Quarterly Bulletin

2010 Q4 | Volume 50 No. 4

50 ANNIVERSARY EDITION

BANK OF ENGLAND

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Foreword

Following the turbulence of the past few years, this edition of the *Quarterly Bulletin* provides an opportune moment to reflect on a source of continuity, as the *Bulletin* marks its 50th anniversary.

Standing back from that turbulence allows us to consider the lessons afforded by a study of the past. Understanding the context for where we are now can frequently be the best way of seeing the path that we need to follow. Hence, this edition begins with two articles examining the history not only of the *Bulletin* itself but also of the broader macroeconomy.

Writing in the 100th issue back in 1985, the Governor at the time — Robin Leigh-Pemberton — described the advent of the *Bulletin* as opening a 'metaphorical window' onto the work of the Bank. This anniversary edition seeks to look through that window again to view the entire breadth of the Bank's work. It contains articles spanning the range of the Bank's interests, from monetary analysis to financial stability, from banknotes to financial markets. Throughout it all, the *Bulletin* aims — as it always has done — to provide a clear and full exposition of the current issues facing central bankers.

The challenges facing the central banking community are continually evolving and we cannot know all that tomorrow might bring. The Bank will remain committed, however, to ensuring that trust is maintained in both the policy framework and the Bank itself. The *Bulletin* has been a symbol of that commitment over the years. But its success can be judged ultimately only by you — the reader. We have certainly come a long way during the past 50 years, but there is undoubtedly further to go. On that journey, we will build on the work of those that established the *Bulletin* some 50 years ago, shining a light onto the work of the Bank.

Mervyn King
Governor

Summary

Recent economic and financial developments (pages 241–56)

Markets and operations. This article reviews developments in sterling financial markets, including the Bank's official operations, since the 2010 Q3 *Quarterly Bulletin* up to 19 November 2010. The article also summarises market intelligence on selected topical issues relating to market functioning.

Research and analysis (pages 257–352)

The history of the *Quarterly Bulletin*. This edition marks the 50th anniversary of the *Quarterly Bulletin*. Over the years, the *Bulletin* has been one of the main conduits through which the Bank has communicated its thinking to the wider public. This article reviews the history of the *Bulletin* — both its origins and its subsequent evolution — as well as examining some of the insights that can be gleaned from its pages on some of the key central banking issues of the time.

The UK recession in context — what do three centuries of data tell us? The *Quarterly Bulletin* has a long tradition of using historical data to help analyse the latest developments in the UK economy. To mark the *Bulletin's* 50th anniversary, this article places the recent UK recession in a long-run historical context. It draws on the extensive literature on UK economic history and analyses a wide range of macroeconomic and financial data going back to the 18th century. The UK economy has undergone major structural change over this period but such historical comparisons can provide lessons for the current economic situation.

The Bank's money market framework. The Bank of England implements the policy stance of the Monetary Policy Committee through its operations in the sterling money markets. It also uses these operations to reduce the costs of disruption to the liquidity and payment services supplied by banks. In order to ensure their continued effectiveness, it was necessary to adapt the framework for these operations in response to the significant changes to financial and monetary conditions that occurred during the recent financial crisis. This article describes how central banks can use their money market operations to implement monetary policy and provide liquidity support to banks and some of the issues that can arise when undertaking operations to achieve these two objectives. The article goes on to explain the Bank's choices about its own operating framework, including how its thinking has been influenced by the lessons learned during the financial crisis.

Managing the circulation of banknotes. Issuing banknotes is one of the Bank of England's best known and most recognisable functions. To maintain confidence in the physical currency, genuine notes must be available to meet public demand. This article explains how the note circulation is managed to maintain this confidence. The Bank's role in this has changed considerably over the past 50 years with technological innovations and as the involvement of the commercial sector has grown. The Bank's response to future developments will continue to be consistent with its objective of ensuring the availability of genuine notes of good quality in a balanced mix of denominations.

Understanding the weakness of bank lending. The flow of new bank lending to UK households and businesses fell sharply following the start of the global financial crisis in mid-2007. That provoked an ongoing debate about the extent to which the sustained weakening of bank lending was caused by a fall in demand for credit, or a fall in supply. While it is difficult to disentangle

the effects of shifts in credit demand and supply, this article finds evidence of a substantial and persistent tightening in credit supply conditions from mid-2007. But independently weaker credit demand — probably associated with the impact of the global financial crisis — is also likely to have contributed to the weakness in bank lending.

Evolution of the UK banking system. The financial system provides three key services: payment services, intermediation between savers and borrowers, and insurance against risk. These services support the allocation of capital, and the production and exchange of goods and services, all of which are essential to a well-functioning economy. While the basic financial services are relatively timeless, the characteristics of the system providing them change continuously, in response to both economic and regulatory developments. This article tracks the evolution of a core component of the financial system in the United Kingdom, the banking sector, describing how technology has transformed the economics of banking, and how deregulation in the 1970s and 1980s freed banks to take advantage of new opportunities through globalisation and financial innovation. The result has been the emergence of large, functionally and geographically diverse banking groups. Post-crisis, public-policy attention has been focused on the costs of a banking sector dominated by large and complex institutions that are seen as too important to fail.

The financial position of British households: evidence from the 2010 NMG Consulting survey. The UK economy has begun to recover over the past year but households' financial positions remain under strain. Elevated unemployment, weak earnings growth and restricted credit availability still pose a problem for some households. But the low level of Bank Rate has continued to bear down on mortgage interest payments for some borrowers. This article examines evidence from the latest survey of households carried out for the Bank by NMG Consulting in late September, which shows how these and other changes have affected households' budgets and spending decisions. The burden of unsecured debt was higher than in the past and concerns about debt levels had increased, leading some to save more in order to reduce indebtedness. A special set of questions this year showed that households' awareness of the fiscal consolidation measures was quite high. They were concerned about the impact on their finances, although the majority had yet to take any action in response.

Reports (pages 353–77)

The foreign exchange and over-the-counter interest rate derivatives markets in the United Kingdom. This report outlines the results of the latest triennial survey of turnover in the United Kingdom's foreign exchange and over-the-counter interest rate derivatives markets. It then goes on to consider the potential underlying drivers in these markets over the past three years.

Global finance after the crisis. This report presents the text of the annual John Flemming Memorial Lecture, which this year was given by Professor Alan M Taylor (Professor of Economics, University of California, Davis, Senior Advisor, Morgan Stanley and Houblon-Norman/George Fellow, Bank of England 2009/10).

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

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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.

Recent economic and financial developments

Markets and operations

This article reviews developments in sterling financial markets, including the Bank's official operations, since the 2010 Q3 *Quarterly Bulletin* up to 19 November 2010.[1] The article also summarises market intelligence on selected topical issues relating to market functioning.

Sterling financial markets

Overview

Over the review period, financial market developments were dominated by expectations of further monetary policy measures by some central banks and concerns about the sustainability of fiscal positions in certain euro-area member countries.

In the United States and the United Kingdom, market expectations of further monetary stimulus had been building following weaker-than-expected macroeconomic data and comments by monetary policy makers. Reflecting this, government bond yields initially fell. The US Federal Reserve announced in November that it would increase its purchases of government assets. In the United Kingdom, expectations of further asset purchases receded following a stronger-than-expected third-quarter GDP release and the November *Inflation Report*. Government bond yields subsequently rose.

In the euro area, a deteriorating economic outlook in some member countries and revelations of further losses at certain banks contributed to perceptions of worsening fiscal positions in some vulnerable economies. This was compounded by uncertainty about the future resolution mechanism for sovereign debt crises. During the review period, market participants appeared to differentiate among euro-area sovereign issuers. Following the review period, concerns over sovereign risk in the euro area became more widespread.

Against this backdrop, there seems to have been a secular improvement in bank funding markets; the major UK banks have been able to access a wider range of long-term funding instruments than earlier in the year — although some indicators of stress were beginning to rise towards the end of the review period.

Recent developments in sterling capital markets

Monetary policy and short-term interest rates

In the United Kingdom, the Bank of England's Monetary Policy Committee (MPC) maintained a highly accommodative monetary policy stance. Bank Rate and the stock of asset purchases were left unchanged at 0.5% and £200 billion respectively throughout the review period.

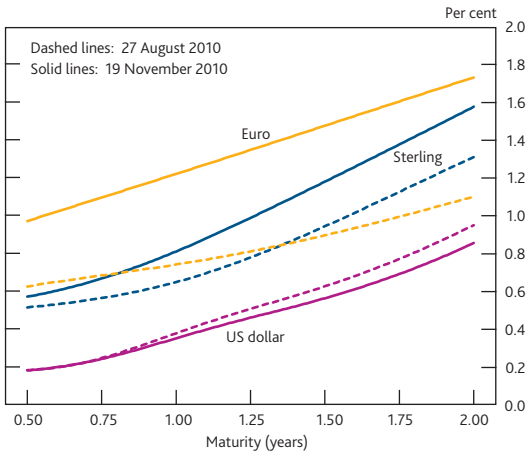
In the United States, the Federal Reserve announced further monetary policy measures to promote a stronger pace of economic recovery and to help ensure that inflation, over time, is at levels consistent with its mandate. At its November meeting, the Federal Open Market Committee (FOMC) decided to purchase a further $600 billion of longer-term US Treasury bonds by June 2011 and to continue to reinvest principal payments from its securities holdings.

A Reuters poll released at the end of October showed that expectations of further asset purchases had also increased in the United Kingdom in the run-up to the November policy meeting; a majority of respondents expected further asset purchases. However, contacts noted that these expectations receded somewhat following stronger-than-expected third-quarter UK GDP data. The probability attached to further asset purchases reportedly continued to decline following the publication of the November *Inflation Report*. Consistent with this, the November Reuters poll showed that only a minority of respondents expected further asset purchases.

Turning to market expectations of future policy rates, UK short-term overnight index swap (OIS) rates fell slightly in the earlier part of the review period. But they rose subsequently to end the period slightly higher (**Chart 1**). Elsewhere, OIS rates fell in the United States on firming expectations of further monetary stimulus. Within the euro area, the euro overnight index average rose as the total level of liquidity supplied by the European Central Bank (ECB) declined. Contacts highlighted a sharp increase in overnight rates following the net maturity of €92 billion at the end of September. And contacts attributed a rise in euro OIS rates to a firming of expectations during the period that the normalisation process started by the ECB in relation to its liquidity operations would continue.

(1) The data cut-off for the previous *Bulletin* was 27 August 2010.

Chart 1 Instantaneous forward interest rates derived from OIS contracts[a]

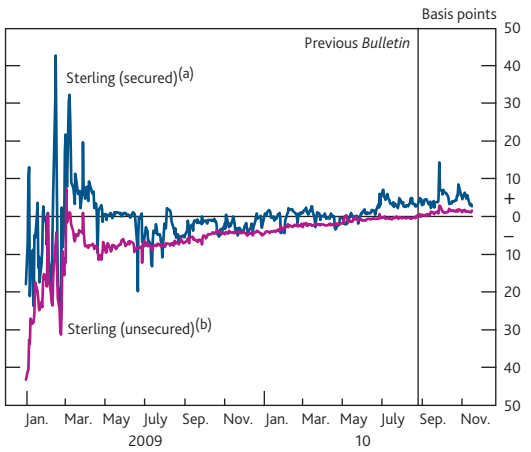


Sources: Bloomberg and Bank calculations.

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

At the very short end of the sterling money market curve, overnight interest rates generally remained close to Bank Rate. However, unsecured overnight interest rates rose gradually over the review period, while volatility in the secured overnight rate increased (**Chart 2**). Increased volatility in secured overnight interest rates is often seen at times of changes in collateral supply. Secured overnight rates tend to rise with an increased quantity of available collateral as lenders of cash require an additional return to finance the increased collateral supply. Indeed, some contacts suggested that collateral released following maturing ECB operations, especially at the end of September, might have affected the sterling overnight secured interest rate. This would most likely have occurred via displacement on account of the differing quality of collateral maturing from the ECB and the collateral used in sterling overnight secured markets.

Chart 2 Spread to Bank Rate of sterling overnight interest rates



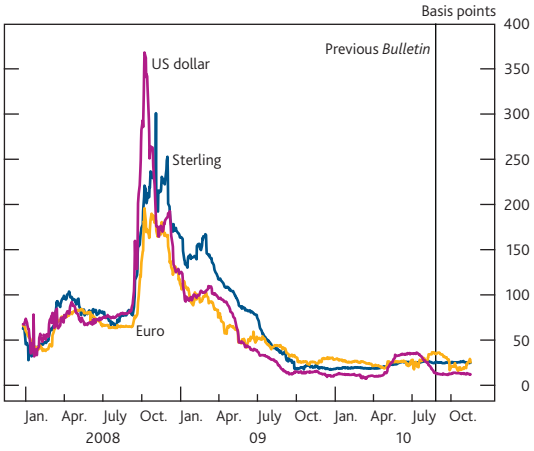
Sources: BrokerTec, Wholesale Market Brokers' Association and Bank calculations.

(a) Spread of weighted average secured overnight rate to Bank Rate.
(b) Spread of weighted average unsecured overnight rate to Bank Rate.

Bank funding markets

The spread of short-term interbank borrowing rates relative to OIS rates, an indicator of bank funding conditions, was little changed since the previous *Bulletin* (**Chart 3**). Another indicator, the cost of interbank borrowing via cross-currency funding markets, compares the difference in cost between borrowing euro or sterling and swapping the proceeds into US dollars, with funding directly in dollars. These spreads fell over the period as a whole, though the euro-implied spread rose in November as concerns around debt sustainability in some European countries reintensified (**Chart 4**).

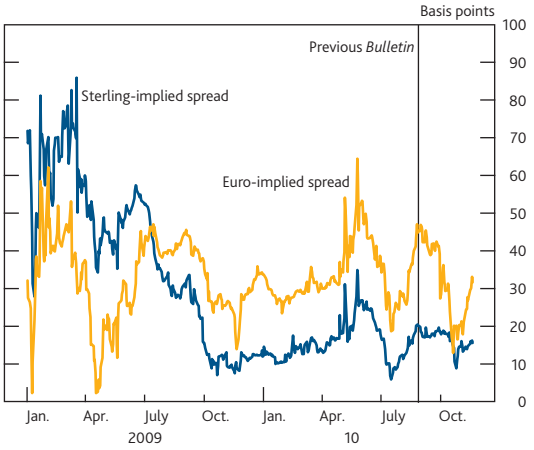
Chart 3 Three-month Libor-OIS spreads[a]



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

(a) Three-month Libor-OIS spreads derived from Libor fixings.

Chart 4 Spread of foreign exchange implied cost of three-month US dollar funding over US dollar Libor[a]

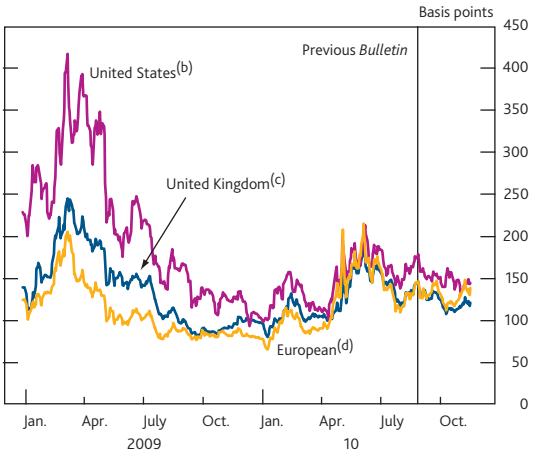


Sources: British Bankers' Association, Reuters and Bank calculations.

(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.

Measures of longer-term funding costs for UK banks fell in early October, but rose subsequently to end the period slightly lower. Consistent with this, five-year UK bank credit default swap (CDS) premia, one indicator of long-term funding costs, declined somewhat (**Chart 5**).

Chart 5 Selected international banks' credit default swap premia[a]



Source: Markit Group Limited.

(a) Unweighted averages of five-year, senior credit default swaps (CDS) prices.
(b) Average of Bank of America, Citi, Goldman Sachs, JPMorgan Chase & Co. and Morgan Stanley.
(c) Average of Barclays, HSBC, Lloyds Banking Group, RBS and Standard Chartered.
(d) Average of BBVA, BNP Paribas, Crédit Agricole, Credit Suisse, Deutsche Bank, Santander, Société Générale, UBS and UniCredit.

Contacts suggested that two main factors had contributed towards a continued improvement in sentiment towards banks internationally earlier in the period. First, the time permitted for banks to comply with new international bank regulations (the so-called Basel III rules) was longer than previously expected. Second, bank earnings in the third quarter of 2010 were generally higher, and loss provisions lower, than analysts' expectations. Later in the period, however, concerns about debt sustainability in some European countries re-emerged, which put upward pressure on longer-term funding costs.

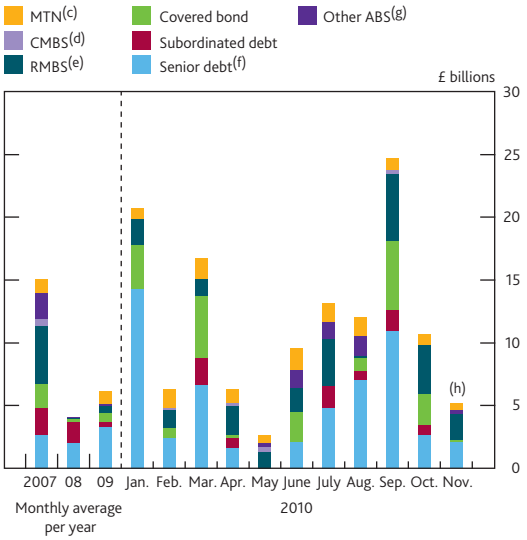
In the United Kingdom, investors' assessment of UK banks' funding positions reportedly improved following the disclosure that banks had already repaid a large share of their borrowing under the Special Liquidity Scheme. The box on pages 246–47 shows that banks have incorporated a gradual repayment of their borrowing under the scheme into their funding plans. In contrast, in the United States, sentiment towards some banks was diminished somewhat by concerns over mortgage origination, servicing and foreclosure practices.

Against this backdrop, UK banks' debt issuance was particularly strong earlier in the period (**Chart 6**). Banks issued over £15 billion senior debt and were able to issue around £20 billion of covered bonds and residential mortgage-backed securities (RMBS) over the period as a whole. Signs of renewed activity in asset-backed securities were tempered by the small number of investors in these transactions. The forthcoming *Financial Stability Report* will discuss these issues, including the funding requirements for UK banks, in more detail.

Long-term interest rates

During the earlier part of the review period, international long-term nominal interest rates approached historically low levels. Expectations of further asset purchases by the

Chart 6 Major UK banks'[a] issuance in term public[b] markets by debt instrument

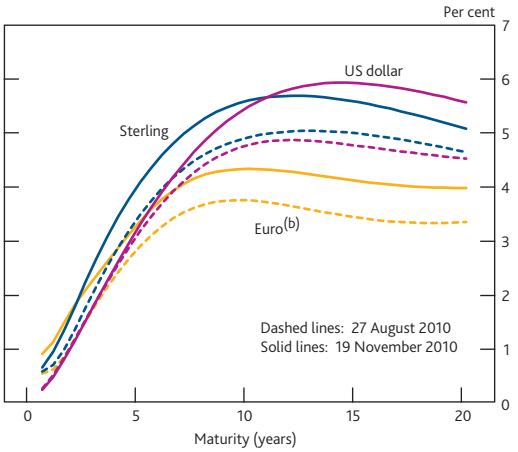


Sources: Bank of England, Dealogic and Bank calculations.

(a) The major UK banks are defined as Banco Santander, Barclays, Co-operative Financial Services, HSBC, Lloyds Banking Group, Nationwide and RBS.
(b) This refers primarily to issuance in excess of 18 months in public markets.
(c) Medium-term notes.
(d) Commercial mortgage-backed securities.
(e) Residential mortgage-backed securities.
(f) Excludes senior debt issued under HM Treasury's Credit Guarantee Scheme.
(g) Asset-backed securities.
(h) Data up to 19 November.

US Federal Reserve and the Bank reportedly contributed to these falls. Following the FOMC's announcement of further purchases in November and stronger-than-expected macroeconomic data, these expectations receded somewhat. This reportedly contributed to the subsequent rise in bond yields. Overall, during the review period, international forward yield curves shifted higher, most notably in the United States (**Chart 7**).

Chart 7 International nominal government bond yield curves[a]



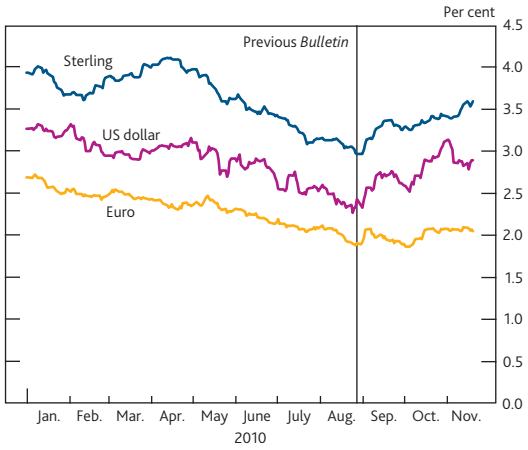
Source: Bank calculations.

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

Nominal interest rates can be decomposed into movements in real forward interest rates and a forward inflation rate.

Market-based measures of medium-term inflation expectations derived from index-linked bonds rose during the review period, particularly in the United States (**Chart 8**). Contacts suggest this may have been exacerbated by an increase in demand for inflation protection in a relatively less liquid market, thereby lowering real yields relative to nominal yields. Indeed, equivalent measures derived from UK inflation swaps rose by less over the review period.

Chart 8 International five-year implied inflation rates, five years forward(a)(b)



Source: Bank calculations.

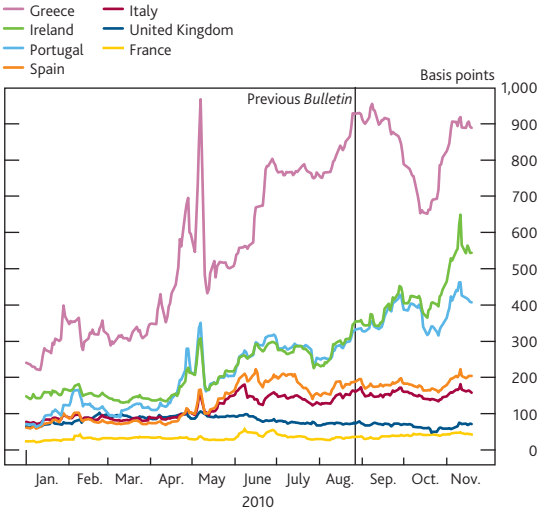
(a) Sterling forward inflation rates are derived from instruments that reference RPI inflation, while US dollar and euro forward inflation rates are derived from instruments referencing CPI inflation.
(b) Sterling and US forward inflation rates derived from the Bank's government liability curves. Euro forward inflation rates derived using the Bank's inflation swap curve.

In the euro area, concerns about the sustainability of the fiscal position of some member countries, notably Ireland and Portugal, reintensified during the review period. Contacts noted in particular the difficulties in the approval process of austerity measures in Portugal and further revelations about the impact of banking sector losses on public finances in Ireland. After the end of the review period, the Irish authorities requested the use of European Union support facilities, provided in conjunction with the International Monetary Fund. The estimated financing need would be up to €85 billion until the end of 2013, with a potential total external assistance of €67.5 billion.

Yields on Irish and Portuguese government bonds rose markedly relative to German government bond yields (**Chart 9**). Toward the end of the review period, LCH.Clearnet Ltd increased the margin requirement on Irish government bonds. Contacts noted that this might have amplified some of the widening in the spread of Irish bonds.

Contacts thought that market participants increasingly differentiated between sovereign credits. Indeed, in contrast to earlier periods when yield spreads of vulnerable euro-area government bonds to German government bonds tended to move together, Italian and Spanish government spreads ended the period little changed. Following the review period,

Chart 9 Selected European ten-year government bond spreads(a)



Sources: Bloomberg and Bank calculations.

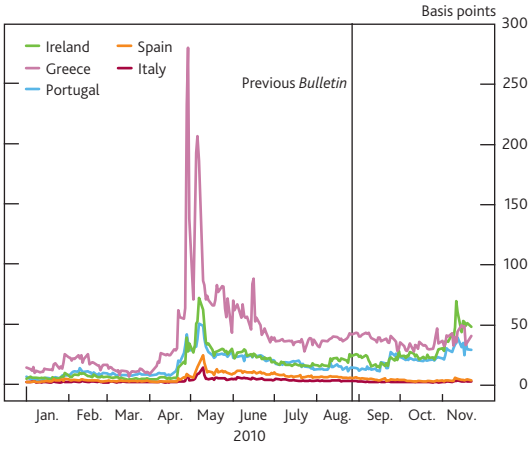
(a) Spread over ten-year German government bond yield.

however, concerns over sovereign risk in the euro area became more widespread.

In explaining the recent widening of euro-area spreads, contacts put some weight on proposals put forward for a permanent resolution mechanism of sovereign debt crises. Contacts noted that yield spreads widened more for those sovereigns potentially more likely to be affected by such a mechanism.

The liquidity of those sovereign bond markets, as measured by bid-offer spreads, deteriorated (**Chart 10**). In order to facilitate the functioning of these markets, the ECB stepped up its sovereign bond purchases somewhat through its Securities Markets Programme, after a period of limited activity since mid-July.

Chart 10 Bid-offer spreads on selected euro-area ten-year government bonds



Source: Tradeweb.

Operations within the sterling monetary framework

The level of reserves 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 248–49 provides more detail on the Asset Purchase Facility (APF). This box describes in more detail the Bank's operations within the sterling monetary framework over the review period.

Operational Standing Facilities

Since 5 March 2009, the rate paid on the Operational Standing Deposit Facility has been zero. Reflecting this, average use of the deposit facility was £0 million in each of the maintenance periods under review. Average use of the lending facility was also £0 million throughout the period.

Indexed long-term repo OMOs

The Bank also offers liquidity insurance to the banking system via long-term repo (LTR) operations. The Bank recently redesigned these operations to provide a permanent and more effective liquidity insurance facility, against a wide range of collateral. The new operations, which are indexed to Bank Rate, replace both the three-month wider collateral operations and the narrow OMO collateral six, nine and twelve-month operations.(1)

The Bank offered £5 billion via three-month indexed long-term repo (ILTR) operations on both 14 September and 12 October, and £2.5 billion via a six-month operation on 16 November. Cover was similar to earlier ILTR operations (**Table 1**).

The proportion of the three-month operations allocated to wider collateral in September and October fell compared to those held in June and July from an average of 17% to 12%. The stop-out spread (the difference between clearing spreads for wider and narrow collateral) fell to 20 basis points in October, compared to 25–26 basis points in the three previous three-month ILTR operations (**Chart A**). This primarily reflected a fall in the wider collateral clearing spread.

The six-month operation held on 16 November produced a stop-out spread of 48 basis points. This was similar to the previous six-month operation in August, where the stop-out spread was 49 basis points. The proportion of funds allocated against wider collateral in November rose to 26%, from 24% in August.

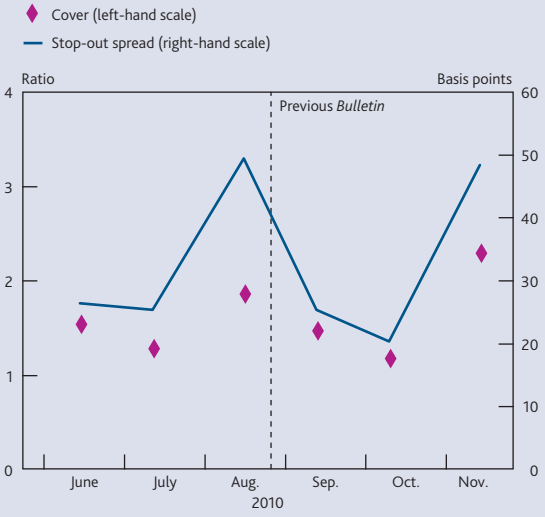
Reserves provided via ILTRs were more than offset by the maturity of the previous LTR operations. Consequently, the stock of liquidity provided through longer-term operations declined.

Table 1 Indexed long-term repo operations

	Total	Collateral set summary	
		Narrow	Wider
14 September 2010 (three-month maturity)			
On offer (£ millions)	5,000		
Total bids received (£ millions)(a)	7,346	6,586	760
Amount allotted (£ millions)	5,000	4,440	560
Cover	1.47	1.32	0.15
Clearing spread above Bank Rate(b)		1	26
Stop-out spread(c)	25		
12 October 2010 (three-month maturity)			
On offer (£ millions)	5,000		
Total bids received (£ millions)(a)	5,905	5,260	645
Amount allotted (£ millions)	5,000	4,355	645
Cover	1.18	1.05	0.13
Clearing spread above Bank Rate(b)		1	21
Stop-out spread(c)	20		
16 November 2010 (six-month maturity)			
On offer (£ millions)	2,500		
Total bids received (£ millions)(a)	5,713	4,920	793
Amount allotted (£ millions)	2,500	1,857	643
Cover	2.29	1.97	0.32
Clearing spread above Bank Rate(b)		2	50
Stop-out spread(c)	48		

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

Chart A Cover and stop-out spread



Discount Window Facility

The Discount Window Facility (DWF) is a permanent facility to provide liquidity insurance to the banking system. It allows eligible banks to borrow gilts against a wide range of collateral. On 5 October, the Bank announced that the average daily amount outstanding in the 30-day DWF between 1 April and

30 June 2010 was £0 million. The Bank also announced that the average daily amount outstanding in the 364-day DWF between 1 April and 30 June 2009 was £0 million. For information on the changes to the collateral accepted in the DWF, see the box on page 251.

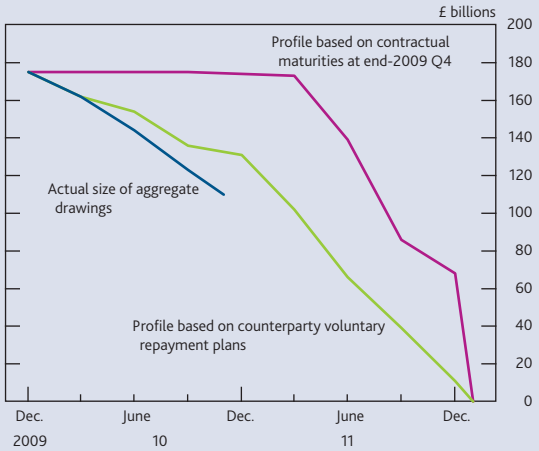
Other operations

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 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.

At the end of January 2009 (when the drawdown period for the SLS closed), £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 users of the Scheme to ensure that there were credible 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. Some £75 billion had already been repaid by end-November.

Chart B Aggregate SLS repayment profiles



US dollar repo operations

In response to renewed strains in the short-term funding market for US dollars, from 11 May the Bank, in concert with other central banks, reintroduced weekly fixed-rate tenders with a seven-day maturity to offer US dollar liquidity. As of 19 November 2010, there had been no use of the facility.

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, eg in the Bank for International Settlements and European Central Bank, 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 £4.1 billion of gilts and £0.6 billion of other debt securities. Over the period from 20 August 2010 to 18 November 2010, gilt purchases were made in accordance with the quarterly announcements on 1 July 2010 and 1 October 2010.

(1) For further details see 'The Bank's new indexed long-term repo operations', in the 2010 Q2 *Bank of England Quarterly Bulletin*, pages 90–91.

Asset purchases

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.(1) The Bank continued to offer to lend some of its gilt holdings via the Debt Management Office (DMO) in return for other UK government collateral.

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

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

Gilt lending facility

In the three months to 30 September 2010 a daily average of £279 million of gilts were lent as part of the gilt lending facility. This was down from an average of £2.12 billion in the previous quarter. The box on page 253 provides more detail on the gilt lending facility.

Corporate bonds

In order to improve the functioning of the sterling corporate bond market, the Bank continued to offer to purchase and sell corporate bonds via the Corporate Bond Secondary Market Scheme.

