and their customers. Lehman Brothers, for example, was a large borrower in the securities lending market and often borrowed securities on behalf of clients, such as hedge funds. When Lehman failed, most beneficial owners were able to liquidate their collateral and replace their lost securities. But a small number of beneficial owners struggled to liquidate their collateral and made losses. And hedge funds that had borrowed securities via Lehman found it difficult to reclaim the collateral that they had pledged to Lehman in order to borrow securities. This was partly due to rehypothecation of collateral by Lehman, a practice that involves using collateral posted by their clients as collateral for other purposes.⁽²⁾

Losses for some securities lending participants led to more widespread counterparty concerns in the securities lending market. This prompted some participants to reduce their activity in the market, some entirely. This contributed to the significant fall in securities available for loan in late 2008 (Chart 1).

Additional interconnections are made when beneficial owners reinvest cash collateral in debt instruments of financial institutions and corporates. The box on page 228 discusses the issues associated with reinvesting cash collateral during the crisis.

With long counterparty chains, individual participants may also find it difficult to understand and price the risks to which they are exposed. The resulting opacity can be a source of risk in itself.

Opacity

The following considers two types of opacity in securities lending — price and risk exposures.

Transactions are usually conducted bilaterally rather than through a centralised exchange, which leads to limited transparency on the fees paid for borrowing securities. Contacts report that the majority of market participants use data from companies that collect and distribute data on the securities lending market. Their data include information on fees and volumes of certain types of securities. But there are relatively little publicly available price data. Lack of easily available data on pricing can lead to inconsistent pricing methodologies being adopted and can lead to uncertainty. In turn, that can potentially lower volumes, particularly during periods of high volatility.

Securities lending may also create opacity in risk exposures when the institutions involved, as well as other market participants, such as their clients and counterparties, do not fully understand the risks to which they are exposed to as a result of these transactions.

Market contacts have noted that beneficial owners may not have fully appreciated the counterparty and liquidity risks involved in their securities lending programmes before the financial crisis. For example, it became evident during the financial crisis that some were not aware what collateral they held.

Market participants, such as investors in investment funds and banks' counterparties, may also find it difficult to understand the risk exposure of institutions due to securities lending. Many institutions do not publish data on the size of their securities lending exposures. This might make it more difficult for participants to assess the risk of these institutions.

In the case of banks, for example, that are large borrowers of securities, securities lending can lead to a significant amount of assets being pledged as collateral. This means that a portion of their assets are 'encumbered' — another party has legal claim over them. The proportion of a bank's balance sheet that is encumbered in this way may be unknown to other market participants. But encumbrance can be an issue for unsecured creditors of a bank as it means they have fewer assets to lay claim on if the bank fails. So in a stressed situation, depositors and creditors may be more uncertain about being repaid, potentially leading them to withdraw their funding pre-emptively.

Developments in securities lending

Market-led developments

This section outlines some of the initiatives that aim to improve the understanding of and mitigate the risks associated with securities lending.

Review of securities lending programmes

Market contacts report that many beneficial owners have reviewed their lending programmes in light of the financial crisis and have introduced more conservative guidelines. These guidelines include changes to the collateral they are willing to accept, the list of counterparties they will lend to and the

⁽¹⁾ The Bank also discussed the risks associated with interconnectedness and opacity in the box entitled 'Bank funding resilience: a whole balance sheet approach' on page 36–37 of the June 2011 *Financial Stability Report*.

⁽²⁾ For further reading on rehypothecation, see Singh and Aitken (2010).

investment parameters of cash collateral reinvestment programmes. Beneficial owners' reporting requirements from their agent lenders are also said to have increased.

Education of beneficial owners

Uncertainty around the risks of securities lending is thought to be one reason behind the withdrawal of some beneficial owners from lending programmes during the financial crisis. As a result, the industry has sought to improve beneficial owners' understanding of securities lending. For example, under the auspices of the Securities Lending and Repo Committee (SLRC), a group of financial trade associations have published educational materials for beneficial owners' understanding of the risks involved in securities lending.

Revisions to legal agreements

Industry-standard legal agreements for securities lending transactions have been updated. For example, the Global Master Securities Lending Agreement includes revisions to the process of valuing collateral in the event of default, something that became problematic after Lehman Brothers' bankruptcy when limited trading in some securities created problems in determining market prices. But adoption of new agreements by securities lending counterparties has been slow.

New market infrastructure

The costs and benefits of fundamental changes to market infrastructure, such as central counterparties (CCPs) and trade repositories, are being considered by market participants.

CCPs⁽²⁾

A CCP is an institution that sits between parties to a financial transaction, acting as the counterparty to each one. It can help manage the risks involved in a transaction, in particular counterparty credit risk.

CCPs are widely used in the repo market and some derivatives markets, such as interest rate derivatives. They are also used for some securities lending transactions, mainly in the United States and more recently in Europe.

In a securities lending transaction involving a CCP, the lender and borrower deliver the securities and collateral to the CCP, who then delivers them to the final parties. The CCP collects margin from the lender and the borrower. This protects the CCP if the borrower fails to return the securities or the lender fails to return the collateral.

Provided CCPs are highly robust, they can potentially provide benefits to the securities lending market. By acting as a secure node within a network of financial institutions, they can reduce system-wide counterparty credit risk. And CCP margin methodologies, which are generally more standardised and transparent, should lead to more continuous and predictable changes in margin requirements. This can reduce the likelihood of sudden collateral calls on borrowers, which can cause them liquidity problems.

Despite the potential systemic benefits of CCPs, contacts have suggested some impediments to their use. These include the additional costs to lenders of providing margin to CCPs. Such costs may contribute to a collective action problem to using CCPs, as an individual participant's decision to use a CCP may not take into account the systemic benefits.

Trade repositories

A trade repository is a central data centre where details of transactions are reported. Data are collected on a trade-by-trade basis, on the type of transaction, notional value, currency, maturity and counterparties.

Trade repositories can improve the transparency of a market, helping authorities and market participants to see the pattern of risk and flows across markets. There are global trade repositories for credit, interest rate and equity derivatives. Transparency in the securities lending market could also be enhanced through the introduction of a trade repository.⁽³⁾

Impact of regulation

Regulatory authorities around the world are changing their regulatory frameworks to improve the resilience of the financial system. There is currently little new direct regulation of the securities lending market but changes to the regulation of institutions, including banks and insurers, may have an indirect impact on the market. This section discusses the possible impact on the securities lending market from some of these regulatory changes, and the potential financial stability implications.

Basel III

Basel III is the new global regulatory standard governing banks' capital and liquidity that aims to improve the resilience of banks. The new rules are due to be phased in from 2013 through to 2019.

A significant element of Basel III is to increase capital requirements to recognise counterparty credit risk more adequately. Banks borrowing or lending securities may need to allocate more capital to capture more accurately the risk of a counterparty defaulting. This could make borrowing securities more expensive for banks, which could in turn increase the cost of providing services such as market-making and the cost of collateral upgrade trades for bank funding purposes.

The educational materials can be found on the Bank's SLRC web page at www.bankofengland.co.uk/markets/gilts/slrc.htm.
 CCPs for securities lending is also discussed in Howieson and Zimmerhansl (2010) and

⁽²⁾ CCPs for securities lending is also discussed in Howieson and Zimmerhansl (2010) and the International Securities Lending Association (2009).

⁽³⁾ The benefits of a trade repository for the securities lending market was also discussed by Tucker (2011a,b).

Collateral swaps

Traditional collateral upgrade trades

A 'collateral upgrade trade' is a type of securities lending transaction that involves an institution, usually a bank, borrowing high-quality and liquid securities, such as gilts, in return for pledging relatively less liquid securities, such as residential mortgage-backed securities (RMBS). The bank may use the high-quality securities they have borrowed to raise cash in the repo market or as collateral for swap and derivative transactions.⁽¹⁾

Collateral swaps

Market contacts and the Financial Services Authority (FSA) have reported increased demand from banks in the past year to undertake a type of collateral upgrade trade, referred to as a 'collateral swap'. The key feature is that the transactions are arranged for a minimum term rather than being open to recall like traditional securities loans. Collateral swaps are typically based on pools of securities, allowing substitutability both of the securities lent and the collateral pledged. This gives each party some flexibility around which assets to use at any time.

Key drivers of these transactions are banks' liquidity and funding requirements. The FSA's Individual Liquidity Adequacy Standards and forthcoming Basel III liquidity rules, require banks to hold a stock of liquid assets to improve their resilience to liquidity stress. These transactions provide banks with another way to access a stock of such liquid assets. Some transactions are arranged for a few years while others are based on regulatory parameters, such as the 90-day FSA liquidity stress periods.⁽²⁾

Banks can also use these transactions to help fund their lending activities. For example, mortgage loans packaged into RMBS can be exchanged for more liquid securities that can be used to raise funding in the repo market. This achieves funding in an equivalent way to long-dated repo transactions.⁽³⁾ The Bank's Special Liquidity Scheme (SLS) allowed banks to pledge relatively illiquid securities in return for liquid Treasury bills, that banks could then use to finance themselves.⁽⁴⁾ Indeed, the expiry of the SLS in January 2012 has been an important driver for collateral swap transactions which can be seen in some respects as providing a private sector replacement for the SLS. Potential lenders in these transactions are pension funds and insurance companies, who hold large portfolios of government bonds. These institutions are less susceptible to liquidity runs and hold these assets more for their high credit quality and long duration (to match the profile of their liabilities) than for liquidity purposes, for which their requirements are typically low relative to banks.

The volumes of these transactions are thought to be low at present, but contacts report significant interest and hence, there is potential for a substantial increase in volumes.

Potential implications for financial stability

This transfer of liquidity from pension funds and insurance companies to the banking system may be viewed as a positive development. By providing another funding and liquidity source for banks this may improve banks' resilience.

But these transactions may also be associated with risks to financial stability. In particular, the limited disclosure around these transactions may add to issues around opacity; as a form of secured funding they add to the encumbrance of banks' assets; and because the transactions are subject to margining, the value of the funding they provide may vary potentially introducing procyclicality to the provision of lending they support. In addition, their recent appearance means the robustness of these transactions during stress is untested as is the capacity of the lender of securities to manage a default in a way that does not entail costly externalities for the financial system.

In the June 2011 *Financial Stability Report*, the Bank's Financial Policy Committee advised the FSA that its bank supervisors should monitor closely the risks associated with opaque funding structures, such as collateral swaps.

- (2) The FSA recently published a guidance consultation document on collateral swaps for liquidity purposes, see Financial Services Authority (2011).
- (3) Long-dated repo transactions were discussed in the 2010 Q4 *Quarterly Bulletin* on page 254.

(4) More details on the SLS are available on the Bank's website at www.bankofengland.co.uk/markets/sls/index.htm.

At the same time, Basel III liquidity regulations, like the current FSA Individual Liquidity Adequacy Standards, will require banks to hold a buffer of liquid assets to help protect against liquidity risks. Market contacts expect increased demand by banks to borrow eligible liquid assets from securities lenders on a long-term basis to include in these buffers. This is discussed further in the box above.

Solvency II

Solvency II is a European directive that aims to enhance the solvency of insurers in order to protect policyholders and beneficiaries. The details of Solvency II are still being finalised and implementation is expected to begin in 2013.

Market contacts note that Solvency II may lead to insurers having to hold additional capital against counterparty

Collateral upgrade trades were also discussed in the Bank's 2006 Q4 Quarterly Bulletin, see box entitled 'Collateral upgrade trades' on page 371.

exposures to banks. This could increase the amount of capital held by insurers against securities loans. The additional cost of transactions may reduce insurers' incentive to lend securities and could potentially be passed on to borrowers of securities through higher fees.

Dodd-Frank Act(1)

The Dodd-Frank Act in the United States aims to improve the stability of the United States' financial system. Some rules began to be implemented from late 2010 with others subject to longer implementation periods.

Under the Dodd-Frank Act, banks will be prohibited from speculating with their own capital (so-called 'proprietary trading'). Proprietary trading desks often borrow securities as part of their investment strategies. Banks have already started closing down their proprietary trading desks, reducing their demand to borrow securities.

New requirements in the Dodd-Frank Act and Basel III may also lead to increased collateral requirements for margining over-the-counter derivatives transactions. Joint research by Morgan Stanley and Oliver Wyman estimated that counterparties will need an additional \$2 trillion of high-quality collateral to meet new margin requirements.⁽²⁾ This is expected to increase demand to borrow high-quality securities.

Short-selling restrictions

A number of countries have introduced restrictions on short-selling in the past few years. Recently, France, Italy, Spain and Belgium introduced temporary restrictions. The aim of these restrictions is to limit potentially destabilising falls in asset prices. To the extent that the restrictions do reduce the amount of short-selling that takes place, it could reduce demand to borrow securities.

Implications for securities lending

The net impact of these new regulations on securities lending is difficult to estimate but could be significant. Higher capital requirements for banks and insurers should make participants more able to withstand negative shocks and reduce the risks that arise from interconnections. But it could also reduce the supply of — and demand for — securities loans, diminishing some of the benefits to the functioning of the financial system associated with securities lending.

Conclusion

Securities lending has an important role in improving market liquidity. This helps markets operate more smoothly and efficiently, which enables better price discovery and can reduce price volatility. But some characteristics of securities lending can lead to fragilities that may reduce those benefits and create risks to financial stability. In particular, securities lending increases interconnectedness between institutions, which — together with opacity around the pricing and exposure to risk associated with it — can amplify contagion in times of stress.

Since the onset of the financial crisis, market participants have sought to address some of the concerns around securities lending. New regulation on institutions involved in securities lending may also address some of the risks, particularly counterparty credit risks. New market infrastructure may also help.

The Bank will continue to monitor developments in the securities lending market.

²³²

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Measuring financial sector output and its contribution to UK GDP

By Stephen Burgess of the Bank's Conjunctural Assessment and Projections Division.⁽¹⁾

In the decade before the financial crisis, the UK financial services sector grew more than twice as fast as the UK economy as a whole. But there are many conceptual difficulties associated with measuring output in finance. This article describes the contribution of the financial sector to GDP and assesses the uncertainty around recent estimates. There is some evidence that financial services output grew less quickly over the recent past than the official data suggest, although this probably had only a small impact on the rate of growth of overall GDP.

Introduction

In the decade before the financial crisis, measured output growth in the UK financial services sector⁽²⁾ averaged over 6% per year, compared with overall UK GDP growth of 3% per year (**Chart 1**). The sector's share of the economy also grew significantly and by more than in most other major advanced economies (**Chart 2**).

Chart 1 Financial services output



Finding practical ways of measuring the output of financial firms accurately is challenging. That is a problem for all statisticians involved in measuring output in finance and not one specific to the United Kingdom. Financial services output data in the United Kingdom are compiled in accordance with international best practice, but care is often needed when interpreting them.

Policymakers need to understand the extent to which estimates of financial sector output may be subject to uncertainty.⁽³⁾ First, they may want to assess the contribution

Chart 2 Share of nominal GDP accounted for by financial services



Sources: OECD, ONS and Bank calculations.

(a) Data for France are for the years 1999 and 2008.

made by the financial sector to overall economic activity, especially at a time when there is an intense debate about the need for reform of finance. Second, data uncertainty could also create problems for measuring GDP itself, particularly in economies with large financial sectors.⁽⁴⁾ Third, if the effect on GDP were large enough, it could create uncertainty in

The author would like to thank Jeremy Rowe for his help in the production of this article.