Over the review period, activity in the Bank's auctions continued to be driven by broader market conditions, which were little changed since the previous *Bulletin*. The level of participation in both the purchase and sales operations (in terms of the level of transactions with the Bank) fell. As of 18 November 2010, the Bank portfolio totalled £1,516 million, compared to £1,571 million at the end of the previous review period on 26 August 2010, as the Bank sold more bonds than it purchased. Market contacts suggested that this reflected the limited scale of new issuance in the wider market.

Reflecting the improved conditions in the corporate bond market since the Scheme was introduced in March 2009, the Bank announced on 15 November that it would adapt its reserve prices to permit relatively more sales of corporate bonds in the future. The Scheme will continue to offer to buy and sell corporate bonds to serve a useful role as a backstop, particularly during periods of market uncertainty.

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.

Spreads on sterling-denominated CP were little changed during the reporting period. Therefore, the majority of primary spreads remained below the spreads at which the APF offers to purchase CP. Accordingly, the stock of APF purchases fell to £0 million on 3 September, and remained at that level for the

Table 1 APF transactions by type (£ millions)

Week ending[a]	Commercial paper	Gilts	Corporate bond		Total[b]
			Purchases	Sales	
26 August 2010[c][d]	120	198,275	1,571		199,966
2 September 2010	0	0	5	2	3
9 September 2010	0	0	0	0	0
16 September 2010	0	0	0	4	-4
23 September 2010	0	0	7	0	7
30 September 2010	0	0	4	2	2
7 October 2010	0	0	0	0	0
14 October 2010	0	0	0	12	-12
21 October 2010	0	0	0	2	-2
28 October 2010	0	0	0	16	-16
4 November 2010	0	0	0	6	-6
11 November 2010	0	0	3	1	2
18 November 2010	0	0	0	11	-11
Total financed by a deposit from the DMO[d][e]	0	–	341		341
Total financed by central bank reserves[d][e]	0	198,275	1,175		199,451
Total asset purchases[d][e]	0	198,275	1,516		199,792

(a) Week-ended amounts are for purchases in terms of the proceeds paid to counterparties, and for sales in terms of the value at which the Bank initially purchased the securities. All amounts are on a trade-day basis, rounded to the nearest million. Data are aggregated for purchases from the Friday to the following Thursday.
(b) Weekly values may not sum to totals due to rounding.
(c) Measured as amount outstanding as at 26 August 2010.
(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.

remainder of the reporting period. On 15 November, the Bank provided twelve months' notice of its intention to withdraw this scheme, reflecting improvements in the market.

Over the review period, the stock of CP issued by UK corporate and non-bank firms fell to around £2.2 billion, down from £2.5 billion at the time of the previous *Bulletin*.

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.(2)

While there had been no use of the facility during the review period, the Bank announced on 15 November that it had recognised the eligibility of a programme for this facility. This programme has subsequently drawn on the facility.

Credit Guarantee Scheme

The Bank did not make any purchases of bank debt issued under the Credit Guarantee Scheme from the secondary market over the period under review.

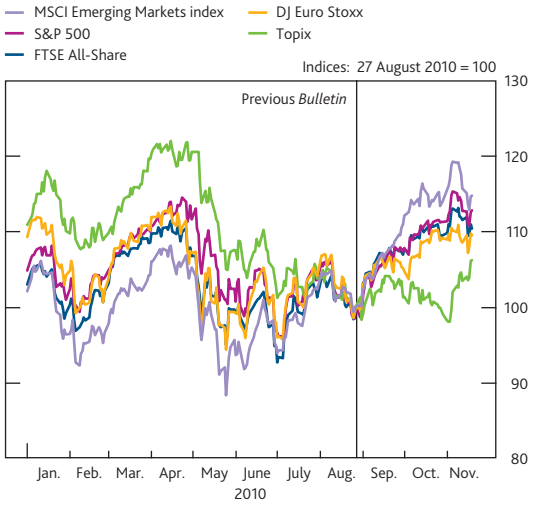
On 15 November, the Bank announced the withdrawal of this Scheme, reflecting the improvements in market functioning over the past year.

(1) Further details of individual operations are available at www.bankofengland.co.uk/markets/apf/gilts/results.htm.
(2) The SCP facility is described in more detail in the Market Notice available at www.bankofengland.co.uk/markets/marketnotice090730.pdf.

Corporate capital markets

International equity prices rose markedly (**Chart 11**). These rises reflected at least in part an improvement in corporate earnings expectations. Indeed, third-quarter earnings were generally better than expected, most notably for US companies. Additionally, forward-looking measures of earnings also improved. For example, the November Bank of America/Merrill Lynch Fund Manager survey showed that around 68% of respondents expected global corporate earnings to improve over the coming year, up from just over 50% in August. Furthermore, dividend swap prices rose, perhaps suggesting that market participants revised higher their expectations for future corporate earnings.(1)

Chart 11 International equity indices(a)(b)



Sources: Bloomberg and Bank calculations.

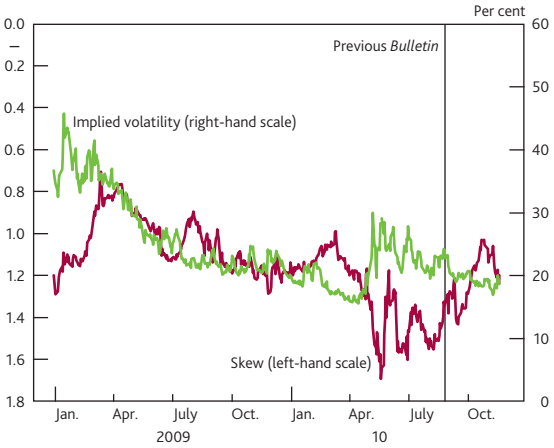
(a) Indices are quoted in domestic currency terms, except for the MSCI Emerging Markets index, which is quoted in US dollar terms.
(b) The MSCI Emerging Markets index is a capitalisation-weighted index that monitors the performance of stocks in emerging markets.

According to contacts, firming expectations of further monetary easing led investors to reduce their perceptions of downside risk to equity prices. Perhaps consistent with that, the skews of option-implied probability distributions of equity returns initially became less negative, although they fell back subsequently (**Chart 12**). Option-implied equity volatilities fell since the previous *Bulletin*. This may reflect a reduction in uncertainty surrounding the financial outlook for businesses. Less negative skews and lower volatilities would be consistent with a fall in the equity risk premium.

The more accommodative stance of US monetary policy reportedly also supported capital inflows in emerging market economies (EMEs). This is likely to have contributed to the sharp increases in EME asset prices over the review period. However, contacts noted that other factors also played a role, including a reassessment by some investors of the expected returns on EME assets relative to developed economies.

Overall, the net effect of lower equity risk premia and higher government bond yields was to lower an indicative measure of the nominal cost of equity finance for UK companies (**Chart 13**).

Chart 12 Three-month option-implied volatility and skewness of FTSE 100 returns(a)

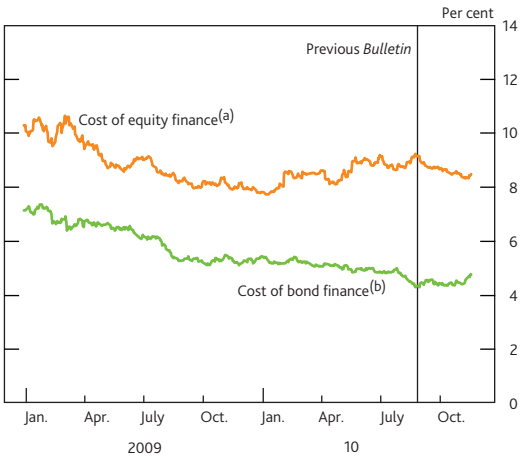


Sources: NYSE Liffe and Bank calculations.

(a) A negatively skewed distribution is one for which large negative deviations from the mean are more likely than large positive deviations.

Investment-grade, non-financial corporate bond spreads over government bond yields of a comparable maturity were broadly unchanged (**Chart 14**). Consistent with the substantial improvement in conditions in the sterling corporate bond market since the Bank's Corporate Bond Secondary Market Scheme was introduced in March 2009, the Bank announced changes to the Scheme (see the box on pages 248–49 for details).

Chart 13 Indicative cost of sterling corporate bond and equity finance



Sources: Bank of America/Merrill Lynch, Thomson Reuters Datastream and Bank calculations.

(a) The cost of equity is measured as a risk-free rate plus an equity risk premium. The risk-free rate is approximated by a ten-year nominal gilt yield and the equity risk premium is inferred from a dividend discount model. For further details of the latter, see Inkinen, M, Stringa, M and Voutsinou, K (2010), 'Interpreting equity price movements since the start of the financial crisis', *Bank of England Quarterly Bulletin*, Vol. 50, No. 1, pages 24–33.
(b) The cost of bond finance is measured as the average yield-to-maturity on the Bank of America/Merrill Lynch Sterling Corporate Industrials and Utilities indices.

(1) For more details on dividend swaps, see the box 'Dividend swaps' in the *Bank of England Quarterly Bulletin*, Vol. 48, No. 4, page 371.

Changes to collateral accepted in the Bank's liquidity insurance operations

The Bank provides liquidity insurance to the banking system through its Discount Window Facility (DWF) and indexed long-term repo (ILTR) operations. In these operations the Bank accepts a wider range of collateral than it accepts in its short-term repo operations or in the operational lending facility.

On 30 November, the Bank published details of two changes it is making to the collateral that it accepts in these facilities in order to further enhance the Bank's ability to provide short-term liquidity insurance to counterparties, thereby underpinning confidence in the financial system.

In particular, from April 2011 the Bank will widen the pool of collateral eligible for use in the DWF, to include portfolios of loans alongside marketable securities. The Bank has also decided to amend its eligibility criteria to require enhanced disclosure of information relating to certain securities, starting in 2011.

Loan portfolios in the DWF

The DWF enables banks and building societies to borrow gilts against a wide range of collateral. It is intended for sound institutions that need temporary access to liquidity, but not as a source of long-term funding.

To obtain gilts, counterparties can pledge securitisations or covered bonds comprising loans they have originated themselves. However, the process of creating such 'own-name' securities can be costly and time consuming for counterparties. It also introduces added complexity, as securitisations generally include derivative instruments such as swaps, and other structural features, which create risks that the Bank has to manage.

By extending eligibility to portfolios of loans, the Bank intends to allow the main assets of most banks and building societies to be used as collateral in the DWF without the need for securitisation.

The Bank will apply the same standards for eligibility and risk management as for other collateral in the DWF. This means that loan portfolios will be subject to a rigorous approval process including regular reviews. And it will be necessary for counterparties to pre-position loan portfolios with the Bank.

Information transparency for asset-backed securities and covered bonds

Since December 2007 the Bank has accepted asset-backed securities (ABS) and covered bonds in its liquidity insurance operations. One of the Bank's guiding principles for its market operations is that it must be able to manage risk and value the collateral it accepts. In view of this, the Bank has considered the information that it requires from issuers of ABS in order to be able to risk manage its collateral more effectively and efficiently.

The Bank has therefore decided to amend its eligibility criteria to require enhanced disclosure of information relating to these securities. While driven by the Bank's own risk management requirements, the Bank considers it important that this information be provided not only to the Bank but also to market participants to help improve market-wide transparency.

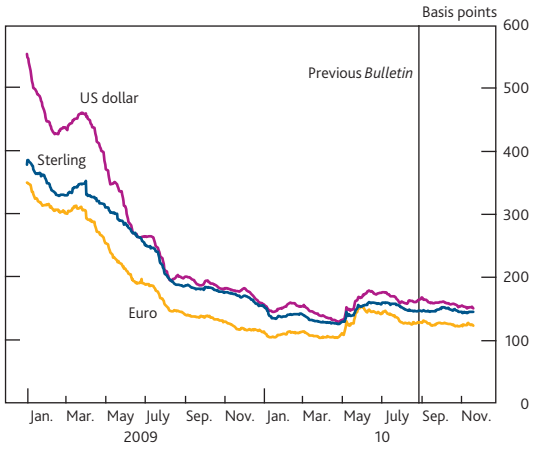
The Bank's new transparency requirements will require banks who originate securities to make the following available to market participants in order for their securities to remain eligible:

- Detailed information about the loans included within the securitisation. For most asset classes this will take the form of loan-level data including details of the borrower, underlying assets and performance of each loan, to be provided on every quarter.
- The prospectus and other key legal documents.
- Monthly reports about the security containing a standard set of minimum information.
- A summary of the structure of individual transactions including the rights of bond or note holders.
- For ABS, a cash-flow model of each transaction which accurately represents how cash flows through the structure to the end-investor.

In order to give participants in the Bank's operations time to fully comply with these requirements, their implementation will be staggered. The publication of the prospectus and other key documents will be required from July 2011 for all asset classes, but the remaining requirements will initially apply from December 2011 to residential mortgage-backed securities and covered bonds backed by residential mortgages. The application of these full requirements will gradually be extended to remaining asset classes by the end of 2012.

The Bank's actions in this area have not been taken in isolation. Other authorities, including the European Central Bank, have indicated that they will impose greater information transparency requirements on ABS, and the new EU Capital Requirements Directive will require investors to undertake their own risk assessment of securities in which they invest. Where possible the Bank has tried to ensure that its requirements will be complementary and consistent with these other initiatives.

Chart 14 International investment-grade, non-financial, corporate bond spreads[a]

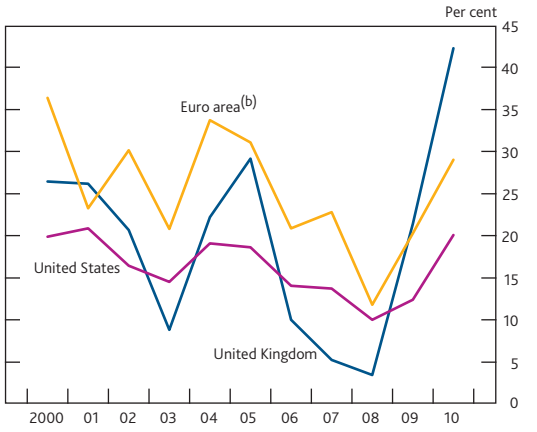


Sources: Bank of America/Merrill Lynch and Bank calculations.

(a) Option-adjusted spreads.

Gross corporate bond issuance by UK private non-financial corporations (PNFCs) picked up in September, following muted issuance in August. In 2010 to date, gross issuance surpassed its annual average over 2000–07 on the back of strong issuance for non-investment grade companies, though it fell short of the exceptional levels seen in 2009. Furthermore, the proportion of corporations issuing bonds for the first time continued to increase in 2010 (**Chart 15**). The majority of the new issuers in the United Kingdom reportedly used the proceeds to repay maturing bank loans. This seems consistent with ongoing disintermediation of banks by UK companies.

Chart 15 Proportion of first-time PNFC bond issuers[a]

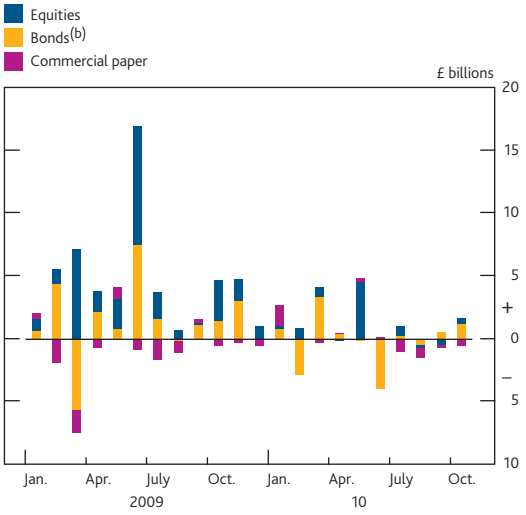


Sources: Dealogic and Bank calculations.

(a) The proportion of first-time bond issuers relative to the total number of bond issuers in a given year, for parent companies based in the United Kingdom, United States and the euro area.
(b) The back data include all euro-area countries as of 19 November 2010.

Notwithstanding relatively strong gross bond issuance, aggregate net bond issuance by UK PNFCs was only mildly positive from August to October. At the same time, equity issuance net of share buybacks was limited (**Chart 16**). Combined with a continued strong net reduction in bank

Chart 16 Net capital market issuance by UK PNFCs[a]



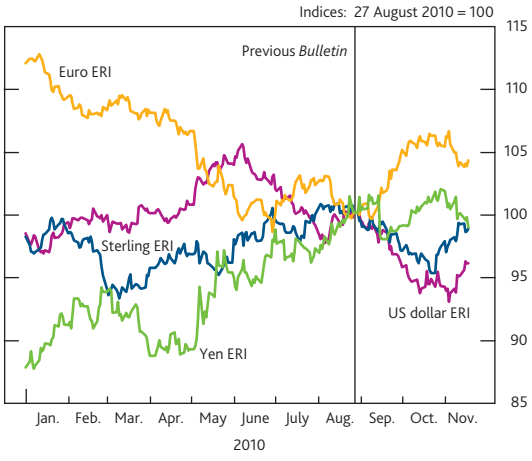
(a) Non seasonally adjusted.
(b) Includes stand alone and programme bonds.

loans, this suggests that, in aggregate, UK PNFCs continued to deleverage their balance sheets in 2010, although at a slower pace than in 2009.

Foreign exchange

Expectations of further monetary policy measures, in particular in the United States, were also reflected in developments in exchange rates. In particular, the US dollar depreciated against the currencies of its major trading partners (**Chart 17**).

Chart 17 International exchange rate indices



Sources: Bloomberg and Bank calculations.

The sterling effective exchange rate index (ERI) depreciated by 1.8% since the previous *Bulletin*. This masked divergent moves against the two largest constituents of the sterling ERI; sterling appreciated 3.1% against the US dollar and depreciated 4% against the euro.

Movements in relative interest rates accounted for most of the developments in the sterling bilateral exchange rate against

Gilt lending facility

The Bank operates a gilt lending facility with the Debt Management Office (DMO) in which it makes available to the DMO a significant amount of gilts purchased via the Asset Purchase Facility (APF) for on-lending to the market. This facility was launched on 7 August 2009 to relieve frictions in the functioning of the gilt repo market arising from the Bank's APF purchases. This box describes the impact of the facility on the gilt repo market and the facility's usage.

Causes of frictions in the gilt repo market

Frictions can appear in the gilt repo market when particular gilts are in short supply relative to their demand. This can occur when institutions — including pension funds, central banks or sovereign wealth funds — have significant holdings that, for a variety of reasons, they may be unwilling to lend out during periods of uncertainty and short supply.

The impact of the gilt lending facility

In March 2009, the Monetary Policy Committee announced a programme of asset purchases financed by the issuance of central bank reserves (commonly known as quantitative easing). Asset purchases were spread across a range of gilts but, by August 2009, the APF gilt purchase operations had contributed to shortages of certain gilts in the open market.

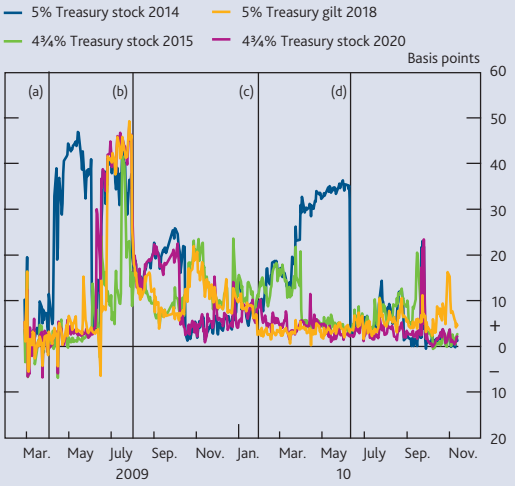
Market participants suggested the impact could be most clearly seen in the repo rates for four bonds (the 5% 2014, 4¾% 2015, 5% 2018 and 4¾% 2020). By July and August, the weighted average overnight repo rate for each of these bonds was consistently around 30 basis points above the weighted average general secured overnight repo. Consequently, market participants would have had to lend cash at a rate significantly below the general secured overnight rate in order to obtain any of these specific bonds (**Chart A**).

The Bank responded by launching the gilt lending facility in August 2009. The DMO may lend the gilts for a term of up to one week.(1) In return for the loan of specific APF gilts, the DMO delivers to the Bank UK government securities of equivalent value. Therefore, the APF's holdings of UK government securities are unaffected. There is also no net impact on the DMO's cash management operations.(2)

Immediately upon launch of the facility, repo rates stabilised on these bonds and, by the second day of the facility being available, spreads fell below 20 basis points. Subsequently, spreads have largely remained below the heightened levels seen previously.

The gilt lending facility also triggered a fall in usage of the DMO's Standing Repo Facility and Special Repo Facility. In the month prior to the introduction of the gilt lending facility, usage of the DMO's facilities had been around £2 billion daily, the vast majority of which involved the four bonds in **Chart A**.

Chart A Spread to general collateral overnight rate of gilts impacted by lending facility



Source: BrokerTec.

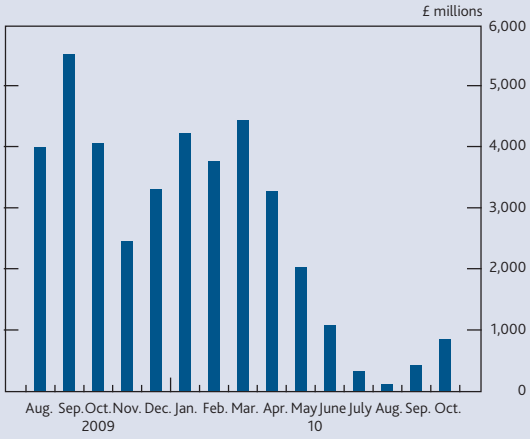
(a) First APF gilt purchase operation.
(b) Launch of gilt lending facility.
(c) Pause of APF gilt purchases.
(d) Issuance of £4.4 billion of the 5% 2014.

In the twelve months subsequent to the launch, usage has fallen to a daily average of around £4.7 million.(3)

Usage of the gilt lending facility

The gilt lending facility was used heavily after it was launched (**Chart B**). As expected, usage has been concentrated in gilts in which the Bank holds a large proportion of the free float: the total amount of a gilt in issue less the amount held by the UK Government. In the past two quarters, usage of the facility has reduced significantly as new DMO primary issuance has resulted in higher private sector holdings of gilts that had previously been in short supply.

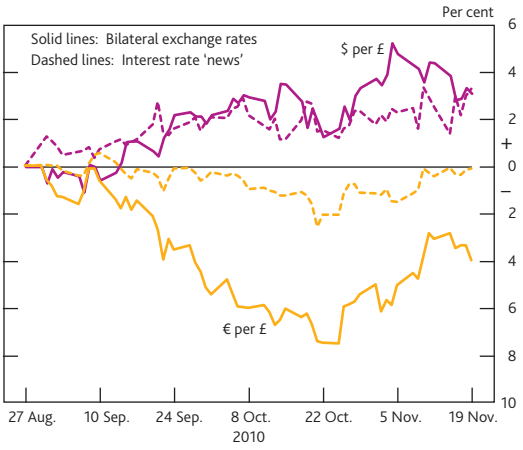
Chart B Average daily aggregate value of gilts lent through the APF gilt lending facility to the DMO on a monthly basis



(1) The Bank makes available at least 10% of the APF's holdings of each stock, and more where the APF's holding is greater than 50% of the 'free float' (total issuance size less government holdings).
(2) In addition, the Bank is prepared to make the APF's gilts available for use in the DMO's Standing Repo facility (this facility allows any gilt to be borrowed overnight at a current rate of 0.10%, with a simultaneous reverse repo trade executed at Bank Rate).
(3) The Special Repo Facility was suspended on 28 August 2009. It had operated in a similar way to the Standing Repo Facility except that certain terms — such as the maturity, price or eligibility of gilts — could vary.

the US dollar (**Chart 18**). In contrast, the depreciation of sterling against the euro appeared to reflect other factors. For example, during the first half of the review period, contacts suggested that asset managers had increased their holdings of euro-area assets as concerns over the sustainability of fiscal positions of some European countries subsided. This perhaps suggested that changes in relative risk premia accounted for some of the developments in the sterling-euro exchange rate. However, these concerns reintensified towards the end of the period.

Chart 18 Implied contribution of interest rate 'news' to cumulative changes in sterling bilateral exchange rates since the previous *Bulletin*(a)



Source: Bank calculations.

(a) For more information on the analytics required to isolate the impact of interest rate 'news' on exchange rates, see Brigden, A, Martin, B and Salmon, C (1997), 'Decomposing exchange rate movements according to the uncovered interest rate parity condition', *Bank of England Quarterly Bulletin*, November, pages 377–89.

Option-implied volatility, a market-based measure of uncertainty, increased for a number of currency pairs. Contacts have cited a number of factors contributing to a rise in uncertainty in currency markets. These included market participants revising their expectations of further unconventional monetary policy measures in some countries; the challenge faced by a number of EMEs in managing the consequences of large-scale capital inflows; the prospects of taxes on capital flows or capital controls; and official intervention in the currency markets by a number of countries.

Market intelligence on developments in market structure

In discharging its responsibilities to maintain monetary 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 about how markets function, which provides 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.

Emergence of long-dated funding

Funding pressures continue to encourage innovations in the funding instruments used by banks. Some of these instruments were discussed in the previous *Quarterly Bulletin*. This section summarises recent market intelligence on the emergence this year of long-dated secured funding transactions.

Characteristics

Long-dated secured funding transactions typically involve banks raising two to seven-year funding against investment-grade asset-backed securities (ABS). UK banks have been particularly active issuers of this funding, with over £15 billion issued in 2010, although this represents a small proportion of banks' overall liabilities. Anecdotal evidence suggested further issuance was possible.

Long-dated secured funding was primarily a funding tool as it does not involve risk transfer nor have capital benefits, as the risks associated with the collateral remained with the bank raising funding.

Structure

There are two main types of long-dated secured funding instruments, although they are economically equivalent. Usage was reportedly fairly evenly split between the two, with some banks funding via both forms.

Conventional repo transaction

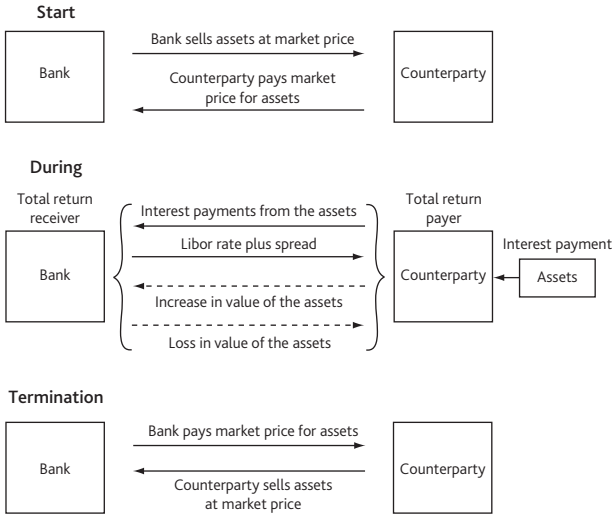
In a conventional long-dated repo transaction a bank sells an asset in exchange for cash and agrees to buy it back at a later date at a price agreed in advance, with the difference in the selling price reflecting the cost of the funding. This, hence, represents collateralised long-term funding for the bank selling the security.

'Synthetic repo' using total return swaps

A synthetic repo typically combines an outright sale of an asset (and potential repurchase) with a total return swap (TRS) derivatives transaction (**Figure 1**).

The transaction involves a bank selling an asset to a counterparty. At the same time, a TRS is entered into whereby the bank (the TRS receiver) agrees to pay the counterparty (the TRS payer) an interest rate of Libor plus a spread and in return receive any interest payments on the asset. Importantly, as part of the TRS, any change in the value of the asset is transferred (via mark-to-market payments) between the two

Figure 1 Typical synthetic repo structure



parties; falls in its value trigger payments from the bank to the counterparty and *vice versa*. This has the effect of leaving the economic risk of the asset with the bank, as with a conventional repo. In principle, the TRS could be provided by a third party independent of the asset sale, but this is reportedly uncommon.

At the end of the transaction, the counterparty will usually sell the asset; it will have been compensated by the bank for any change in the asset's value through the daily mark-to-market payments.

In most cases, the bank will buy back the asset from the counterparty at the termination of the agreement. This is because, while there is no formal obligation for the bank to buy back the asset, if it is sold to another party, the bank has to recognise any change in value of the asset. The assets used have often been legacy assets issued at a higher price than their current value. This gives banks an incentive to buy the asset back given it will then remain on their banking book and they can then avoid crystallising a loss. For this reason, these transactions are often referred to as 'failed sales' for accounting purposes, as the sale is effectively unwound at the end of the transaction.

A synthetic repo TRS structure might seem a complex way of raising funding when a conventional repo can achieve the same economic outcome. However, some institutions prefer using TRS systems and (ISDA) documentation as they find them more suited to longer-term trades. This is partly because under a TRS, both margin payments and the eventual return of the asset can be in cash equivalent, rather than in asset form. In addition, institutions may prefer to retain available repo lines for short-term funding and investment.

Other ways of a bank raising long-term secured funding are via securities lending or collateral swaps. These allow banks to source liquid assets (eg gilts), which can then be used to raise funding. While market contacts report this as an area being increasingly explored, they suggest that the transactions thus far have tended to be shorter-dated, and are thus outside the scope of this box.

Cash borrowers/TRS payers

Prior to the crisis, banks could rely on short-dated unsecured borrowing and securitisation markets for funding, with long-dated repos reportedly rare. However, lenders' appetite for unsecured exposures has since reduced and securitisation markets have only partially reopened.

Over the past year, UK banks were thought to have been most active in raising funding via long-dated secured markets. It was reportedly used to refinance collateral that had been placed in the Bank's Special Liquidity Scheme. In addition, these instruments helped banks meet new regulatory requirements that aim to lengthen banks' liquidity and funding profiles.

Banks that operate in euro-area member countries were also thought to have been active in long-dated secured markets partly in anticipation of scheduled changes to the ECB's collateral rules. These rule changes will increase the cost of pledging lower-quality collateral with the ECB.

Lenders/TRS receivers

Long-term secured funding provides counterparties with dual recourse in the event of default — to the borrowing bank and to the underlying collateral. In contrast, senior debt holders had recourse only to the former and residential mortgage-backed securities (RMBS) owners to the latter. This increases the attractiveness of long-dated secured funding for some investors. The increased use may in part also reflect investors looking to extend the maturity of lending in return for higher yields.

So far, most of the counterparties to these transactions (ie the repo cash lenders and TRS receivers) have been liquid banks, which implies that these transactions have mainly recycled liquidity around the banking system. Some modest activity has been reported outside of the banking sector. Contacts thought there were a number of obstacles to wider participation in the market. This included a lack of familiarity with a relatively new market, the lack of a liquid secondary market, and a perception among some potential participants that TRS structures were too complex.

Collateral

The long-dated repo market has emerged to help fund ABS assets that had become illiquid during and after the crisis. Most of the assets being funded are RMBS, but other types of ABS (eg student loans, credit card receivables) and corporate bonds have also been used. There was some interest in

funding newly originated 'own-name' assets, although the bank selling the asset had to provide extra collateral to reflect the potential higher correlation between its credit risk and the value of the asset.

The assets used as collateral generally had a minimum rating of single-A, but market contacts suggested that the majority of the transactions were against triple-A rated ABS collateral. Collateral was generally marked-to-market daily with any related remargining (under a repo) or payment (under a TRS) then being carried out.

There appeared to be no market standard for termination triggers for these transactions, either on the credit rating of the borrower and/or the quality of the collateral, but some form of triggers were used in most transactions.

Pricing

Banks borrowing via long-dated secured transactions were typically paying a rate above that paid on covered bonds, as the latter were generally backed by better-quality collateral and had a more liquid secondary market. But the rate was below that payable on senior debt as this was an unsecured exposure.

Pricing on individual long-dated secured transactions was heavily influenced by the perceived credit risk of the underlying borrower, the term, and quality and diversity of collateral. Typically, the bank selling the asset paid a floating rate between 100–200 basis points over three-month Libor (**Table A**).

Table A Typical characteristics of conventional and synthetic long-dated repos

Market size	UK banks issued over £15 billion in 2010.
Term	2–7 years.
Currency	Sterling, US dollars and euros.
Region	United States, United Kingdom and Europe.
Borrowers	Banks, especially UK banks.
Lenders	Mainly banks, but some asset managers.
Collateral	Investment grade, though not defined as liquid by regulatory standards. Usually ABS.
Pricing	Floating rate of three-month Libor plus 100–200 basis points (depending on collateral and counterparty).

Research and analysis

The history of the *Quarterly Bulletin*

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This edition marks the 50th anniversary of the *Quarterly Bulletin*. Over the years, the *Bulletin* has been one of the main conduits through which the Bank has communicated its thinking to the wider public. This article reviews the history of the *Bulletin* — both its origins and its subsequent evolution — as well as examining some of the insights that can be gleaned from its pages on some of the key central banking issues of the time.

Introduction

This edition marks the *Quarterly Bulletin's* 50th anniversary. The *Bulletin* originally sprang into existence in 1960, the product of a series of recommendations by the Radcliffe Committee. Up until the advent of the *Inflation Report* in 1993, it was the main route through which the Bank communicated its assessment of the economic environment. It remains one of the Bank's flagship publications, providing an assessment of recent developments in financial markets as well as medium-term analytical research.[2] On its 50th birthday, this article reviews the history of the *Bulletin*, how it has evolved, and the insight it has provided into the Bank's thinking on key central banking issues.

The article is structured as follows. The first section examines briefly the *Bulletin's* origins. The next two sections examine its coverage of some of the key central banking issues of the past 50 years, through both the economic commentary and the companion articles and speeches. The fourth section then looks at how the *Bulletin* has evolved over time, both in terms of content and style.

The origins of the *Quarterly Bulletin*

The *Quarterly Bulletin* first appeared in response to a recommendation from the Radcliffe Committee in 1959.[3] The Committee — appointed to investigate the workings of the monetary and credit system — found that there was 'scope for more regular comment by the authorities on monetary and financial affairs'.[4] The Bank was therefore invited to 'give consideration to…the issue of a quarterly bulletin in which could appear either some of the more technical discussions of monetary issues or signed articles on more controversial matters'.

The Bank had anticipated this recommendation. Internal discussions about the shape of a prospective regular publication had begun as early as 1958. This work examined questions such as the publication's potential audience, its frequency, the attribution of the articles and its relationship to government publications already in existence. In doing so, it drew heavily on the experience of other central banks — such as the Federal Reserve and the Bundesbank — and of commercial banks in producing their own publications. The proposals were taken up with varying degrees of enthusiasm by the Bank's directors, but by the time the Radcliffe recommendations emerged, much of the work was already in place.

By the end of 1960, the Bank was in a position to produce its first edition of the new *Bank of England Quarterly Bulletin*.[5] The aims were twofold (Cairncross (1985)). First, it was intended to provide regular official comment on current monetary and financial developments, including through the publication of a broader set of economic statistics. And, second, it was intended to encourage research both inside the Bank and by others outside. The first edition included an economic commentary, an analysis of banking and exchequer statistics, an article on 'the financial surplus of the private sector', the Governor's Mansion House speech and a statistical annex. It was well received although it remains unknown whether its editors at the time would have expected it still to be here some 50 years later.

The *Bulletin's* assessment

At the outset, the *Bulletin's* economic commentary was the prime route through which the Bank presented its policy analysis and assessment of current events to a wider audience. In retrospect, successive *Bulletin* commentaries also provide an

(1) The authors would like to thank Philip Bunn, Alan Castle and Kenny Turnbull for their help in producing this article.
(2) An index of past *Bulletin* articles can be found on pages 267–76 of this *Bulletin*.
(3) The origins of the *Quarterly Bulletin* are discussed further in both Cairncross (1985) and Capie (2010).
(4) See Committee on the Working of the Monetary System (1959).
(5) A dummy edition was produced in September 1960 but was not circulated.

insight into how the Bank saw its own role, and its relationship with government and markets. During this period, the Bank had no statutory policy responsibility or objective but carried out a number of functions. It was an adviser to government, especially on monetary policy; it managed the government's borrowing programme and the foreign exchange reserves; it implemented monetary policy; and it had a general interest in the structure and 'orderly' operation of financial markets. The Bank had expertise in each of these areas and its views mattered, both to government and markets. How far it felt it safe to publish these views in the *Bulletin* was a judgement and depended on the mood and circumstances of the day.

Living with fixed exchange rates

On occasion the Bank could be robust. In the period before the 1967 devaluation, the *Bulletin* chronicled the various steps taken to narrow the current deficit. These included both quantitative and qualitative forms of credit control,(1) which the Bank justified as 'an earnest of the Government's resolution to maintain the exchange rate for sterling'.(2) Aware of contrary views, the Bank added 'this does not mean that the pound has been defended at the expense of the domestic economy: but rather that, given the extent of the nation's present ability and willingness to produce, we could not afford all we were doing'.

The effort, however, proved insufficient and the pound was devalued in November 1967. 'Devaluation' commented the Bank, 'is in itself no solution…it requires, even more urgently than before, if this be possible, both that efficient production at home shall increase and that home demands which are not immediately essential to a rise in productivity shall be restrained…the potential advantages of devaluation will be lost if wage costs rise, so success also turns on the patience with which hardships in the form of higher prices and taxation…are tolerated'.(3)

Sterling remained on a fixed parity, at its new lower level, and the *Bulletin's* emphasis on wages, productivity and the current account persisted for several more years. In June 1969, for example, it was 'essential that policy manifestly continues to give priority to obtaining the necessary improvement in the balance of payments'.(4) And in mid-1970, the Bank described the upward trend in domestic incomes and costs as 'disturbing', noting that 'it remains to be seen how far improvements in productivity will relieve these pressures'.(5)

By the end of 1970, the Bank's focus was more explicitly on inflation: 'wage and price increases at current rates present grave economic and social problems at home'.(6) However, 'to cure the present inflation solely by restricting demand would be likely to involve very high costs in terms of unemployment, bankruptcies and falling output'. Accordingly, 'it remains a major priority to moderate the growth of incomes'.(7)

Living with inflation

Sterling was floated in June 1972 with the *Bulletin* reporting a loss of reserves of over £1,000 million over the previous six working days. The *Bulletin* attributed the speculative attack to concerns about how recent developments — such as the movements in domestic wages and prices — might affect the United Kingdom's future balance of payments.(8)

The following years, however, saw a new source of cost pressure from abroad. The surge in global commodity prices in 1972–74 triggered a sharp deterioration in the United Kingdom's current account position. Non-oil commodity prices started to rise from late 1971 — accelerating from mid-1972 — and oil prices quadrupled in late 1973. In classic Bank parlance, the rise in commodity prices was deemed 'particularly unwelcome' for the Government's counterinflationary policies.(9)

Also of significance, however, was the impact on the country's balance of payments. Rising commodity prices were estimated to account for the majority of the deterioration in the current account between the first half of 1972 and late 1973, as a substantial non-oil deficit emerged.(10) And the surge in oil prices led to a further widening of the current account deficit, from a quarterly rate of £660 million in the fourth quarter of 1973 to almost £1 billion in the first quarter of 1974 (Bank of England (1974a)). The prospect of exporting North Sea oil meant that the UK economy was deemed 'favourably placed' in the longer term, but the non-oil deficit meant the near-term situation was less favourable.(11) The Governor at the time — Gordon Richardson — stated that there 'is no doubt that this non-oil deficit must be corrected as soon as possible' (Richardson (1974)).

Initially, however, concern appeared unwarranted as the larger current account deficit was financed without undue difficulty during the first half of 1974. But pressures started to build during 1975 as the ongoing deficit proved increasingly hard to finance, with sterling depreciating substantially over the year and official reserves being drawn down. In June 1976, the G10 and Switzerland, together with the Bank for International Settlements, announced a $5.3 billion short-term credit facility made available to the Bank 'in the common interest of the stability and efficient functioning of the international monetary system'.(12) But by September, and with sterling falling further, the Bank warned that 'the problems faced by

(1) Bank of England (1966a), page 3.
(2) Bank of England (1966b), page 220.
(3) Bank of England (1967), page 336.
(4) Bank of England (1969a), page 144.
(5) Bank of England (1970a), page 135.
(6) Bank of England (1970b), page 400.
(7) Bank of England (1971a), page 166.
(8) Bank of England (1972a), pages 325–26.
(9) Bank of England (1973a), page 127.
(10) Bank of England (1973b), page 410.
(11) Bank of England (1974a), page 134.
(12) Bank of England (1976a), page 163.

this country with regard to inflation and the balance of payments are especially severe'.(1) These problems proved too severe for the country to deal with unaided and the Government applied to the IMF for a stand-by credit.

The December 1976 *Bulletin* went to print in an atmosphere of crisis. 'At the time of writing (8th December), the reaction of the Government to the present situation is still under consideration. But in general it is clear that circumstances limit the room in which economic policy can manoeuvre…we face a year more of restraint and retrenchment.'(2) Tight monetary targets were urged, with particular emphasis on domestic credit expansion. But on the brighter side, the *Bulletin* observed that, unlike other countries, the United Kingdom could look forward to its own source of oil.

Living with monetary aggregates

Subsequently, inflation rates improved gradually as wage and price controls took hold and sterling appreciated, partly in response to North Sea oil. In addition, tight control of banking balance sheets — including through the 'corset' — improved at least the appearance of the monetary statistics.

Inflation rebounded, however, in 1980 following the unwinding of wage controls and a further pickup in the oil price. The withdrawal of the corset also led to a return to bank intermediation of credit, contributing to above-target growth in broad money. And yet, as the Assessment pointed out at some length in December 1980, the behaviour of sterling M3 'has probably not adequately reflected the stringency of financial conditions', which were putting considerable pressures on industry and had been effective in slowing inflation.(3) In large part, the counterinflationary pressure was coming from the appreciating real exchange rate. But the *Bulletin* also devoted considerable space to explaining the overshoot in the monetary data, which remained at that time the official measure of the monetary policy stance. The Bank was, however, careful to stress that this was not the only factor — 'monetary policy has thus continued to have to pay regard to a range of considerations: the target aggregate, sterling M3, and the other monetary aggregates, as well as the exchange rate, the rate of inflation and developments in the economy affecting them'.(4)

The 1992 sterling ERM crisis

Through much of the 1980s there was discussion of sterling's entry into the Exchange Rate Mechanism (ERM). And even while sterling was outside the system, shadowing policies were sometimes pursued to provide a nominal anchor for expectations. Sterling finally joined the ERM on 8 October 1990. Under the terms of entry, sterling was allowed to fluctuate against other currencies in a band of ±6% around a set of agreed bilateral central rates.(5) Membership of the ERM was expected to reinforce the authorities' counterinflationary strategy and to provide greater stability to help businesses to plan and invest.(6) The Bank warned that 'companies can have no grounds for expecting a lower exchange rate to validate any failure to control costs', warning that 'if they fail to recognise the constraints under which they now operate, the outcome will prove painful for them'.(7)

There were few signs of any tension within the ERM during 1991 despite contrasting moves in interest rates across member countries. But pressures increased during the first half of 1992 as the Bundesbank attempted to quell building inflationary pressure emerging from reunification. High interest rates in Germany obliged other countries 'to maintain higher interest rates than domestic considerations would, for the most part, have dictated', making it difficult for UK authorities to ease policy further in response to the persistent weakness in output.(8) Nevertheless, even in May, the tensions were not yet perceived to be 'serious'.

The situation deteriorated further in the second half of the year. The Bundesbank raised its discount rate in mid-July and the negative vote in the Danish referendum on the Maastricht Treaty increased tensions within the ERM. Sterling came under pressure throughout July and August as concerns built about the prospect of a 'no' vote in the French referendum on the Maastricht Treaty, due to be held on 20 September. The August *Bulletin* noted these 'strains' within the ERM, but emphasised the importance of the credibility derived from the authorities' macroeconomic policies.(9)

Tensions came to a head on 16 September when sterling fell towards its floor.(10) The Bank intervened to support the currency and there were two announced increases in interest rates. But the measures proved insufficient and with the cost of supporting the currency becoming prohibitive, the only appropriate action was to suspend sterling's membership of the ERM. The costs were substantial — both financially and in terms of the credibility of the authorities' counterinflationary policies. Robin Leigh-Pemberton — the Governor at the time — described sterling's exit as 'a shock; it was a shock to confidence; and it was a shock to a framework for monetary policy which had become highly visible and easily understood'.(11)

The sterling ERM crisis marked a watershed in UK monetary policy. Immediately after exit, the Chancellor announced the introduction of an inflation target and Leigh-Pemberton

(1) Bank of England (1976b), page 297.
(2) Bank of England (1976c), page 419.
(3) Bank of England (1980), page 406.
(4) Bank of England (1981), page 452.
(5) The ERM is described further in Adams (1990).
(6) Leigh-Pemberton (1990), page 483.
(7) Bank of England (1990), page 439.
(8) Bank of England (1992a), page 125.
(9) Bank of England (1992b), pages 241 and 244.
(10) The events of the day are described on an hour-by-hour basis in the 'Operation of monetary policy' section of the November 1992 *Bulletin* (Bank of England (1992c)).
(11) Leigh-Pemberton (1992), page 458.

emphasised the importance that 'the authorities are not perceived as taking their eye off their counterinflationary duty'.(1) The crisis also marked a watershed for the *Bulletin* — the Chancellor accompanied the announcement with an invitation for the Bank to produce a regular report on the progress being made towards the inflation target. With the advent of this '*Inflation Report*', the general assessment section of the *Bulletin* ceased to exist, more than 30 years after it was first introduced.

Evolution of central banking

The role of the *Bulletin* is, however, broader than the assessment of current economic or financial developments. The research and analysis contained within the articles in the *Bulletin* has been one of the mainstays of the publication. Some of these — such as 'The use of quill, patent and steel pens by the Bank of England during the nineteenth century' (Bank of England (1972b)) — have perhaps been somewhat tangential to core central banking. But, in general, these articles, supplemented with the speeches and working papers covered in the *Bulletin*, provide a rich stream of thought with which to monitor how key central banking issues have evolved. Two such examples of these are the role of money within the monetary policy framework and the Bank's official operations in sterling money markets.

The role of money

The importance of money within the monetary policy framework was one of the highest profile economic debates of the 20th century. The strength of the long-run relationship between money growth and inflation is now widely accepted.(2) But that was not the case at the end of World War II, when the role of monetary policy was perceived to be largely to manage the exchange rate and thereby the balance of trade. It was not until later that inflation was understood to be 'always and everywhere a monetary phenomenon' (Friedman (1963)). Indeed, during the 1960s, the *Bulletin* was largely silent on the role of money, at least in terms of analytical contributions.(3) That is not to say, however, that work was not progressing internally. In 1966, for example, an article on money was scheduled for publication but was culled late on in the process (Capie (2010)).

It was not until the 1970s that the Bank started to engage publicly with the debate surrounding monetarism. The seminal work — 'The importance of money' — was published in the *Bulletin* in 1970 (Goodhart and Crockett (1970)). This examined closely the distinguishing features of the 'monetarist' and 'Keynesian' theories on the role of money, highlighting the importance of the demand for money. It then went on to estimate money demand functions, an approach that was extended in a number of subsequent *Bulletin* articles during the remainder of the 1970s (see, for example, Price (1972), Hacche (1974) and Coghlan (1978)).

Attention also shifted during the 1970s to the potential role for targets for money growth in controlling inflation. The British Government first began publishing targets for money growth in 1976. Commenting on these in a speech in 1977, then Governor of the Bank — Gordon Richardson — stated that 'the best way of giving a clear indication of the thrust of monetary policy is to state quantitative aims for the rate of expansion of one or more of the monetary aggregates' (Richardson (1977)).

The focus on monetary targets increased following the election of the Thatcher Government in 1979 and, in particular, the introduction of target ranges for broad money as the sole intermediate target in the Medium Term Financial Strategy (MTFS) in 1980. Somewhat paradoxically, analytical contributions on money in the *Bulletin* fell back over this period. But that is perhaps unsurprising — the political prominence and economic relevance of broad money meant it became instead a key focus of the economic commentary.

By the mid-1980s, however, doubts were growing about whether monetary targets continued to serve a useful purpose. In a speech in 1986, Governor Robin Leigh-Pemberton commented that the relationship between the rate of growth of broad money and the rate of growth of nominal incomes had become increasingly unpredictable (Leigh-Pemberton (1986)). He attributed this to the rapid pace of financial change during the 1980s and raised the question about whether it might not be better to dispense with a target for broad money, something that was subsequently done in the 1987/88 MTFS.(4)

Having played only a supporting role during the United Kingdom's membership of the ERM, money growth once again rose in prominence following sterling's exit, with the announcement of medium-term monitoring ranges for both M4 and M0. Articles on money began to appear with some regularity in the *Bulletin*. Most of these began to focus on money growth at a more disaggregated (sectoral) level, identifying factors that were influencing the money holdings of households, companies or other financial corporations.(5) Some articles — on 'divisia money' — explored the weights that should be placed on different components of money according to their use in transactions (Janssen (1996) and Hancock (2005)). And other articles explored the information that money and credit might contain as a guide to real and nominal trends two to three years ahead (Astley and Haldane (1997)) — a topic originally explored in the *Bulletin* back in

(1) Leigh-Pemberton (1992), page 459.
(2) See, for example, the evidence in King (2002) and Benati (2005).
(3) The exception came in 1969, when an article was published on the concept of 'domestic credit expansion', which was viewed as superior to the rate of growth of money supply as an indicator of monetary conditions (Bank of England (1969b)). While analytical articles were few and far between, the economic commentary consistently referred to money and credit growth throughout the period.
(4) Illustrative targets remained for the narrower M0 measure.
(5) See, for example, Salmon (1995), Thomas (1996), Brigden *et al* (2000), or Berry *et al* (2007).

1970 (Crockett (1970)) — or the role of money and credit in an inflation-targeting regime (Hauser and Brigden (2002)).

The contributions contained within the *Quarterly Bulletin* do, of course, represent just one small part of the vast academic literature on the role of money. Nevertheless, as this potted history has demonstrated, leafing through the pages of the 50 years of *Bulletins* can provide an interesting insight into how the analysis of the role of money has evolved within the central banking community.

The Bank's role in the money markets

The Bank's operations in the sterling money markets are the means by which the Bank both implements monetary policy and reduces the cost of disruption to the liquidity and payment services supplied by commercial banks. Consequently, these operations lie at the heart of central banking. The framework governing the Bank's operations can be split into three broad periods during the *Bulletin's* lifetime: up to 1981; 1981–2006; and post-2006 (including the financial crisis). Other reforms during the period — notably those in 1971 and 1996–97 — were largely operational and left the conceptual framework in place at the time little altered. Throughout these reforms, the *Quarterly Bulletin* has acted as a record of both the changes and the motivations underlying them. It is of course impossible to do justice to this history in just a few paragraphs; this section aims merely to provide a brief overview.(1)

Prior to 1981, the Bank operated what was referred to as the 'classical' system.(2) Each week, a money market 'shortage' was created by the Bank issuing slightly more Treasury bills than necessary for the Treasury's needs (Bank of England (1963)). Discount houses — specialist intermediaries in the short-term money market — thereby needed to come to the Bank for funds, which the Bank would make available at the appropriate policy rate. In this framework, it was this lending facility that determined market rates; other open market operations (in which the Bank dealt in the market on a multilateral basis) were secondary, aiming merely to offset other 'autonomous' factors that might affect the amount discount houses needed to borrow.

A series of reforms was introduced during the 1970s to increase the focus on interest rates rather than quantitative controls in monetary policy (Bank of England (1971b,c)). But the underlying framework governing the Bank's money market operations remained the same. From 1972, the policy rate was replaced with a Minimum Lending Rate (MLR), which was linked initially to the Treasury bill rate but was later administered. The requirement on clearing banks to hold a certain proportion of their deposit liabilities as cash or high-quality assets was extended to cover all banks. And clearing banks were required to agree to end their collective agreements on interest rates.(3)

By the end of the 1970s, however, further (more fundamental) reforms were felt necessary. These stemmed in part from a desire to allow market factors a greater role in determining the structure of short-term interest rates and the need for greater flexibility to deal with higher and more volatile inflation (Bank of England (1982)). But more significantly, while the case for moving to a system aimed at controlling the monetary base was eventually rejected by the Government, new money market arrangements were necessary to leave open a move in that direction.(4)

The reforms in 1981 emphasised the role of open market operations relative to the Bank's lending facility. The abolition of the reserve asset ratio (liquidity) requirement relieved clearing banks of the requirement to hold excess balances at the Bank of England. Instead, discount houses would use the Bank's open market operations to bid for the amount judged necessary solely for market participants to avoid the penal charges incurred if their balances at the Bank went overdrawn. The Bank ceased to continually post an MLR; interest rates were determined by market forces based on the aggregate supply and demand of balances at the Bank, with the Bank intervening only when rates went outside an unpublished band. But from 1985, the Bank did once again, from time to time, announce an MLR at which discount houses could borrow from the Bank in an operation later in the day. And the introduction of inflation targeting in 1992 along with the regular interest rate meetings between the Chancellor and the Governor — the 'Ken and Eddie show' — meant that the authorities were setting interest rates overtly rather than leaving it to the market.

By the mid-1990s, further reforms were required (Bank of England (1997, 1998)) to address concerns that the limited scope of the operations allowed a few market participants to influence overnight interest rates disproportionately. First, the pool of eligible collateral was extended to include the newly developed gilt repo market.(5) Second, the range of counterparties was extended to include banks and securities dealers as well as the discount houses. And, third, the late-day (penal rate) lending facility was made available to all settlement banks, rather than just the discount houses. These reforms were supplemented in 2001 with an overnight deposit facility, thereby creating a 'corridor' for market interest rates.

In 2003, however, the Governor announced a review of the Bank's money market operations 'with a view to improving and simplifying them' (King (2003)). The existing system was complex and the two-week maturity of the open market

(1) For further detail, see Chapters 6, 9, 10 and 13 of Capie (2010) or Tucker (2004).
(2) See, for example, page 213 of Coleby (1983).
(3) These reforms are discussed further in Davies *et al* (2010).
(4) For further discussion of the monetary base control debate, see Foot *et al* (1979).
(5) Gilt repo operations had been used previously, for example during the ERM crisis in 1992. For further discussion of the gilt repo market, see Bank of England (1996).

operations could lead to an unusual interest rate maturity structure around the time of policy rate changes. In addition, although market interest rates were kept broadly in line with the policy rate on average, overnight interest rates were highly volatile by international standards and could still be influenced by some counterparties, thereby discouraging participation.

The reforms of 2006 returned the standing (lending and deposit) facilities to pre-eminence as the means through which overnight interest rates were set.(1) Banks agreed to hold a specified positive balance with the Bank on average over a maintenance period lasting from one Monetary Policy Committee meeting to the next. The level of 'reserves balances' targeted was chosen by individual banks and, for the first time ever, remunerated at the Bank's official policy rate. Weekly open market operations were used to ensure that the demand for reserves was met in aggregate. Standing lending and deposit facilities were made available for banks to access at any time, priced to create a corridor around the official policy rate. These arrangements ensured that, through arbitrage, overnight interest rates should remain around the middle of the corridor over the maintenance period in line with Bank Rate (Mac Gorain (2005)).

The framework was adapted further during the recent financial crisis in response to significant changes to financial and monetary conditions.(2) These adjustments are discussed further on pages 292–301 of this *Bulletin* and so will not be discussed at length here. In brief, however, the introduction of asset purchases (also known as 'quantitative easing') led to the suspension of reserves targets, with all reserves remunerated at Bank Rate. In addition, a number of liquidity insurance facilities were introduced. These included long-term (initially three-month) repo operations against a wider-than-normal pool of collateral, and a US dollar facility to address strains in term money markets and dollar markets. The Bank also introduced the Special Liquidity Scheme (SLS) and, subsequently, the Discount Window Facility (DWF) to allow banks to exchange illiquid collateral for UK Treasury bills or gilts for a fee.(3) Of these, both the SLS and US dollar facility were intended as temporary measures whereas the DWF and the extended-collateral long-term repos are intended to be permanent features. The prospective shape of the sterling monetary framework is examined further in the article by Clews, Salmon and Weeken on pages 292–301 of this *Bulletin*, continuing the *Bulletin's* tradition of documenting the Bank's role in sterling money markets.

The *Bulletin's* evolution

The *Quarterly Bulletin* has evolved continually to reflect the changing nature of the Bank and its communication needs. In some instances, that has reflected changes in content, as when the *Inflation Report* was first introduced in 1993. But on other occasions it has reflected changes in style, design or method of communication. This section reviews how the *Bulletin* has evolved over time.

Structure and content

Despite its age, the backbone of the *Bulletin* remains similar to that in the first edition in December 1960 (**Table A**). Research articles continue to form a core part of the *Bulletin*. And, while the nature of the report may have shifted over time, there has been a consistent focus on recent developments in financial markets throughout the history of the *Bulletin*.

Table A Structure of the *Quarterly Bulletin*

	1960–92	1993–96	1997–2000	2001–08	2008–current day
Summary/foreword[a]		✓	✓	✓	✓
Economic commentary[b]	✓				
Financial market commentary[c]	✓	✓	✓	✓	✓
Research and analytical articles	✓	✓	✓	✓	✓
Full speeches[d]	✓	✓	✓	✓	
Speech summaries					✓
Working paper summaries				✓	✓
Statistical annex	✓	✓			

(a) During 1993, the summary formed the introduction to the *Inflation Report* but from 1994 it covered the main content of the *Quarterly Bulletin*.
(b) While the commentary on the domestic economy ended following the publication of the *Inflation Report* in 1993, the *Bulletin* continued to contain a section on international economic developments up until 2001.
(c) The commentary on financial markets was dropped for three editions in 1997 before being reintroduced.
(d) Only selected speeches were published in early editions.

But there have been some notable changes in the *Bulletin's* structure over time. Perhaps most noteworthy is the shift away from publishing commentary or assessment of recent economic developments. For many years, this was the highest-profile section within the *Bulletin*, representing as it did the easiest (and, often, only) way to understand the Bank's thinking on the issues of the day. But following the introduction of inflation targeting in 1992 and the requirement on the Bank to produce a quarterly '*Inflation Report*', this part of the *Bulletin* was stripped out, leaving the *Bulletin* to focus solely on recent financial and, for a time, international developments.

A second notable change was the cessation of the statistical annex in 1997 as these figures moved across to form part of the Bank's new *Monetary and Financial Statistics* publication. On one level, this marked a clear departure from one of the original purposes of the *Bulletin*: to provide regular financial statistics. But it was actually aligned with the original thinking of the Radcliffe Committee, which had never envisaged the *Bulletin* including these statistics, favouring instead a separate 'Digest of Monetary and Financial Statistics'. Nevertheless, the removal of the statistical annex altered the nature of the *Bulletin*, increasing the share devoted to more medium-term analytical research.

(1) See Bank of England (2004a,b), Tucker (2004) and Clews (2005).
(2) See Cross, Fisher and Weeken (2010) or Clews, Salmon and Weeken (2010).
(3) For further discussion of the Bank's collateral risk management framework, see Breeden and Whisker (2010).

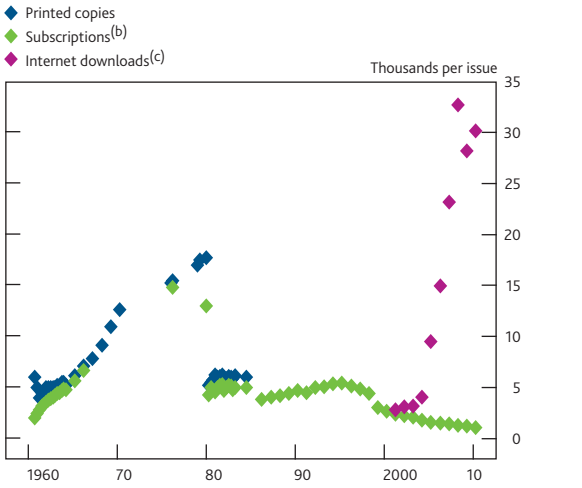
Other changes to the *Bulletin* have perhaps been less prominent but have, nevertheless, marked important stages in the *Bulletin's* evolution. The emergence of the information age placed a premium on the *Bulletin* being easily digestible for readers who had increasing access to vast swathes of research. From 1993, a summary was introduced (later evolving into a foreword authored by the Bank's Chief Economist) that allowed a busy reader to grasp quickly the key points. And summaries of Bank of England working papers were introduced in 2001, thereby allowing easy access to the breadth of the Bank's research. More recently, the immediacy with which speeches have become available — both through media and the internet — has nullified the need to replicate speeches in full in the *Bulletin*; instead, short summaries were made available from 2008. This contrasted with earlier years, where the *Bulletin* could sometimes represent the first opportunity readers would have had to read Bank speeches.

Style and publication

Over the years, a great deal of care and consideration has gone into the design and production of the Bank's publications. The *Bulletin* has gone through various incarnations, as shown by the selection of front covers in **Figure 1**, but it remains the same clearly branded product that it was back in 1960. Boxes — now an important part of the *Bulletin* — were introduced from 1981, thereby allowing standalone parts of the analysis to be separated out from the main text. And it was not until 1992 that colour was first introduced into the *Bulletin*.

Changes in design were accompanied by changes in communication techniques. When the *Bulletin* was first introduced in 1960, it was freely available and the print run quickly soared, from around 5,000 per issue in early editions to approaching 20,000 per issue towards the end of the 1970s (**Chart 1**). But these numbers were unsustainable without charges being brought in to cover printing costs. These were introduced in the early 1980s and circulation fell back sharply, to numbers comparable to those in the early 1960s.

Chart 1 *Quarterly Bulletin* circulation[a]



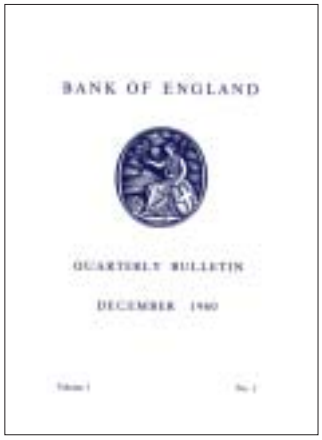
(a) The data are based on past internal papers; gaps occur where the data are incomplete.
(b) Includes complimentary copies and all UK and overseas paid and concessionary subscribers who receive the *Bulletin* when it is released.
(c) Average number of downloads for each issue within a calendar year. A download is recorded if somebody chooses to download either the full *Bulletin* or an individual article. So the numbers may distort the number of individual readers.

Circulation was then steady for much of the 1980s before falling back from the mid-1990s as copies became more widely available on the internet. Indeed, internet downloads have soared in recent years as the Bank has shifted towards greater use of electronic communication.

The future of the *Bulletin*

The Bank places great premium on the effectiveness of its communication, and seeks continually for ways to make improvements (see, for example, Aikman *et al* (2010)). Over the past 50 years, the *Quarterly Bulletin* has been a key conduit through which external observers can gain an insight into the Bank's thinking, and never more so than during the recent financial crisis. The *Bulletin* has evolved during that time, adapting to new responsibilities and new technologies. But the same rigour and analysis that underpinned the original *Bulletin* remains today and will continue to do so in the future.

Figure 1 Selection of past covers of the *Quarterly Bulletin*



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Index of articles 1960–2010

This subject index covers all articles published during the first 50 years of the *Quarterly Bulletin* (ie up to 2010 Q3). It also includes the main subjects of speeches by the Governors, senior staff and external MPC members, together with notices and notes, including 'boxes' in articles and in the various regular commentary articles. It does not include the subject matter of the commentary articles themselves, nor does it cover the statistical annex. Neither does it include the *Inflation Report*, which was contained within the *Quarterly Bulletin* during 1993.