⁽²⁾ The box on page 237 explains how the 'financial services sector' is defined for the purposes of this article.

 ⁽³⁾ See Ashley et al (2005) for more background on the Bank's work on data uncertainty.
 (4) For example, Basu, Fernald and Wang (2008) argue that the GDP of Luxembourg could be overstated by as much as 11% because of current practice in output measurement in finance.

The analysis in this article finds that financial services output in the pre-crisis period was probably overstated. But much of this effect was concentrated in consumption of financial services by other production sectors, so would mostly be matched by understatement of value added in those sectors. Overall, it is unlikely that average annual GDP growth in the decade before the crisis would have been boosted by more than 0.1 percentage points as a direct result of difficulties in measuring output in financial services.

This article builds on previous Bank work by Haldane et al (2010). They explain why it is important from a financial stability perspective to be able to measure accurately the contribution of the financial sector to the economy, and why problems may be created by including compensation for banks' risk-taking in measured output. This article considers why measurement issues may also matter for monetary policy. It considers a range of potential difficulties, particularly those affecting real measures of output, and assesses their possible impact on estimates of overall economic growth.

The first section describes the growth of the financial sector in the United Kingdom in more detail. The second section explains some of the conceptual and practical challenges associated with measuring output in finance. The final section explains why it is likely that output was overstated prior to the crisis, and estimates what effect that might have had on growth in GDP.

The growth of the financial sector in the United Kingdom

The contribution of a sector to overall economic activity can be measured by its share in gross value added (GVA). Table A compares the growth of real GVA in the financial services sector with rates of GDP growth since 1856. The historical trends in financial sector growth are striking.

Table A	Average ca	lendar-year	growth	rates c	of real	GVA
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	Financial services	GDP
1856–1913 ^(a)	7.6	2.0
1914–70 ^(a)	1.5	1.9
1971–96	2.7	2.2
1997–2007	6.1	3.0
2008	5.0	-0.1
2009–10	-4.1	-1.6
1856–2010	4.2	2.0

Sources: Feinstein (1972), Mitchell (1988), ONS and Bank calculations.

(a) Data before 1920 include Southern Ireland

In the 60 years before the First World War, GVA in the financial sector grew at an annual average of 7.6%, well above GDP growth. That probably reflected its small initial base, the increasing need for finance in the wider economy, legal changes such as the removal of restrictions on joint-stock banking (Davies et al (2010)) and the establishment of building societies.

Between 1914 and 1970 the sector grew more slowly than the rest of the economy, perhaps reflecting tighter government control, restrictions on the movement of capital or the increasing maturity of the industry. The more recent past has been associated with a second period of financial deepening, with output growing at over 6% per annum between 1997 and 2007.

Measured financial services output also grew strongly during 2008, in contrast with indicative surveys of financial sector output, which fell back at the onset of market disruption in mid-2007 (Chart 3). There was a sharp reduction in lending growth and the provision of some financial services to the rest of the economy around that time, but financial markets themselves were very active.

Chart 3 Financial services output and business surveys



Sources: CBI/PwC, CIPS/Markit and ONS.

(a) Survey measures scaled to have the same mean and standard deviation as ONS series over

the period 1996-2011.

(b) CIPS: Balance of firms reporting that business activity was higher than one month earlier, averaged across three months of the quarter. (c) CBI: Balance of firms reporting that business volumes were higher than three months earlier.

From the beginning of 2009 onwards, the level of output in the sector fell sharply and continued to do so even as the rest of the economy recovered (**Chart 4**). By the end of 2010, it was 10% below its pre-crisis peak.

As the next section will explain, output in the financial sector is hard to define and measure accurately. Since it is important to

⁽¹⁾ See Benito et al (2010) and Section 3.2 of the November 2010 Inflation Report for more about estimating potential supply and how to estimate the extent of spare capacity in the economy. It is also important to note that measured output is not necessarily the best measure of the demand for resources that determines inflationary pressure: see Churm et al (2006).

have confidence in rates of economic growth observed in the past, the remainder of this article focuses on the period 1997–2007 when financial sector output grew rapidly.

Chart 4 Financial services output since 2007



One reason to focus on this period concerns the behaviour of measured productivity. Although measured financial services output almost doubled between 1997 and 2007, there was barely any growth in financial sector employment (Chart 5). It is possible that productivity growth in the sector was very high (Haldane *et al* (2010) consider this possibility). But another possibility is that the national accounts, while compiled in accordance with international best practice, led to an overstatement of the sector's output growth. If that also had a material effect on overall GDP growth over that decade, that would be an important issue for policy both now and in the future.

Chart 5 Employment and output in UK financial services^(a)



(a) Employment data are based on the SIC 2007 classification system, whereas the output data are based on the SIC 2003 system.

Table B shows the contribution of different financial industries to growth in real value added since 2000. Although banks and building societies (hereafter simply 'banks') account for only around 55% of the level of output in the sector, they

accounted for the vast majority of growth in the period before the crisis. The material in the next section therefore concentrates on output measurement in banking, rather than in finance more generally. A box on page 237 provides more detail about the composition of the financial services sector as a whole, and the main methods used to measure the output of the individual industries.

Table B Sources of financial sector growth since 2000

		Average gro	Average growth rates ^(a)	
W f	eight in inancial services (2006 prices)	2000–07	2008–10	Contribution to financial services growth, ^(b) 2000–07
Banks and building societies ^(c)	57%	7.5	-4.7	4.2
Other financial intermediaries ^(c)	9%	6.9	3.5	0.6
Insurance and pension funds(c)	19%	-1.6	-0.3	-0.3
Auxiliary activities ^(c)	15%	4.4	3.3	0.7
Total financial services	100%	5.6	-2.1	

(a) Average annualised quarterly measures

(b) Using time-varying weights.

(c) Dang unit e up, with the series for total financial services.

The measurement of output in the banking sector

This section explains some of the challenges involved in measuring output in banking, before describing the recommended processes for addressing them in national accounts guidelines.⁽¹⁾ Many of the same difficulties arise when trying to measure demand for financial services by users — that is, viewing the problem from the expenditure side of the accounts rather than the output side, as this section does.

In many industries, it is straightforward to specify sensible measures of output. By contrast, formulating a satisfactory definition of 'output' in the financial sector is challenging, and remains an area of research and debate for both academic researchers and national accounts statisticians. The problem of formulating a satisfactory definition of output is not unique to financial services: it applies also to public sector output and the output of many non-financial business services, such as consultancy and advertising.

The discussion begins by describing difficulties that relate to all measures of bank output (real or nominal). It then outlines some problems that relate specifically to real measures of output, before explaining how these are used as the basis for calculating real GVA.

Triplett and Bosworth (2004) provide a comprehensive treatment of many of these issues, reflecting on both the academic literature on banking output and on national accounts practice.

Throughout this article, the 'financial services' sector is taken to be the set of firms that are classified under Division J ('Financial Intermediation') in the Standard Industrial Classification (2003) system.⁽¹⁾ Under this system, firms are classified into industries according to the type of goods and services they are mainly involved in producing, not by their ultimate ownership.

Within the financial sector, monetary financial institutions⁽²⁾ banks and building societies — account for around 55% of value added. Since they have been the main source of movements in output in the recent past, the article focuses more on issues of measurement in banking than in other industries. The other 45% is accounted for by insurance companies and pension funds (around 20%) and a range of other financial intermediaries and auxiliary companies (around 25%). These weights are based on shares of value added in the base year (currently 2006). As **Chart 2** indicates, value shares can vary significantly over time.

Table 1 gives more detail about the types of firms in the financial sector, along with a summary of how value and volume indicators of output are constructed. The information below is based on Williams *et al* (2009) and the ONS's 'Methodology of the Monthly Index of Services',(3) which contain much more detail. Further information about the measurement of output in the banking sector is given in a separate box on page 240.

Table 1 The composition of the financial services industry

Financial services industry	Description and examples	National accounts division (SIC 2003)	Weight in financial intermediation (weight in GDP)	Examples of nominal value added indicators	Examples of real value added indicators
Monetary intermediation ('Monetary financial institutions')	Central bank; other banks; building societies.	65.1	57% (4.4%)	Indirect measures (FISIM); direct measures (fees and commissions; other operating income) — see box on page 240.	Deflated version of nominal value added. Direct measures are deflated by an adjusted earnings (AWE) measure for the sector.
Other financial intermediation	Finance leasing; non-bank credit grantors; bank holding companies; investment funds; unit trusts; securities dealers; factoring companies.	65.2	9% (0.7%)	FISIM used for non-bank lenders. Output of investment funds proxied by the value of funds under management.	Finance leasing based on capital stock of leased assets. Investment fund measures calculated by deflating nominal measure using suitable share index.
Insurance companies	Life assurance; general insurance; reinsurance.	66.01, 66.03	13% (1%)	Value of premiums earned less claims due, with technical adjustments.	Direct quantity measures such as (weighted) numbers of policies.
Pension funds	Autonomous schemes only.	66.02	5% (0.4%)	For privately run schemes this is the excess of contributions over payments, with technical adjustments.	Direct quantity measures such as (weighted) numbers of schemes.
Activities auxiliary to financial intermediation	Administration of financial markets; advisory services; fund management; miscellaneous other activities.	67	15% (1.1%)	Range of measures; generally volume measures are collected first and then reflated using earnings or share price series.	Range of direct volume measures such as number of members of funds being managed; number of transactions on particular exchanges.
Total financial intermediation	Combination of the above.		100% (7.7%)		

 SIC 2003 is the system currently used in the national accounts, though this is shortly to be updated to SIC 2007.
 Specifically, these are deposit-taking institutions. Not all financial institutions that

(2) Specifically, these are deposit-taking institutions. Not all financial institutions that describe themselves as 'banks' or 'investment banks' would necessarily fall under this heading: some would be classified under 65.2.

(3) See www.ons.gov.uk/ons/guide-method/user-guidance/index-of-servicesmethodology/source-data/business-and-finance.pdf.

Conceptual difficulties

Banks provide a number of important services to the wider economy:

- payment, settlement and transaction services to depositors and borrowers;
- (ii) intermediation, that is, transforming deposits from savers into funding for households, companies or governments who wish to borrow; and
- (iii) risk transfer and insurance.

Banks' gross output is, in principle, just the sum of the output of each of these individual services. But some of them are easier to quantify than others.

In some cases it is possible to derive an intuitive measure of output. For example, where a bank charges a customer a fee for an overdraft or for a mortgage application, that can be treated as part of its current price output in the same way that overall turnover from car sales would be treated as the current price gross output of a car manufacturer.

But many of the above services are not charged for explicitly. An obvious example of this is transaction services provided to depositors. Many banks offer their customers automated payment facilities, bookkeeping services and safekeeping of money in exchange for a steady flow of funding for their own lending and investment activities.

Measuring the output of services associated with a loan also introduces conceptual difficulties. The actual transfer of funds is often a small part of the operation and in some cases could equally well be done through capital markets, without the need for an intermediary such as a bank. But a bank may provide services in other ways. For example, they may have a comparative advantage in screening and monitoring potential borrowers (Campbell and Kracaw (1980), Mester (1991)), through gathering information about their customers that is not available to other lenders. That might help their management of risk and generate a better allocation of capital across the economy.

But it is hard to quantify the benefits arising when banks use this additional information. Banks with better risk management practices should be regarded as providing higher-quality services, and therefore as generating higher output when they provide finance. But this activity is almost impossible to measure *ex ante*. Conversely, the impact of poor decision-making may only become apparent years later, and cannot easily be reflected in estimates of output when a loan is first made.

Computing real measures of output

In order to be able to calculate real GDP from the output side, it is necessary to find measures of real GVA for each industry.

This section explains some of the conceptual problems involved in finding real measures of activity for banks, beginning with the calculation of gross output.

In an ideal world, one would try to observe quantities that corresponded to banks' real output, in the same way that one might count the number of cars produced by a car manufacturer (taking account of improvements) to measure its real output. But for many services provided by banks, finding a suitable unit of output is difficult. Steindel (2009) gives a flavour of the potential complications when describing a bank making a market in a corporate stock:

'Even a very simple transaction...raises some complexity in determining the real activity involved. Is the unit of transaction a single sale of a block of shares, or the sale of one share? It certainly seems as if the sale of ten shares in one block involves no more physical services than a sale of one share...; however, the sale of multiple shares may also involve transactions with multiple buyers.'

Rather than trying to measure explicitly the actual quantity of services provided (or their prices), an alternative approach is to begin with a nominal measure of output and to deflate it using a suitable generic deflator, such as the GDP deflator or an average earnings series. This is often the most practical approach, given the amount of data required for the explicit quantity approach, and it is the one used in the United Kingdom and most other European countries. But it only provides a proxy for real output and could diverge significantly from an explicit quantity measure of activity, where that is also available.

For example Inklaar and Wang (2011) compare different methods for estimating the real services provided to depositors. The explicit quantity approach involves counting the number of transactions banks process in connection with customers' accounts, applying suitable weights to different types of payment. The alternative approach takes some indicator of the stock of deposits that customers hold, and applies a suitable deflator. Inklaar and Wang demonstrate that those two methods can provide substantially different answers for real services provided.⁽¹⁾

GVA is calculated by deducting banks' use of inputs produced by other industries (their intermediate consumption) from their gross output. Although some information is available about banks' purchases of goods and services in current prices, they are not calculated in constant prices. So real GVA is

⁽¹⁾ They find that in most countries, explicit quantity measures of depositor services would have outgrown the deflated balances measures in the years 2000–08. That could have major implications for cross-country comparisons of output and productivity in financial services. For example, the measures of real output produced by the US Bureau of Labor Statistics are based on direct measures, whereas most European countries, like the United Kingdom, use the deflated balances approach.

usually estimated by assuming that it is a constant fraction of banks' gross output.

Treatment of bank output in national accounts

Most of the data on the financial sector presented in this article are taken from the UK national accounts. These are compiled from data collected by both the Bank of England and the Office for National Statistics, and are produced in accordance with international best practice.⁽¹⁾

While strict standards exist for best practice, it is important not to have unreasonably high expectations of any particular method of measurement. As the previous section demonstrated, even providing a theoretical basis for measuring output in finance is difficult. And finding measures that accord with a particular theoretical basis can often be challenging.

Statistical standards recommend a two-faceted approach to measuring banks' output. Where explicit measures of activity are available, such as banks' income from fees and commissions, those direct measures are to be included. For most of the services listed above, this is not possible, so in these cases an indirect method has to be used to proxy the output of the remaining services.

The main indirect measure of output used in the national accounts is known as Financial Intermediation Services Indirectly Measured (FISIM). It is calculated on deposits and loans, though not on securities, even though the boundary between them has become increasingly fluid. It is assumed that the output of all the implicit services associated with loans and deposits is captured in the margin that the bank makes on them.⁽²⁾ The margin is calculated relative to a particular reference rate that is assumed to reflect the pure cost of borrowing. For most deposits and loans, the current practice in the United Kingdom is to use Bank Rate, though other alternatives, such as Libor or an index of bond yields, could be used instead. The precise choice of the reference rate can have a material impact on the estimated level of output and how its consumption is allocated to different sectors.

Despite the uncertainty involved with using FISIM to impute the output of bank services, it is still a useful exercise because the alternative would be not to reflect these indirectly measured services anywhere in GDP. That would clearly understate the contribution of the sector.

Dealing profits and losses on assets held by banks are not treated as output, consistent with the treatment across the rest of the national accounts. Trading activities affect measured output only to the extent that customers are paying fees and commissions for investment services, or that banks making a market for an asset may buy or sell at a price that is not the market mid-price. For example, where a bank sells foreign currency to a customer and takes a margin over the market exchange rate, those net spread earnings are considered to be output.

A more complete explanation of methodologies used in measuring output in the banking sector is given in the box on page 240.

The effect of data uncertainty in the pre-crisis period

Having identified the main difficulties in measuring output, this section explains why the contribution of the financial sector might have been overstated in the decade before the crisis. It also shows that this is unlikely to have had a major impact on overall GDP growth over that period, though that judgement is subject to uncertainty.

Since the object of the exercise is to evaluate the potential impact on *real* GDP, the discussion focuses on problems in measuring *real* output in the financial sector.

Specific issues concerning pre-crisis estimates of financial services output

Following the distinctions made in the national accounts, this section begins by considering indirect measures of output (FISIM), before discussing direct measures. On the whole, indirect measures are more subject to measurement problems because they may only be a very rough proxy for the services they are intended to capture. The final part of the discussion considers possible bias in the opposite direction from incomplete coverage of the financial sector.

The discussion on FISIM identifies three potential issues that may have led to an overstatement of financial sector output before the crisis: the effect of choosing a particular reference rate; possible problems with deflating; and the difficulty in measuring quality changes.

Indirect measures: (a) choice of reference rate

The calculation of FISIM on loans and deposits relies on the specification of a reference rate. Any margin that a bank makes relative to that rate is assumed to be an implicit payment for a service. For most lending, a risk-free rate such as Bank Rate is chosen as the benchmark.

The approach of using a risk-free rate has been criticised by some commentators (Colangelo and Inklaar (2010), Haldane *et al* (2010), King (2010)). They argue that the services provided by financial intermediaries do not involve the bearing of risk, as that is not a productive activity. Therefore

⁽¹⁾ UK national accounts are produced in accordance with the guidelines in the European System of Accounts, which are legally binding. In most respects the standards are similar to those laid down in the United Nations System of National Accounts.

⁽²⁾ A more formal motivation for this approach is that the margin represents the user cost to the bank of a particular liability or asset. The theory behind this is described in Hancock (1985) and Fixler and Reinsdorf (2006).

The measurement of output in the banking sector

The box on page 237 summarises some of the measures used to calculate nominal and real output in the financial sector as a whole. This box focuses on the measurement of output in the banking sector.

Banking sector output is divided into four main components:

- (1) Fees and commissions receivable (30% of gross output).⁽¹⁾ This direct measure of output includes all the fees banks obtain from investment banking activities (underwriting, brokerage, advisory services), fees associated with loans and advances and current accounts (eg credit card, mortgage and overdraft fees) and commissions associated with sales of insurance products by banks. To provide a volume indicator, these revenue data are deflated using the AWE series for the financial services industry, excluding bonuses and adjusted for changes in productivity.⁽²⁾ This assumes that price changes in an industry can be proxied by the part of pay growth that is not accounted for by productivity improvements.
- (2) Net spread earnings (10% of gross output).⁽¹⁾ This is a measure of service income provided by banks involved in dealing activities. It captures earnings that banks receive by undertaking transactions at prices above or below the mid-market price; for example, the sale of foreign currency to a consumer at a favourable rate to the bank. These earnings can be generated on securities and derivatives as well as on foreign exchange. Net spread earnings are deflated in the same way as fees and commissions.
- (3) Other operating income (20% of gross output).⁽¹⁾ This component includes rents received by banks and other miscellaneous sources of income. These revenues are deflated in the same way as those from fees and commissions.
- (4) Financial Intermediation Services Indirectly Measured (FISIM) (40% of gross output).⁽¹⁾⁽³⁾ This measure uses the margin between the interest rates offered by banks and an assumed reference rate to impute a service charge for all the valuable activities of banks that cannot be measured directly. Akritidis (2007) provides a comprehensive account of how this has been implemented in the United Kingdom.

Consider a personal loan of \pounds 1,000 that is priced at 10% and assume that the reference rate (in this case Bank Rate) is 5%. The imputed service charge on this loan (over one year) is given by:

A similar concept applies to customer deposits. If another customer placed £500 in a bank account at a rate of 3%, the service charge (over one year) would be:

Deposit FISIM = $(5\% - 3\%) * \pounds 500 = \pounds 10$.

The margin on the account is assumed to give some idea of the value the customer attaches to the services offered by the bank. Suppose the 3% rate above was being offered by an ordinary high street bank. If the customer were to move the deposit to an internet account paying 4.5%, then the FISIM on the deposit would fall to $\pounds 2.50$ per year. The difference ($\pounds 7.50$) gives a measure of the value the customer places on being able to walk into a branch and use the extra services available there.

The calculation of volume measures for FISIM is more complicated. The spread (5% in the loan example above) is assumed to be the price of the implicit service, and the size of the loan or deposit is an indicator of the volume of services provided. So to produce a constant price measure, the spread is held fixed at its base-year value. A further adjustment is necessary because the stocks of lending and deposits themselves tend to grow over time with inflation. Hence there is an additional deflation process whereby the stocks are revalued using the GDP deflator (adjusted to exclude FISIM). Specifically, the real FISIM on the loan described above is given (over one year) by:

Real loan FISIM = (Spread over Bank Rate in base year (2006)) * £1,000 * GDP deflator in base year

GDP deflator in current period

Of course, it is impractical to calculate FISIM for individual loans and deposits. Instead an average rate and a total stock are calculated for each sector of the economy that banks transact with. This enables the provision of services to each part of the economy to be computed. More information about this is given in the box on page 243.

Changes in the spreads on lending and deposits therefore have no impact on changes in real FISIM, or on real GDP growth.⁽⁴⁾ Changes over time in the real measure of FISIM are determined mainly by growth in the stocks of loans and deposits on banks' balance sheets. Money and credit growth in excess of final output price inflation will therefore tend to raise the imputed value of services.

Loan FISIM = $(10\% - 5\%) * \pm 1,000 = \pm 50$.

These figures for the gross output shares in 2006 exclude the contribution of building societies.

⁽²⁾ Williams *et al* (2009) explain the motivation for excluding bonuses.

⁽³⁾ It is sometimes stated that FISIM is around two thirds of banking sector value added. While true in an arithmetic sense, this is somewhat misleading. FISIM accounts for 40% of gross output, and it is only two thirds of value added on the basis that intermediate consumption by the banking sector is all netted off from the other 60% of output. But those intermediate inputs are used in banks' production processes to produce all of their output, including the FISIM element.

⁽⁴⁾ Strictly speaking this is true only in recent years. When the base year for the national accounts is updated, estimates of real growth prior to the base year are affected by changes in the weights (which depend on the spreads) and on annual chain-linking.

they argue that although risk is unobservable and difficult to measure, the margin used to reflect banks' service provision should exclude some measure of risk premia. Such an approach would mean using a reference rate that reflected risk, implying a much lower margin being used in the imputation for nominal output of most lending services.

Because the spread between the lending rate and the reference rate is treated as part of the price of FISIM, such a change would have no direct effect on the growth of real financial sector output, which is measured from balance sheet stocks (see the box on page 240 for more details). It would, however, have the effect of reducing the weight of the financial sector in overall GDP. Colangelo and Inklaar (2010) calculate that, for the euro area, using a reference rate that fully reflected risk premia would reduce total FISIM by up to 40%, and the level of GDP by up to 0.3 percentage points.⁽¹⁾ If the relative size of the adjustment were the same in the United Kingdom as in the euro area, it would lower the weight of financial services in UK GDP from 7.7% to 6.1%.⁽²⁾

Indirect measures: (b) deflating to produce real output

Real FISIM reflects the size of banks' stocks of loans and deposits. The stocks are adjusted for the effects of inflation, using the GDP deflator, but further growth in the stocks is assumed to reflect higher real service provision.

The period just before the financial crisis was characterised by growth in money and credit in excess of final output price inflation. There is, therefore, a risk that some of the growth in balance sheets was reflected in higher estimates of real service provision (on both lending and deposits), when it might have been better treated as an increase in prices. For example, the number of mortgage approvals made might be one alternative (quantity) measure of some of the services provided to borrowers by banks. The total number of approvals was relatively stable between 2002 and 2007, suggesting little change in output, but the stock of mortgage lending deflated by the GDP deflator rose by almost 60%.

A similar alternative approach would be to use a house price index to deflate the stocks of mortgages on banks' balance sheets.⁽³⁾ That might have given a more plausible answer for the growth in real service provision in the years before the crisis, though it might not do so in all circumstances. It could also be argued that as the average size of banks' loans increases, they may have to carry out more screening and monitoring work.

Indirect measures: (c) difficulties in quality adjustment

Although FISIM is intended to capture, among other services, the value of banks' screening and monitoring activity, it is at best only a proxy measure for that work.

It became obvious during the financial crisis that some banks had reduced the effectiveness of their screening and

monitoring services in the preceding years. In a perfect world, that would have been reflected in slower growth in value added in earlier periods. But because it is only possible for national accounts to estimate these services from spreads and the size of banks' loan books, there was no way — at least *ex ante* — that the national accounts could have shown this. The size of this effect is almost impossible to quantify, partly because FISIM is meant to capture other unpriced services, not just banks' screening and capital allocation decisions. But it is conceivable that the value of many bank services may actually have fallen during the pre-crisis period.

Direct measures of output

Direct measures of output are probably subject to less uncertainty than estimates of FISIM. But it is possible that there may have been one-off factors boosting these revenues prior to the crisis.

As explained in the previous section, trading gains are not themselves considered to be output. But it is possible that the prevailing market conditions at the time helped to raise measured output by other means (Weale (2009)). They may have enabled banks to invent new products, such as complex structured derivatives, on which they were able to earn additional fee income. Buoyant household demand for credit would also have increased banks' income from credit card, overdraft and mortgage fees.

This need not necessarily imply that these measures were overstated before the crisis: they accurately reflected rising revenues in banking, and the additional output would have required workers and capital to produce it. But it may be a reason to expect those direct measures to grow more slowly in the long term than they did in the years just before the crisis.

Potential sources of understatement

But there are also reasons to think that growth before the crisis might have been understated. For example, the national accounts coverage of the financial sector is only partial (Williams *et al* (2009), Davies (2009)), and it is possible that official statistics failed to capture output in industries that were growing rapidly, such as those in the 'shadow banking system'.⁽⁴⁾

A Eurostat Task Force on FISIM is currently reviewing the choice of reference rate, as well as other methodological issues.

⁽²⁾ These weights are based on data from 2006 (the current national accounts base year).
(3) Inklaar and Wang (2011) explore the impact for the United States of using a house

price index rather than the GDP deflator to adjust balance sheet stocks. Deflating by a house price index would have given a lower growth rate of real imputed services over the pre-crisis period.

⁽⁴⁾ For example hedge funds are outside the scope of ONS surveys, and assets under management in London hedge funds grew by an average annual rate of 47% between 2000 and 2007 (IFSL (2009)). Until 2010 Q1 there was also only partial coverage of banks' off balance sheet vehicles. So the services associated with some loans that had been securitised would not have been included in GDP data. Ashcraft and Steindel (2008) estimate that, for the United States, similar problems might have led to imputed output being understated by more than 10%. For more information about the impact of securitisation on UK banking statistics, see Burgess and Janssen (2007).

That would have two consequences. First, the fact that some industries were missing would be one reason to think that the sector's share in overall value added was understated. Second, to the extent that they might have grown more quickly than the rest of the financial sector, output growth in finance could actually have been higher than measured. The size of this effect is very uncertain, given the lack of data.

On balance, it is probably the case that real output growth in the sector was overstated and also boosted by temporary effects. But it is important to note that there could also be sources of bias in the opposite direction.

Impact on past estimates of GDP growth

This section considers whether overstatement of financial sector output in the decade before the crisis could have had a material effect on overall rates of GDP growth. Although financial services only make up a relatively small part of the economy (Chart 2), measured output grew rapidly over this period, so large errors might have been possible.

The analysis here suggests that the effect of data uncertainty was fairly small, probably adding no more than 0.1 percentage points to average annual GDP growth over the decade before the crisis. The estimates are of a similar order of magnitude to those of Steindel (2009), who estimated upper bounds for the possible effect of output overstatement in finance on US GDP growth in the years before the crisis.

Sources of growth in demand for financial services

To assess the impact of possibly overstated financial sector growth on overall GDP, it is also necessary to analyse the demand for those services in the expenditure side of the accounts.

It is not necessarily true that an over or understatement in measuring output growth in one sector must automatically lead to an over or understatement in measuring overall GDP growth. If the difficulties relate to output demanded by final consumers (households and the rest of the world),⁽¹⁾ then there will be an impact on overall GDP growth. But if the difficulties relate to output demanded by other firms, and their own gross output is unaffected, then there need not necessarily be any impact on overall GDP growth. The composition of GDP growth might, however, be affected.⁽²⁾

In practice, the output and expenditure estimates of GDP never match exactly, because they are compiled from different data sources and each produces estimates that, like all statistical estimates, are subject to errors and omissions. The ONS therefore applies judgement in order to provide its best estimate of GDP growth, which in some years may mean aiming off the output measure.⁽³⁾ Also, no data are published on real intermediate demand, so this has to be calculated by residual. So this exercise should be regarded as illustrative. **Chart 6** shows that around 60% of the additional demand for UK financial services in the decade before the crisis came from final demand (consumption and net exports), with about 40% being accounted for by intermediate demand.⁽⁴⁾ The rapid growth in demand for financial services did boost GDP growth in the United Kingdom.

Chart 6 Estimated contributions to annual growth in overall real^(a) demand for UK financial services



(a) These estimates are not based on fully balanced production accounts, which are only available in current price terms. The methodology used is explained in the notes to Table C.

But the sources of bias described earlier are likely to be concentrated in particular components of output. There is reason to suspect that indirect measures of output are subject to more uncertainty than direct ones. And many (though not all) of the problems described in the previous section relate to the provision of lending services. Because those are dominated by loans to businesses and loans for house purchase,⁽⁵⁾ they are far more likely to be concentrated in intermediate demand (the blue bars), not final demand.⁽⁶⁾ Any overstatement of those services would affect only the composition of GDP growth, not its rate.

The government sector is also a final consumer, though its consumption of financial services is negligible.

⁽²⁾ Strictly speaking this is only true when national accounts are prepared under double deflation methodology, so that problems in measuring intermediate demand are offset elsewhere in the national accounts. This is not the current practice in the United Kingdom, so there could be some spillover effects to real GDP from overstatement or understatement of intermediate demand for financial services. In the calculations in this article, these effects are assumed to be small.

⁽³⁾ See, for example, page 92 of the 2010 *Blue Book* for more information about particular adjustments recently applied to the output side of the accounts.