Entries are referenced by a code generally in the form **yy**-ppp where **yy** represents the last two digits of the year of the issue and ppp the page number within that volume. In the first five issues, covering 1960 and 1961, pages are numbered from 1 in each issue; for 1961 the first part of the reference code has three digits, the third being the number of the issue within that year. Thus, **613**-24 refers to page 24 of the September 1961 issue. Speeches are indicated by a letter in brackets after the reference; the annual Mansion House speeches are denoted by (M) and other speeches by (S). Speeches are included up to 2008 Q3, since when only summaries have been published in the *Bulletin*.

The UK recession in context — what do three centuries of data tell us?

By Sally Hills and Ryland Thomas of the Bank's Monetary Assessment and Strategy Division and Nicholas Dimsdale of The Queen's College, Oxford.[1]

The *Quarterly Bulletin* has a long tradition of using historical data to help analyse the latest developments in the UK economy. To mark the *Bulletin's* 50th anniversary, this article places the recent UK recession in a long-run historical context. It draws on the extensive literature on UK economic history and analyses a wide range of macroeconomic and financial data going back to the 18th century. The UK economy has undergone major structural change over this period but such historical comparisons can provide lessons for the current economic situation.

Introduction

The UK economy recently suffered its deepest recession since the 1930s. The recent recession had several defining characteristics: it took place simultaneously with a global recession; the financial sector was both the source and propagator of the crisis; the exchange rate depreciated sharply; and there was a substantial loosening of monetary policy alongside a marked increase in the fiscal deficit. But despite UK output falling by more than 6% between 2008 Q1 and 2009 Q3, CPI inflation remains above the Government's 2% inflation target.

To mark the 50th anniversary of the *Quarterly Bulletin*, this article places these recent events in a long-run historical context. It looks at an extensive range of macroeconomic and financial data reaching back as far as the early 18th century. It uses these data to draw out some of the key features of historical recessions and recoveries, drawing on the extensive literature on the United Kingdom's economic history.[2] This collection of data is provided as an annex to this article.[3] Although the UK economy has undergone structural change over this period, the past may contain lessons for the current recovery.

The article is structured as follows. The first section provides a basic chronology of UK economic cycles. It looks at the comparative scale of the recent recession and examines how it fits into the general classification of UK business cycles in the historical literature. The second section considers some of the key drivers of UK business cycles, including the role of external factors, and monetary and fiscal policies. The final section considers the behaviour of nominal variables over the cycle.

An overview of UK business cycles

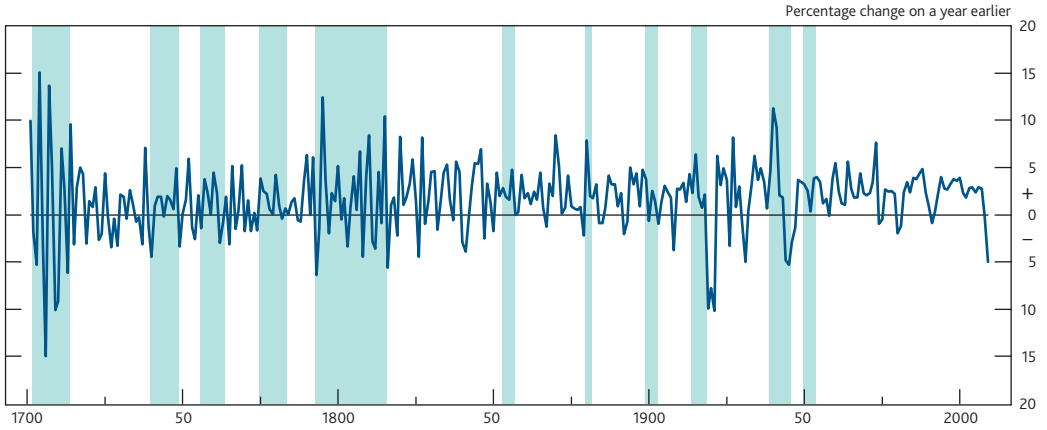
Over the past half century, enormous effort has gone into constructing historical national income data for the United Kingdom. First, annual GDP estimates were constructed back to the mid-19th century, based on output, income and expenditure approaches (Deane and Cole (1962), Deane (1968) and Feinstein (1972)). These were followed by 'balanced' estimates of GDP growth that attempted to reconcile these different approaches from 1870 onwards (Solomou and Weale (1991) and Sefton and Weale (1995)). More recently, annual GDP estimates have been constructed back to the 18th century using an output-based approach (Broadberry and van Leeuwen (2010)).[4] And more frequent (monthly and quarterly) estimates of GDP have been constructed for the inter-war years (Mitchell *et al* (2009)). Although there is inevitable uncertainty around historical national accounts data,[5] collectively these estimates allow a rich historical analysis of UK economic cycles.

This section constructs a simple chronology of business cycles in the United Kingdom, drawing out some general characteristics that allow comparisons to be made with the recent recession.

Taking the data at face value, the volatility of economic growth appears to have changed considerably over time. During the 18th and early 19th centuries, for example, GDP growth

(1) The authors would like to thank Lisa Gupta, Chris Hare, Natalie Hills, Priya Mistry and Amar Radia for their help in producing this article.
(2) For further, more detailed discussion of historical economic cycles, see Dimsdale (1990), Solomou (1994) and Dow (1998).
(3) See www.bankofengland.co.uk/publications/quarterlybulletin/threecenturiesofdata.xls.
(4) We are very grateful to Steve Broadberry and Bas van Leeuwen for permission to use the provisional results from their work.
(5) See Solomou and Weale (1991), Solomou (1994) and Solomou and Ristuccia (2002).

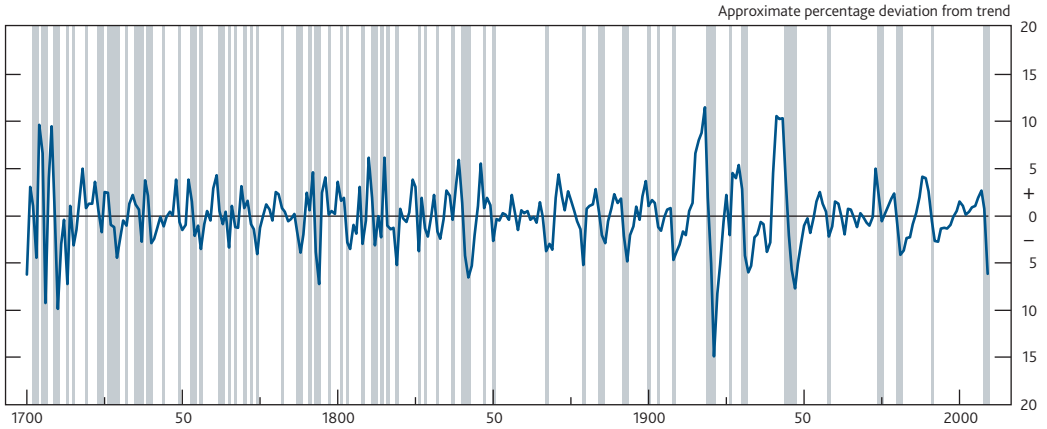
Chart 1 Annual UK GDP and major war periods[a]



Sources: Broadberry and van Leeuwen (2010), Mitchell (1988), Sefton and Weale (1995), Solomou and Weale (1991) and ONS.

(a) Factor cost measure. See the appendix for details of how these series are combined. Major war periods are shaded in blue.

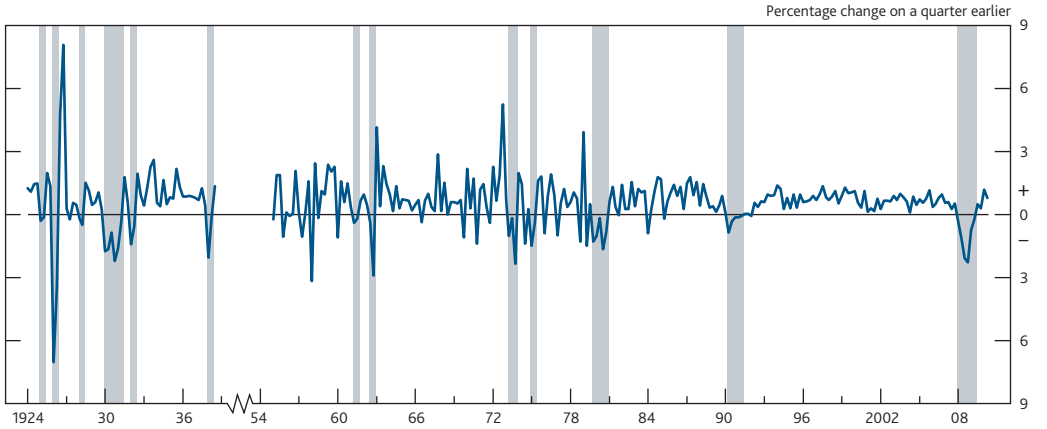
Chart 2 UK GDP relative to a statistical trend[a] and annual recessions[b]



Sources: As in **Chart 1**.

(a) A Hodrick-Prescott filter with a lambda parameter of 100 was used to detrend GDP at factor cost.
(b) Annual recessions are defined as one or more years of negative calendar-year growth in GDP and are shaded in grey.

Chart 3 UK GDP and recessions[a] — quarterly data



Sources: Mitchell *et al* (2009) and ONS. No quarterly GDP data available for 1939 Q1–1954 Q4.

(a) Factor cost measure. Recession periods are shaded in grey and defined as two or more consecutive periods of negative quarterly growth in GDP at factor cost.

appears to have been relatively volatile (**Chart 1**).[1] Using a simple statistical trend, the gaps between major peaks and troughs were relatively short, at between two and three years implying a total cycle of around five years (**Chart 2** and **Table A**).[2] While measurement error is undoubtedly more of a problem for this period, Broadberry and van Leeuwen (2010) note the timing of these cycles appears to coincide broadly with those identified by earlier authors using more disaggregated data and other indicators.

Table A Summary of UK GDP cycles[a]

	Annual GDP growth		Average length of cycle (years)		
Period	Averages	Standard deviation	Downturn	Upturn	Total
1701–1831	1.09	4.32	2.50	2.56	5.06
1831–71	2.21	2.79	2.60	5.40	8.00
1871–1913	1.76	2.24	4.20	4.20	8.40
1921–38	2.56	3.42	2.00	6.50	8.50
1952–92	2.37	2.00	2.71	3.00	5.71
1992–2007	2.93	0.65			

(a) Date ranges chosen represent either peak-to-peak points or trough-to-trough points, apart from 1992–2007 which is treated as a single upswing period. Downturns (upturns) are defined as peak-to-trough (trough-to-peak) periods based largely on the detrended output data in **Chart 2** but also informed by growth rates in **Chart 1**. So downturns will include periods of below-trend growth as well as actual recessions.

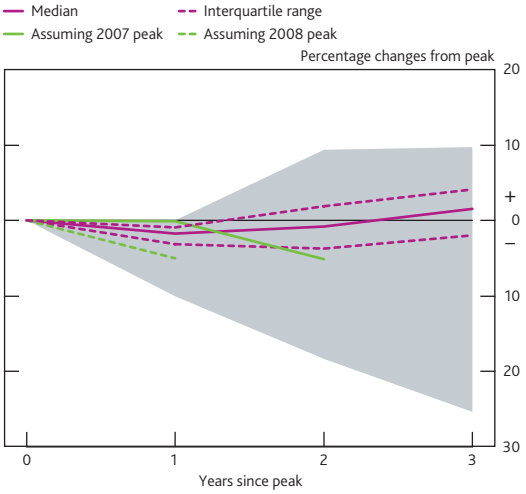
During the mid-to-late 19th century, the average growth rate of the economy picked up and there was less volatility in output (**Table A**). As a result, recessions were rarer and the business cycle lengthened to around eight years.[3] But volatility returned in the 20th century, during which there were several major recessions. Business cycles after World War II were typically shorter than those during the 19th century (Matthews *et al* (1982) and Dimsdale (1990)). But the post-World War II period also contained prolonged periods of positive and relatively stable (annual) growth, such as in the late 1950s/early 1960s, and between the early 1990s and the onset of the recent financial crisis.

The scale of decline in output in the recent recession was large but not unprecedented when viewed in a simple historical context. It lies within the broad swathe of past recessions since 1700 (**Chart 4**). And, based on quarterly data (**Charts 3** and **5**), its profile is not dissimilar to certain other post-World War I recessions.

The drivers of UK cycles

This section draws on the economic history literature to examine the key drivers of past economic cycles, linking them to developments in the world economy, domestic fiscal and monetary policy, and past financial crises. The data are split into three periods: 1700–1830; 1830–1913; and 1913–2007. These dates are in part chosen according to the availability of data, but they also correspond approximately to distinct phases in the United Kingdom's economic history.

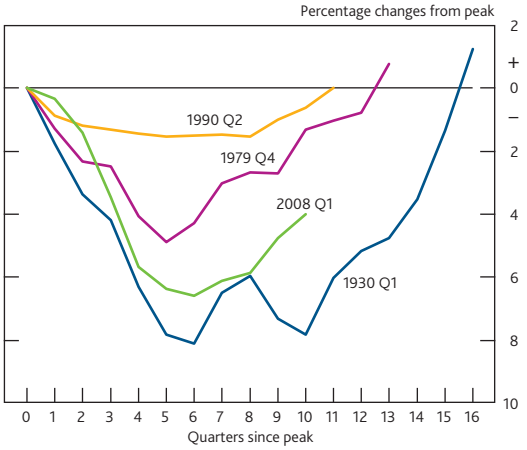
Chart 4 A swathe[a] of recessions since 1700



Sources: As in **Chart 1**.

(a) The swathe shows the range of percentage falls in the level of GDP from previous cyclical peaks. The chart shows the recent recession using both 2007 and 2008 as the peak year. The recession lasted from 2008 Q2–2009 Q3 but the fall in annual average GDP in 2008 was only 0.1%.

Chart 5 GDP behaviour during major 20th century recessions[a]



Sources: As in **Chart 3**.

(a) The dates shown mark the peak in output. As discussed in the box on page 48 of the November 2010 *Inflation Report*, the chart defines the pre-recession peak as 1979 Q4 for the early 1980s recession. But the level of output was higher in 1979 Q2, and using that definition the fall in output looks more similar to the recent recession.

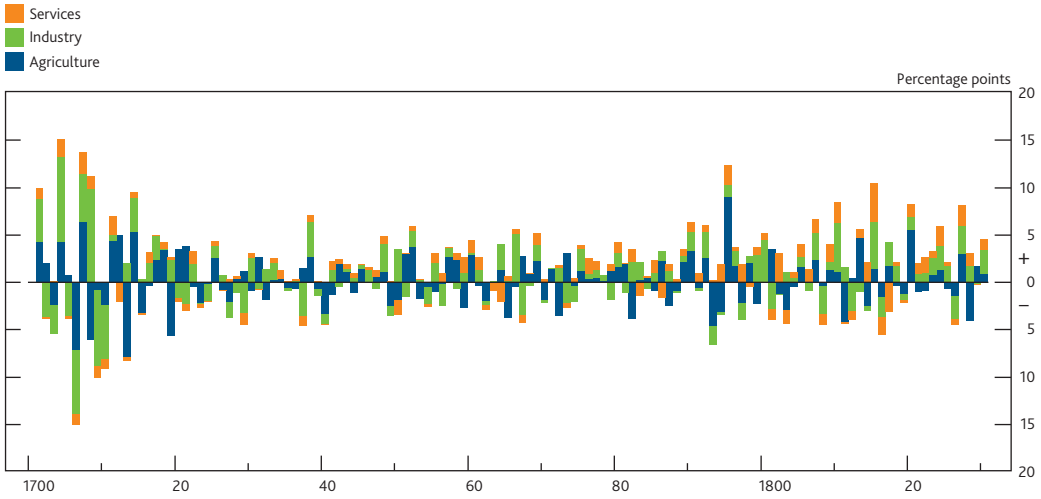
The industrialising economy 1700–1830

While data for the 18th and early 19th centuries are inevitably uncertain, there are a number of candidate explanations for relatively volatile economic growth (Gayer *et al* (1953), Ashton (1959), Deane (1965) and Hoppit (1986)).

The first of these is the impact of poor harvests. Agricultural output was a large contributor to the swings in output over

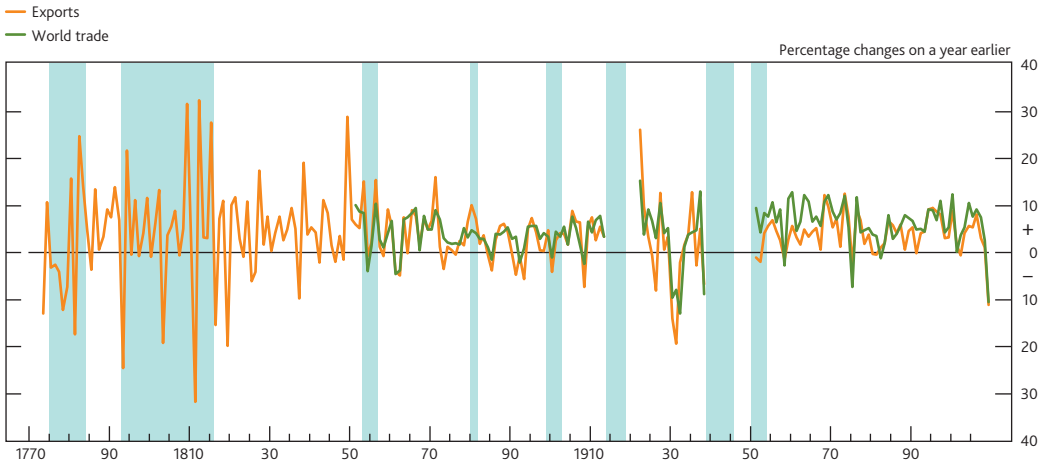
(1) Further information on how these composite measures are constructed can be found in the appendix.
(2) The simple statistical trend used is a Hodrick-Prescott filter with a smoothing parameter ('lambda') of 100. Although this filter suffers from well-known 'end point' problems it should still provide a reasonable basis for determining peaks and troughs in the economic cycle. It is unlikely, however, to pick up high-frequency fluctuations in potential supply, so the detrended GDP series in **Chart 2** should not be interpreted as an indicator of inflationary pressure, as is discussed later in this article.
(3) Some of the cycles apparent in the late 19th century may be artefacts of the way in which some of the data were constructed (Solomou (1994)).

Chart 6 Contributions to output growth 1701–1830



Source: Broadberry and van Leeuwen (2010).

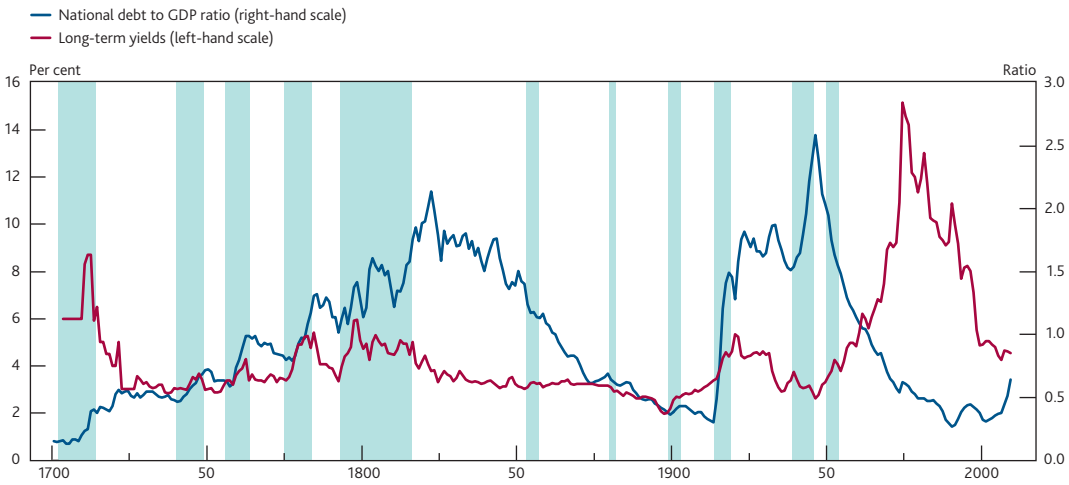
Chart 7 Exports and world trade(a)



Sources: Cuenca Esteban (1997), Domit and Shakir (2010), Feinstein (1972), Lewis (1981), Mitchell (1988), ONS and United Nations.

(a) Both 1914–21 and the period 1939–50 are excluded due to a lack of data availability. Major war periods are shaded in blue.

Chart 8 National debt(a) to GDP ratio and long-term government bond yields(b)



Sources: See appendix for nominal GDP; Janssen *et al* (2002), Mitchell (1988), Bank of England and ONS for the national debt and long-term government bond yields.
Major war periods are shaded in blue.

(a) Par or nominal values; calendar-year observations represent end financial year stocks (eg 1974 = 1974/75 end-year stock); from 1835/36 terminable annuities are included in the national debt; from 1974/75 public sector net debt is used. For market values, see Janssen *et al* (2002); these are included in the data annex.
(b) These include the corrections made by Harley (1976) for the 1879–1902 period.

this period (**Chart 6**), reflecting in part its 30% share of GDP.[1] And to the extent that agricultural products were used as an input into other production processes, this may have had a further knock-on effect to the industrial sector.

A second reason was that Britain was at war for almost half of this period. The disruption to trade that accompanied these wars frequently led to weaker exports and economic downturns. But wars could also trigger cyclical upturns (Deane (1965)); concerns about potential disruptions to trade could lead to a near-term boost in activity, perhaps explaining the pickup in exports in 1774/75 and 1791/92 (**Chart 7**). And exports of munitions and other war materials also increased in some conflicts.

A third reason for the volatility of growth was the domestic investment cycle. Spending on the investment projects of the time — such as road (turnpike) and canal building — often fluctuated in response to waves of optimism (for example the canal 'mania' in the mid-1790s) as the industrialising economy of Britain developed (Feinstein and Pollard (1988)).

In addition, there were a number of financial crises during this period (Ashton (1959) and Hoppit (1986)). In part, these were crises of public finance that had little impact on the private sector and growth more generally, especially in the early to mid-part of the 18th century. These crises mainly reflected fluctuations in the fortunes of war. Public debt rose throughout the 18th century, reaching over twice the level of GDP just after the end of the Napoleonic Wars (**Chart 8**). This level was only surpassed at the end of World War II and is three times as high as the projected peak in the public sector debt ratio in the June 2010 *Budget*. Increases in the public debt ratio resulting from military spending were often associated with increased government bond yields (Barro (1987)) and public finance crises, such as those in 1745 and 1761.

During the second half of the period, financial crises increasingly began to involve the private sector more widely and often occurred at the peak of the economic cycle. This was arguably the natural outcome of the growing pains of a developing industrial economy. Upturns in economic growth, although well founded, often encouraged speculative business activity much of which was financed by a network of trade credit. This financial structure depended heavily on confidence, which often vanished when the economy reached a turning point and expectations of growth were not fulfilled (Hoppit (1986)). The worst crises involved both the public and private sectors. For example, in 1793, there was a sharp rise in government bond yields and a widespread collapse in trade credit, leading to a large increase in bankruptcies.

The Victorian economy 1830–1913

A more regular economic cycle in GDP emerged during the Victorian age. The average rate of growth rose to around 1¾%–2¼% — double that in the 1700–1830 period — reflecting the growing pace of industrialisation and technological progress. There were few severe downturns and actual recessions were less frequent than in the 18th century.

The improved availability of disaggregated data for this period permits the analysis of individual expenditure components. The literature typically divides these into those that are largely thought to drive the cycle (**Chart 9**) and those that are largely thought to respond to the cycle (**Chart 10**). Drivers of the cycle include: fluctuations in investment and durable consumption spending that are the result of shifts in expectations and 'animal spirits'; the impact of government purchases resulting from changes in fiscal policy; and movements in exports dependent on the world economy. Components that are thought to be largely responsive to the cycle include non-durable consumption, stockbuilding and imports. If 'driver' components have a second-round impact on the other components, they are likely to have a larger impact on growth than measured by their direct contributions to GDP.[2]

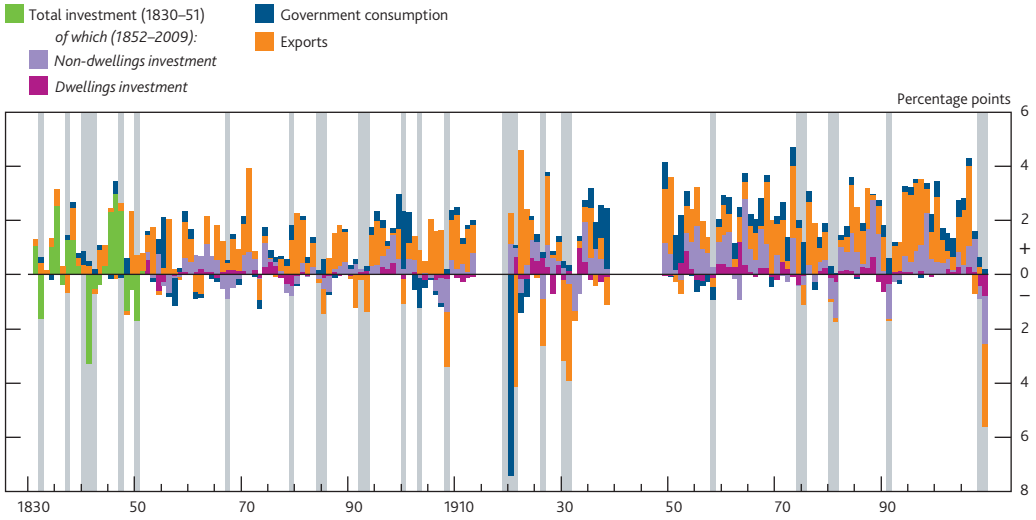
Investment was an important driver of demand growth in the Victorian age (**Chart 9**). The pattern of industrialisation during the 19th century was far from smooth and investment cycles were important. There were waves of railway building throughout the century, and domestic investment made a major contribution to growth in the 1830s and 1840s, largely reflecting railway building. Dwellings investment also contributed to growth in the mid-1870s and to the domestic boom from 1893–99.

Exports also played an important role during the second half of the 19th century (**Chart 9**). Between 1850 and 1875, Britain participated in a boom associated with gold discoveries and a move towards free trade. UK exports and world trade were closely correlated over this period (**Chart 7**). And the relative competitiveness of the UK economy had an increasingly important influence on the export cycle from 1870, as shown by the negative relationship between the real exchange rate and net trade (**Chart 11**).

Shifts in consumption behaviour do not appear to have played a major role in economic cycles during this period (Matthews *et al* (1982)). On average, consumption generally tracked incomes, growing at a pace at, or a little below, GDP growth. Consumption was also generally less volatile than GDP growth. Declining fertility and the associated fall in the number of young people in the population did, however, contribute to a structural fall in the consumption-income ratio

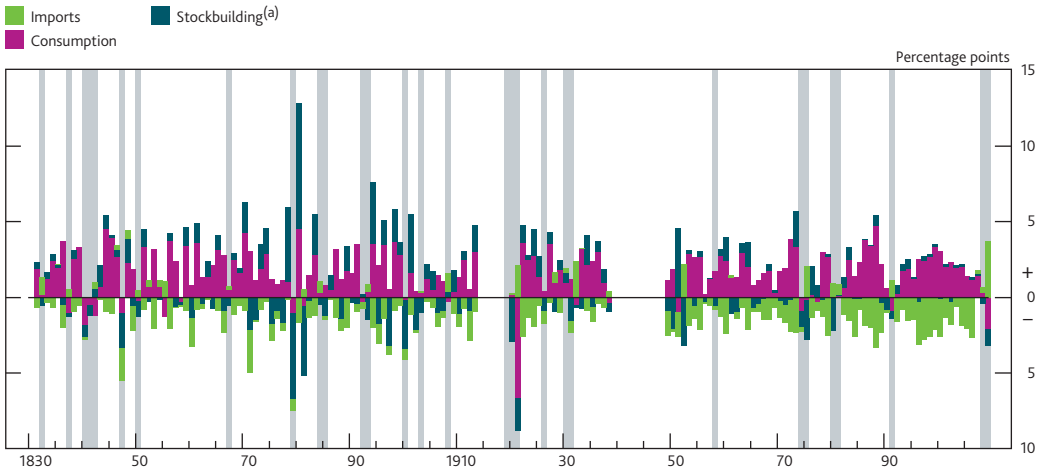
(1) Solomou and Wu (2002) argue that the weather and agriculture may also have been important in driving cycles in the late 19th century, although its impact was less given its lower share in GDP.
(2) This split between driver and non-driver components is imperfect. There may be structural changes in savings behaviour, tax rates, inventory holdings and import penetration that might also lead to cyclical changes in output.

Chart 9 Contributions of 'driver' demand components to GDP growth



Sources: Feinstein (1972), Feinstein and Pollard (1988), Mitchell (1988), Sefton and Weale (1995) and ONS. The exports contribution represents trade in goods only prior to 1870. Data for World War I and 1939–48 are excluded. Annual recessions are shaded in grey.

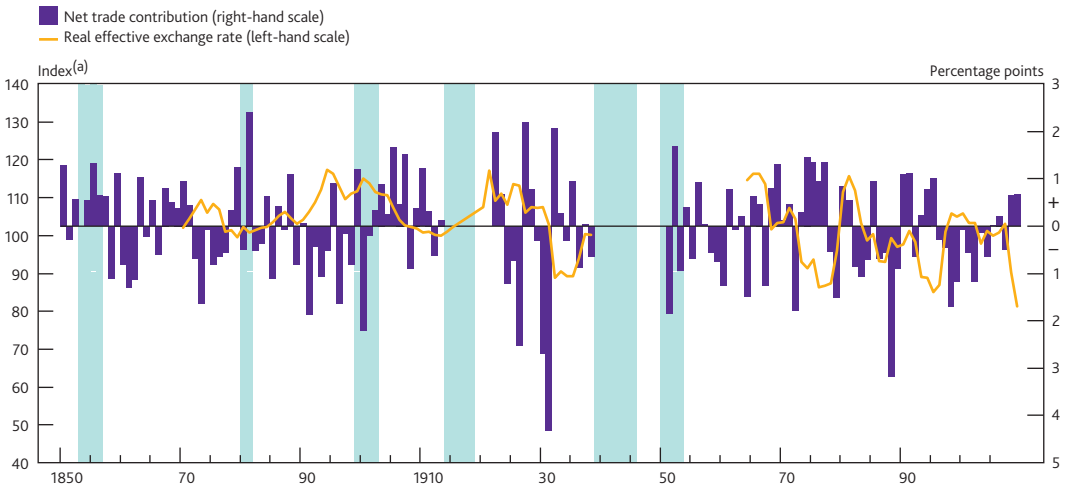
Chart 10 Contributions of 'non-driver' demand components to GDP growth



Sources: Feinstein (1972), Mitchell (1988), Sefton and Weale (1995) and ONS. The imports contribution represents trade in goods only prior to 1870. Data for World War I and 1939–48 are excluded. Annual recessions are shaded in grey.

(a) Including acquisitions less disposals of valuables.

Chart 11 The net trade contribution to GDP growth and the real exchange rate



Sources: The sources of the net trade contribution data are the same as those in **Charts 9** and **10**, but between 1830 and 1913 the net trade data are based on later estimates by Feinstein and include services so they do not exactly match the difference between the export and import contributions in **Charts 9** and **10**. For the real exchange rate, Catão and Solomou (2005) for 1870–1913, Solomou and Vartis (2005) for 1913–30 (excluding Germany), Dimsdale (1981) for 1930–38 and BIS for 1964–2009. The data are linearly interpolated 1913–20. Net trade data for 1914–21 and 1939–50 are excluded. Major war periods are shaded in blue.

(a) Two indices for the real exchange rate are shown: one between 1870–1938 with 1913 = 100, and one between 1964–2009 with 2005 = 100.

in the latter part of the period (Dimsdale (2009)). This rise in the saving ratio contributed to the finance of large capital exports between 1870 and 1914.