⁽⁴⁾ This contrasts with Steindel's (2009) result for the United States, where he finds an increasing share of banking sector gross output being consumed by other businesses.

⁽⁵⁾ The reason that mortgage lending is treated as intermediate consumption rather than final consumption of financial services by households is explained in more detail in the box on page 243. Mortgage lending accounts for 85% of the stock of lending to individuals.

⁽⁶⁾ This also means that some of the 'shadow banking' activity that fell outside the scope of output estimates would have been missing from intermediate demand, rather than from final demand. So this could have led to some downward bias in financial sector output, and upward bias in the GVA of non-financial firms that were using services from the shadow banking system (such as commercial borrowers whose loans had been securitised).

Intermediate and final demand

Firms involved in production use the economy's endowment of resources (land, labour and capital) to produce output. They also rely on the provision of goods and services by other producing firms, which may be used as inputs in their own production processes. Any attempt to quantify the value of economic production in a given year cannot simply add the total turnover (output) of all industries in the economy, because intermediate inputs will be double counted.

A fully balanced set of national accounts takes into account both the gross output of firms and their intermediate consumption, and calculates their gross value added as follows:

Gross value added of industry A = Gross output of industry A – Intermediate consumption by industry A.

GDP is then defined to be the sum of gross value added (not gross output) across all producing units within an economy. A similar relationship also holds on the demand side, where GDP is also the sum of final demand across all industries:

Demand for output of industry A = Intermediate demand from other firms + Demand from final consumers.

The ONS publishes annual Supply-Use tables (Mahajan (2006)) which make these relationships explicit: demand for each product is decomposed into demand from households, government, the rest of the world and other firms; and the input structure of individual industries is estimated.

Financial companies sell a significant proportion of their output to other businesses. According to the 2008 Supply-Use tables, around 40% of financial services were consumed by other firms (this figure includes mortgage lending: see section below), with the remaining 60% being consumed by other sectors: 32% by UK households and 28% by the rest of the world. It is this latter 60% that is accounted for in final demand and hence in GDP. The other 40% represents part of the gap between output and value added in other industries.

Much of that intermediate business occurs with other financial firms. That is captured to some extent in the Supply-Use tables. But it is of little consequence for the measurement of overall value added because the net service provision by the financial sector as a whole is unchanged.

The article considers the possibility that there may have been periods in the past when output in the financial sector was overstated. If true, then GDP would only be affected to the extent that this occurred in final demand for financial services — essentially consumption and exports. If it were just the intermediate sales to other businesses that were too high, then the only impact would be a greater deduction from gross output in some other industries and a change in the composition of value added across the economy — but not on its overall level.

Production of housing services

One further remark is needed about the treatment of residential mortgages. The national accounts conventionally assume that owner-occupied households are engaged in 'production' of their housing services, in the same way that landlords offer a flow of housing services to their tenants in exchange for rents. So services associated with borrowing for house purchase (primarily mortgage fees and FISIM on the outstanding stock of mortgages) are actually classed as intermediate consumption by another industry, not as consumption by the household sector. Therefore the majority of bank lending services to households do not directly contribute to GDP.

However, any services associated with unsecured lending (credit cards, personal loans, overdrafts) are still treated as final consumption, as are all imputed services to households who hold deposits. **Table C** decomposes growth in demand for financial services in the pre-crisis period into demand for directly and indirectly measured components of output, as well as intermediate and final demand. The entries show the growth rates of particular components, with the contributions to overall growth in demand for financial services in brackets.

Table C Estimated average annual growth in sources of realdemand for financial services, 1997–2007 (contributions to totalin parentheses)

	Total demand, of which:	Intermediate demand (services to other businesses, including residential mortgages)	Final demand (exports, services to households other than residential mortgages)
Demand for indirectly measured components (FISIM)	8.8 (2.0)	8.1 (0.9)	9.8 (1.1)
Demand for directly measured components	5.2 (4.0)	3.6 (1.5)	7.0 (2.5)
Total demand	6.0	4.7 (2.4)	7.5 (3.6)
Memo: overall growth i	n real (calendar <u>y</u>	year) GDP	2.9
Weight of financial serv	0.07		

Notes: Fully balanced production accounts are only published in current price terms and no data are available on real intermediate consumption, so these calculations rely on certain assumptions. Consumption of financial services by government and non-profit institutions is assumed to be negligible. The intermediate consumption component is calculated by residual, and hence may implicitly include small chain-linking effects, because they are derived from chain-linked output and expenditure series. In order to reconcile properly output data at basic prices with expenditure data at market prices, an adjustment for taxes and subsidies and subsidies applied by taking a proportion of the ONS's basic price adjustment corresponding to the financial sector's share in GDP.

Sources: Bank calculations, based on estimates and ONS data.

The top row shows that FISIM grew rapidly over the decade before the crisis, with intermediate and final demand for those services both contributing about the same to overall growth. Demand for these indirectly measured services accounted for around a third of total growth in demand for financial services. For the non-FISIM components, which accounted for the remaining two thirds, final demand grew around twice as fast as intermediate demand.

Sensitivity of past estimates

Table C can be used for sensitivity analysis to estimate how average annual GDP growth would have been affected in the ten years before the crisis under different assumptions about financial sector output. This is done by constructing simple alternative scenarios and assessing how final demand (in the right-hand column) would have been different. The weights of those components in GDP are then used to estimate the effects on overall economic growth.⁽¹⁾

If the demand for all financial services had grown in line with GDP in the ten years before the crisis, GDP growth would have been 0.3 percentage points per year weaker on average. But that alternative scenario is likely to be an extreme one.

The right-hand column of the table shows that around two thirds of growth in final demand was accounted for by directly measured services (ie not FISIM).⁽²⁾ If the true value of those services had grown by only half as much as the national accounts suggest, then GDP growth would have been 0.15 percentage points per year weaker on average. But there is no reason to suspect that those services were particularly poorly measured, albeit that they might have grown at an unusually rapid rate in the pre-crisis period.

As discussed earlier in the section, the indirect measures are more likely to be subject to measurement difficulties. For example, if part of the FISIM on loans was imputing the screening and monitoring services offered by banks, it could be argued that it should have been falling over the pre-crisis period, not growing rapidly.

If real FISIM had actually not grown at all during the 1997–2007 period, then GDP growth would have averaged 0.15 percentage points less than it did. That is probably an overestimate, because FISIM also proxies for other valuable services, such as processing customer payments, many of which increased.⁽³⁾ If instead the true growth of real FISIM had been half what is currently stated in the national accounts,⁽⁴⁾ the effect would have been to reduce average annual GDP growth by around 0.1 percentage points over the 1997–2007 period. Given the huge uncertainties involved, this figure should be treated as a very rough upper bound.

Wider effects of growth and contraction in the financial sector

This article has shown that the direct effect of measurement difficulties in the financial sector on past GDP growth is likely to have been relatively small. But to some extent it has only been a partial analysis. There may be other channels, not considered in this article, through which changes in activity in the financial sector could affect the wider economy.

First, there may be supply chain effects that have not been considered explicitly. Financial institutions are consumers of goods and services from other sectors, such as utilities, legal and accountancy services, and output in the financial sector may have an impact on overall demand for those services.

Second, financial deepening can have more general effects on non-financial firms, by influencing the cost of transactions, the allocation of capital in the economy and the availability of credit and working capital. It may also influence the ease with

A maintained assumption throughout the analysis is that the ratio of GVA (which is what is most relevant for GDP) to gross output (which is shown in Table C) in the industry is relatively stable over time.

⁽²⁾ The analysis in this final section relates to the whole of the financial services sector, so in this context the 'direct measures' also include growth in non-bank industries. But, as Chart 4 shows, most of the growth over the 1997–2007 period was driven by banks.

⁽³⁾ Data from the 'Red Book' published by the Bank for International Settlements show that the number of direct debit and credit transfer payments processed by UK banks rose significantly over the period, though this was partly offset by a fall in the number of cheques processed.

⁽⁴⁾ Another way to motivate this counterfactual would be to note that Colangelo and Inklaar (2010) recommend changing the reference rate for the FISIM calculation in a way that would roughly halve its level (though not necessarily its growth rate).

which new businesses can be started up. These effects are discussed in more detail by authors such as Levine (2005), Rajan and Zingales (1998) and Benito *et al* (2010).

Third, because labour productivity in financial services is around double that in the rest of the private sector (Weale (2010)), a change in the proportion of the labour force working in financial services could also have an impact on aggregate output and productivity. For example, a rebalancing of the economy away from financial services might not be neutral for measured GDP. However, because the employment share is small (around 3.5%) and the higher productivity in the sector may partly reflect worker-specific characteristics (eg their level of qualifications), any effect on measured GDP would probably be relatively minor.

Conclusion

In the decade before the financial crisis, the financial services sector grew at more than double the rate of the UK economy as a whole. Measured output also grew strongly during the financial crisis, before falling back sharply. However, this article has illustrated that defining and collecting suitable measures of output in financial services is not straightforward. Users should not have unreasonably high expectations of some of the proxy measures that have to be used to estimate output in the sector.

It seems likely that the conventions used in the UK national accounts probably did flatter the contribution of the financial sector in the pre-crisis period. But the effect of those distortions on overall rates of GDP growth in the past is likely to have been relatively small.

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The Money Market Liaison Group Sterling Money Market Survey

By Ben Westwood of the Bank's Sterling Markets Division.⁽¹⁾

The Bank of England recently initiated a new survey of the sterling money market on behalf of the Money Market Liaison Group. This market — where short-term wholesale borrowing and lending in sterling takes place — plays a central role in the Bank's pursuit of its monetary and financial stability objectives. Participants include banks, other financial institutions and non-financial companies, who use the market to manage their liquidity, by investing over short periods and raising short-term funding. The survey supplements the Bank's long-standing gathering of market intelligence and will increase public understanding of the market. Over time, it is expected to help identify emerging structural trends in the market, helping policymakers assess the impact of their actions on the behaviour of market participants. This article introduces and presents the results of the inaugural survey launched in May 2011.

The sterling money market plays a central role in the Bank of England's pursuit of its monetary policy and financial stability goals.⁽²⁾ The Bank operates in the sterling money market to implement the interest rate decisions of the Monetary Policy Committee (MPC). The Bank also uses its operations in the sterling money market to provide liquidity insurance to the banking sector with the aim of reducing the costs of disruptions to the liquidity and payment services supplied by banks. The market also plays a central role in enabling financial and non-financial companies to manage their liquidity positions.

To operate effectively in the sterling money market, participants, including the Bank, need to understand how the market functions. To this end, the Bank gathers regular market intelligence and analyses available data. But there is limited consistent, publicly available information about the size, structure, liquidity and efficiency of the market as a whole.

To fill this gap, the Money Market Liaison Group (MMLG) agreed to conduct a regular, six-monthly survey of commercial banks and building societies active in the sterling money market.⁽³⁾ The aim of the MMLG Sterling Money Market Survey is to provide a source of both quantitative and qualitative data on market activity and functioning. The survey will be conducted in May and November of each year. The Bank will collect the data and publish it on behalf of the MMLG.

This article describes the Sterling Money Market Survey and presents the results of the inaugural May 2011 survey.⁽⁴⁾ The first section describes the sterling money market and the objectives of the survey. The second section describes the

design and coverage of the survey. The final section presents the results of the May 2011 survey.

Objectives of the survey

The importance of the sterling money market

The sterling money market is where short-term wholesale sterling borrowing and lending takes place. Transactions can be secured or unsecured and include deposits, loans, and the sale and purchase of tradable financial instruments such as commercial paper (CP) and certificates of deposit (CDs). The maturities of market transactions typically range from overnight to one year and these are the limits of the market as defined in this survey.

Banks and building societies active in the United Kingdom use the sterling money market to manage their sterling liquidity positions; lending cash surpluses or borrowing to make up cash shortages for short periods. They also use the market to raise short-term funding, for example, by issuing CDs. In addition, banks borrow and deposit cash in the money market on behalf of their clients. These may include other banks,

The author would like to thank Matthew Sim for his help in producing this article.
 See The Framework for the Bank of England's Operations in the Sterling Money Markets — the 'Red Book', available at

www.bankofengland.co.uk/markets/sterlingoperations/redbook.htm. (3) The Money Market Liaison Group is a forum in which structural issues concerning the

sterling money market are discussed. It comprises representatives from market participants, trade associations and the authorities and is chaired by the Bank of England. For further details see www.bankofengland.co.uk/markets/money/smmlg.htm.

⁽⁴⁾ To inform the design of the May survey, the MMLG conducted a pilot survey in November 2010. A selection of results from the pilot survey was published in the 2011 Q1 Quarterly Bulletin, available at www.bankofengland.co.uk/publications/quarterlybulletin/qb1101.pdf.

non-bank financial companies, such as pension funds, and non-financials, such as manufacturers or retailers. Some non-bank financial companies and large non-financials also access the money market directly.

The Bank operates in the sterling money market in pursuit of its monetary and financial stability goals. First, in order to implement the MPC's monetary policy decision, the Bank operates in the market to influence overnight interest rates so that they are close to Bank Rate. In turn, these overnight interest rates influence longer-term money market interest rates, which act as a benchmark for deposit and loan rates in the wider economy. While the precise relationship between overnight and longer-term interest rates depends on a number of factors, the sterling money market acts as the initial stage of this monetary policy transmission mechanism.

Second, developments in the sterling money market can have implications for the stability of the financial system as a whole. During the financial crisis, concerns among money market participants about credit and liquidity risk led to some banks experiencing liquidity shortages, impairing their ability to provide liquidity and payment services to the wider economy. Some of the Bank's operations in the sterling money market are designed to provide banks with a liquidity backstop through which they can access liquidity directly from the Bank of England.

The evolution of the framework that governs the Bank's operations in the sterling money market — the sterling monetary framework — has benefited from the Bank's access to information about the market, both from market intelligence and existing data sources (see the box on page 249 for a description of existing sources of data on the market).⁽¹⁾

Objectives for the new survey

The aim of the Sterling Money Market Survey is to increase understanding of the market by providing a source of quantitative and qualitative data on market activity and functioning. The survey is designed to quantify the size of the market and identify key instruments within it. The survey also provides information on market participants' use of the market and may help to identify factors that could impede the efficient functioning of the market.

The data will be collected on a consistent basis at regular intervals, so over time, the survey will aid the identification of structural trends in the sterling money market. These could include changes in the relative importance of secured versus unsecured transactions, changes in the types of collateral against which transactions are secured, and changes in the term over which transactions are taking place. Such trends could reflect developments in market infrastructure and the consequences of regulatory changes or changes in the way the Bank conducts its operations in the sterling money market.

Survey coverage

Survey sample

Thirty three commercial banks, building societies and investment banks were chosen to take part in the May 2011 survey.⁽²⁾ The selection was based on information about the scale of these institutions' involvement in the sterling money market, combined with market intelligence on which banks were most active in the market. Certain banks less active in the market will therefore fall outside the survey sample.

Content

For the purposes of the survey, market transactions are defined as having a maturity of no longer than one year. Participants are asked to exclude any retail business, along with any non-sterling and intragroup trades.

Both central government, via the Debt Management Office (DMO), and local authorities use the sterling money market to manage their liquidity. Money market transactions with individual local authorities, classified as non-financials, are included in the survey, but respondents are asked to exclude transactions with the DMO. The survey also excludes transactions with the Bank of England, such that Bank and central government activity should not directly impact the survey results.⁽³⁾⁽⁴⁾

The survey comprises both quantitative and qualitative questions. The quantitative questions ask survey participants to record the value, volume, type and maturity of sterling money market activity conducted in their own name over the month-long survey period, on a daily-average basis. The qualitative questions are designed to ascertain how well market participants perceive markets to be functioning and how market liquidity and efficiency is evolving. Participants are asked about different aspects of the functioning of the sterling money market relative to six months earlier. They are also asked to rate the current state of market conditions in the secured and unsecured money market.

Results from the May 2011 survey

The results of the MMLG Sterling Money Market Survey are indicative of market activity and functioning, reflecting survey participants' responses. As such, the results do not necessarily reflect the Bank's views on the functioning of the sterling

For more details on the sterling monetary framework, including the conditions under which commercial banks can access liquidity directly from the Bank of England, see www.bankofengland.co.uk/markets/sterlingoperations/redbook.htm.

⁽²⁾ Although non-bank financial companies and non-financial companies are important money market participants, market intelligence suggests that their transactions are largely with or via banks. Those flows should therefore be captured in the survey returns of the participating banks.

⁽³⁾ For more details on the DMO's money market activity, see www.dmo.gov.uk.
(4) It may be the case that you was an data are unable to identify the ultimate

⁽⁴⁾ It may be the case that survey respondents are unable to identify the ultimate counterparty when using an automated trading system to transact via a central counterparty in the secured market. So to the extent that DMO activity in the secured market is conducted using an automated trading system and settled via a central counterparty, survey respondents may not be able to exclude it.
Existing data sources

There is a range of publicly available price and quantity data for different segments of the sterling money market. For example, the Wholesale Markets Brokers' Association (WMBA) publishes data on the value of secured and unsecured overnight transactions conducted via their members and the interest rates at which these transactions take place.⁽¹⁾ In addition to these transactions-based data, quoted interest rates are available for a variety of maturities. A number of surveys provide additional data on aspects of secured lending and borrowing activity. For example, twice a year, the International Capital Market Association surveys the outstanding value of repurchase (repo) agreements in Europe, a proportion of which are denominated in sterling.⁽²⁾⁽³⁾

The Bank of England already collects some data containing information on banks' sterling money market activity, via the monthly balance sheet data UK-resident banks are required to supply, as well as via a long-standing repo and securities lending (RSL) survey, conducted by the Bank on a quarterly basis. Neither data set is directly comparable with the quantitative data from the Sterling Money Market Survey. For example, the balance sheet data provide a record of amounts of transactions outstanding rather than flows, as in the Sterling Money Market Survey, and do not explicitly separate money market activity from other borrowing and lending conducted by banks. The RSL survey asks respondents to record all repo

money market. The lack of consistent pre-existing data limits the extent to which the survey results can be verified. It is difficult to be certain about the coverage of the survey sample, although market intelligence indicates that gaps in the sample should be relatively small. And it is important to recognise that activity and conditions in the market can and do vary from month to month, with the survey representing a snapshot in a single month.

Quantitative results

The overall size of the sterling money market

Participants reported average daily transactions worth more than £125 billion during May 2011, with the average reported loan or deposit worth around £30 million.⁽¹⁾ To give a comparable indication of scale, that total is equivalent to around 10% of the size of the London foreign exchange market turnover recorded in the April 2011 Foreign Exchange Joint Standing Committee survey.

During May, the value of secured sterling money market transactions was roughly two and a half times greater than unsecured transactions (**Chart 1**). In aggregate, banks reported that they were net borrowers from the non-bank sector in this market. And reported activity was concentrated at shorter maturities. transactions including those which are intragroup, whereas in the Sterling Money Market Survey, respondents are asked not to record such transactions. Nevertheless, under reasonable assumptions to enable comparison across data sets, these existing sources are broadly corroborative of the results from the May 2011 Sterling Money Market Survey.

The Bank also obtains information about conditions in, and the functioning of, the sterling money market through its own operations. For example, the Bank's indexed long-term repo operations, in which the Bank offers to lend central bank reserves against either of two different collateral sets, were designed partly with a view to obtain a signal from participants about liquidity conditions based on bidding behaviour in the operations.⁽⁴⁾ The Bank complements this information by talking directly to its counterparties and through its market intelligence programme more generally.

- See 2011 Q2 Quarterly Bulletin, pages 97–98, for a description of relevant WMBA data, available at
- www.bankofengland.co.uk/publications/quarterlybulletin/qb1102.pdf.(2) Repo is a specific type of secured transaction in which the borrower agrees to sell securities and repurchase them in the future.
- 3) The European Central Bank has been conducting a survey of euro money market turnover since 2000, the content of which is similar to the MMLG Sterling Money
- Market Survey. For details see www.ecb.int/stats/money/mmss/html/index.en.html. (4) See the box on the Bank's indexed long-term repo operations on pages 93–94 of the 2011 Q2 *Quarterly Bulletin*, available at
 - www.bankofengland.co.uk/publications/quarterlybulletin/qb1102.pdf.

Chart 1 Reported daily average flows in the sterling money market



Key instruments and segments of the market

This section of the article discusses the quantitative results from the May 2011 survey in more detail, starting by looking at the key counterparties, instruments and transaction types in

⁽¹⁾ These figures are adjusted to take account of estimated double counting. Double counting occurs because respondents are asked to record both borrowing and lending, so where survey participants transact with each other, the same transaction will appear as lending in one participant's return and as borrowing in another participant's return.

the unsecured and the secured segments of the market. It goes on to examine what the results reveal about the maturity of money market transactions, before describing the types of collateral used in the secured market.

The survey results show that in May 2011 banks borrowed more than they lent in the unsecured market. The majority of banks' borrowing in this market was in the form of deposits from non-bank financial companies and non-financials (**Chart 2**). In contrast, the majority of banks' unsecured lending in this market tended to be to other banks. These results are consistent with market intelligence.

Chart 2 Unsecured activity split by instrument, destination of lending or source of borrowing^{(a)(b)}



⁽a) Purchases of sterling CP issued by other financials and corporates are not included.
(b) CP and CD issuance are not split by type of purchaser because these instruments may be traded, making the identity of the 'lender' difficult to verify.

Sales or purchases of CDs and sterling CP accounted for a fairly small proportion of reported unsecured flows (**Chart 2**). These transactions were typically for longer maturities than cash deposits and unsecured loans. Market intelligence suggests that the US dollar and euro-denominated CP markets are likely to represent a more important source of funding for banks included in the survey.

Around half of secured borrowing reported by banks in the May 2011 survey was conducted via a central counterparty (CCP) (**Chart 3**).⁽¹⁾ A further 40% was conducted bilaterally. A minority of deals were transacted via a tri-party arrangement.⁽²⁾ CCP transactions accounted for over 60% of secured bank lending, with bilateral lending making up the majority of the remainder. Market contacts attributed the popularity of conducting secured lending via a CCP to banks' aversion to the credit risk exposure inherent in bilateral transactions, and to the convenience associated with transacting via a CCP.

Survey responses suggest that interbank lending and borrowing accounted for more than half of secured money

market transactions in May 2011, with the bulk of this interbank activity taking place via a CCP.





Chart 4 Maturity of transactions



The majority of money market transactions reported in the survey were overnight (Chart 4). In part, this reflected the number of overnight transactions rolled over each day.⁽³⁾ But market participants also conducted a significant amount of business at longer maturities. For example, were the maturity distribution of flows recorded in the May 2011 survey to be replicated each month, around half of banks' outstanding money market transactions, by value, would have maturities longer than two weeks, with roughly 10% longer than three months.

In a CCP transaction, the CCP transacts with both the borrower and the lender, mitigating the credit risk.

⁽²⁾ In a tri-party arrangement, a third party acts as agent, holding associated collateral in a custodian capacity.

⁽³⁾ Survey participants are instructed to record each transaction that is rolled over as a new trade.

Reported secured transactions had longer maturities on average than unsecured ones, although the difference was not large. The weighted average maturity of recorded activity in the unsecured market was around eight days, while the weighted average maturity of transactions on the secured side was roughly ten days.⁽¹⁾

Contacts reported that new FSA liquidity regulations were reducing the incentive for banks to borrow at short maturities.⁽²⁾ Market participants also reported that the regulations created incentives for banks to transact on a secured rather than unsecured basis. This is because banks are required to hold fewer liquid assets to cover secured borrowing, and because, by lending secured cash, they obtain assets which may be used to form part of their liquid asset buffer.

It was reported that secured money market transactions predominantly involved high-quality, liquid collateral; more than three quarters of the collateral used consisted of gilts, UK government Treasury bills and Bank debt (**Chart 5**).





Market contacts reported that there had been an increase in secured wholesale market borrowing using other forms of collateral over the past year, such as debt issued by major international institutions and highly rated asset-backed securities. According to contacts, this increase may have been associated with the repayment of UK government Treasury bills issued under the Bank's Special Liquidity Scheme, whereby banks had been able to borrow Treasury bills using temporarily illiquid high-quality assets as collateral.

Qualitative survey questions

The qualitative section of the May 2011 survey contained questions on different aspects of the functioning of the sterling money market at the end of May 2011 relative to the situation six months earlier. Respondents were asked for their view on how well the secured and unsecured market was functioning overall, by giving a score from 1 to 5 (with 5 indicating that the market was functioning very well) (Chart 6). The mean score for the secured market was 3.6, indicating that overall, survey participants considered that the secured sterling money market was functioning fairly well. Survey respondents were less positive about the functioning of the unsecured market, where the mean score was 2.7. Contacts suggested that a combination of increased risk aversion and the new FSA liquidity rules could be deterring some unsecured market participation. The suspension of reserves averaging at the Bank of England since March 2009 has meant that those banks with reserves accounts, on average, have less incentive to borrow and lend in the unsecured money market to manage their liquidity. They can instead allow their reserves account balances at the Bank of England to increase or run down.⁽³⁾

Chart 6 Respondents' views on overall market functioning



In the unsecured market, the balance of responses indicated that more participants had experienced a worsening in market functioning and liquidity conditions over the previous six months than had witnessed an improvement. The number of dealers quoting prices and the depth of the market were the two measures suggesting the greatest signs of deterioration in conditions (Chart 7).

Indicators of change in market functioning were slightly more positive in the secured market (**Chart 8**). More respondents reported that bid-ask spreads had narrowed than reported that they had widened. And, on balance, more respondents

These figures are estimates based on the mid-points of the maturity buckets into which survey respondents allocated transactions. The calculations are based on values rather than volumes.

⁽²⁾ See 'Strengthening liquidity standards', FSA PS09/16, available at www.fsa.gov.uk/pubs/policy/ps09_16.pdf.

⁽³⁾ See The Framework for the Bank of England's Operations in the Sterling Money Markets — the 'Red Book', available at www.bankofengland.co.uk/markets/sterlingoperations/redbook.htm.



Chart 7 Indicators of change in unsecured market functioning relative to six months earlier^(a)

(a) For bid-ask spreads: Better (Worse) = Tighter (Wider). For number of dealers quoting: Better (Worse) = Higher (Lower). For average size of trades: Better (Worse) = Larger (Smaller).

Chart 8 Indicators of change in secured market functioning relative to six months earlier^(a)



⁽a) See footnote (a) to Chart 7.

reported that the number of counterparties they traded with had increased. This improvement in the secured market relative to conditions in the unsecured market may reflect increased sensitivity to risk among market participants related to euro-area concerns.

Conclusion

The MMLG Sterling Money Market Survey increases transparency about activity in, and the functioning of, this important financial market. It complements the Bank's existing knowledge of the market, but also helps to inform financial market participants, other policymaking bodies and the wider public.

Key quantitative results from the May 2011 survey are that reported activity in the sterling money market was greater in the secured market than the unsecured market, and that daily activity was concentrated at short maturities. Banks were reported to be net borrowers from non-bank financials and non-financials. The main qualitative finding was that survey participants perceived that the secured market was functioning better than the unsecured market.

The survey is currently in its infancy, but over time it should help identify structural trends, sparking further investigation of important features of money market activity, and helping policymakers identify the impact of their actions on the behaviour of market participants.

An estimated DSGE model of energy, costs and inflation in the United Kingdom

Summary of Working Paper no. 432 Stephen Millard

The job of monetary policy makers is to set monetary policy so as to achieve their goal of low and stable inflation. In order to carry this out, it is important to understand what drives inflation and how changes in monetary policy feed through the economy into inflation. But no single model can capture all aspects of reality. This is why many central banks have used, and continue to use, a variety of macroeconomic models to help in their understanding of inflation. The main purpose of this paper is to estimate a model of the United Kingdom that, unusually, includes an energy sector. It could in principle be used as another input within a policymaker's 'suite of models'.

The standard model of inflation suggests that it is driven by lagged and future expected inflation and movements in costs. One important cost for most producers is the cost of energy. So, inflation will be affected by movements in energy prices. In addition, to the extent that consumers use energy themselves, movements in energy prices will have a direct, and immediate, effect on consumer price inflation, which is not necessarily captured by standard models. The novelty of this paper, relative to previous work, is that the model takes seriously the effects of movements in energy and other costs on inflation. The goal is to produce a macroeconomic model that can be used to analyse quantitatively the effects on inflation of many temporary shocks, including but not limited to energy prices as well as how monetary policy can respond to such shocks. Furthermore, estimating the model enables us to evaluate how these shocks have evolved over time and the implications of this for explaining movements in output and inflation.

The basic building blocks of the model are standard. The main complication is that there are three consumption goods: non-energy output, petrol and utilities (which can be thought of as a combination of gas and electricity). Each of these consumption goods is produced using different combinations of five inputs: labour, capital, imported (non-energy) intermediates, oil and gas. The prices set by the producers of these goods are sticky. Demand for oil and gas over and above what we produce has to be met from abroad. The central bank affects aggregate demand via movements in interest rates. How this level of aggregate demand translates into demand for each of the goods is determined by consumers' preferences and relative prices. Finally, the model adds a government that 'eats up' some of the non-energy good and levies taxes as well as a specific duty on petrol.

The estimates suggest, not surprisingly, that petrol prices are highly flexible, utility prices are quite flexible, while non-energy prices, on the other hand, are very sticky. The relative stickiness of prices in the three sectors are in line with survey and other evidence for the United Kingdom. In terms of the shocks, the estimates suggest that the productivity shock is fairly persistent but the others much less so; the model is able to explain persistence in the data without having to resort to extremely persistent shocks. The estimated standard deviation of monetary policy shocks is very low, not altogether surprising given that the model was estimated over the inflation-targeting period. But, the domestic demand and investment-specific technology shocks are highly volatile over this period. Finally, the estimates suggest that the model including energy prices is better able to explain UK macroeconomic data than an otherwise identical model that does not include energy prices.

Given these estimates, it is possible for the model's user to apply the model quantitatively to UK policy issues. The paper has shown how this could be done by examining the effects of many different shocks on inflation and by decomposing recent movements in output and inflation into those parts caused by each of the model's structural shocks. It found that the fall in gross non-energy output from 2008 Q2 to 2009 Q3 was driven by three shocks: to productivity, to world demand and to the domestic risk premium, proxying the effects of the recent financial crisis. The risk premium shock also put downwards pressure on inflation during this period while the productivity shock was putting upwards pressure on inflation. The world demand shock, by contrast, was much less important in explaining the behaviour of inflation over this period.