Up to 1878, domestic financial crises continued to be a significant factor in downturns (Hicks (1982) and Dimsdale (1990)). In 1867, for example, output fell following the earlier failure of a leading financial institution, Overend and Gurney. A domestic financial crisis also checked the railway boom of the 1840s. And the failure of the City of Glasgow Bank in 1878 was an important factor in aggravating the downturn in that year (Collins (1988)).

After 1878, however, domestic financial crises appear to have played a less significant role, reflecting the increasing stability of the United Kingdom's monetary system. The UK business cycle became more closely aligned with external factors as international linkages became more important following the widespread adoption of the gold standard system of fixed exchange rates (**Chart 12**). Consequently, as during the recent recession, the UK economy was vulnerable to international financial crises, such as the 1907 US financial crisis.

Monetary policy in this period was largely concerned with maintaining adherence to the gold standard, at the heart of which was the Bank of England. After the Bank Charter Act of 1844, the Bank was given the exclusive right to issue notes, but these had to be backed by gold. Bank Rate would typically therefore rise in response to external deficits and flows of gold overseas. This would both attract gold back to the United Kingdom and encourage fewer notes to be held. For example, Bank Rate rose in the late 1830s and 1840s in order to protect reserves as poor harvests and higher overseas corn prices led to a deterioration in the balance of payments (**Chart 13**). But this further exacerbated the downturns during these periods.

Given the absence of major wars over this period, the fiscal position of the United Kingdom was considerably more stable. Throughout the mid-late 19th century, the United Kingdom ran a substantial primary surplus (**Chart 13**), thereby allowing it to service the considerable national debt commitments built up in the 18th and early 19th centuries and maintain a balanced budget overall.(1) Given the growth of national income, the positive primary surplus ensured the national debt to income ratio fell substantially in periods of peacetime (**Chart 8**).

The 20th century UK economy (1913–2007)

Output became more volatile for much of the 20th century and there were several periods of major recession. Fiscal and monetary policies were used more actively to try to stabilise the economy, especially in the post-World War II period. And the United Kingdom changed its monetary policy and exchange rate regime a number of times, which played a major role in both downturns and recoveries.

The first half of the 20th century was dominated by the two World Wars, interspersed by the 'Great Depression' of the 1930s. In the immediate aftermath of World War I, monetary and fiscal policies were tightened sharply as the authorities attempted to control the initial inflationary effects of the post-war boom. Nominal short-term interest rates were raised sharply, reducing consumption, while exports declined as a result of weaker world activity. And there was a period of severe deflation during which real interest rates rose to unprecedented levels. Nominal rates rose to 5% during the early 1920s following the decision to return to gold at a high (and possibly overvalued) parity (**Charts 12** and **14**).

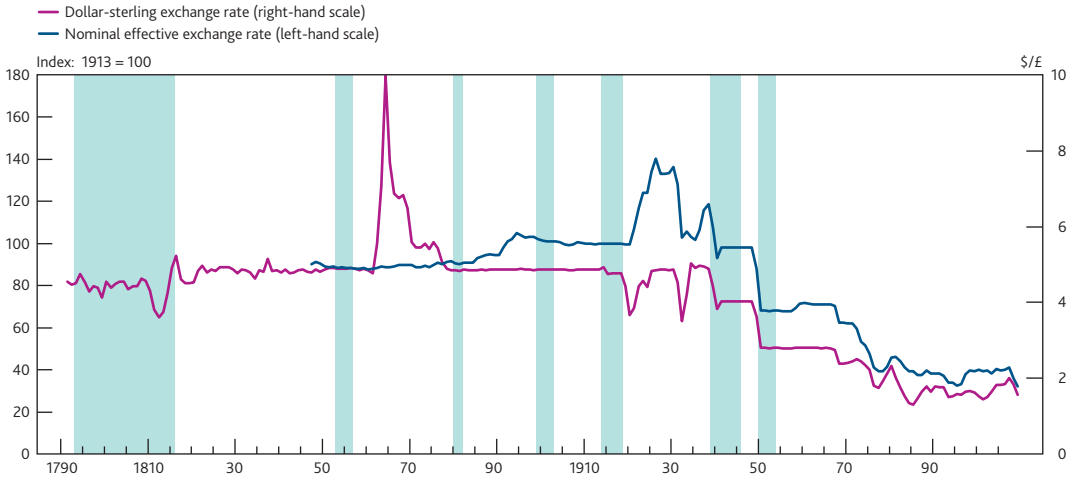
For the United Kingdom, the recession of the 1930s was large by historical standards, but the initial impact on GDP was smaller than that of 1920–21, and overall was considerably less than the output falls experienced in the United States and Germany. This is less true of the rise in unemployment, which was more comparable to the early 1920s and somewhat closer to overseas experience. While exports, and to some extent investment, collapsed in response to the global downturn, consumption was relatively stable (in contrast to 1920–21). That may have reflected a combination of higher real wage growth — as wage growth fell by less than price inflation — and automatic fiscal stabilisers helping to support real incomes (Broadberry (1986)).

Short-term interest rates remained relatively high in the initial stages of the Great Depression, largely as the result of having to maintain sterling's gold standard parity. While nominal rates did fall following similar cuts overseas, falling prices meant that real interest rates remained well above 5%. And nominal rates actually increased in 1931 as pressure on sterling mounted. Economic recovery only came early in 1932 following the suspension of the gold standard in the United Kingdom in late 1931. This made possible a reduction in interest rates in 1932 (after an initial increase to 6% designed to reassure financial markets) and a depreciation of the exchange rate of around 20% (**Chart 12**).

Despite sterling's depreciation, the recovery was driven mainly by domestic demand with both consumption and investment growing strongly, the latter reflected an initial boom in house building followed later by rising industrial investment and growing government spending on rearmament in the build-up to World War II (**Chart 9**). Net trade made a muted contribution, largely because the limited recovery of world trade and the impact of foreign protectionism offset the benefits from sterling's depreciation and the imposition of import tariffs (**Charts 7** and **11**).

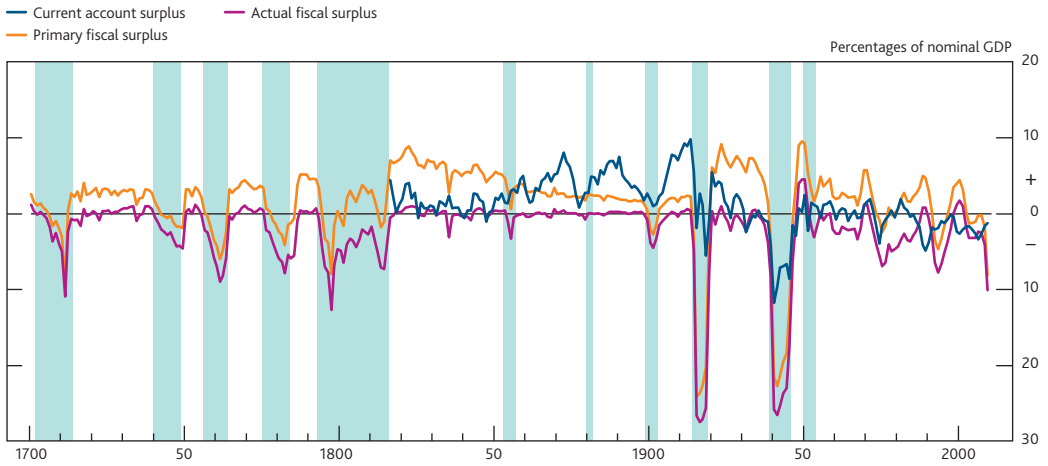
(1) The primary surplus refers to the fiscal surplus excluding interest payments on public sector debt.

Chart 12 Nominal exchange rates



Sources: $/£, Officer (1996), Federal Reserve *Banking and Monetary Statistics 1914–41* and *1941–70*, and ONS; effective exchange rate, Collins (1986) for 1847–70, Catão and Solomou (2005) for 1870–1913, Solomou and Vartis (2005) for 1913–30 (excluding Germany), Dimsdale (1981) for 1930–38, IMF *International Financial Statistics* for 1957–75 and Bank of England 1975–2009. Effective exchange rate data linearly interpolated 1913–20 and interpolated using $/£ 1938–57. The $/£ exchange rate takes into account deviations from official parities during periods when paper currencies were not convertible into gold: 1797–1821 and 1914–25 for sterling and the 'Greenback' period between 1862–78 for the US dollar. Major war periods are shaded in blue.

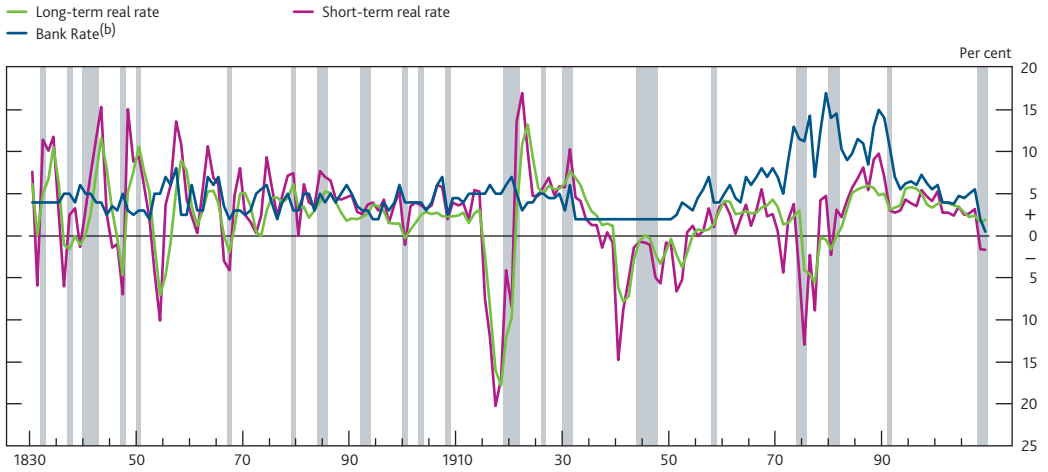
Chart 13 Fiscal[a] and current account balances



Sources: Middleton (1996), Mitchell (1988), Sefton and Weale (1995) and ONS. Major war periods are shaded in blue.

(a) Exchequer (consolidated fund) surplus from 1700–1899; calendar-year observations represent financial-year totals; from 1900–2009, public sector net lending on a calendar-year basis.

Chart 14 Nominal and real interest rates[a]



Sources: Janssen *et al* (2002), Mitchell (1988) and ONS. Annual recessions are shaded in grey.

(a) Real interest rates are defined according to Chadha and Dimsdale (1999). Short-term real interest rates are defined as Bank Rate minus the actual rate of inflation. Long-term real interest rates are defined as the consol yield minus a weighted three-year moving average of inflation.
(b) Bank Rate 1830–1972 and 2006–09, Minimum Lending Rate 1972–81, London clearing banks' base rate 1981–97, repo rate 1997–2006.

During the inter-war period there was increasing public debate about the use of fiscal policy to alleviate unemployment.(1) But, in general, discretionary movements in underlying fiscal policy contributed little to the economic cycle during the late 1920s and early to mid-1930s (Turner (1991) and Middleton (2010)). Rearmament spending, however, probably ensured the quarterly recession of 1938 was mild.

Between 1945 and 2007, the UK economy experienced an average rate of growth of about 2¾% per annum. Despite the well-documented instances of the 'stop-go cycle', fluctuations in the 1950s and 1960s were generally mild and annual growth was positive in downswings as well as in recoveries.(2) Fiscal policy was increasingly used in the pursuit of Keynesian demand management policies (Dow (1964) and Hicks (1982)). This was combined with monetary policy actions that largely operated via a variety of direct quantitative controls on credit and banks' balance sheets. In general, all components of demand contributed to the economic cycle during the 1950s and 1960s. Recoveries tended to be led by strong home demand — particularly through spending on consumer durables and an associated fall in the saving ratio (**Chart 15**) — with exports only tending to make a major contribution after exchange rate depreciations.

In the early 1980s, a determined attempt was made to reduce the rate of inflation, which had picked up sharply during the 1970s in response to higher oil prices and an expansionary monetary policy. Policy was geared towards meeting targets for money supply growth, but money growth remained stubbornly resilient. Consequently, nominal short rates remained at or above 12% between 1980 and 1981. The exchange rate also appreciated in response to tight monetary policy and the flow of North Sea oil revenues that had started to come on stream. There followed a large recession between 1980 and 1981 and only a sluggish recovery until the mid-1980s.

Domestic demand was the key driver of the recovery during the 1980s. The strength of sterling and the fall in manufacturing capacity meant (non-oil) exports played little role. By the late 1980s, the strength of output growth began to put upward pressure on inflation. There was a tightening of short-term interest rates, in part to rein in demand but also to match European interest rates leading up to Britain's entry into the Exchange Rate Mechanism (ERM) in October 1990. Real short-term interest rates reached over 9% in 1989, the highest level since the early 1930s (**Chart 14**). This tightening of monetary policy led to a significant recession.

The United Kingdom's exit from the ERM in 1992 was associated with a reduction in nominal short-term interest rates and a depreciation of the exchange rate. From that point on, exports contributed to the recovery. From the introduction of inflation targeting in the early 1990s, both nominal and real short-term rates remained low and relatively stable. This outcome, and the stability in growth it engendered, reflected in part the impact of inflation targeting (and from 1997, the operational independence of the Bank of England) compared with previous monetary regimes. But the shocks hitting the economy over this period were also relatively benign,(3) at least until the onset of the financial crisis in mid-2007.

Following the onset of the recent financial crisis, UK output fell sharply from mid-2008. But a key difference relative to previous recessions was the rapid response of monetary policy. In earlier episodes in the 20th century, the policy response was often delayed (or even reversed). This typically reflected monetary policy attempting to pursue intermediate targets such as maintaining a particular exchange rate or money supply objective.

Nominal variables and the cycle

This section examines how nominal variables — such as money, nominal spending and inflation — have behaved during previous cycles.

Money and nominal spending

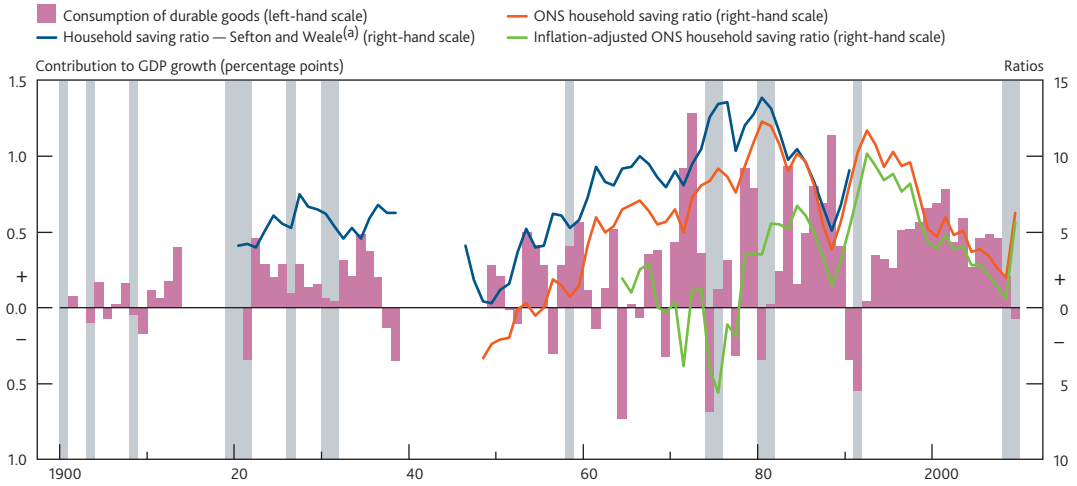
The relationship between money and nominal spending forms the basis for a vast swathe of economic literature, dating back to Hume (1752).(4) In the United Kingdom, there has, historically, been a tight link between the two (**Chart 16**) but that relationship has been less strong since World War II. In particular, during the periods of financial liberalisation in the early 1970s and the 1980s, the growth rate of broad money exceeded that of nominal spending. And a similar pattern emerged during the 'Great Stability' period from the mid-1990s until 2007. It is notable, however, that money and credit growth have tended to move broadly in line with nominal spending growth in the first year or two of recoveries from previous troughs in output (**Chart 18**).

Nominal spending and inflation

Inflation has risen above the 2% target during the recent recession despite the sharp fall in nominal spending. As discussed in the November 2010 *Inflation Report*, CPI inflation is likely to remain above the target throughout 2011, boosted by the increase in VAT effective in January, elevated import price inflation and by some businesses continuing to rebuild profit margins, which were compressed during the recession. Further ahead, CPI inflation is likely to fall back to around the

(1) See, for example, the Keynes-Henderson proposals in the 1929 election to use public works to alleviate unemployment.
(2) Dow (1998) argues that a better characterisation of policy during this period was 'go-stop'. UK Governments believed fast economic growth was achievable and attempted to stimulate demand through supportive fiscal policy. This policy was subsequently reversed as demand outstripped potential supply leading to balance of payments difficulties and inflationary pressure.
(3) See King (2003).
(4) See, for example, Hawtrey (1913), Friedman and Schwartz (1963), Benati (2006) and Schularick and Taylor (2009).

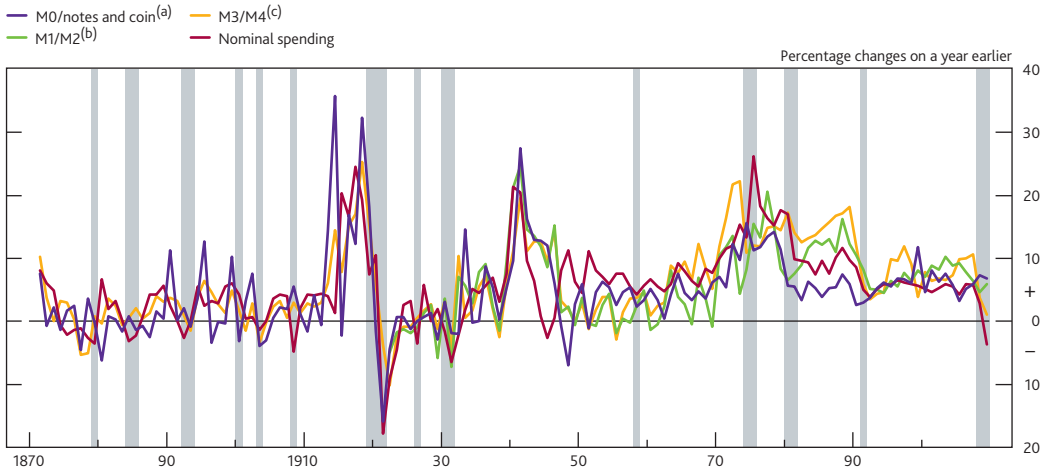
Chart 15 Consumer durables and the saving ratio



Sources: Mitchell (1988), Sefton and Weale (1995), ONS and Bank calculations. No data available for the consumption of durable goods' contribution for 1914–20 and 1939–48. Sefton and Weale's household saving ratio data for 1939–45 are excluded. Annual recessions are shaded in grey.

(a) Sefton and Weale's estimate is based on a definition of the saving ratio from an earlier system of national accounts to the current ESA95 system used by the ONS.

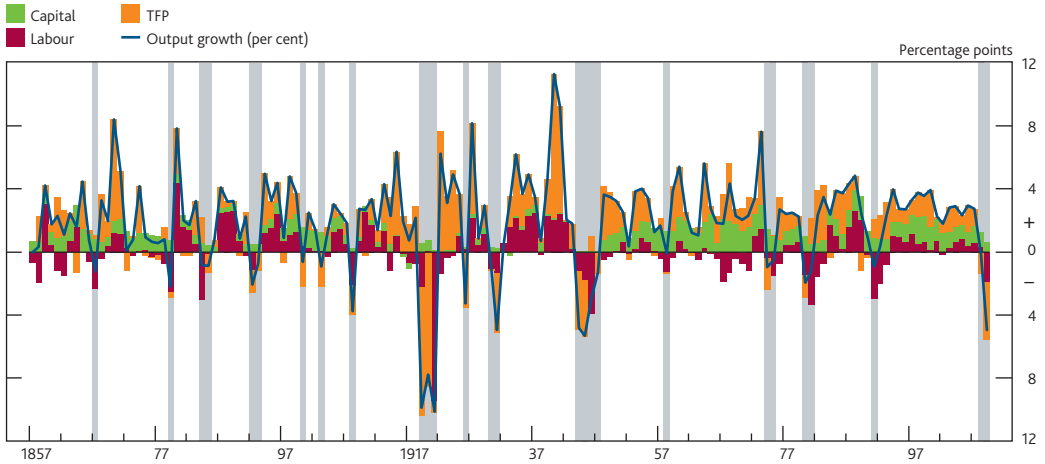
Chart 16 Money and nominal spending



Sources: Capie and Webber (1985), Mitchell (1988), Sefton and Weale (1995), Solomou and Weale (1991) and ONS. Annual recessions are shaded in grey.

(a) M0 1870–1969, notes and coin 1969–2009.
(b) M1 1921–82, M2 1982–2009.
(c) M3 1870–1962, M4 1963–97, M4 excluding intermediate OFCs 1998–2009.

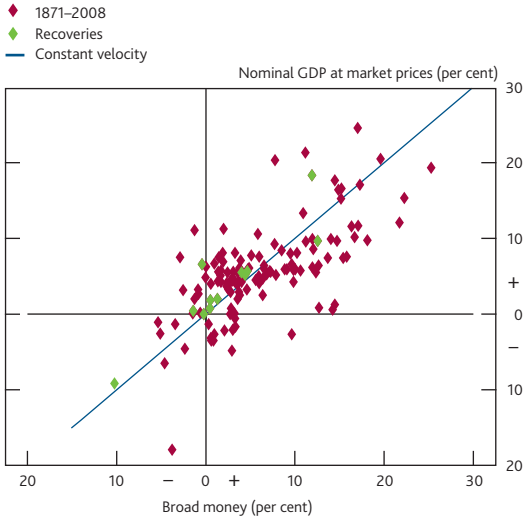
Chart 17 Contributions of capital,(a) labour(b) and total factor productivity (TFP)(c) to annual output growth



Sources: GDP as in **Chart 1**. Total hours worked from Feinstein (1972), Mitchell (1988) and ONS. Capital stock and services data from Feinstein and Pollard (1988), ONS and Bank calculations. Labour and capital shares from Feinstein (1972). Annual recessions are shaded in grey.

(a) Capital is defined as the non-housing whole-economy capital stock prior to 1963 and non-housing whole-economy capital services thereafter.
(b) Labour is defined as whole-economy total hours worked. Average hours data from Feinstein are linearly interpolated to create annual data between 1856 and 1972.
(c) TFP is defined as GDP growth minus the contributions of labour and capital weighted by their shares in output. The labour share includes the income of the self-employed.

Chart 18 Annual growth of broad money and nominal spending

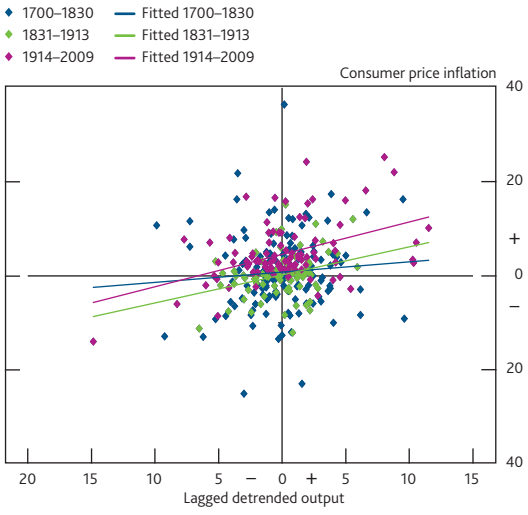


Sources: As in **Chart 16**.

target, as the effects of higher import prices and VAT diminish, and persistent economic slack, particularly in the labour market, continues to restrain the growth of wages and prices. This subsection examines the extent to which these features are unusual given historical experience.

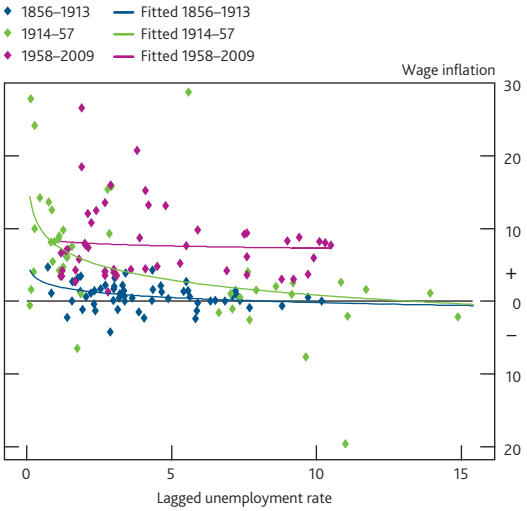
It is not unusual for weak output to be accompanied by only small changes in consumer price inflation. There is, for example, a large economic literature that examines the flatness of the 'Phillips curve' relationship between either inflation and detrended measures of output (**Chart 19**), or nominal wage inflation and unemployment (**Chart 20**). Over time, inflation is likely to have been affected by a range of other factors, including import prices, inflation expectations and movements in potential supply that are not captured by a simple statistical trend.

Chart 19 The reduced-form Phillips curve relationship (1700–2009)



Sources: Inflation is taken from Mitchell (1988) and ONS; detrended output defined as in **Chart 2**. Detrended output is lagged by one year.

Chart 20 The reduced-form wage Phillips curve relationship (1856–2009)



Sources: Crafts and Mills (1994), Feinstein (1972) and ONS. Unemployment rate is claimant count measure, and is lagged by one year.

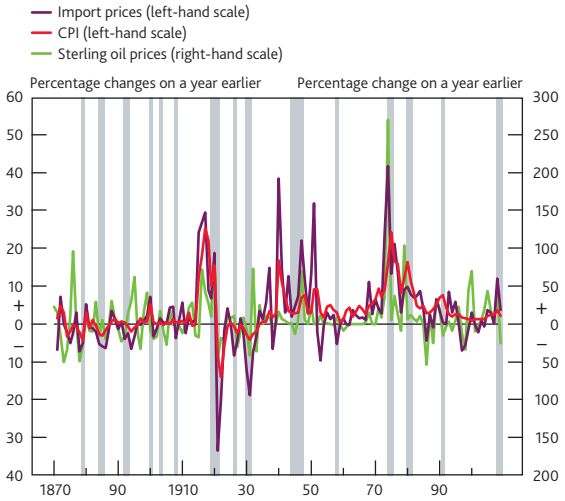
It is possible that past recessions have been associated with a period of slower growth in potential supply due to a slowdown in underlying productivity growth. Underlying productivity cannot be observed directly, only actual. A simple decomposition of output growth suggests that actual total factor productivity (TFP) — also known as the 'Solow residual' — has tended to move procyclically in the past (**Chart 17**).(1) It is important to recognise, however, that such procyclical movements in actual TFP might just reflect cyclical changes in companies' utilisation of both their capital and labour inputs rather than a slowdown in underlying technological progress. For example, if companies believed that a downturn would be brief, they may have chosen to hoard labour — that is, maintain employment despite falls in output — or mothball capacity — that is, put capital temporarily out of use. In the longer term, both wage growth and inflation would have eventually fallen as companies cut back on labour inputs or lowered margins.

Low factor utilisation may, however, still have reduced potential supply growth through 'hysteresis effects'. For example, low labour utilisation in the early 1980s ultimately led to rising long-term unemployment that may have reduced the downward pressure on wages, helping to explain the weakness of the wage-unemployment relationship in the post-war period (Layard, Nickell and Jackman (1991)).

Movements in relative prices — such as commodity and import prices — can also affect the observed relationship between output and inflation. This was particularly the case in the post-World War II period, when rising import and commodity prices often coincided with recessionary periods,

(1) The Solow residual measures the difference between output growth and the contribution of capital and labour inputs. Different concepts of potential supply (and their components) are discussed further in the box on page 106 of Benito *et al* (2010).

Chart 21 Consumer, import and oil prices



Sources: Feinstein (1972), Mitchell (1988), BP and ONS. Annual recessions are shaded in grey.

masking the relationship between output and inflation (**Chart 21**). For example, wage pressure increased during the 1970s following the increases in oil prices (Layard and Nickell (1987)).

It is also likely that the 1970s were accompanied by a pickup in inflation expectations given higher oil prices and the lack of a credible monetary policy framework. These expectations became ingrained in the wage-bargaining and price-setting processes. And they proved hard to shift during both the money-targeting and exchange rate targeting regimes of the 1980s and early 1990s, despite relatively tight monetary policy and the presence of two large recessions. Inflation, and inflation expectations, only stabilised following the introduction of inflation targeting in 1992 (Bean (2004)).

Conclusions

The recession of 2008–09 had parallels with earlier slowdowns in the UK economy. Recessions in the 18th century and much of the 19th century generally involved domestic financial crises of one form or other. And financial crises abroad often had a large impact on the United Kingdom in the late 19th and early 20th centuries, given the increasingly interconnected nature of global goods and financial markets.

There are also some lessons we can draw from the past about the nature of the current recovery. Some of these lessons are optimistic. For example, real exchange rate depreciations — such as those experienced during the recent recession — have generally supported economic recoveries. History also emphasises the important role that monetary policy has to play.

Appendix

(a) Construction of real GDP data in Charts 1, 2, 4 and 17

The measure of real output used in these charts is GDP at factor cost. This is consistent with the concept used in previous exercises that combine or balance the estimates from the output, income and expenditure approaches and is almost identical to the current ONS preferred measure of output (GVA at basic prices). A continuous time series is generated back to 1700 by combining the various estimates in the literature in the following way:

1700–1830 Broadberry and van Leeuwen (2010), GDP growth at constant factor cost based on an output approach.
1830–55 GDP growth at constant 1900 factor cost from Feinstein's extensions to Deane's (1968) estimates based on an expenditure approach (available in Mitchell (1988), page 837).
1855–70 Feinstein's Compromise index of GDP at factor cost, available in Mitchell (1988), page 836.
1870–1913 Solomou and Weale (1991) balanced measure of GDP at constant 1900 factor cost, Table 3.
1913–20 Feinstein's Compromise index of GDP at factor cost available in Mitchell (1988), page 836.
1920–48 Sefton and Weale (1995) balanced measure of GDP at constant 1938 factor cost, Table A.3.
1948–2009 ONS GDP at factor cost, chained-volume measure, 2006 reference year prices.

In the data annex spreadsheet, the different estimates are spliced together to form a continuous chained-volume measure based on 2006 reference year prices.

(b) Contributions to GDP in Charts 9, 10 and 11

These charts use contributions to the expenditure-side estimate of GDP at market prices (GDP(E)). Contributions are calculated within each of the historical chains of data as follows:

1830–1920 Contributions to GDP(E) at constant 1900 market prices based on Feinstein's extensions to Deane's (1968) estimates (available in Mitchell (1988), page 837).
1920–48 Contributions to Sefton and Weale's (1995) balanced measure of GDP at market prices, Table A.3.
1948–2009 Contributions to GDP(E) at market prices. ONS annual chain-linking methodology means that chained-volume estimates of the components of expenditure only add up to the chained-volume estimate of GDP(E) in the reference year (currently 2006) and beyond. So an annual chain-linked contributions formula is used prior to 2006. This involves multiplying the growth rate of each expenditure component by its nominal share of GDP(E) in the previous calendar year.

(c) Nominal GDP series used in Charts 7, 13, 16 and 18

These charts are based on GDP at current market prices. A spliced series was obtained from the following components:

1700–1830 Broadberry and van Leeuwen (2010), GDP at current factor cost based on an output approach.
1830–55 GDP growth at current market prices from Feinstein's extensions to Deane's (1968) estimates based on an expenditure approach (available in Mitchell (1988), page 831).
1855–70 Feinstein's Compromise index of GDP at current factor cost (available in Mitchell (1988), page 836), multiplied by the ratio of GDP(E) at market prices to GDP(E) at factor cost from Feinstein's extensions to Deane's (1968) estimates based on an expenditure approach (available in Mitchell (1988), page 831).
1870–1913 Solomou and Weale (1991) balanced measure of GDP at factor cost, Table 3, multiplied by the ratio of GDP(E) at market prices to GDP(E) at factor cost from Feinstein's extensions to Deane's (1968) estimates based on an expenditure approach (available in Mitchell (1988), page 831).
1913–20 Feinstein's Compromise index of GDP at current factor cost prices (available in Mitchell (1988), page 836), multiplied by the ratio of GDP(E) at market prices to GDP(E) at factor cost from Feinstein's extensions to Deane's (1968) estimates based on an expenditure approach (available in Mitchell (1988), page 831).
1920–48 Sefton and Weale (1995) balanced measure of GDP at current market prices, Table A.3.
1948–2009 ONS GDP at current market prices.