The impact of permanent energy price shocks on the UK economy

Summary of Working Paper no. 433 Richard Harrison, Ryland Thomas and Iain de Weymarn

The world price of energy has risen dramatically in recent years. This rise has been persistent. Energy has an important role in all economies, affecting both demand and supply, in ways that depend upon energy intensity and the degree to which an economy produces energy as a raw material. For economies that are significant net producers or net consumers of oil and natural gas, persistent price rises can imply potentially large wealth effects in the absence of full international risk-sharing. The United Kingdom is an interesting case as it represents an economy on the transition path from being broadly self-sufficient in energy to being one that is a significant net importer. Thus in this paper, we analyse the implications of permanent energy price shocks for the UK economy.

To analyse the impact of such shocks we build a dynamic general equilibrium model. This approach allows us to articulate theoretically the wide variety of channels through which energy prices might affect demand and supply by making a careful analysis of how shocks propagate through the economy, a process that inevitably takes time. The calibration process we use involves the careful choice of critical parameters that allow us to match key properties of the UK data. On the supply side, we model how primary energy inputs such as oil and natural gas are used to produce final energy goods such as petrol and electricity and gas distribution. We also model the way that final energy goods enter the production process of non-energy goods. We allow for the direct use of energy in the production process and for energy prices to influence the utilisation of the capital stock. On the demand side we model the substitution in household consumption between final energy goods and non-energy goods. To calibrate the model we construct a UK data set using the National Accounts Input-Output Supply and Use Tables. This allows us to gauge the quantitative importance of the different channels.

We examine how the various channels in the model contribute to the overall response to a permanent energy price shock. We show the quantitative sensitivity of inflation and output responses to the following key assumptions and judgements:

- (i) the degree of nominal rigidity in price and wage-setting;
- (ii) the monetary policy response, both domestic and overseas;
- (iii) the assumption about self-sufficiency and its impact on the real exchange rate and import prices;
- (iv) the degree of real wage resistance and the impact on the labour market; and
- (v) the impact on the level and utilisation of the capital stock.

We show that the impact of higher energy prices depends significantly on the monetary policy response to higher energy prices, both here and abroad. When policy does not fully accommodate the shock the degree of nominal wage rigidity is important in determining the extent to which the indirect effects of higher energy prices are able to offset the direct effects of higher petrol and utility prices on inflation. Indeed negative effects on inflation from higher energy prices are possible if these offsetting indirect effects are not synchronous with the direct effects. The degree of self-sufficiency in energy is also important as it leads to significantly different effects on consumption and the real exchange rate. On the supply side, we find that the effects on potential supply are not likely to be large unless there is significant real wage resistance and higher energy costs affect the utilisation of the capital stock.

Our model only explores the effects of permanent shocks in a theoretical model. In a companion paper, the model is estimated on actual data to see how well it describes the UK experience.

Evolving UK and US macroeconomic dynamics through the lens of a model of deterministic structural change

Summary of Working Paper no. 434 George Kapetanios and Tony Yates

This paper contributes to a body of work that has sought to describe evolutions in the dynamics of inflation and output in developed economies. That work has been preoccupied with documenting changes in the volatility of inflation and output, changes in the persistence of inflation, and changes in the impact of a monetary policy shock, among other questions.

These facts have been deployed to try to diagnose the causes of the Great Moderation; document evolutions in real and nominal frictions in the economy, and to understand their ultimate causes. The tool of choice for studies of structural change of this kind has been an econometric model that views the parameters that propagate shocks as themselves evolving over time, and behaving as though they were random, but mean-reverting process. This paper applies a very different tool to the same set of questions. We posit that the parameters that propagate shocks evolve smoothly and non-randomly, and may not necessarily be attracted back to the mean.

Why the need for a different tool to the industry standard? First, we provide some suggestive Monte Carlo evidence that models of deterministic structural change do a good job of characterising that change even when in truth that change is random in origin. Second, whether a deterministic or random parameter model is the best choice will depend on the nature of the task in hand. In the macroeconomic dynamics literature that we apply the tool to, there are reasons for at least studying what this deterministic model generates; economic theory is generally silent about the true causes of parameter change, so that we cannot choose on those grounds which econometric tool to use. This theory is however also silent about whether such change should be mean-reverting, so on these grounds it may be desirable to look at evolving macroeconomic dynamics through the lens of the deterministic model which allows structural change to be non mean-reverting.

With these motivations in mind, we take the tools to UK and US data on inflation, GDP and policy interest rates. We document several findings of interest. First, we note significant reductions in inflation persistence (using univariate models) and predictability (using multivariate models). Second, we estimate that changes in the volatility of shocks were decisive in accounting for the Great Moderations in these two countries. Third, the evidence suggests that the magnitude and persistence of the response of inflation and output to monetary policy shocks has fallen in these two countries.

Preferred-habitat investors and the US term structure of real rates

Summary of Working Paper no. 435 Iryna Kaminska, Dimitri Vayanos and Gabriele Zinna

US long-term interest rates have fallen substantially since 2000. The decline continued during 2004–05, at the same time that US monetary policy was being tightened. This phenomenon was identified as a 'conundrum' by Alan Greenspan, the Federal Reserve Chairman at that time. Understanding the causes of low long real rates is important for financial stability, because low interest rates may represent a potential threat to the health of a financial system. Indeed, prior to the financial crisis in 2007, excessively low interest rates may have contributed to the so-called 'search for yield' environment, whereby investors' demand for risky assets increased in order to secure returns comparable to those seen in the earlier era of higher bond interest rates. Combined with excessive credit creation and poor investment decisions, the 'search for yield' undermined the stability of the financial system profoundly.

Until now, the low rates phenomenon has not been fully explained and remains a puzzle. Monetary explanations were unable to rationalise the 'conundrum', and the view that bond yields had benefited from a more stable and credible regime for monetary policy fails to match the evidence: in reality, only yields on Treasury bonds declined, while equity yields and global equity premium were increasing. Instead, we argue that large amounts of savings flowing into US Treasury securities have pushed down on US long rates. Thus our hypothesis is in line with that strand of the literature focusing on the role of saving (the so-called Asian 'saving glut') and 'global imbalances' to explain the conundrum. This literature on global imbalances suggests that US interest rates were lower because of capital flowing to advanced economies, and the United States in particular.

However, the macroeconomic literature on 'global imbalances' is mostly theoretical and/or lacks a quantitative structural analysis to explain the fall in bond yields. To try to improve the analysis it is natural to look at standard finance bond pricing models. Such models assume that there are no risk-free profits to be made by trading between bonds at different maturities (in other words, there are no arbitrage opportunities). The assumption of no arbitrage is crucial because it allows for the decomposition of interest rates into expectations of future short (ie risk-free) rates and term premia. These models are also based on the assumption that the economy consists of identical (representative) agents whose actions cannot affect prices.

In this paper, to analyse how quantities (demand for Treasuries by foreign investors) can affect the term structure of yields we have to deviate from the standard finance approach of modelling the real term structure. In particular, while we maintain the key assumption of no arbitrage, we assume that there are two different types of investors: those who buy bonds of specific maturities also for reasons other than returns (preferred-habitat investors) and those who trade bonds at different maturities for returns considerations (arbitrageurs). The interaction of preferred-habitat investors and risk-averse arbitrageurs determines equilibrium interest rates. We conjecture that, because foreign central banks are a major player in the US Treasury market and because they buy US long-term Treasury securities for 'necessity' as part of their reserve accumulation strategy, foreign central banks can be (partly) identified as preferred-habitat investors.

We estimate a model of the term structure of real interest rates, derived from US Treasury Inflation-Protected Securities (TIPS). Our results show that the decline in long rates in 2004–05 is explained by the drop in the term premia. And, in turn, term premia are mainly driven by a rising preferred-habitat demand. We show that international reserves, foreign official holdings of longer-term US Treasuries and other proxies for foreign reserve demand may all be possible explanations for the increasing preferred-habitat demand. We also find that the interaction between arbitrageurs and preferred-habitat investors (demand pressure) matters. In other words, arbitrageurs require a higher compensation for trading away arbitrage opportunities, which may arise as a result of foreign central banks' purchases of US Treasuries, when their capital is particularly low. So, the timing of reserve accumulation is important to determine its impact on equilibrium rates.

It is also worth noting that the model set-up assumes that arbitrageurs have a constant degree of risk aversion. This allowed us to work with a more tractable model. But, looking ahead, a time-varying degree of risk aversion might increase the performance of the model, eg during the crisis when arbitrageurs' trading activities were impaired.

PROMISE

Report

Monetary Policy Roundtable

On 24 June, the Bank of England and the Centre for Economic Policy Research hosted the sixth Monetary Policy Roundtable. These events are intended to provide a forum for economists to discuss key issues affecting the design and operation of monetary policy in the United Kingdom.⁽¹⁾ As always, participants included a range of economists from private sector financial institutions, academia and public sector bodies. At this sixth Roundtable there were two discussion topics:

- will the protracted period of above-target inflation lead to further upward pressure on prices?; and
- how will the contrasting fortunes of the household and corporate sectors play out?

This note summarises the main points made by participants.⁽²⁾ Since the Roundtable was conducted under the 'Chatham House Rule', none of the opinions expressed at the meeting are attributed to individuals. The views expressed in this summary do not represent the views of the Bank of England, the Monetary Policy Committee (MPC) or the Centre for Economic Policy Research.

Will the protracted period of above-target inflation lead to further upward pressure on prices?

Inflation, measured by the annual change in the consumer prices index (CPI), has exceeded the 2% target set by the Government for much of the past three years. The elevated rate of inflation reflects the temporary effects from a number of factors, including: increases in commodity prices; higher import prices following the substantial depreciation of sterling since the onset of the financial crisis; and increases in the standard rate of VAT.

As the temporary effects from those factors wane, the path of inflation in the medium term will be shaped by substantial, but opposing, pressures on inflation. On the one hand, there is a risk that the protracted period of above-target inflation might make high inflation more persistent. For example, inflation expectations might drift up and that may lead companies to increase wages and/or prices by more than they otherwise would. Or the recent and prospective squeeze on households' real income may result in some upward pressure on nominal wages. On the other hand, the reduction in households' real income and the continued existence of a margin of spare capacity are likely to weigh on wages and prices, creating a risk that inflation might fall well below the target.

Participants discussed the likelihood that these pressures on inflation might arise and what that might imply for the balance of risks to inflation in the medium term.

Participants suggested that clear communication by the MPC of the factors underlying the recent rise in inflation and an assessment of when inflation was likely to return to target might help to keep inflation expectations stable. That was consistent with the results from a model presented by one participant, in which monetary policy makers may at times choose not to respond to current deviations of inflation from target. In that model, if the policymakers were unable to communicate credibly that they remained committed to responding to deviations of inflation from target in the medium term, then a prolonged period of policy inaction could cause inflation expectations to de-anchor from the target.

It was widely recognised that the United Kingdom's monetary policy remit allowed the MPC to respond flexibly to deviations of inflation from target, setting policy so that inflation could be brought back to target within a reasonable period of time without causing undesirable volatility in the economy. But some thought that the Committee could better communicate what was meant by a 'reasonable' amount of time. Alternatively, one participant suggested that responsibility for defining 'reasonable' should rest with the Government, given that the trade-off between returning inflation to target more quickly and reducing volatility in output might have welfare implications. But some noted that writing such a remit would be infeasible in practice, since it could not cover every possible scenario in which inflation might deviate from target.

Some participants felt that there was a fair chance that the risk to inflation from higher nominal wage growth would materialise. It seemed likely that households would resist further reductions in their real income and perhaps even push to 'catch up' some of the past reduction in real earnings. A fall in unemployment might also provide a fillip to nominal wage

Roundtables are held twice a year. The next Roundtable is scheduled for December 2011.

⁽²⁾ This summary was originally published on the Bank of England's website on 22 July 2011. For both this and previous summaries, see www.bankofengland.co.uk/publications/other/monetary/roundtable/index.htm.

growth. But a rise in nominal wage growth might generate less upward pressure on inflation if it was accompanied by a rise in productivity, as that would increase companies' scope to grant larger pay increases without the need to raise prices too. One participant suggested that households' real income would continue to be squeezed: the depreciation of sterling since the onset of the financial crisis should, other things being equal, lead to a fall in the price of UK exports relative to the price of UK imports — the United Kingdom's terms of trade — and that would necessitate a corresponding decline in UK households' real purchasing power.

There was some discussion of whether the pass-through of higher import prices following sterling's depreciation might generate additional inflationary pressures in the medium term. One participant noted that it would take time for a relative price shock, such as an exchange rate depreciation, to propagate through the economy because of nominal rigidities. For example, not all companies are able to adjust their prices immediately in response to the shock. And businesses competing against those companies may adjust their prices more slowly than they are able to. But a range of evidence, including a comparison of consumer price levels in the United Kingdom, United States and euro area, suggested that there had already been substantial pass-through of the rise in import prices caused by the depreciation. Some participants contrasted that with the depreciation of sterling in 1992, when there was little evidence to suggest that substantial pass-through occurred.

Many participants thought that there would be substantial downward pressures on inflation in the medium term. For example, one participant stressed that the outlook for demand remained unusually weak. Historical experience suggested that the recovery from a financial crisis, and the recession that accompanied it, would be slow. And the fiscal consolidation was likely to weigh further on demand. Moreover, money growth remained subdued.

Some participants also emphasised that the current stance of monetary policy was likely to be tighter than implied by Bank Rate or the yields on government bonds. The onset of the financial crisis had been accompanied by a tightening of credit conditions, which had not yet fully unwound. As a result, the spreads of loan rates faced by households and businesses over Bank Rate were much higher than before the crisis, and the availability of credit for some borrowers remained limited.

Participants also discussed whether there would be merit in changing the measure of inflation specified in the MPC's remit from CPI to one that excluded the volatile prices of 'non-core' items, such as food and energy. Some thought that switching to a measure of core inflation, while desirable in theory, would be impractical in the current environment, since there was a

risk that changing the measure would destroy confidence in the MPC's commitment to the inflation target. Others argued that such a change was not even desirable, for example because there was little justification for targeting a price index that did not include every item consumed by the typical household. Indeed, the flexibility in the current monetary policy remit already enables the MPC to look through volatility in inflation caused by one-off shocks to the price of any item. But that flexibility did not allow the MPC to disregard the price of non-core items completely, as it would do if it were to target core inflation, because it has to take into account any trends in non-core prices when setting policy.

How will the contrasting fortunes of the household and corporate sectors play out?

One participant set the scene by arguing that the *Inflation Report* forecasts for GDP growth in the past three years had been too optimistic. The current projection is based on a rebalancing of the UK economy, away from consumer and government spending, towards net trade and business investment. Such a large switch would be historically unusual. The speaker noted that this recession had been deep compared to previous ones, though judging the scale of the slowdown and recovery in GDP relative to trend was sensitive to the estimate of potential output.