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The Bank's money market framework

By Roger Clews, Chris Salmon and Olaf Weeken of the Bank's Sterling Markets Division.[1]

The Bank of England implements the policy stance of the Monetary Policy Committee through its operations in the sterling money markets. It also uses these operations to reduce the costs of disruption to the liquidity and payment services supplied by banks. In order to ensure their continued effectiveness, it was necessary to adapt the framework for these operations in response to the significant changes to financial and monetary conditions that occurred during the recent financial crisis. This article describes how central banks can use their money market operations to implement monetary policy and provide liquidity support to banks and some of the issues that can arise when undertaking operations to achieve these two objectives. The article goes on to explain the Bank's choices about its own operating framework, including how its thinking has been influenced by the lessons learned during the financial crisis.

Introduction

The Bank's operations in the sterling money markets serve its core purposes: to ensure monetary stability and to contribute to financial stability. Some of these operations are designed primarily to implement the Monetary Policy Committee's (MPC's) decisions on the stance of monetary policy. Others are designed mainly to provide a liquidity backstop for the banking system. They are brought together under the Bank's operating framework — the sterling monetary framework (SMF) — which provides a transparent set of principles governing these operations.

A central bank's operating framework consists of a number of elements, including: policies on access rights to central bank facilities; collateral policies; and an operating system. In different countries these elements are combined in different ways to give rise to a variety of operating frameworks. Moreover, operating frameworks continually evolve over time. This evolution can at times be rapid. During the recent financial crisis, central banks, including the Bank of England, adapted to the needs of exceptional circumstances. This period also emphasised the need to have an operating framework capable of both implementing monetary policy and fostering financial stability.

This article explains why the Bank is minded, in due course, to reinstate substantively those elements of the SMF that were suspended in March 2009 following the MPC's decision to embark on a programme of asset purchases (known as quantitative easing).[2] In order to explain that decision, the first section of this article describes the crucial role of reserves balances that banks hold at the central bank. The second section discusses how the central bank can use the terms on which it supplies these reserves to support the achievement of its monetary and financial stability objectives. The third section then describes the key characteristics of three commonly discussed systems through which the central bank supplies reserves. The fourth section discusses the implications of these three systems for the interbank money market. The final sections explain the principles underpinning the choices that the Bank has made about its own operating framework and, given those principles, how its thinking about the design of its operating framework has been influenced during the financial crisis.

The role of reserves balances

Reserves are overnight balances that banks hold in an account at the central bank. As such, they are a claim on the central bank. Together with banknotes, reserves are the most liquid, risk-free asset in the economy. And they are the ultimate asset for settling payments; banking transactions between customers of different banks are either directly or indirectly settled through transfers between reserves accounts at the central bank.

Reserves also help banks to manage their liquidity risks, which arise as a natural result of banking activities. Banks transform

(1) The authors would like to thank Tarkus Frost and Ben Westwood for their help in producing this article.
(2) Quantitative easing is discussed in Benford *et al* (2009).

deposits, many of which may be withdrawn at short notice, into loans that are typically contractually committed for longer periods. This maturity mismatch exposes banks to liquidity risk — the risk that they cannot realise assets quickly enough to pay back deposits — or, if they were forced to realise assets quickly, to the risk that they could do so only at distressed prices thereby damaging their value. Banks can self-insure by holding a buffer of liquid assets that can be easily realised. As the most liquid asset of all, reserves often form a key component of such a buffer.

Factors affecting the aggregate demand for reserves

The demand for reserves can shift for a number of reasons. Over time it is likely to grow as the economy and payment flows expand. But, as recent events have shown, there can also be more abrupt changes. During stressed times, the interbank market may not work effectively and a bank that is short of reserves may find it more difficult than usual to borrow reserves from another bank in the market. Observing such difficulties, other banks may respond by increasing their desired buffers of reserves in case they are faced with unexpected future payment demands. For the banking system as a whole, this would be reflected in a greater aggregate demand for reserves.

Supply of reserves

Only central banks can alter the supply of reserves. Their operating framework defines the terms on which, and the process by which, this is normally done. It also provides central banks with a mechanism for achieving their policy objectives. The next section describes the objectives the central bank typically seeks to achieve in its operations.

Objectives of operating frameworks

The specific objectives of central banks' operating frameworks differ from one central bank to another. But typically, central bank objectives involve implementing monetary policy and supporting financial stability. The financial crisis has highlighted that the design of a central bank's operating framework plays a key role in how these two objectives can be met.

Monetary policy implementation

Central banks usually communicate the desired stance of monetary policy by setting a short-term interest rate — the 'policy rate'. Their operations in money markets are typically conducted with the objective that the interest rates at which banks transact for short periods of time are close to this policy rate. To achieve that, central banks need to keep the supply of reserves in line with changes in the banking system's aggregate demand, so that there is neither a shortage nor a surplus of reserves. Otherwise, in the event of an increase in the demand for reserves, market interest rates would tend to rise relative to the policy rate as banks bid rates up in their efforts to secure scarce reserves. The opposite would occur following a fall in the demand for reserves.

Provision of liquidity insurance

Central banks' responsibilities with respect to financial stability mean that they usually provide some degree of liquidity insurance to individual banks and to the banking system as a whole. An adverse liquidity shock could impair banks' ability to provide payment services to their customers or to undertake new lending. Central banks can mitigate the impact of liquidity shocks to individual banks by offering to lend reserves bilaterally. And they can mitigate the effects of liquidity shocks to the banking system by allowing the aggregate supply of reserves to increase and/or by easing the terms at which reserves are supplied.

A key challenge for central banks is that, although they can observe changes in banks' demand for reserves, they are usually not able to identify with certainty why demand has changed. For example, the central bank rarely knows whether an increase in demand for reserves reflects a temporary liquidity problem or a more fundamental problem that casts doubt on the solvency and viability of the borrowing bank. More generally, the availability of liquidity insurance could induce risky behaviour, with adverse consequences for future financial stability. This 'moral hazard' is discussed further in the box on page 294.

Other objectives

Central banks can effectively fulfil their objectives only if their own creditworthiness is unquestioned. So central banks place considerable weight on ensuring that their financial operations with banks do not endanger their own solvency. For this reason most central banks choose to transact on conservative terms. This means that they would usually prefer to lend reserves secured against only high-quality collateral that they could sell if the borrowing bank were to default. And, to ensure that the collateral would be sufficient to cover the loan under most circumstances, they would usually lend less than 100% of the value of the collateral — ie impose a 'haircut'.

Central banks are likely to consider other criteria when designing their operating framework. For example, central banks generally prefer frameworks that are operationally simple and transparent. And they favour frameworks that promote competitive and fair money markets to facilitate the efficient provision of payment services to the wider economy.

Interactions between monetary policy and financial stability objectives

A central bank's operational monetary policy objective is usually unambiguous: the closer market interest rates are to the policy rate, the more reliably monetary policy is implemented. And the more the supply of reserves adjusts automatically to accommodate changes in demand, the better

Liquidity insurance and moral hazard

Central banks typically provide liquidity insurance to the banking system. When designing their liquidity insurance facilities, central banks — like any insurance provider — have concerns over 'moral hazard'.

Moral hazard in this context refers to the risk that the availability of liquidity insurance induces banks to take on more risk than they otherwise would. A simple incentive arises because liquid assets such as reserves yield less than illiquid long-term loans and hence self-insurance is costly.

Given that central banks can create reserves at effectively zero cost to themselves, it could be argued that it does not matter if banks take on more liquidity risk. That line of reasoning fails to take account, however, of the intimate relationship between banks' liquidity risk and their solvency. For example, one way that an insured bank could increase its liquidity risk would be by making longer-term loans than it otherwise would. But that would probably also increase its solvency risk, given that pay-offs from its loan book would become more uncertain.

Central banks have a number of options for limiting this moral hazard. One response that all central banks seek to implement is to lend only to institutions that it judges to be solvent. In principle, this threat of not being able to access central banks' liquidity facilities should reduce the liquidity risk (and the associated solvency risk) banks are willing to shoulder.

It can, however, be difficult to distinguish between liquidity and solvency problems in practice. So central banks also make liquidity insurance costly to access. In principle, they can do this by charging higher interest rates for high usage of liquidity facilities or for accepting lower-quality collateral. Alternatively, they can increase the size of the haircuts on collateral imposed beyond those that would be strictly necessary to guard against credit risk.

Central banks are unlikely to have sufficient information to manage moral hazard effectively through haircuts alone. They can set haircuts based on an analysis of the characteristics of the assets pledged as collateral (for example, an assessment of how the value of an asset might change in different scenarios) to help manage credit risk.(1) But setting haircuts to manage moral hazard would also require an analysis of the balance sheet and possible future behaviour of the bank pledging the asset.

Charging a premium over the policy rate for high usage of liquidity facilities or for lending against lower-quality collateral is likely to be a more effective way to reduce moral hazard. However, to the extent that, in some conditions, these interest rates could influence market interest rates, the central bank may induce unwanted changes in the monetary policy stance. The liquidity insurance framework therefore needs to be carefully designed and implemented to strike the appropriate balance between these different considerations.

(1) See Breeden and Whisker (2010) for a description of collateral risk management at the Bank.

this objective will be met. By contrast, there is an inherent tension in how a central bank's financial stability objective can best be met. The more the supply of reserves adjusts automatically to accommodate changes in demand, the more seamlessly liquidity insurance is provided. But this makes it more likely, other things being equal, that the banking sector will pursue riskier activities to the detriment of future financial stability. In other words, fully accommodating changes in the demand for reserves is often the best way to implement monetary policy but not necessarily best, in the long run, for financial stability. In principle, there could thus be a tension between the central bank's monetary policy and financial stability objectives that needs to be managed.

There are a number of complementary tools that can help manage this potential tension. In particular, the regulatory framework limits the risks individual banks take. But the design of central banks' operating frameworks will also have an influence. Before describing how the Bank pursues its objectives through the design of its operating framework, it is important to understand the key characteristics of different approaches. The next section sets out three alternative operating systems, each of which would enable the central bank to supply reserves so as to keep market interest rates close to the policy rate.

Alternative operating systems

Most central banks alter the supply of reserves through market transactions known as open market operations (OMOs) and/or standing facilities.

- OMOs are designed as multilateral transactions in which the central bank, at its own initiative, deals in the market, affecting the banking system as a whole. If it buys assets or makes loans, it puts reserves into the banks' accounts held at the central bank. If it sells assets or borrows in the market, these transactions are settled by reducing the banks' reserves accounts.

- Standing facilities are designed to facilitate bilateral transactions in which a bank at its own initiative deals with the central bank. Lending facilities allow banks to borrow reserves directly from the central bank, potentially in very

large amounts. Deposit facilities allow banks to deposit reserves in interest-bearing accounts at the central bank.

Central banks also need to specify the circumstances in which banks can access the facilities that they offer and the range of eligible collateral, and associated haircuts, that can be pledged with the central bank in return for borrowed reserves.

In principle many different operating systems could be constructed from the basic elements, but they can broadly be grouped into three types. A number of central banks in countries with developed financial systems have adopted variants of the so-called 'corridor system'. More recently some have adopted what has become known as a 'floor system'. And, finally, there is the so-called 'zero-corridor' system that has been proposed as a simpler alternative.(1)

The choices of operating system, access rules and collateral policies *jointly* determine how monetary policy is implemented and how liquidity insurance is provided, as well as how any potential tensions between those activities are managed. The remainder of this section describes in generic terms how these three operating systems can be used to implement monetary policy, and the particular challenges associated with their use.

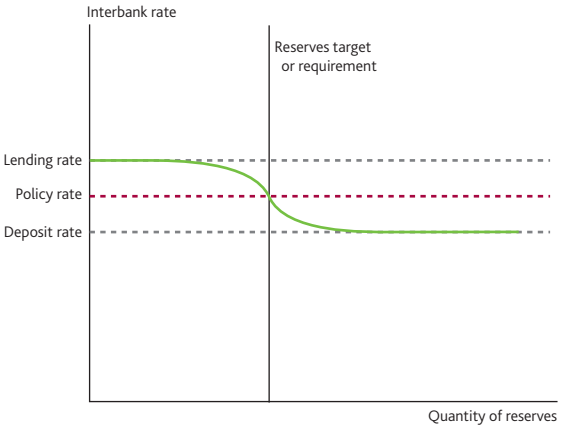
A corridor system

The corridor system derives its name from the interest rates on the central bank's standing facilities. The lending rate will be above, and the deposit rate will be below, the policy rate, forming a corridor around it. As discussed in the box on page 296, the specific design of the corridor system — in particular, whether banks are required to hold reserves or do so voluntarily — differs from central bank to central bank.

Banks will typically be unwilling to deal in the market on worse terms than those available at the central bank. Consequently, the short-term market rate is unlikely to fall below the central bank's deposit facility rate or to rise above the lending facility rate, thus helping to keep market rates close to the policy rate. But the presence of an interest rate floor from the deposit facility and a ceiling from the lending facility also influences market rates within the corridor. Banks are generally uncertain about the impact that their customers' future payment flows will have on their reserves position. On the one hand, if they think they are likely to be short of reserves, then they will be willing to pay more in the market to reduce the risk of having to use the lending facility at a penal rate. On the other hand, market rates will be relatively low if banks think they face holding excess reserves and receiving a lower return in the deposit facility. The resulting demand for reserves is illustrated in the green line in **Chart 1**.(2)

To implement monetary policy the central bank has to forecast the amount of reserves it needs to supply to meet banks' aggregate demand at the point where the market rate and policy rate coincide.(3) Consequently, the central bank's task is easier in corridor systems where banks' demand for reserves is determined through mandated reserve requirements or reflected in formal targets, than in corridor systems with no specified targets. Inaccurate forecasts by the central bank and/or changes in the demand for reserves that leave banks with insufficient or surplus reserves will tend to lead to deviations of market rates from the policy rate. Whether or not such deviations have a material impact on the stance of monetary policy will depend on the amplitude and persistence of shocks, as well as the precise design of the system. The box on page 296 explains how corridor systems can be designed to minimise such deviations.

Chart 1 Stylised demand for reserves in the corridor system(a)



(a) The shape of the demand curve will differ depending on the specification of the corridor system. This is discussed further in the box on page 296.

Under the corridor system, the central bank adjusts the aggregate amount of reserves by undertaking OMOs. The on-demand standing facilities then help to keep market interest rates close to the policy rate.

The corridor system relies on a functioning interbank money market to distribute reserves across the banking system. This poses a challenge if — as during the recent financial crisis — banks become reluctant to lend to each other. To provide liquidity insurance in the face of such a shock, while maintaining interest rate control, the central bank could try to bypass the interbank money market. It could do this by offering both to supply and to absorb a large amount of reserves in its OMOs. Narrowing the width of its interest rate corridor would have a similar effect, as it would lower banks' costs of dealing directly with the central bank relative to dealing in the interbank money market.

(1) See, for example, Buiter (2008) and Wiseman (2007).
(2) See, for example, Keister *et al* (2008) for a more detailed description.
(3) In so doing, the central bank must also account for other factors that affect the supply of reserves, such as changes in the public's demand for banknotes.

Interest rate corridors

Interest rate corridors consist of a rate at which the central bank will lend reserves to commercial banks and a rate at which it will take deposits from them. Any such system will help to prevent rates in the interbank market from straying outside the corridor. How market rates are determined within the corridor depends on factors such as whether or not banks are required to hold reserves, and whether and how reserves are remunerated. The combination of the corridor with these other factors gives rise to a variety of different corridor systems, examples of which are discussed further in this box.

In some systems, including in the euro area, banks are each required to hold a certain quantity of reserves. In the United Kingdom, prior to the MPC's decision to purchase assets financed by reserves creation, banks were invited to set their own explicit reserves target each month. In both cases, the central bank's task in implementing monetary policy is to supply a quantity of reserves in line with the requirements or target, so that the market rate lies at the centre of the corridor with no tendency to move towards one or other edge.

If banks are required to meet their reserves requirements or targets precisely, market interest rates will be very sensitive to variations in the supply of reserves around those requirements or targets. That is because small variations in supply can move banks from using the lending facility into using the deposit facility or *vice versa*. In that case, the demand curve in **Chart 1** would be steep in this area. But if requirements or targets do not have to be met so precisely, market rates should be less sensitive. For example, in the United Kingdom, banks suffered no penalties so long as their reserves were, on average over the month, within a certain range around their targets. Consequently, within the target range, the demand curve in **Chart 1** was relatively flat.

Both the tolerance and the averaging process contribute to the objective. If banks can vary their reserves holdings from day to day, that reduces the probability that they will have to use central bank facilities to borrow or deposit at rates at the top or bottom of the corridor. That in turn helps to stabilise market interest rates. The central bank's task is also made easier in that it needs to forecast and supply the necessary quantity of reserves only on average over the period. And it has the opportunity to adjust supply during the period.

Other corridor systems are rather different. In Australia and Canada, for example, there are no reserves requirements or formal targets. All reserves are remunerated at the rate at the bottom of the corridor (below the policy rate and below market rates). Banks therefore, in practice, target quite low levels of reserves. Their demand depends mainly on a comparison of the benefits from holding some reserves for use in the payment system against the cost of their low remuneration rate. The central bank's task is to supply its estimate of the small amount of reserves that will enable the market to clear at the target rate. With the demand for reserves less easy to observe in such systems, central banks are more reliant on information from movements in the market rate itself. And with only a low level of reserves available to buffer liquidity shocks from day to day, the central bank needs to regularly adjust the supply of reserves — possibly almost every day as, for example, in Australia — in order to avoid volatility in market interest rates.

A floor system

The 'floor system' can be thought of as a variant of the corridor system where backstop liquidity insurance is still provided at a penal rate, but where the deposit rate that provides a floor to interbank money market rates has been raised to the level of the policy rate.

Under the floor system, the central bank deliberately supplies reserves in excess of the level banks would voluntarily target. In aggregate, the banking system has to hold all the reserves the central bank creates. Individual banks might try to lend their surplus reserves to other banks, but would not do so at a lower interest rate than could be obtained at the central bank. In this way, the floor system drives market interest rates down to, but not below, the policy rate. It has obvious attractions if a central bank wishes to inject additional money into the system without losing control of its target interest rate.

The floor system negates the need to regularly forecast the demand for reserves accurately since reserves are oversupplied with an interest rate floor at the policy rate. With the banking system oversupplied with reserves, it also relies less on the interbank market to distribute them through the banking system.

Oversupply of reserves may, however, create its own challenges as banks find themselves with a higher ratio of liquid to total assets than they would choose. Whether and how banks respond to this disequilibrium in their balance sheet will depend on a number of factors and may not be easily predictable in advance. If the additional liquidity allows banks to extend profitable loans, then they might return towards their desired ratio by increasing lending. A floor system thus has the potential to impact on monetary conditions in ways that extend beyond influencing short-term market rates.

A zero-corridor system

The 'zero-corridor' system can be thought of as a further variant of the corridor system where both the lending and

deposit rates are the same as the policy rate so that the whole interest rate corridor is collapsed to the policy rate.

Since no bank would transact at a less favourable interest rate in the interbank market than it could obtain at the central bank, overnight interbank interest rates — to the extent that interbank trading would still take place under such a system — would thus converge to the policy rate.

Under this system OMOs are not required. Instead, the standing facilities play the central role in supplying and absorbing reserves at the policy rate. With the supply of reserves seamlessly adjusting to demand, the zero-corridor system should provide the most robust interest rate control in the face of changes to the demand for reserves or disruption to the interbank money market. However, with the banking system relying more heavily on transacting with the central bank than it does under the corridor or floor system, the zero-corridor system is also more susceptible to shortages of eligible collateral, which would impinge on the reliable implementation of monetary policy.

A drawback of the zero-corridor system is that it conflates monetary policy implementation and the provision of liquidity insurance. In the corridor and floor systems, usage of the lending facility is exceptional; in the zero-corridor system, by contrast, it is the norm. The lending facility is therefore delivering two objectives, making it harder for the central bank to distinguish between banks that are using it to manage their day-to-day liquidity buffers and those that have experienced a more fundamental liquidity or even solvency shock.

As with the two other systems, the zero-corridor system can be operated in a manner that protects the integrity of the central bank's balance sheet by appropriate restrictions on collateral and the setting of haircuts. However, a distinctive feature of a zero-corridor system is that, by regularly offering to borrow and lend overnight on demand, the central bank relinquishes day-to-day control over the size (and potentially the composition) of its balance sheet.

Impact on the interbank money market

The interbank money market is the market in which banks borrow and lend short-term funds between each other. Since these transactions have ultimately to be settled via banks' reserves accounts, the interbank money market is also the market for reserves. It follows that banks' incentives to trade in the interbank market are affected by the terms on which reserves are available from the central bank.

Of the three operating systems described above, it is the corridor system that provides the strongest incentive to trade in the interbank market. If payment flows leave one bank with a surplus of reserves and another with a shortage of reserves, they have an incentive to trade with each other at a rate within the corridor. If, instead, they were to make use of the central bank's standing facilities, the bank that is short of reserves would have to pay the less favourable central bank lending rate (at the top of the corridor), while the bank with a surplus would receive only the central bank deposit rate (at the bottom of the corridor). There is less incentive to trade in a floor system, where banks generally have a much larger buffer of reserves with which to absorb payment shocks. And the zero-corridor system provides little or no incentive to trade in the interbank market, since banks can borrow (on security) any amount from the central bank at the policy rate and can deposit any amount at the same rate.(1)

The interbank market forms the centre of a wider money market in which non-bank financial institutions and some non-financial companies participate. Without a liquid overnight interbank market and transparent pricing, there is a risk that this wider market would not function efficiently.

The next section briefly describes the operating framework the Bank employed prior to the financial crisis, and discusses how the lessons learned during the past three years have influenced its plans for the future development of the SMF.

The sterling monetary framework since 2006

The Bank reformed its operational framework in May 2006 to improve its implementation of monetary policy.(2) The new framework was comprised of a corridor system in which banks set their own reserves targets every month. Reserves balances that on average over the month fell within a relatively narrow range around those targets were remunerated at Bank Rate. Outside this range, surplus reserves, which had been moved to the deposit facility, were remunerated at the lower deposit rate, while banks with insufficient reserves had to borrow those reserves at the higher lending rate to avoid a penalty.

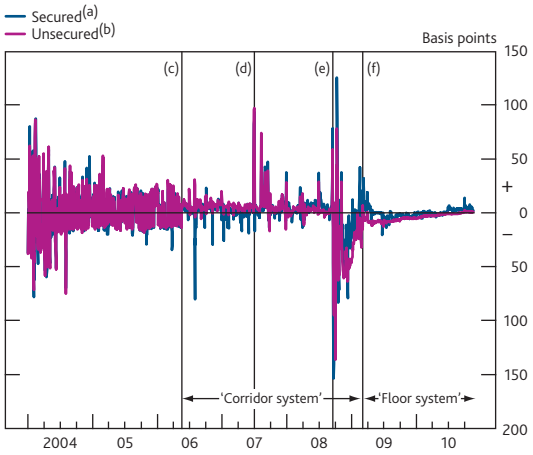
The objective of the reforms was to ensure that monetary policy would be implemented reliably, ie there would be a close and stable relationship between overnight market rates and Bank Rate. It was designed also to offer a flexible structure for banking system liquidity management and to foster a competitive and fair money market. But it involved only limited liquidity insurance, provided in the course of implementing monetary policy. In particular, the Bank only lent against a narrow range of high-quality, liquid, collateral.

Prior to the onset of the financial crisis in mid-2007, the reserves averaging corridor system met its monetary policy

(1) Under the zero-corridor system, the incentives to trade in the interbank market would depend on the collateral policies of the central bank. If the central bank only lends against a narrow range of collateral at the policy rate, banks may have an incentive to trade with each other using other types of collateral.
(2) For a detailed description of the SMF, see Bank of England (2008a,b), Clews (2005) and Tucker (2004).

objective effectively. Short-term money market interest rates, such as secured and unsecured overnight interest rates, were generally close to Bank Rate and less volatile than under the Bank's previous operational framework (**Chart 2**).

Chart 2 Spread to Bank Rate of sterling overnight interest rates



Sources: BrokerTec, Wholesale Markets Brokers' Association and Bank calculations.

(a) Spread of weighted average secured overnight rate to Bank Rate.
(b) Spread of weighted average unsecured overnight rate to Bank Rate.
(c) Introduction of reserves averaging corridor system.
(d) Start of financial crisis.
(e) Failure of Lehman Brothers.
(f) Start of quantitative easing.

From the summer of 2007, however, when interbank markets began to seize up amid concerns about banks' solvency and liquidity, the Bank, along with many other central banks, had to adapt its operations to provide large-scale liquidity support to the banking system. Over that period, there was a greater divergence between short-term market interest rates and Bank Rate than had previously been the case.(1)

Subsequently, the SMF underwent a further major change when the Bank suspended the corridor system of voluntary reserves in March 2009, following the MPC's decision to purchase assets financed through the creation of central bank reserves (commonly known as 'quantitative easing'). In principle, banks could have continued to set monthly targets and — to the extent that the MPC's asset purchases supplied reserves in excess of these targets — the Bank could have borrowed them back through OMOs. The Bank judged it better not to borrow reserves in increasingly large quantities at the same time as the purchase programme grew. Instead, monetary policy has since been implemented through a floor system, with the level of reserves initially being increased exactly in line with asset purchases.(2) Over this period, overnight market rates have been close to Bank Rate (**Chart 2**).

The experience of the financial crisis has influenced the Bank's thinking about the operation of the SMF in a number of ways. In particular, the Bank found that it could better achieve its two main objectives if it could more clearly separate operations aimed at implementing monetary policy decisions from those aimed at providing liquidity insurance. The crisis also highlighted that lending facilities can become ineffective if banks are unwilling to use them for fear of the reputational damage that might occur. As a result, the Bank now sees merit in having a framework that allows it to supply reserves to the banking system through a variety of channels. This provides greater robustness to unexpected events. Finally, the Bank found that, during times of great uncertainty, the information it gained about banks' liquidity through its money market operations became particularly valuable.

The remainder of this section describes in more detail how these lessons have influenced the development of the SMF.

Separation between objectives

The Bank's collateral policy plays an important role in the separation between monetary policy implementation and the provision of liquidity insurance. Operations aimed at implementing monetary policy decisions only provide reserves against a narrow range of high-quality collateral that is reliably liquid in private markets (predominantly debt securities of highly rated governments). Such operations are unlikely to alter the risk characteristics of banks' balance sheets to such a degree as to prompt any behavioural changes. By contrast, the Bank stands ready to provide liquidity insurance against a broader range of less liquid assets, such as asset-backed securities. When providing such liquidity insurance, the Bank charges higher fees to provide incentives for banks to manage their liquidity prudently.

Reflecting this separation between monetary policy implementation and the provision of liquidity insurance, the Bank split its single bilateral lending facility into two separate facilities in 2008. The first, aimed predominantly at monetary policy implementation, is the Operational Lending Facility. In this facility, banks may borrow reserves overnight on demand against a narrow range of collateral at a spread of 25 basis points over Bank Rate. Its use is limited to situations where banks suffer frictional, temporary, payment difficulties (say because of a temporary problem with the payments infrastructure) or where overnight market rates have become unexpectedly volatile.

The second facility, aimed more exclusively at liquidity insurance, is the Discount Window Facility (DWF). In the DWF, banks can borrow gilts against a wide range of collateral and for a longer period. But they have to pay higher fees that reflect the type of collateral and the size of the drawing relative to the size of the borrowing bank. Borrowers can then use the gilts in the secured money market to obtain reserves.

(1) See Cross, Fisher and Weeken (2010) for a more detailed description of how the SMF evolved during the crisis.
(2) The Bank accompanied the change with an announcement that all reserves would be remunerated at Bank Rate. Consequently, while the lending and deposit facilities remained in place, they had little or no influence on market rates.

Gilts are supplied rather than reserves, to ensure that liquidity supplied for a longer term than overnight and at the borrowing bank's initiative (but subject to the Bank's approval) does not affect the liquidity of the banking system as a whole. The DWF thus provides an operational separation between the provision of liquidity insurance and monetary policy implementation. The Bank aims to exclude from its facilities any bank whose solvency or viability is seriously in question. These design features of the DWF should help mitigate moral hazard and also reduce any stigma that has in the past been associated with the use of the Operational Lending Facility.

The Bank also stands ready to operate two different types of OMOs to supply reserves. In its short-term OMOs, it offers to lend reserves for a period of one week or less against a narrow range of collateral.(1) Short-term OMOs are aimed to steer the quantity of reserves to the amount necessary for the banking system in aggregate to meet its targets and to ensure that market rates remain close to Bank Rate. In contrast, since December 2007, long-term OMOs have been intended to provide some liquidity insurance. In these operations the Bank offers to lend reserves for a longer period, including against a broader range of collateral than it accepts in its short-term OMOs. But unlike with the DWF the quantity of liquidity supplied is entirely controlled by the Bank.

Of course, the distinction between monetary policy implementation and liquidity insurance is not categorical: long-term OMOs create reserves and so contain an element of monetary policy implementation, while the combination of reserves accounts and the Operational Lending Facility provides some degree of liquidity insurance. Nevertheless, the current arrangements serve to delineate the aims of the different operations more than has been the case in the past.

Robustness

In principle, the Bank could provide liquidity insurance solely via on-demand liquidity facilities like the DWF. But the Bank believes that there would be two main risks with relying solely on a single facility. First, during times of severe stress, there may be heavy operational demands on the Bank were it to use the DWF alone to supply a large amount of liquidity. Second, stigma provides an opposing risk. By their very nature, liquidity facilities, such as the DWF, are for use in exceptional circumstances and are most likely to be used by banks that need a large amount of liquidity that they would find difficult to obtain in the private markets. While the DWF is designed to limit any stigma associated with its use, it may not do so completely.

The Bank's long-term repo operations provide it with an alternative means of providing liquidity insurance. By offering to transact with the banking system as a whole on the initiative of the Bank, they are qualitatively different than facilities in which individual banks have to approach the Bank. They also allow the Bank to supply a large amount of liquidity insurance to the banking system in an operationally simple manner.

Information

In 2006, the combination of voluntary reserves targets and the remuneration, at Bank Rate, of reserves balances that were in line with those targets, was a departure from the mandatory reserves requirements specified in many corridor systems. By inviting banks to reveal their demand for reserves every month, the Bank gained useful information about banks' liquidity needs. Under the current floor system this information is lost.

More recently, the Bank has further reformed its long-term OMOs. It continues to offer to supply reserves against both a narrow and a wider range of collateral. However, whereas from December 2007 the premium banks paid to obtain reserves against wider collateral relative to narrow collateral was initially fixed, since June 2010 it has been variable. And the amount of reserves supplied against each collateral range now depends on the level of the premium. During times of heightened stress, banks will be willing to pay a higher premium for obtaining reserves against the broader range of collateral that is less liquid in private markets. The amount of insurance provided is thus dependent on the value that banks place on this insurance.(2) Moreover, through their bidding behaviour, banks will reveal the value they place on this insurance, thereby providing the Bank with useful information about emerging liquidity stresses in the banking system.

The SMF in the future

The Bank will retain many of the innovations and new facilities it introduced during the financial crisis. In particular, the DWF and the reformed long-term OMOs, together with the associated collateral and access policies, now form an integral part of the SMF.

The Bank is also minded, in due course, to reinstate its version of the corridor system in which banks set voluntary reserves targets. Overall, the Bank judges that — during normal times — a corridor system in conjunction with the Bank's collateral and access policies will facilitate the reliable implementation of monetary policy, while also providing appropriately limited liquidity insurance. It avoids the risk that could be associated with the oversupply of reserves under a permanent floor system and facilitates some separation between monetary policy implementation and the provision of liquidity insurance. Moreover, the Bank sees it as an advantage of the corridor system that it allows the interbank market to continue in being.(3)

(1) With the Bank's version of the corridor system suspended, the Bank currently does not operate short-term OMOs.
(2) The Bank's new long-term repo operations are described in more detail on pages 90–91 of the 2010 Q2 *Quarterly Bulletin*.
(3) The interbank market provides banks with greater flexibility in managing their liquidity, although, there can be instances where excessive interbank trading acts as a source of instability.

In extreme circumstances, the Bank stands ready to make further adjustments to its operating framework, to best meet its objectives at the time. The floor system currently in operation is an example of such an adaptation.

Conclusions

The design of an operating framework has implications for how the central bank discharges its objectives with respect to monetary policy implementation and financial stability. The former rests on meeting the banking system's demand for reserves, while the latter requires managing the provision of liquidity insurance to mitigate moral hazard.

The choice of operating system, access rules and collateral policies that constitute a central bank's operating framework will jointly determine how monetary policy is implemented and liquidity insurance is provided and how any potential tensions between them are managed.

The experience of the financial crisis has influenced the Bank's thinking about the design of its operating framework. As a result, the Bank has adopted an operating framework that more clearly separates monetary policy implementation and the provision of liquidity insurance, that allows it to supply reserves through a variety of channels and that, through its operations, provides the Bank with information about the liquidity needs of the banking system. For the reasons outlined above, the Bank is minded, in due course, to reinstate its version of the corridor system that was suspended in March 2009. But central banks' operating frameworks are not static and the Bank's operating framework will continue to evolve in light of experience and developments in financial markets.

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Managing the circulation of banknotes

By Helen Allen and Andrew Dent of the Bank's Notes Division.[1]

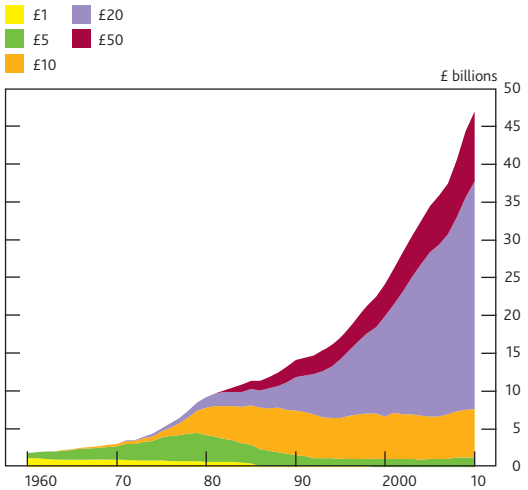
Issuing banknotes is one of the Bank of England's best known and most recognisable functions. To maintain confidence in the physical currency, genuine notes must be available to meet public demand. This article explains how the note circulation is managed to maintain this confidence. The Bank's role in this has changed considerably over the past 50 years with technological innovations and as the involvement of the commercial sector has grown. The Bank's response to future developments will continue to be consistent with its objective of ensuring the availability of genuine notes of good quality in a balanced mix of denominations.

Introduction

The Bank of England has been issuing notes for over 300 years. Today, the note issue is one of the Bank's best known and most recognisable functions, and cash is the most frequently used means of payment by the public.[2]

The stock of Bank of England notes in circulation has risen almost continuously for the past 50 years (**Chart 1**). It now is around £50 billion, the largest proportion of which is the £20 denomination. Relative to nominal GDP, however, the value of notes in circulation has fallen, from almost 8% in the 1960s to around 3% today.

Chart 1 Stock of notes in circulation[a]



(a) Data provided for the value of £1, £5, £10, £20 and £50 notes annually at end-February (the end of the Bank's financial year).

People want to hold notes for two reasons: for making transactions and as a store of value. The size and composition of notes in circulation can therefore be influenced by a number of factors. Among the most important are economic growth, inflation and the extent to which people use non cash payment means. These in turn depend on other more structural forces, such as technological innovations, demographics and personal preferences. The purpose of the Bank's note issue function is to meet the resulting public demand for notes.

This article explains how the Bank manages the circulation of its notes.[3] It first sets out the principles that engender confidence in notes and how the Bank seeks to achieve these through its role in note circulation and its interaction with commercial organisations involved in note distribution. It then highlights measures the Bank is taking to encourage a balanced mix of denominations to be provided to the public — particularly with respect to the £5 note. Finally, the article gives a flavour of some opportunities and challenges that may affect the management of the note issue in coming years.

Objectives of the note issue

Bank of England notes are a form of 'central bank money', which the public holds without incurring credit risk. This is because the central bank is backed by the government. The public's confidence in the currency requires not only stability in the value of money — through low and stable inflation,

(1) The authors would like to thank George Baldwin, Alex Holmes, Hannah Street and Jordan Thursby for their help in producing this article.
(2) It is estimated that cash accounted for almost two thirds of UK consumer payments in 2009 (Payments Council (2010)).
(3) There are eight other issuers of currency in the United Kingdom: coin is issued by HM Treasury; and seven commercial banks are legally authorised to issue their own notes in Scotland and Northern Ireland. The Bank of England has statutory responsibility for regulating the issue of Scottish and Northern Ireland notes under Part 6 of the Banking Act 2009.

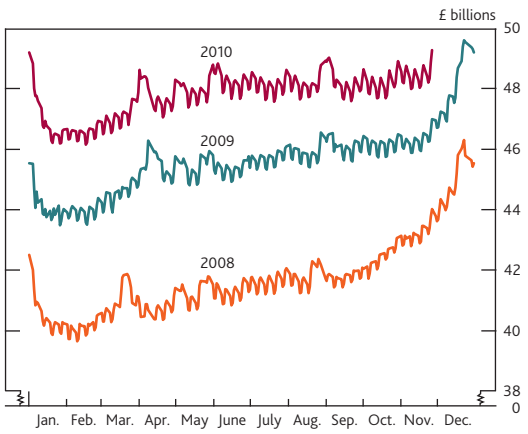
which is the focus of monetary policy — but also confidence that the physical notes in circulation are genuine and readily available. Cash users need to accept that a piece of paper that costs a few pence to produce is worth five, ten, twenty or fifty pounds.

In terms of managing the note issue, there are two aspects to maintaining this confidence in the currency. First, there needs to be confidence in the physical integrity of notes: counterfeit notes are worthless. There are many ways through which the Bank seeks to achieve this, including: the periodic upgrading of designs with the latest security features; the procurement of good-quality notes; providing information to the public and retailers on how to check that notes are genuine; and co-operation with law enforcement authorities to combat counterfeiting activity. There is further information on the Bank's note design and anti-counterfeiting strategy in the box on pages 304–05.

Second, there needs to be confidence in the availability of notes. To achieve this, the Bank facilitates a sufficient quantity of notes reaching the public, with an appropriate balance of denominations. It is the Bank's policy to meet the public's demand for notes: the choice between cash or other payment means is considered a matter for public preference. Achieving an appropriate balance in the availability of denominations is, however, an area in which the Bank is taking an increasingly active role. For example, the Bank is currently working with the commercial sector to improve the availability of £5 notes. This is discussed later in the article.

Recognising that the demand for notes follows clear, seasonal patterns (as seen in **Chart 2**) is central to making sufficient notes available. The peak for the public's note demand is the Christmas period, with smaller peaks around Easter and other bank holidays. There is also an intraweek pattern, with the highest demand for notes coming ahead of weekends.

Chart 2 Regular patterns in the stock of notes in circulation(a)



(a) Data provided on a daily basis for the combined value of £5, £10, £20 and £50 notes in circulation. Data for 2010 are to 26 November.

Despite this general predictability, the Bank needs to hold substantial contingency stocks of notes to meet unusual or unexpected peaks in demand. For example, in the run-up to the millennium, the Bank, along with the major financial institutions, held substantial additional stocks that could have been made available to the public, if required. This was in anticipation of the impact of two extended bank holiday weekends plus precautionary planning for breakdowns in, for example, communications or power that might interrupt the use of electronic payments or the normal operation of the note cycle. In the event, payment arrangements worked as planned and there proved to be ample cash available.

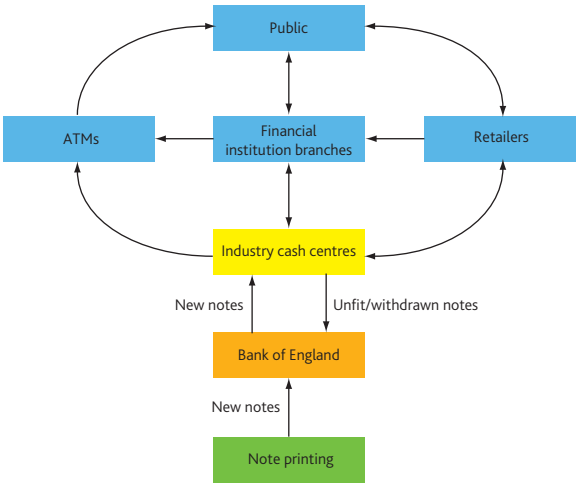
More recently, the demand for the higher-value denominations increased following the onset of the financial crisis in mid-2007. Increasing uncertainty about the state of the banking system led some people to prefer to hold notes (a direct claim on the central bank) rather than rely on access to commercial bank accounts. This further demonstrates the need for contingency stocks to support note availability, especially in times of stress.(1)

The note cycle

Overview

The life cycle of a typical note is illustrated in **Figure 1**. The first stage in a note's life is its design and printing. The Bank procures new notes from a commercial printer, then supplies them to the wholesale cash industry — commercial institutions that handle large volumes of notes. There needs to be a regular flow of new notes into circulation, both to replace notes that have become unfit for further use and to facilitate the stock of notes in circulation growing in response to public demand.(2)

Figure 1 Stylised life cycle of a note



(1) Data on the Bank's stocks of new notes can be found at www.bankofengland.co.uk/banknotes/about/stats.htm.
(2) In 2009/10, £14 billion of new notes entered circulation.

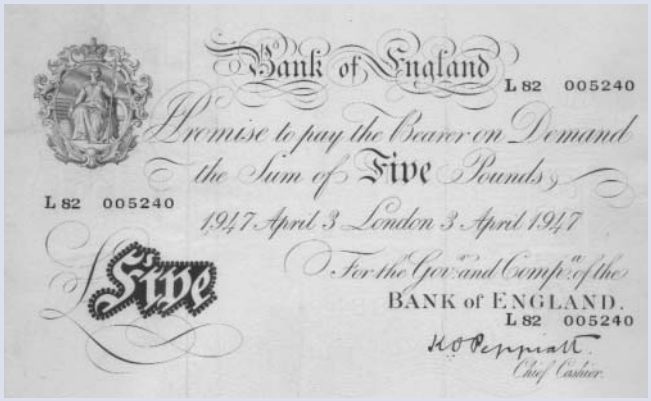
Note design and anti-counterfeiting

There have been significant advances in the sophistication of the Bank's notes over the past 50 years, in terms of both design and anti-counterfeiting measures. This box examines each of these in turn, looking first at the evolution of note design, illustrated by changes in the £5 denomination.

Fifty years of note design

In 1960, the famous 'white fiver' was still in circulation, albeit nearing the end of its life. These notes were more than twice the size of current £5 notes, and had printing on one side of the note only (**Figure A**). Rather than any picture, it was the monochrome black writing that was the focus on these notes, together with a watermark visible when held up to the light.[1] The style of this £5 note had changed very little since a version of this design was first issued in 1793.

Figure A White £5 note[a]



(a) First issued 1793, last issued 1957, ceased to be legal tender 1961.

In the 1960s, notes became predominantly pictorial with subtle colour combinations and detailed artwork — including the Queen's portrait, which first appeared on the £1 note in 1960. Notes also became smaller, facilitating their use in regular transactions. The design shown in **Figure B** is from a note series that was introduced from 1970. They were designed by Harry Eccleston, the Bank's first full-time note designer, who sadly died earlier this year.

The detailed artwork was deliberately difficult to reproduce and as such — in the days before digital reproduction technology — was a key anti-counterfeiting property of the note. The series was the first to use a picture of a historic character on one side — for example, the Duke of Wellington on the £5 note — which has been a feature of all subsequent Bank of England note designs.

Current note designs continue to consist of detailed artwork with subtle shading, but with an advanced array of more technical security features also incorporated within the design.

Figure B £5 note featuring the first Duke of Wellington[a]

(a) First issued 1971, last issued 1990, ceased to be legal tender 1991.

Several new security features were incorporated in the current £5 note design (**Figure C**). The image on the foil patch hologram changes on tilting, between a picture of Britannia and the number '5'. More subtly, there is microlettering in the pattern under the Queen's portrait — using a magnifying glass

Figure C Current £5 note featuring Elizabeth Fry[a]

(a) First issued 2002. Current series, legal tender.

reveals that the lines comprise 'FIVE' and '5' in minute lettering. Other security features within the design can only be detected with specialist equipment. For example, on the front of the note, the number 5 appears in the bottom-left area when viewed under ultraviolet light.

The design of notes with integral security features has a central role in combating counterfeiting. It is, nevertheless, only one of a number of aspects of the Bank's work in this area.

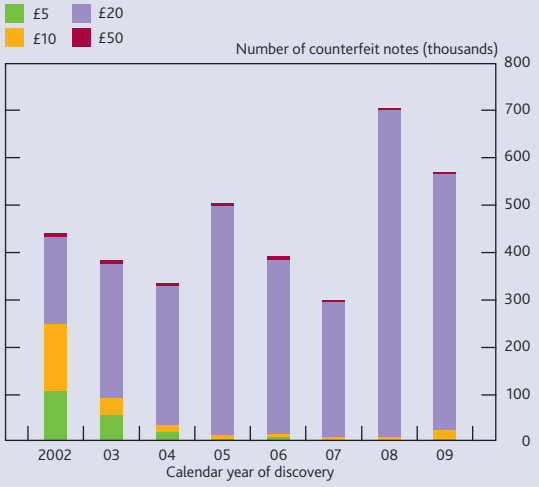
The Bank's anti-counterfeiting strategy

Counterfeiting is an ever-present threat faced by all note issuers: there will probably never be a note that criminals cannot attempt to counterfeit. However, through a combination of approaches, the Bank works to maintain confidence in the integrity of the currency and minimise the impact of any counterfeiting.

The overall incidence of counterfeiting is small. During 2009, some 566,000 counterfeit Bank of England notes were taken out of circulation. This compared with around 2.5 billion genuine notes in circulation.

The most commonly counterfeited note is the £20 denomination (**Chart A**). This largely reflects that the number of £20 notes in circulation far exceeds any other denomination — it represents nearly 60% of all notes — and that the £20 note is the highest-value denomination commonly used in everyday transactions.

Chart A Number of counterfeit notes removed from circulation



The majority of counterfeits emanate from a handful of criminal groups. Some counterfeits are seized by police operations before they ever enter circulation. Of those that do enter circulation, the majority are soon identified in the Note Circulation Scheme sorting process and sent to the Bank for analysis.(2)

The Bank works to combat counterfeiting in a number of ways.

- **The physical notes**. The Bank issues high-quality notes, produced to consistent standards. The notes are deliberately made to be difficult to copy. They have intricate, complex designs, features such as raised print and are printed on unique paper incorporating the latest security features. The Bank employs a team of scientists who analyse new developments that can further improve the security of notes.

- **Working with machine manufacturers**. The Bank works closely with the cash industry to help ensure that note-handling equipment can identify and reject counterfeits. It has recently introduced arrangements for manufacturers of machines that accept, count or sort notes to test the machines' ability to identify known counterfeits. The results are published on the Bank's website and regularly updated.(3)

- **Working with law enforcement agencies**. The Bank supports investigations and prosecutions of counterfeiters in a number of ways. Information on counterfeit numbers and types are collected by the Bank and reported to the police. Specialist Bank staff can provide forensic expertise for analysis of counterfeits and act as expert witnesses in court cases.

- **Education and training**. The Bank provides a range of materials to help cash users — including the public and staff at retailers and at financial institutions — check that notes are genuine.(4) It also has a training programme for those involved in law enforcement.

Through these approaches, the Bank seeks to minimise the number of counterfeits and ensure that any counterfeits are quickly detected and withdrawn from circulation.

(1) Watermarks have been a security feature of the Bank's notes since 1697, assuming a variety of patterns and pictures for different designs of notes.
(2) Advice on how to check notes and what members of the public should do if they believe they have been given a counterfeit note can be found at www.bankofengland.co.uk/banknotes/index.htm.
(3) Information on the Bank's framework for the testing of automatic banknote handling machines can be found at www.bankofengland.co.uk/banknotes/retailers/framework.htm.
(4) These include leaflets, posters, information on the Bank's website, a film guide and a computer-based training guide. Information can be found at www.bankofengland.co.uk/banknotes/educational.htm.

The wholesale cash industry then puts the notes into public circulation — that is, to circulate around the blue sections of **Figure 1**. Notes reach the public predominantly through ATMs and, once in circulation, can then be used in transactions. Some notes — especially lower denominations — will be used by retailers as change items in further transactions with members of the public. Other notes will be surplus to retailers' requirements and they are likely to deposit them at a financial institution.(1)

In turn, financial institutions in receipt of such deposits will send surplus notes to industry cash centres at regular intervals. An institution in receipt of surplus cash has an incentive to pass on the physical cash, converting it into value in its bank account, thereby also relieving itself of the physical storage requirement and security risk.

While in the industry cash centres, the notes are checked by passing them through sorting machines. If authenticated as genuine and of sufficient quality, they will be recirculated to the public. Some 93% of notes acquired by the public are used notes that are being recirculated; the remainder are new notes entering circulation for the first time.

Notes are likely to pass between the public, retailers, financial institutions and cash centres a number of times during their life. For example, a typical £20 note will circulate for four to five years — being sorted and recirculated around 25 times — before its quality has degraded to the extent that it is no longer fit for circulation. At that point — or if a note design is being withdrawn — cash centres will return it to the Bank for destruction.(2)

The Bank's role in the note cycle has changed over the past 50 years, particularly in relation to the involvement of the commercial sector. The next section examines the main changes that have occurred.

Development of roles in the note cycle

The Bank's involvement in preparing used notes for recirculation to the public has evolved gradually. Throughout the 1960s, the counting, authentication and quality checks were performed by hand by Bank staff. The Bank began to automate these processes from the late 1970s with the introduction of note sorting machines. This period also saw widespread adoption of mechanised sorting by financial institutions, particularly reflecting their increased demand for notes sorted to a sufficient standard for use in ATMs. For some years the Bank helped meet this demand by supplying sorted notes to some financial institutions on a commercial basis.

By the mid-1990s, commercial sorting capacity had expanded such that financial institutions had become self-sufficient in preparing notes for recirculation. The Bank judged it was more efficient for sorting to be performed by the commercial sector and gradually withdrew from this activity, closing four of its regional branches at which note sorting was performed. Since the late 1990s, sorting has taken place wholly within the commercial sector.

There was a further change of roles in 2003, when the Bank's printing of notes was outsourced to the commercial sector. The role is currently performed by De La Rue, a company specialising in high-security printing.(3)

These changes mean that the Bank's direct, operational involvement in the note cycle — the issue of new notes and destruction of unfit and withdrawn notes — now comes only at the beginning and end of a note's life. To perform these roles, the Bank retains two cash centres (in Essex and Leeds) to store its stock of new notes and to process and destroy notes no longer fit for recirculation.(4) The Bank also maintains a direct interest in the functions performed by the commercial sector and, through its contractual arrangements, ensures that there is an appropriate framework in place to manage these arrangements.

Development of the Bank's contractual schemes

The Bank's relationship with the cash industry has changed over time. These developments have been influenced in part by the expanding role of the commercial sector but also by the Bank seeking increased efficiency and improved risk management.

A significant development came in 1982 when the Bank introduced the Notes Held to Order (NHTO) scheme to address the risks and costs associated with excessive volumes of notes being transported to and from the Bank. Before the 1980s, financial institutions would physically return large volumes of surplus notes to the Bank (including its regional branches) for storage, then collect them when required to fulfil public demand. This was because the alternative — of holding the surplus notes themselves — would mean that a financial institution would incur the cost of funding a non interest bearing asset on its balance sheet. Over time, the volumes being transported each day grew in size and the associated risks and costs rose commensurately.

The principal feature of the NHTO scheme was that it allowed scheme members (the major financial institutions handling

(1) Large retailers may have arrangements to send their cash directly to industry cash centres.
(2) In 2009/10, the Bank destroyed notes worth £13 billion. The most recent withdrawal of a note series was of the £20 note bearing the portrait of Sir Edward Elgar. From 2007, this was gradually replaced with a new design featuring Adam Smith, which incorporates stronger anti-counterfeiting measures. The Elgar £20 was formally withdrawn on 30 June 2010; however, the Bank will always exchange its old series notes for current series notes (see www.bankofengland.co.uk/banknotes/about/exchanges.htm).
(3) In 2009/10, the Bank procured 1,369 million new notes from De La Rue, at a cost of £38 million.
(4) The Bank also stores new notes in the vaults of its head office at Threadneedle Street, London.

large quantities of notes) to be paid the face value for selling surplus notes to the Bank, but without physically returning those notes to the Bank. They could hold these notes — with no balance sheet funding cost — securely in their own cash centres until demanded by the public. This removed the financial incentive for physical movements of notes to and from the Bank. As a result, the NHTO scheme substantially reduced the transport costs and associated risks of commercial note distribution.

By 2001, note sorting was established as an activity wholly in the commercial sector and the NHTO scheme was replaced by the Note Circulation Scheme (NCS). The NCS incentivised greater efficiency in members' processes and improved the risk management of the overall scheme. Importantly, it retained as a central principle the mechanism for relieving members of the funding cost of holding notes that are being sorted, or held as surplus to current demand.

The NCS — described in more detail in the next section — remains in operation today, subject to periodic reassessment by the Bank to ensure the framework remains suited to achieving the Bank's objectives for the note circulation.

The Note Circulation Scheme

The NCS framework allows the commercial sector to perform key functions in the middle of the note life cycle. That is, NCS members perform the activities to manage the circulation of notes after the Bank has issued new notes and until the notes are returned to the Bank for destruction. They facilitate notes entering and leaving circulation and sort, distribute and store notes without the direct operational involvement of the Bank.(1) There are few other countries in which the commercial sector plays such a large role in the note cycle, but more are now moving in this direction.

The manner in which these activities are performed by the commercial sector is critical to the Bank's ability to achieve its objectives for the note issue. Consequently, the Bank maintains a close interest in the operations of these commercial institutions and influences their behaviour through both the rules of the NCS and frequent bilateral contact.(2)

Requirements of NCS membership

The NCS is a contractual framework: its members undertake to perform activities in accordance with the Bank's NCS rules. Membership of the NCS is open to institutions engaged in wholesale note processing: for example, financial institutions, specialist note processors, cash in transit companies or security companies. Potential members must fulfil a number of operational, financial and security-related criteria. There are currently five NCS members, which between them operate 28 NCS cash centres in England and Wales.(3)

A condition of NCS membership is compliance with clear requirements set by the Bank. These cover the physical security for the custody of notes owned by the Bank, the overall control environment, the conditions of custody and reporting procedures. Regular audits are conducted by the Bank to check the security and contents of members' cash centres.

Security standards are regularly reassessed and upgraded to mitigate new threats. An important upgrade occurred in the wake of the robbery of the Securitas NCS cash centre in Tonbridge, Kent in February 2006. Some £53 million was stolen, the largest ever cash robbery in the United Kingdom: reimbursement was, however, received immediately from Securitas for the notes belonging to the Bank, so there was no loss to the public sector. Following this incident, the physical security of note storage and the accompanying monitoring arrangements were immediately reviewed and more stringent requirements for NCS members were put in place.

All of these requirements are intended to protect the Bank — and therefore the public sector — from the financial and reputational risk of operating the NCS.

The following sections describe the key roles performed by NCS members, which are undertaken within their cash centres — the yellow box in **Figure 1**.

Sorting

When used notes pass through an NCS cash centre, they will be checked by a sorting machine. In aggregate, NCS members sort some £200 billion of notes each year.

This process of machine sorting is a cornerstone of the NCS: financial institutions and other ATM operators have a strong reputational incentive to ensure that counterfeit notes are not recirculated to their customers. This in turn means the vast majority of notes acquired by the public will have been machine-authenticated as genuine.

Notes that are unsuitable for recirculation — whether because they are poor quality, or from a note series that is being withdrawn — are returned to the Bank for destruction. Any counterfeit notes identified are sent to the Bank for analysis, as explained in the box on pages 304–05. All NCS members are required to operate sorting machines that reliably detect counterfeit notes and the Bank regularly checks the performance of these machines.

(1) Typically, financial institutions requiring and/or receiving large amounts of notes have a contractual relationship with an NCS member and pay a fee for its services.
(2) Additionally, the Bank liaises with the cash industry at all levels of seniority through a range of fora, often organised in conjunction with the Payments Council, see www.paymentscouncil.org.uk/payments_council_working_groups/-/page/783/.
(3) At 1 December 2010, the NCS members were: Bank of Scotland plc, G4S Cash Centres (UK) Ltd, Post Office Ltd, Royal Bank of Scotland plc and Vaultex UK Ltd (a joint venture between Barclays Bank and HSBC Bank).

The note issue and the Bank's balance sheet

Notes that have been acquired from the Bank for their face value are termed 'in circulation'. These can be in a wide variety of locations of different accessibility — ranging from being in ATMs or bank branches awaiting dispense, to being in the hands of the public or in retailers' tills — illustrated by the blue area in **Figure 1** on page 303.

In accounting terms, only those notes that are 'in circulation' are a liability on the Bank's balance sheet. At that point, the Bank has received value from the commercial sector for the notes, at their face value. The Bank of England's balance sheet currently has around £50 billion of notes in circulation.

The Bank purchases low-risk assets to match this liability on its balance sheet, typically sterling money market instruments or government bonds. The income from these assets, after deducting the Bank's costs of managing the note issue, is paid to HM Treasury, as the Bank's shareholder. This net profit of the note issue is known as 'seigniorage' and can be a significant source of revenue for the government.

Most stocks of notes held by NCS members are not in circulation. They are neither a liability of the Bank, nor an asset of the commercial sector, as the Bank has paid the face value to the NCS member. Typically, around £10 billion of notes are held in the NCS, although this is subject to considerable seasonal variation.

The NCS is designed to encourage efficient commercial processes. This is achieved by limiting the period over which the Bank buys notes that are being sorted by members.

Surplus notes: storage and redistribution

The seasonal variation in the demand for notes means there is a significant stock of used notes that is surplus to the economy's requirements in between peak periods. For example, the stock of notes in circulation typically rises by around £4 billion ahead of the Christmas period. After Christmas, there is a significant reduction in this stock as public demand declines, which in turn results in surplus notes being sent to NCS members. Surplus used notes are stored in the vaults of the NCS members' cash centres but are purchased by the Bank so that NCS members do not incur any funding costs while storing them.

This arrangement has other benefits. It helps ensure a geographically dispersed stock of used notes, which supports efficient note distribution and gives widespread contingency supplies in case of any problems with the normal operation of the note cycle. It also means the Bank does not have to provide storage space for these surplus used notes.

These storage arrangements also facilitate the redistribution of surplus notes between NCS members. Some NCS members may service financial institutions that typically have surplus notes — in that the deposits they receive from customers, such as retailers, exceed the notes they send out, for example to fill ATMs. But other NCS members may service financial institutions that typically have a deficit of notes. These surpluses and deficits can be matched through the redistribution of notes between NCS cash centres. This helps reduce the stock of used notes in NCS cash centres, which in turn reduces the cost to the public sector of printing additional notes.

The box above explains the accounting treatment of notes on the Bank's balance sheet and how this interacts with their movement in and out of NCS members' cash centres.

The importance of denominational mix

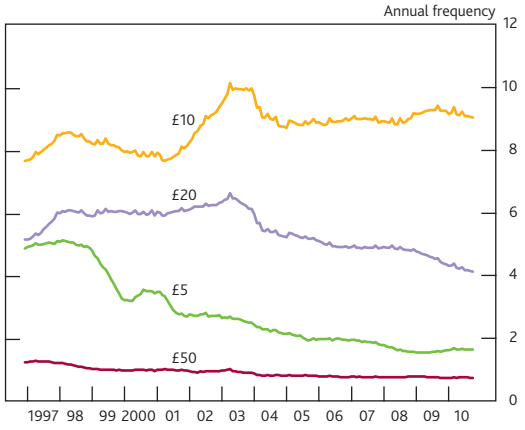
The Bank does not place any restrictions on the overall value of notes in circulation: it aims to meet public demand. However, it recently has adopted an active policy in influencing the denominational mix of notes available to the public. Primarily, this has been to address the suboptimal circulation of £5 notes. In recent years, the availability of good-quality £5 notes to the public has declined — a decline that the Bank believes must be addressed for notes to continue to fulfil an efficient transactional role.(1)

Higher-value denominations are more likely to serve as a store of value and so people will tend to hold them for longer. In contrast, lower-value denominations are used almost exclusively for consumer transactions and so should be more likely to pass through NCS cash centres for sorting. In general, therefore, higher-value denominations (such as the £50 note) might be expected to be sorted less frequently than lower-value denominations.

In practice, this relationship holds true for all denominations except £5 notes (**Chart 3**). A £5 note typically now passes through an NCS cash centre for sorting less than twice a year, far less frequently than a £10 or £20 note. Moreover, there has been a trend decline in the frequency with which £5 notes are sorted. A consequence of this has been a deterioration in the quality of £5 notes in circulation.

(1) The Governor drew attention to this problem in his Mansion House speech of 2007 (King (2007)). Recent developments are explained in Cleland (2010).

Chart 3 Frequency with which notes pass through an NCS cash centre[a]

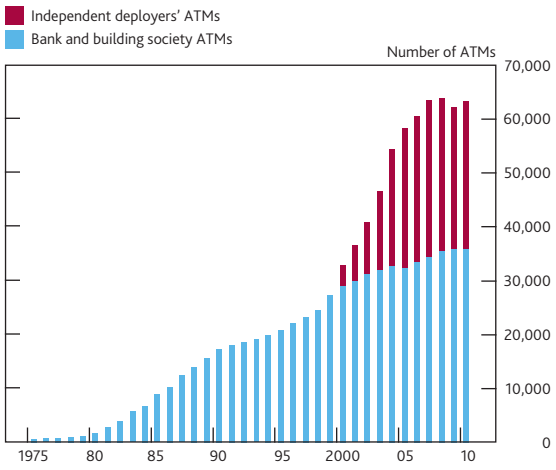


Sources: Bank of England and Payments Council.

(a) The average number of times a note passes through an NCS cash centre each year. Calculated as a twelve-month moving average of annualised monthly outflows from NCS cash centres divided by notes in circulation of that denomination.

The problem stems from there being few channels through which £5 notes enter circulation. As ATMs have become more prevalent (**Chart 4**), they have become the dominant channel through which the public obtains cash.(1) The public now acquires almost three quarters of its cash from ATMs, compared with only one quarter in the early 1990s. Yet very few ATMs dispense £5 notes. As a result, the public's ability to acquire £5 notes is impaired, despite opinion surveys showing there is demand for the denomination. Those £5 notes that are in circulation tend to be repeatedly used for transactions between the public and retailers without returning to cash centres for sorting and potential replacement.

Chart 4 Number of ATMs in the United Kingdom[a]



Source: Payments Council.

(a) Data for 2010 are provided for end-September; all other data are on an end-year basis.

To address this problem, the Bank is working with NCS members, financial institutions, ATM owners and retailers. The Bank has concluded that the long-term solution is for more £5 notes to be dispensed through ATMs, accompanied by a greater supply of £5 notes to retailers for use as change.