The 'domestically orientated' service sector recovery was much less pronounced than the more 'internationally focused' manufacturing rebound, following the latter's sharp decline during the recession. Meanwhile, service sector productivity growth was weak. One interpretation was that firms had found that they could adjust flexibly to the shocks, and in such a way that they were better able to retain labour. Alternatively, sluggish productivity growth could reflect weaker potential growth. One participant questioned why companies had hoarded labour if they were not investing. It was suggested that productivity might be incorrectly measured, or there might have been a switch from capital to labour in production processes.

Domestic demand in the United Kingdom had fallen more than in the euro area and the United States in the recession, and had recovered less sharply. The largest component of domestic demand, consumption, was restrained by uncertainty, tight credit, taxes and inflation. But others noted that nominal retail sales and consumer credit were buoyant, however. One participant noted the regional dimension of the public sector consolidation, with relatively low income areas disproportionately affected. But the impact on disposable income should wane, since tax increases and benefit reductions had been front-loaded. Given weak incomes, household savings had remained low, rather than picking up sharply. One participant thought that this reflected households running down financial assets to fund consumption.

As discussed in the first session, inflation had been high, had consistently surprised on the upside, and was a key factor in eroding real incomes. There was a risk of a much more prolonged productivity growth slowdown, or that additional external price shocks would erode disposable income further. One participant noted that the transfer of income from the household to the corporate sector reflected underlying global forces, which were difficult for policy to lean against.

By contrast, private non-financial corporations had continued to accumulate resources. Given that, and the recovery in global demand, it was perhaps surprising that business investment had not been stronger. Perhaps that reflected heightened uncertainty, a weak outlook for domestic demand and/or tight credit conditions.

One speaker focused on the outlook for business investment, in the context of both a recent slowing in GDP growth and external shocks (such as developments in the euro area and in the Middle East and North Africa), as well as further expected weakness in public and housing investment. That speaker argued for a cautiously positive outlook, but that growth would remain more muted than in previous recoveries.

The decline in business investment in the first quarter of 2011 had been exaggerated by large movements in aircraft imports, in part due to impending changes to indirect taxes. Inventories had increased, but were doing so at a slower rate, providing a drag on GDP growth. Firms' operating profits had recently increased, resulting in a build-up of cash, although they were concentrated in large firms and could reflect risk-averse behaviour. Indeed, there were several candidate explanations for why it had not translated into stronger investment.

For instance, the BCC survey showed that business confidence was relatively weak, that investment intentions in plant and machinery were broadly flat, and that there was little evidence that firms were running against capacity constraints. The CBI surveys revealed a mixed outlook across sectors with relatively upbeat investment plans in some subsectors, such as business, professional and financial services, and manufacturing. But more consumer-facing sectors such as retail and consumer services did not plan to expand investment. The speaker thought that business investment was more likely to occur overseas than in the United Kingdom, given that more rapid growth was expected in many emerging markets. By contrast, there was significant uncertainty surrounding the prospects for the euro area (the United Kingdom's main export market), as well as the sterling-euro exchange rate. One participant observed that measured business investment does not take into account intangible assets, which have grown strongly in recent decades.

Set against these factors, the level of business investment was extremely weak, implying that postponed investment would need to occur at some stage. And the user cost of capital was consistent with robust investment growth.

Another speaker analysed the unprecedented movements in household income in recent years and their implications for the future. From 2002 to 2007, mean and median household incomes had grown more slowly than GDP. But during 2008–10, incomes had continued to grow even as GDP shrank. Over this period growth had been largely accounted for by an increase in benefits.

The top 1% of earners had seen their incomes grow relatively rapidly over the past decade or so. But between the 10th and 90th percentiles of the distribution, income had grown roughly the same amount. This contrasted with the 1979–97 period, when income inequality had widened across the distribution.

Although the period of the recession saw rising incomes, since then a squeeze had been experienced. In 2010–11 (for which data are not yet available), real incomes were expected to have fallen substantially. Looking ahead, the Office for Budget Responsibility forecasts falls in real earnings growth until 2013–14. It was suggested that average living standards in 2013–14 might still be around 2002 levels — following the longest/largest squeeze in real incomes since at least the 1970s.

Set against these changes in income, it was perhaps not surprising that consumption had been so weak. The weakness in incomes could also help explain low consumer confidence. Thinking ahead, one participant noted that there might be a relatively large impact on consumption when Bank Rate was raised, as households had become used to the current long period of low rates and because some households were heavily indebted. However, interest rates faced by many households were already a lot higher than Bank Rate, so it was less clear that such a rise would entail a large rise in the effective rate.

Speeches

PROMISE

Bank of England speeches

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

Tail risks and contract design from a financial stability perspective

Paul Fisher, Executive Director for Markets, September 2011.

www.bankofengland.co.uk/publications/speeches/2011/ speech515.pdf

In this paper, Paul Fisher and co-author Patrik Edsparr discussed how failures to take into account how the financial system as a whole operates can generate deviations between a financial contracts' true and intended value. Examples taken from the crisis include contracts where extreme events benefiting the insured party would wipe out the insurer, and contractual provisions which were not exercised because of potential reputational repercussions.

The authors drew a number of policy conclusions. First, regulators, investors and analysts need to take account of true stress correlations so that they properly capture the impact of tail events. Second, contract designs which are exclusively relevant in a tail event should probably be avoided, at least between banks, which are not a good home for tail risks. These conclusions are relevant for contingent capital instruments, which should be designed so that they do not completely disrupt the market if/when they are triggered.

The choice between rebalancing and living off the future Martin Weale, Monetary Policy Committee member, August 2011.

www.bankofengland.co.uk/publications/speeches/2011/ speech514.pdf

In a speech to the Doncaster Chamber of Commerce, Dr Martin Weale considered the appropriate balance between consumption and saving — one of the key drivers of the longer-term position of the economy. He argued that the United Kingdom had a long history of not saving enough. A comparison of UK assets (including future labour income) with liabilities (mainly future consumption) showed that the country's assets were greater than its liabilities. The economy therefore needed to rebalance away from consumption and towards investment (either at home or overseas) if the consumption plans of current and future generations were to be met.

Dr Weale also considered developments in the economic outlook. Recent data pointing to slowing economic growth in

major advanced economies, and a downward revision to the growth and inflation outlook in the August *Inflation Report* had led him to vote to keep Bank Rate unchanged in August. But while further asset purchases could stimulate the economy if required, Dr Weale argued that these were not yet needed.

Risk off

Andrew Haldane, Executive Director for Financial Stability, August 2011.

www.bankofengland.co.uk/publications/speeches/2011/ speech513.pdf

Since the onset of the crisis, market sentiment has alternated between periods of 'risk on' and 'risk off'. In this paper, Andrew Haldane explained why he believes we are now in a 'risk off' period and the role that macroprudential policy might play in this environment.

Mr Haldane outlined that risk aversion was driven by two factors: balance sheet disrepair and 'psychological scarring'. On the first, this process remained incomplete causing strong headwinds to risk-taking. On the second, behavioural factors may have led to overpessimism in markets as financial crashes may have caused perceptions of risk to become overstated. Given the detrimental impact of persistent risk aversion, Mr Haldane noted that new policy approaches might be needed to allay the 'fear factor', speed up balance sheet repair and stimulate risk-taking. He suggested a number of ways in which this can be achieved through the newly established Financial Policy Committee (FPC). Opportunistic raising of capital levels by banks, as recommended by the FPC in June, was one way. Communicating about the possible overpricing of risk was another. Recommending changes in regulation to lean against the wind would be a third.

Haircuts

Andrew Haldane, Executive Director for Financial Stability, August 2011.

www.bankofengland.co.uk/publications/speeches/2011/ speech512.pdf

Andrew Haldane released a paper drawing out the key messages and policy implications from a forthcoming *Journal of Monetary Economics* article entitled 'Complexity, concentration and contagion' co-authored with Prasanna Gai and Sujit Kapadia. The paper highlights the procyclical nature of haircuts on secured lending transactions which had the damaging effect of amplifying the credit cycle, both on the upswing as secured lending transactions became cheaper, and on the downswing as higher haircuts immobilised collateral and led to liquidity hoarding. The authors illustrate this by developing a model of a banking network in which connectivity provides a key channel for contagion when haircuts rise. These procyclicalities may call for intervention to regulate collateral requirements for macroprudential policy purposes, which the paper illustrates with a numerical simulation. This can help reduce materially the probability of a systemic liquidity crisis. The financial network set-up can also be used to assess other topical policy issues, such as central clearing to address system-wide complexity and targeting liquidity requirements on the most connected banks in the system to reduce the risks from concentration.

Monetary policy and banking fragility

David Miles, Monetary Policy Committee member, July 2011.

www.bankofengland.co.uk/publications/speeches/2011/ speech511.pdf

In this speech, Professor David Miles argued that revisions to the prudential capital framework did not add to the two problems that monetary policy makers were facing in the United Kingdom: above-target inflation and weak output growth. The policy rate had been lowered to almost zero. But bank lending rates had fallen by less, mainly because banks and their creditors had reassessed the risk of their exposures. In contrast, revisions to the prudential capital framework did not appear to have contributed substantially to the increased spread between bank lending rates and policy rate. Banks should find it relatively easy to raise sufficient equity to meet tighter capital standards gradually without restraining loan growth: as the risk of bank debt and equity declines when capital ratios rise, owners of bank debt should be willing to replace some bank debt with equity to maintain the risk profile of their portfolios.

Central banking then and now

Charles Bean, Deputy Governor, July 2011.

www.bankofengland.co.uk/publications/speeches/2011/ speech510.pdf

At the Sir Leslie Melville Lecture, Charlie Bean offered some lessons of the crisis for central banks. He said that central banks needed to show flexibility in crises and that monetary policy easing was not limited by the zero bound for policy rates.

Charlie Bean described the interaction of monetary policy and financial stability. He argued that macroeconomic stability leading up to the crisis may have contributed to the build-up of risks and that price stability did not guarantee financial stability. He identified the need for financial intermediation to be brought into macroeconomic analysis. Charlie Bean discussed the policy instruments required to maintain financial stability concluding that, alongside monetary policy tools required to maintain price stability, macroprudential regulation should be used to maintain financial stability. He ended by describing the creation of a Financial Policy Committee charged with protecting and enhancing the resilience of the UK financial system.

The race to zero

Andrew Haldane, Executive Director for Financial Stability, July 2011.

www.bankofengland.co.uk/publications/speeches/2011/ speech509.pdf

In a speech at the International Economic Association Sixteenth World Congress in Beijing, Andrew Haldane discussed the increase in systemic risk associated with changes in the topology of trading and policy options to address these developments.

In particular, Mr Haldane attributed the change in speed to the dominance of high-frequency trading (HFT) where market advantage lies in being the fastest to execute a trade — a 'race to zero'. These developments may have led to an increase in price dislocation across markets, caused by a withdrawal of liquidity in stress situations, as evident during the so-called 'Flash Crash' on 6 May 2010. The advent of HFT and fragmentation of trading structures may have made this more likely, with HFT firms more inclined to withdraw and longer-term investors unwilling to fill the liquidity gap because HFT activity makes this risky. This poses a challenging set of issues for policymakers. Mr Haldane provided some possible solutions to improve the resilience of liquidity and forestall the 'race to zero'. These included circuit breakers to halt trading and provide a means of establishing a level informational playing field for all traders; and imposing a speed limit on trades through minimum resting periods to make bid-ask spreads less variable, especially in situations of stress.

The case for more CHAPS settlement banks

Chris Salmon, Executive Director for Banking Services and Chief Cashier, July 2011.

www.bankofengland.co.uk/publications/speeches/2011/ speech508.pdf

In a speech to the ifs School of Finance on 5 July, Chris Salmon examined the crucial but perhaps underexplored role of payment systems in the economy and their impact on financial stability.

While reflecting on the recent successes of the United Kingdom's payment systems infrastructure during the crisis — many of which were the result of advances championed by the international regulatory community in previous decades, for example the adoption of real-time gross settlement — the speech examined areas where improvements to resilience could still be made, with particular emphasis on the Bank's initiative to increase the number of banks that are direct members of CHAPS, thereby reducing 'tiering risk'.

In addition, Chris touched on several other initiatives currently under way to increase efficiency and decrease risk in the payment system. These included the Liquidity Saving Mechanisms project which will allow banks to settle their obligations at a lower liquidity cost, and Term DBV, which will decrease the operational risk associated with intraday expansion of the Bank's balance sheet.

The state of the financial markets

Paul Fisher, Executive Director for Markets, June 2011.

www.bankofengland.co.uk/publications/speeches/2011/ speech507.pdf

In this speech, delivered to a group of institutional investors at the end of June, Paul Fisher reviewed the progress of financial markets since their seizure at the height of the crisis in 2008. The process of gradual healing had reflected the impact of significant injections of central bank liquidity into the global financial system, depressing yields on 'safe' securities and prompting increased demand for risky assets through a portfolio rebalancing channel. The speech outlined how that process might have encouraged investors to reach for yield by moving into more illiquid or complex products. But to date, only a few specific markets had shown signs of excess. Paul also discussed the market impact of uncertainty about the precise rules and calibration of new regulations, aimed at solving the 'too big to fail' problem. As more details are finalised, that uncertainty, and its impact on markets, should dissipate.

Macro and microprudential supervision Paul Tucker, Deputy Governor, June 2011.

www.bankofengland.co.uk/publications/speeches/2011/ speech506.pdf

In this speech, Paul Tucker set out how the key planks of the reform of the financial system amount to constructing a new Social Contract between banking and society. The two new guiding principles are an insistence on the feasibility of resolving distressed firms, however large and complex, without taxpayer solvency support; and on the importance of prioritising the health of the system as a whole so as to maintain key financial services to the economy. Reflecting that, a central element of the work of the planned new Prudential Regulation Authority will be to work backwards from what would happen in the event of a firm's failure. Supervisors will also look laterally across peer groups of firms for signs of short-term and longer-fuse threats to stability. The new Financial Policy Committee (FPC) at the Bank of England will steer and orientate this work from a macroprudential perspective.

He also summarised the decisions taken by the FPC at its first meeting in late June. He stressed two of the decisions in particular: first, the need currently for banks to retain a greater share of profits when they are buoyant in order to build up resilience against external threats; and second, the need to contain potential threats posed by the growing complexity of exchange-traded funds and similar instruments.

Not that '70's show: why stagflation is unlikely

Adam Posen, Monetary Policy Committee member, June 2011.

www.bankofengland.co.uk/publications/speeches/2011/ presentation110627.pdf

In this speech at the University of Aberdeen Business School, Dr Adam Posen argued that a repeat of the 1970s' stagflation in the United Kingdom is highly unlikely and a pre-emptive tightening of monetary policy is therefore unwarranted. He pointed to four factors whose interaction produced stagflation in the 70s — unanchored inflation expectations, real wage resistance, economically significant supply shocks and an unrecognised decline in productivity growth. He argued that institutional reform of monetary policy making since then has helped to anchor expectations, and that labour market liberalisation has eroded workers' ability to resist declines in real wages. Dr Posen also argued against revising down the estimate of trend productivity growth more than modestly. He noted that energy price trends remain a potential source of stagflationary pressures, but argued that there is no alternative to forecasting inflation using the prices implicit in forward contracts, which remain broadly flat or rising only slightly.

Current issues in monetary policy

Paul Fisher, Executive Director for Markets, June 2011.

www.bankofengland.co.uk/publications/speeches/2011/ speech505.pdf

In this speech, Paul Fisher discussed some of the challenges associated with setting monetary policy over the past three years. He argued that the recent overshoot of the inflation target reflected the impact of three real relative price shocks (VAT, commodity prices and the fall in sterling). Dealing with these real shocks has been uncomfortable for everyone. But given their nature, the best policy response consistent with the Committee's inflation remit, was to accommodate the one-off price-level effects, while ensuring there were no second-round effects. In his speech he also discussed the role of forecasts in setting monetary policy. Because models can only ever provide a rough approximation of reality, setting policy is a matter of decision-making under uncertainty. That is why the MPC focuses on the range of possible outcomes and the balance of risks, as summarised in the *Inflation Report* fan charts, rather than on a single projection.

The Governor's speech at the Mansion House

Sir Mervyn King, Governor, June 2011.

www.bankofengland.co.uk/publications/speeches/2011/ speech504.pdf

The Governor commented briefly on three themes: monetary policy; macroprudential policy, and the work of the new Financial Policy Committee at the Bank; and the new approach to banking regulation that will follow the creation of the Prudential Regulation Authority.

The challenge facing monetary policy was obvious — the combination of high consumer price inflation and weak economic growth. The big picture was that the UK economy was going through a major rebalancing of demand and output, from private and public consumption to net exports and business investment, which would take several years to complete. The Monetary Policy Committee (MPC) could have raised Bank Rate significantly so that inflation would be closer to the target. But that would not have prevented the squeeze on living standards that had arisen from higher oil and commodity prices and the measures necessary to reduce the United Kingdom's twin deficits. The Governor noted that the MPC was watching extremely carefully for any signs of a pickup in domestically generated inflation and it would take action as soon as it was appropriate to do so.

Turning to his second and third themes, the Governor said that the creation of the Bank's new Financial Policy Committee (FPC) was a response to the lesson that monetary policy could not target stability of both prices and the financial system. A key part of the FPC's role would be to issue recommendations and directions to the new regulatory bodies, the Prudential Regulation Authority (PRA) and Financial Conduct Authority.

The style of regulation would change with the PRA. It was vital that the PRA collect and process data only where the supervisors had a need to know. Targeted and focused regulation, allowing senior supervisors to exercise their judgement, did not require ever-increasing resources. The obsession with detail was in fact a hindrance to seeing the big picture. And here the FPC had a crucial role to play. By drawing attention to system-wide developments, it could strengthen the hand of the supervisor in dealing with a particular institution.

Summarising, the Governor said that he felt the right course had been set, albeit through turbulent waters. There was an appropriate policy mix to rebalance the UK economy. The FPC was about to embark on its first meetings. And a new approach to prudential supervision had been identified. The Governor said he was confident that by sticking to that course and adjusting the tiller in response to changing conditions, the UK economy would return to both price and financial stability.

Why the Bank Rate should increase now

Martin Weale, Monetary Policy Committee member, June 2011.

www.bankofengland.co.uk/publications/speeches/2011/ speech503.pdf

In a speech at the Finance Directors' Strategy Meeting, Dr Martin Weale considered the case for the Bank Rate to rise earlier than expected by the financial markets, but for the path of Bank Rate subsequently to be flatter. He noted that alternative interest rate profiles could be used to bring inflation back to target, and argued that an early increase in Bank Rate would make it more likely that the inflation target would be met in two or three years' time as it allowed for greater flexibility. If inflationary pressures proved to be stronger than expected, an early rise would help. After a long period of above-target inflation, acting now would also help guard against the risk of inflation expectations becoming entrenched in people's behaviour. But if inflation was weaker than expected, future interest rate rises could be implemented more slowly or even reversed. He also noted that, even after his proposed small rise in interest rates, monetary policy would remain very expansionary.

Clearing houses as system risk managers

Paul Tucker, Deputy Governor, June 2011.

www.bankofengland.co.uk/publications/speeches/2011/ speech501.pdf

In this speech, Paul Tucker set out several recommendations on how central counterparties (CCPs) can contribute more effectively to preserving stability. The role CCPs play in the financial system extends well beyond acting simply as a provider of operational and capital efficiency for clearing members. However constituted, they are *de facto* regulators and supervisors for the markets they clear; and through their risk management of their own balance sheet, they are risk managers for core parts of the financial system. In protecting themselves, they impose some financial discipline on clearing members and their customers. CCPs therefore need to monitor the robustness of their clearing members and of the business these members bring to CCPs, which would raise awareness of any fragility. Second, he highlighted the lack of a clear *ex-ante* framework for resolving a distressed CCP. This was a very serious gap in official policies and needed to be remedied as a priority.

Appendices

PROMISE

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/quarterlybulletin/ index.htm.

Articles and speeches

Speeches are indicated by (S)

2007 Q3

- Extracting a better signal from uncertain data
- Interpreting movements in broad money
- The Bank of England Credit Conditions Survey
- Proposals to modify the measurement of broad money in the United Kingdom: a user consultation
- The Governor's speech to CBI Wales/CBI Cymru, Cardiff (S)
- The Governor's speech at the Mansion House (S)
- London, money and the UK economy (S)
- Uncertainty, policy and financial markets (S)
- Central banking and political economy: the example of the United Kingdom's Monetary Policy Committee (S)
- Promoting financial system resilience in modern global capital markets: some issues (S)
- UK monetary policy: good for business? (S)
- Consumption and interest rates (S)

2007 Q4

- Household debt and spending: results from the 2007 NMG Research survey
- The macroeconomic impact of higher energy prices on the UK economy
- Decomposing corporate bond spreads
- The foreign exchange and over-the-counter derivatives markets in the United Kingdom
- The Governor's speech in Northern Ireland (S)
- Current monetary policy issues (S)
- The global economy and UK inflation (S)
- Trends in European labour markets and preferences over unemployment and inflation (S)
- Fear, unemployment and migration (S)
- Risk, uncertainty and monetary policy (S)
- New markets and new demands: challenges for central banks in the wholesale market infrastructure (S)
- A tale of two shocks: global challenges for UK monetary policy (S)

2008 Q1

- Capital inflows into EMEs since the millennium: risks and the potential impact of a reversal
- Recent developments in portfolio insurance

- The Agents' scores: a review
- The impact of low-cost economies on UK import prices
- The Society of Business Economists' survey on MPC communications
- The Governor's speech in Bristol (S)
- The impact of the financial market disruption on the UK economy (S)
- The return of the credit cycle: old lessons in new markets (S)
- Money and credit: banking and the macroeconomy (S)
- Financial markets and household consumption (S)

2008 Q2

- Public attitudes to inflation and interest rates
- Recent advances in extracting policy-relevant information from market interest rates
- How do mark-ups vary with demand?
- On the sources of macroeconomic stability
- A review of the work of the London Foreign Exchange Joint Standing Committee in 2007
- Sovereign wealth funds and global imbalances (S)
- Monetary policy and the financial system (S)
- Inflation and the global economy (S)
- Does sterling still matter for monetary policy? (S)
- Strengthening regimes for controlling liquidity risk: some lessons from the recent turmoil (S)
- Inflation, expectations and monetary policy (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

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/index.htm.

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/workingpapers/ index.htm

where abstracts of all papers may be found. Papers published since January 1997 are available in full, in portable document format (PDF).

No. 421 Global rebalancing: the macroeconomic impact on the United Kingdom (April 2011) Alex Haberis, Bojan Markovic, Karen Mayhew and Pawel Zabczyk

No. 422 Understanding the macroeconomic effects of working capital in the United Kingdom (April 2011) *Emilio Fernandez-Corugedo, Michael McMahon, Stephen Millard and Lukasz Rachel*

No. 423 Shifts in portfolio preferences of international investors: an application to sovereign wealth funds (April 2011) *Filipa Sá and Francesca Viani*

No. 424 How did the crisis in international funding markets affect bank lending? Balance sheet evidence from the United Kingdom (April 2011) Shekhar Aiyar

No. 425 International transmission of shocks: a time-varying factor-augmented VAR approach to the open economy (May 2011) Philip Liu, Haroon Mumtaz and Angeliki Theophilopoulou

No. 426 Labour supply as a buffer: evidence from UK households (May 2011) Andrew Benito and Jumana Saleheen

No. 427 System-wide liquidity risk in the United Kingdom's large-value payment system: an empirical analysis (May 2011) *Marcelo Perlin and Jochen Schanz*

No. 428 Intraday two-part tariff in payment systems (May 2011) *Tomohiro Ota*

No. 429 Domestic financial regulation and external borrowing (May 2011) Sergi Lanau

No. 432 An estimated DSGE model of energy, costs and inflation in the United Kingdom (July 2011) Stephen Millard

No. 433 The impact of permanent energy price shocks on the UK economy (July 2011) *Richard Harrison, Ryland Thomas and Iain de Weymarn*

No. 434 Evolving UK and US macroeconomic dynamics through the lens of a model of deterministic structural change (July 2011) *George Kapetanios and Tony Yates*

No. 435 Preferred-habitat investors and the US term structure of real rates (July 2011) *Iryna Kaminska, Dimitri Vayanos and Gabriele Zinna*

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/externalmpcpapers/ index.htm.

The following paper has been published recently:

No. 32 Financial protectionism: the first tests (May 2011) Andrew K Rose and Tomasz Wieladek

Monetary and Financial Statistics

Monetary and Financial Statistics (Bankstats) contains detailed information on money and lending, monetary and financial institutions' balance sheets, banks' income and expenditure, analyses of bank deposits and lending, external business of banks, public sector debt, money markets, issues of securities, financial derivatives, interest and exchange rates, explanatory notes to tables and occasional related articles. *Bankstats* is published on a monthly basis, free of charge, on the Bank's website at:

www.bankofengland.co.uk/statistics/bankstats/current/ index.htm.

Further details are available from: Leslie Lambert, Monetary and Financial Statistics Division, Bank of England: telephone 020 7601 4544; fax 020 7601 3208; 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/ms/articles.htm.

Financial Stability Report

The *Financial Stability Report* is published twice a year under the guidance of the interim Financial Policy Committee (FPC). It covers the Committee's assessment of the outlook for the stability and resilience of the financial sector at the time of preparation of the *Report*, and the policy actions it advises to reduce and mitigate risks to stability. The Bank of England intends this publication to be read by those who are responsible for, or have interest in, maintaining and promoting financial stability at a national or international level. It is of especial interest to policymakers in the United Kingdom and abroad; international financial institutions; academics; journalists; market infrastructure providers; and financial market participants. It is available at a charge, from Publications Group, Bank of England, Threadneedle Street, London, EC2R 8AH and on the Bank's website at:

www.bankofengland.co.uk/publications/fsr/index.htm.

Payment Systems Oversight Report

The Payment Systems Oversight Report provides an account of how the Bank is discharging its responsibility for oversight of UK payment systems. Published annually, the Oversight Report sets out the Bank's assessment of key systems against the benchmark standards for payment system risk management provided by the internationally adopted Core Principles for Systemically Important Payment Systems, as well as current issues and priorities in reducing systemic risk in payment systems. Copies are available on the Bank's website at:

www.bankofengland.co.uk/publications/psor/index.htm.

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/ccbs/handbooks/ index.htm.

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/money/publications/ redbookdec10.pdf.

The Bank of England Quarterly Model

The Bank of England Quarterly Model, published in January 2005, contains details of the new macroeconomic model developed for use in preparing the Monetary Policy Committee's quarterly economic projections, together with a commentary on the motivation for the new model and the economic modelling approaches underlying it.

www.bankofengland.co.uk/publications/other/beqm/ index.htm.

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/about/cba.htm.

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.

www.bankofengland.co.uk/publications/other/monetary/ creditconditions.htm.

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/other/monetary/ trendsinlending.htm.

Quarterly Bulletin

The *Quarterly Bulletin* provides regular commentary on market developments and UK monetary policy operations. It also contains research and analysis and reports on a wide range of topical economic and financial issues, both domestic and international.

www.bankofengland.co.uk/publications/quarterlybulletin/ index.htm.

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/inflationreport/ index.htm.

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

Copies of the *Quarterly Bulletin, Inflation Report* and *Financial Stability Report* can be bought separately, or as combined packages for a discounted rate. Current prices are shown overleaf. Publication dates for 2011 are as follows:

Inflation Report

Quarterly Bulletin

Q1	21 March	February	16 February
Q2	13 June	May	11 May
Q3	19 September	August	10 August
Q4	19 December	November	16 November

Financial Stability Report

24 June 1 December

Quarterly Bulletin, Inflation Report and Financial Stability Report subscription details

Copies of the *Quarterly Bulletin* (*QB*), *Inflation Report* (*IR*) and *Financial Stability Report* (*FSR*) can be bought separately, or as combined packages for a discounted rate. Subscriptions for a full year are also available at a discount. The prices are set out below:

Destination	2011						
	<i>QB, IR</i> and <i>FSR</i> package	QB and IR package	IR and FSR package	QB only	<i>IR</i> only	<i>FSR</i> only	
United Kingdom							
First class/collection ⁽¹⁾	£31.50	£27.00	£13.50	£21.00	£10.50	£5.25	
Students/schools (concessionary rate UK only)	£10.50	£9.00	£4.50	£7.00	£3.50	£1.75	
Academics (concessionary rate UK only)	£21.00	£18.00	£9.00	£14.00	£7.00	£3.50	
Rest of Europe							
Letter service	£38.50	£33.00	£17.00	£25.00	£13.00	£6.50	
Outside Europe							
Surface mail	£38.50	£33.00	£17.00	£25.00	£13.00	£6.50	
Air mail	£50.00	£43.00	£21.50	£34.00	£17.00	£8.50	

(1) Subscribers who wish to collect their copy (copies) of the Bulletin, Inflation Report and/or Financial Stability Report may make arrangements to do so by writing to the address given below. Copies will be available to personal callers at the Bank from 10.30 am on the day of issue and from 8.30 am on the following day.

Readers who wish to become **regular subscribers**, or who wish to purchase single copies, should send to the Bank, at the address given below, the appropriate remittance, payable to the Bank of England, together with full address details, including the name or position of recipients in companies or institutions. If you wish to pay by **Visa**, **MasterCard**, **Maestro** or **Delta**, please telephone +44 (0)20 7601 4030. Existing subscribers will be invited to renew their subscriptions automatically. Copies can also be obtained over the counter at the Bank's front entrance.

The **concessionary** rates for the *Quarterly Bulletin*, *Inflation Report* and *Financial Stability Report* are noted above in *italics*. Academics at UK institutions of further and higher education are entitled to a concessionary rate. They should apply on their institution's notepaper, giving details of their current post. **Students and secondary schools** in the United Kingdom are also entitled to a concessionary rate. Requests for concessionary copies should be accompanied by an explanatory letter; students should provide details of their course and the institution at which they are studying.

These publications are available from Publications Group, Bank of England, Threadneedle Street, London, EC2R 8AH; telephone +44 (0)20 7601 4030; fax +44 (0)20 7601 3298; email mapublications@bankofengland.co.uk or fsr_enquiries@bankofengland.co.uk.

General enquiries about the Bank of England should be made to +44 (0)20 7601 4878. The Bank of England's website is at www.bankofengland.co.uk.

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