In 2009, the Bank worked with HSBC to facilitate a wider understanding of the business case for ATM dispense of £5 notes and similarly with Sainsbury's on the case for ordering more £5 notes as change items. Both pilot studies proved positive, demonstrating benefits to ATM owners and retailers — as well as to the public — from the greater dispense and use of £5 notes. All the major ATM owners have since committed to increase significantly the value of £5 notes dispensed and several large retailers are also working to increase the number of £5 notes they give as change.

Together, these initiatives should result in the availability of significantly more £5 notes to the public. By 2012, an extra £2 billion of £5 notes should be entering circulation each year, which will double the current rate. The quality of these £5 notes should also improve, as the Bank is requiring NCS members to sort £5 notes to a higher-quality standard than before.(2)

Nevertheless, the extent to which these initiatives will improve the circulation of £5 notes cannot be precisely predicted at this stage, so the availability and quality of £5 notes will remain under close review by the Bank.

Additionally, the Bank will be implementing changes to the design of the NCS in 2011, in part so the funding relief available through the NCS better supports the Bank's denominational mix policy. The proposed new design will rebalance the funding relief currently provided, to recognise the additional costs in preparing £5 notes for recirculation.

Future developments

There are many developments that can present challenges to the Bank's objectives for the note issue — be they innovations in cash-handling technology, changes in cash use and alternatives to cash, or alterations in the structure of the industry. Most such developments take a number of years to become established, but sudden shifts in the cash landscape cannot be ruled out.

One example is the possible impact of cash alternatives such as contactless payment cards or mobile payments. These have the potential to alter the public's demand for cash but — as with ATMs — their impact may only become apparent over a number of years. Outcomes are subject to many variables, including the scale of roll out and the public's adoption of the

(1) The way in which ATMs have changed and 'modernised' the use of cash is discussed in a recent speech (Bailey (2009)).
(2) See the News Release, 'Fivers — back on track', 27 October 2010, available at www.bankofengland.co.uk/publications/news/2010/083.htm.

arrangements. The same observations apply to whether greater use of self-service tills in retail outlets might influence the overall demand for notes and its denominational mix.

Another development is the use of note sorting machines that are small enough to be feasibly deployed in a retailer's premises or a financial institution's branches — in contrast to the industrial-scale sorting machines used in NCS cash centres. The Bank is mindful that the potential convenience and efficiencies from using such machines could be accompanied by a risk to note integrity were they to have inadequate authentication capabilities that allowed counterfeits to re-enter circulation. Therefore, as explained in the box on pages 304–05, the Bank is working with machine manufacturers to facilitate high standards of authentication capabilities in these, and other, note-handling machines.

The range of institutions involved in the cash cycle — from manufacturers of cash-handling machines to financial institutions to retailers — makes widespread co-operation in day-to-day business essential. This becomes even more important in times of stress during which there could be a sudden impact on cash arrangements. Business continuity planning exists for a range of scenarios, including to maintain the cash circulation system in the event of disruption due to a pandemic, the preparation of which involved industry groups, a range of commercial organisations and several public authorities, including the Bank.

There have been enormous changes in note circulation arrangements over the past 50 years. The Bank's response to future developments will be consistent with the maintenance of its objectives for the note issue. That is, the priority is to ensure that genuine notes, of good quality and in a balanced mix of denominations, are available to the public.

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Understanding the weakness of bank lending

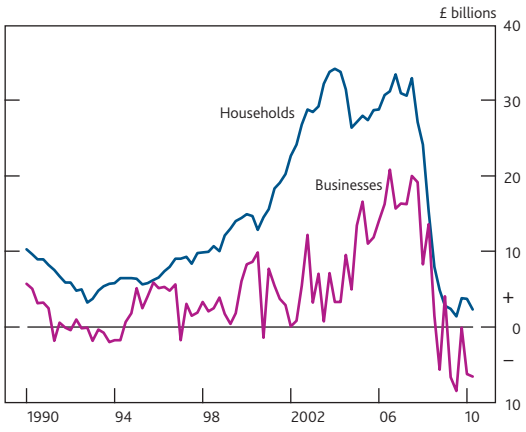
By Venetia Bell and Garry Young of the Bank's Monetary Assessment and Strategy Division.[1]

The flow of new bank lending to UK households and businesses fell sharply following the start of the global financial crisis in mid-2007. That provoked an ongoing debate about the extent to which the sustained weakening of bank lending was caused by a fall in demand for credit, or a fall in supply. While it is difficult to disentangle the effects of shifts in credit demand and supply, this article finds evidence of a substantial and persistent tightening in credit supply conditions from mid-2007. But independently weaker credit demand — probably associated with the impact of the global financial crisis — is also likely to have contributed to the weakness in bank lending.

Introduction

The recent global financial crisis was accompanied by a marked fall in the flow of new bank loans to UK businesses and households (**Chart 1**), and lending has remained subdued even as economic activity has begun to recover. Weaker bank lending is likely to reflect both a tightening in the supply of credit and an easing in the demand for credit. This article reviews the available evidence on the relative importance of each of these factors in explaining the weakness of bank lending.

Chart 1 Quarterly flow of net lending to UK households and businesses[a]



(a) Lending to individuals and M4 lending (excluding securitisations) to private non-financial corporations (PNFCs).

The global financial crisis began in mid-2007, triggered by emerging losses in the US sub-prime mortgage market. As the financial crisis intensified, the funding costs of lenders in the United Kingdom rose markedly relative to Bank Rate. That made it more expensive for them to fund the loans and facilities to which they were already committed and discouraged new lending.

The financial crisis also exposed other systemic vulnerabilities,[2] and the resulting adjustment in the banking system took several forms. Some financial institutions raised equity and sold assets. Banks both in the United Kingdom and abroad tightened credit conditions. And some foreign lenders withdrew from lending in the United Kingdom.[3]

Alongside the tightening in the supply of credit, a number of factors are likely to have weighed on the demand for loans during the financial crisis. Some of these may have been a direct or indirect consequence of tighter credit supply conditions, and some may have occurred independently. Companies may have scaled back or postponed investment plans, and therefore their demand for finance, in part reflecting increased spare capacity, a reduction in expected demand for their products or greater uncertainty about the economic outlook. Some households may have scaled back spending due to concerns over job losses, or expectations of lower pay growth. The economic downturn may also have encouraged both households and companies to revise down the levels of debt that they wished to hold.

But, in the opposite direction, other factors may have bolstered credit demand. Monetary policy was loosened markedly between mid-2007 and late 2009, and Bank Rate remains at 0.5%. Lower interest rates increase the incentive to consume or invest today, which, for some households, would

(1) The authors would like to thank Emily Beau for her help in producing this article.
(2) These issues have been covered in detail in past *Financial Stability Reports*.
(3) See the box on pages 18–19 of the June 2009 *Financial Stability Report*.

increase their demand for credit. In addition, some households may borrow to smooth out consumption in the face of temporary weakness in income. Similarly, some businesses may have needed more day-to-day finance (sometimes referred to as 'working capital' finance) as short-term cash flow came under pressure from strains along their supply chains.

Identifying the relative contribution of tight credit supply and weak credit demand to the weakness in lending is important for monetary policy. To the extent that weak bank lending reflects tight supply rather than weak demand, then weak lending is more likely to dampen the recovery in activity. For example, an increase in the cost of credit would push down investment spending.

The remainder of the article is structured as follows. First, it discusses the issues around identifying changes in credit demand and credit supply in principle. Second, it takes several different approaches to assess the extent to which changes in credit supply and demand have contributed to the weakness in bank lending.

Identifying changes in credit demand and supply

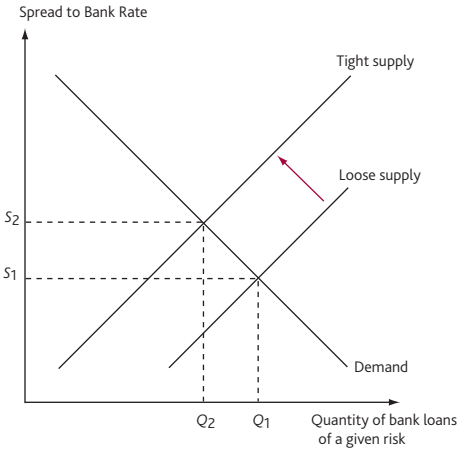
Disentangling the impacts of changes in the demand for and the supply of credit is difficult. Only the cost of borrowing and the quantity advanced are directly observable. And lenders only observe demand for credit given the rates and other terms and conditions on the products that they make available. Similarly, borrowers only report their demand given the cost and availability of products.

Simple economic theory can help to assess how the cost and quantity of bank lending would be expected to change given movements in credit demand and supply. In a simple framework, where the quality of potential borrowers is assumed to be fixed, credit demand and credit supply are related to a measure of the cost of credit (for example, the interest rate spread on loans relative to Bank Rate). The higher the cost of credit, the less willing people will be to ask for credit, but the more willing institutions will be to provide it.

In this simple framework, prices move to bring demand and supply into balance. As such, when the amount of credit advanced falls, it must ultimately be because both the amount of credit demanded and supplied have fallen. For example, if there is a reduction in banks' willingness to lend, prices will rise so as to choke off demand and bring the market back into balance. The identification issue in explaining the weakness of bank lending is not whether supply or demand have fallen — both have — but it is assessing the underlying cause of that decline, whether it is an independent tightening in the supply of credit, an independent fall in credit demand, or some combination of both.

Figure 1 illustrates a tightening in the supply of credit (represented by a leftward shift in the supply curve from 'loose supply' to 'tight supply'), consistent with the definition of a credit supply shock used by Bernanke and Lown (1991).(1) Such a tightening in credit supply could reflect a number of factors, including an increase in banks' funding costs relative to Bank Rate, or a reduction in risk appetite. **Figure 1** suggests that a reduction in the supply of credit would result in an increase in the cost of credit and a reduction in the quantity of bank lending. Following the shift in credit supply, lenders would observe weaker credit demand, as borrowers shift along their credit demand schedule, but that would reflect the tightening in credit supply and hence the movement to the new equilibrium, rather than an independent shift in overall credit demand.

Figure 1 Illustration of a tightening in credit supply

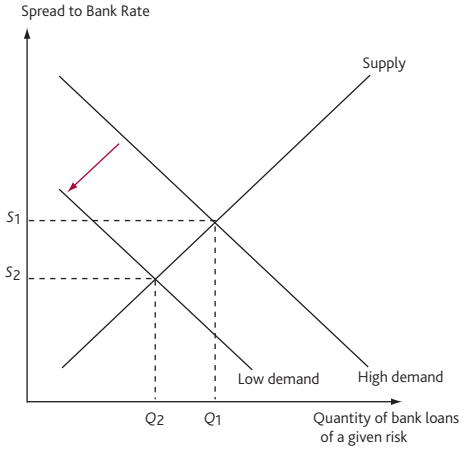


The sensitivity of credit demand to changes in its cost — known as the elasticity of demand — influences the extent to which the price and quantity of lending adjusts. The elasticity of demand reflects a number of factors, including the alternative sources of finance available. For example, large companies have more alternative sources of finance than small companies and households, so their demand is likely to be more sensitive to changes in credit supply than that of small companies or households. And the increase in the cost of issuing corporate bonds — an alternative source of finance for large companies — during the crisis would also have boosted the demand for bank credit at any given spread.

Figure 2 illustrates how an independent reduction in demand for credit (represented by a downward shift in the demand curve from 'high demand' to 'low demand') would result in a

(1) The Bernanke-Lown (1991) definition of a credit crunch is: a significant leftward shift in the supply curve for bank loans, holding constant both the safe real rate of interest and the quality of potential borrowers.

Figure 2 Illustration of a weakening in credit demand



reduction in the quantity of bank lending, and a reduction in the cost of credit. The sensitivity of credit supply to changes in the demand for credit would influence the price and quantity of lending in the new equilibrium.

The strength of this simple framework is that it gives a clear picture. But the real world is inevitably more complicated. For example, in practice, the quality of potential borrowers changes over time, and that can affect the interpretation of a change in loan spreads. On the one hand, if the quality of borrowers deteriorates, as is likely to have happened during the financial crisis, lenders would require a higher spread to compensate them for the increased risk associated with lending. That could be misinterpreted as a credit supply shock, which would overstate the extent to which weak bank lending reflects a genuine tightening in credit supply. On the other hand, lenders might restrict credit supply by tightening non-price terms and conditions to improve the quality of borrowers that are granted credit. The resulting reduction in loan spreads could be misinterpreted as a reduction in loan demand or a loosening in the supply of credit. So it is important to control, insofar as possible, for changes in the quality of borrowers and borrowing terms in making an assessment about the drivers of the weakness of bank lending.

The overall demand for credit is likely to be influenced by other factors in addition to the spreads on loans relative to risk-free rates. For example, overall demand for credit is likely to be a function of total borrowing costs, among other things, rather than just the spread relative to Bank Rate as drawn in the simplified example. During the financial crisis, falls in Bank Rate would have boosted demand for credit for any given spread, working against the impact of any other weakening in credit demand. Demand for credit is also likely to be affected by expectations of the future cost and availability of credit, reflecting the long-term nature of financing needs. When taking out a mortgage, households' expectations of future spreads and Bank Rate will influence their current demand for credit. And companies' borrowing decisions are likely to be influenced by the likelihood that loan facilities will be renewed in the future.

Second-round effects further complicate the identification of changes in credit demand and supply. For example, when businesses cancel their expansion plans because they cannot obtain a loan, credit demand from the suppliers of those businesses may also be weaker. To the extent that such second-round effects have been important, a simple analysis would tend to underestimate the size of the underlying shock to credit supply, and attribute more of any weakening in lending to an independent shift in credit demand.

Nonetheless, this simple framework can help to identify credit demand and supply shocks. As this article goes on to discuss, the weakness of bank lending has been associated with higher spreads (as in **Figure 1**), rather than lower spreads (as in **Figure 2**). That suggests that a tightening in credit supply is likely to be a significant part of the explanation for weak bank lending during the recession following the financial crisis. It is not possible to say, using this simple framework, whether there have been independent shifts in credit demand as well.

Evidence on credit supply and credit demand

This section discusses evidence on changes in credit supply and demand using five approaches. First, using evidence on the price and availability of loans to households and companies. Second, evidence from the lenders is examined. Third, evidence from business surveys and reports from the Bank's Agents is used. Fourth, information on the price and quantity of non-bank finance is scrutinised. Finally, the article discusses the results from an econometric identification of credit supply and demand shocks.

Price and availability of bank credit

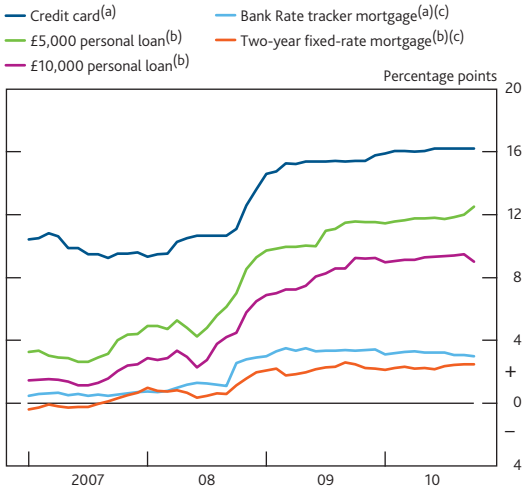
Assessing the extent to which credit conditions have changed without a detailed investigation of data on individual loans is necessarily imperfect. Nevertheless, this section brings together the available evidence in order to assess the contribution made by tighter credit supply to the rise in the relative cost of credit and the reduction in availability during the financial crisis.(1)

Households

Spreads on bank credit to households rose during the financial crisis, and the availability of loans tightened. Spreads increased between mid-2008 and early 2009, and have remained high (**Chart 2**). Increases were most marked for relatively risky loans, such as unsecured lending. But spreads rose on mortgages obtained with even a 25% deposit. Credit availability also fell, particularly for those with little equity built up in property on which to secure their loans. While

(1) For a discussion of recent developments in credit conditions, see Section 1.3 in the November 2010 *Inflation Report*.

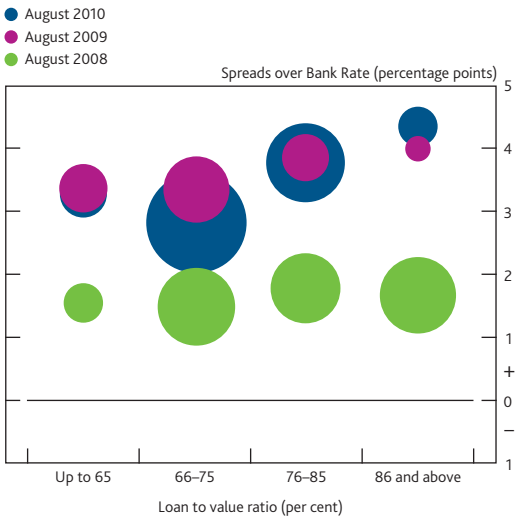
Chart 2 Average quoted interest rate spreads on household loans



(a) Spreads are taken over Bank Rate.
(b) Spreads are taken over two-year swaps.
(c) At 75% LTV.

loans of up to 90%–95% of the value of the property (LTV) — and some products with LTVs in excess of 100% — were common in the few years preceding the financial crisis, the number of products with LTVs in excess of 85% dropped to a fraction of its pre-crisis level by mid-2009, and has remained low (**Chart 3**). In part, the tightening in credit conditions is likely to have been in response to the unusually loose conditions immediately prior to the crisis.

Chart 3 Floating-rate mortgage spreads and product availability across loan to value ratios(a)



Sources: Moneyfacts Group and Bank calculations.

(a) End-month advertised rates for products with different LTV ratios. Size of bubble reflects the number of products. The spread is calculated over Bank Rate at the end-month for the relevant period.

The loan pricing framework set out in Button *et al* (2010) can be used to assess the factors driving higher spreads. Their analysis shows that higher bank funding costs and residual items such as the mark-up or operating costs on a 75% LTV mortgage together have increased by around 2.5 percentage points compared to pre-crisis averages (**Table A**). The equivalent increase in spreads on unsecured personal loans has been over 6 percentage points.

Table A Decomposition of new lending rates(a)

Differences from 2004–07 averages (percentage points)

	2008	2009	2010(b)
Mortgage spread(c)	0.8	2.7	2.5
of which:			
Funding cost	1.6	1.5	1.2
Credit risk factors	-0.1	0.0	0.0
Residual	-0.8	1.2	1.4
Unsecured loan spread(d)	1.3	5.7	6.8
of which:			
Funding cost	0.9	1.2	1.3
Credit risk factors	-0.1	0.4	0.5
Residual	0.5	4.2	5.0

Sources: Bank of England, Bloomberg, British Bankers' Association, Council of Mortgage Lenders, Markit Group Limited, UK Cards Association and Bank calculations.

(a) For details on the data and method used in the decompositions, see Button *et al* (2010). As discussed in that article, the marginal source of funding, and the way in which lenders set their loan rates, may vary across different institutions. So while this decomposition is likely to be useful in understanding loan pricing in aggregate, the experience of individual lenders may vary. Contributions may not sum to the total due to rounding.
(b) Data are an estimate based on data to October 2010.
(c) 75% LTV tracker mortgage average quoted rate relative to Bank Rate. The funding cost is shown as a spread relative to Bank Rate.
(d) £10,000 personal loan average quoted rate relative to two-year swaps. The funding cost is shown as a spread relative to two-year swaps.

That loan pricing decomposition suggests that the bulk of the increase in spreads since mid-2007 reflects tighter credit supply. Although perceived credit quality — identified as an increase in credit risk factors in **Table A** — has deteriorated over this period for unsecured borrowing, that appears to have made a relatively small contribution to increased spreads. If lenders had reduced spreads in response to weak demand, that would have pushed down the residual components of loan prices, while tighter supply would have pushed up the residual components. Although there may be other unmodelled factors affecting the residual components, the residuals have increased markedly since 2008 (**Table A**), suggesting that tighter credit supply is likely to have been more important than weaker credit demand.

Businesses

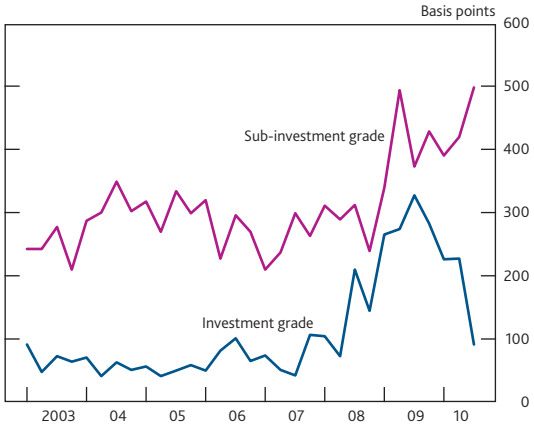
Measuring the impact of tighter credit supply on the cost of bank finance to businesses is harder than it is for households. First, there are no comprehensive data on quoted interest rates on new loans split by credit quality. The alternative — average lending rate data — will reflect changes in the quality of loans. Second, there is no clear distinction in the available data between interest rates on new and existing loans: for some lenders, new business includes companies drawing down existing facilities with pre-arranged costs, or loans that have been repriced in line with changes in reference rates. Reflecting both of these factors, and given that existing facilities are likely to have had lower spreads than those on genuinely new credit since the start of the crisis, measured

effective rates are likely to underestimate the rates at which companies are able to arrange genuinely new loans from banks in practice.

Indicative data on loans to small and medium-sized enterprises (SMEs), available from late 2008 onwards, point to a rise in interest rate spreads for some borrowers. According to data from the Department for Business, Innovation and Skills, margins over the banks' own base rates for SMEs who applied for overdrafts in 2008 were significantly higher than they had been in earlier years.

Another indicator of the cost of finance is spreads on new syndicated loans — large loans provided by a group of banks or other lenders.(1) Syndicated loan spreads increased sharply from mid-2008, with investment-grade spreads rising to a peak of over 300 basis points (**Chart 4**). But these spreads are based on a small number of deals, as the flow of syndicated lending to UK businesses declined sharply from its peak in mid-2007. More recently, investment-grade spreads have fallen back, although sub-investment grade spreads remain elevated.

Chart 4 Spreads reported on syndicated loans(a)



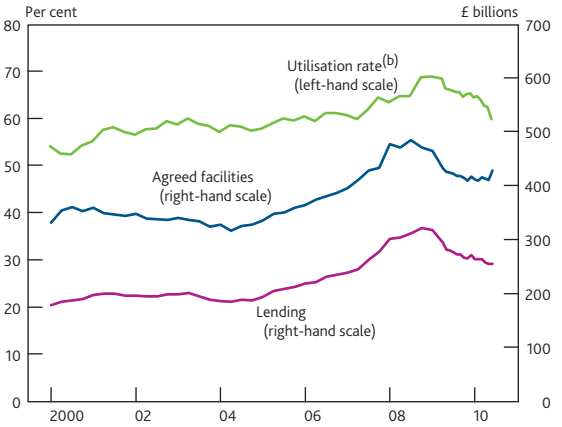
Sources: Dealogic and Bank calculations.

(a) Average disclosed spreads over reference rates in the currency in which loan tranches are denominated, weighted by tranche size. Investment grade is classified by Dealogic as a rating of BBB- or higher, with the classification adjusted where ratings change over the life of the loan. If there is no rating, then the loan spread on origination is used as the basis for classification, with any margin up to 250 basis points classified as investment grade. Quarterly data.

It is difficult to assess the extent to which increased spreads on corporate loans reflect tighter credit supply. Although an equivalent decomposition of loan pricing as discussed for new household borrowing is not available, it is likely that increased funding costs would also have pushed up the cost of corporate lending. So it is likely that at least part of the estimated rise in SME spreads and syndicated loan spreads reflects tighter credit supply.

An indicator of credit availability is the amount of agreed lending facilities outstanding, and the utilisation rates of those facilities. The outstanding stock of facilities (excluding facilities advanced to the real estate sector)(2) fell sharply from mid-2008. And utilisation rates rose from mid-2007 to early 2009 as companies made more intensive use of their already-agreed facilities, but utilisation rates have since fallen back (**Chart 5**).

Chart 5 PNFCs' agreed facilities, lending and utilisation rate(a)



(a) Private non-financial corporations (PNFCs) excluding commercial real estate. The data are quarterly prior to 2009 Q3 and monthly thereafter.
(b) The utilisation rate is the amount of lending divided by the amount of facilities agreed.

Utilisation data suffer from the same identification issues as other indicators of credit demand and supply, however. Low utilisation rates might suggest weak demand for credit relative to supply. But low utilisation rates may also reflect the response of demand to higher lending spreads and more stringent terms and conditions on new facilities. Furthermore, concerns among businesses that existing facilities might be withdrawn, or become more expensive in the future, would lead them to reduce their reliance on bank credit before those facilities expire. As a result, low utilisation rates need not necessarily imply weak demand for credit. Similarly, if lower-quality borrowers are put off applying for credit by the high cost of borrowing, consistent with low numbers of loan applications, that might boost approval rates.

Overall, the evidence suggests that the cost of credit rose sharply during the financial crisis, and that there was a reduction in the availability of credit, both for households and companies. For households, the available evidence points to an increase in credit spreads controlling for changes in credit quality, consistent with a significant role for tighter credit supply in explaining the weakness of bank lending. The evidence for corporate lending is less clear-cut, but it is likely that tight credit supply played a role in driving up the cost of credit.

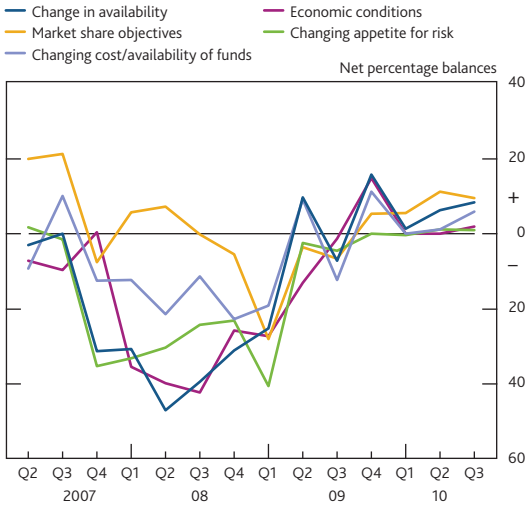
(1) See the box on page 8 of the July 2010 *Trends in Lending* for a discussion of recent trends in syndicated lending.
(2) The relationship between agreed facilities and lending in the real estate sector has different aggregate dynamics to that in other sectors. See the box on page 7 of the September 2010 *Trends in Lending* for a discussion of recent trends in lending to the real estate sector.

Evidence from the lenders

Evidence from the lenders suggests that price and non-price terms on loans rose during the financial crisis. Lenders responding to the Bank's *Credit Conditions Survey* reported that spreads increased markedly across all types of lending, particularly during 2008 and early 2009. The net percentage balances of lenders reporting increased fees on secured lending and fees/commissions on loans to companies also rose.

According to the *Credit Conditions Survey*, the availability of secured lending to households contracted markedly during 2007–08, and has remained tight (**Chart 6** shows responses on *changes* in credit availability and the factors contributing to that). A net balance of lenders reported that tightening in part reflected economic conditions. That would be consistent with reduced availability to compensate for a deterioration in the quality of potential borrowers, rather than suggesting either a fall in demand or a tightening in supply. But lenders also reported a significant role for market share objectives, changing appetite for risk and changing cost/availability of funds. These three factors may be thought of as credit supply factors, suggesting that there was an independent tightening in the supply of secured credit during the financial crisis. A similar picture was reported for both corporate lending and unsecured lending to households during the worst of the recession, although lenders have reported some easing in corporate credit conditions over the past 18 months.

Chart 6 *Credit Conditions Survey*: change in availability and factors contributing to change in availability of secured loans to households[a]



(a) Weighted response of lenders. A positive balance indicates looser credit availability or factors increasing the availability of credit over the past three months.

Lenders responding to the *Credit Conditions Surveys* indicated that demand for credit has fallen on average since 2007 H2 for most borrowers, with demand holding up only for small businesses (**Table B**). That is consistent with the findings reported by the Business Finance Taskforce.(1) But, as discussed above, lenders only see demand for credit given the rates that they are charging, or given the availability of products. And they are unlikely to be able to tell whether the weakness in demand was caused by earlier tightening of credit supply or by independent factors. Indeed, given that the weakening in demand was accompanied by an increase in reported spreads and non-price terms on lending, weak credit demand is more likely to reflect the tightening in credit supply than independent factors.

Table B *Credit Conditions Survey*: demand for credit[a]

Net percentage balances

	Averages[b]			
	Since 2007 H2	2009	2010 H1	2010 Q3
Large PNFCs	-16	-17	-4	-2
Medium PNFCs	-11	-11	6	-4
Small business borrowing				
Secured	0	4	19	-14
Unsecured	7	10	21	12
Households				
Secured	-4	19	-15	-6
Unsecured	-8	-19	-6	-12

(a) Weighted response of lenders. A positive balance indicates higher demand for credit over the past three months.
(b) Averages of quarterly data.

Overall, the evidence from the lenders points to a tightening in the supply of credit during the financial crisis, although conditions for large companies have improved over the past year or so and conditions for other borrowers appear to have stabilised. Lenders also reported a weakening in demand for credit during the financial crisis, but in part that is likely to reflect the effect of the tightening in credit supply.

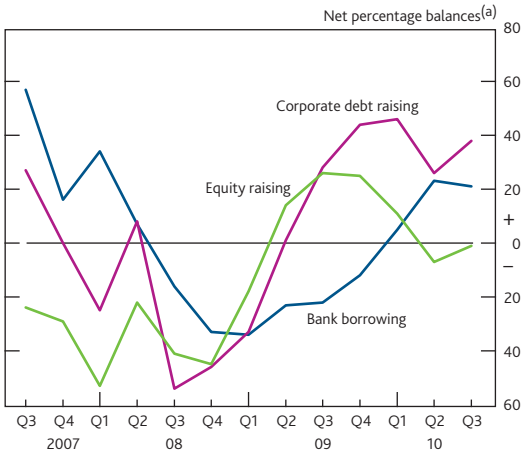
Evidence from the Bank's Agents and survey data

Survey evidence and reports to the Bank's Agents point to a tightening in bank credit conditions for businesses during the financial crisis. Respondents to the *Deloitte Chief Financial Officer* surveys indicated that bank credit became increasingly unattractive during 2007–08, although it has become more attractive since then (**Chart 7**). Evidence from contacts of the Bank's Agents and various business surveys points to a sharp drop in the perceived availability of credit to SMEs in 2007–08, and higher rates relative to Bank Rate or Libor.(2) That initial tightening appeared to be sharper than for larger companies, and in recent months conditions are reported to have improved by less, if at all, for SMEs.

Reports from the Bank's Agents suggest that, in part, the rise in spreads and reduction in availability reflected increased risk. Some regional banking contacts described themselves to the Bank's Agents as frustrated by the lack of demand from

(1) See 'Supporting UK business, the report of the Business Finance Taskforce', available at www.bba.org.uk/media/article/business-finance-taskforce.
(2) See the box on pages 7–8 of the October 2010 *Trends in Lending* for further details on lending to SMEs, and the box on pages 30–31 of the February 2010 *Inflation Report* for a discussion of how SMEs have been affected during the recession.

Chart 7 Survey measures of the attractiveness of different sources of finance



Source: *The Deloitte CFO Survey* 2010 Q3.

(a) Net percentage balances are calculated as the percentage of respondents who thought that each source of finance was attractive less the percentage who thought that it was unattractive.

'good-quality' propositions, even as companies reported that they had seen the terms of their borrowing tighten. That suggests that lenders saw some companies unable to access finance as too risky.

Survey evidence suggests that deteriorating credit quality can only in part explain increased spreads and reduced availability, however. Using responses from the UK survey of SME finances, Fraser (2009) found that the businesses with the most difficulty in obtaining bank credit tended to be higher-risk companies. But he also found that loan rejections increased in 2008 compared with the 2005–08 period, even having attempted to control for the riskiness of borrowing SMEs.

Reports from the Bank's Agents and survey evidence suggest that demand for finance weakened markedly during the recession. A survey conducted by the Bank's Agents in late 2009 concluded that, on balance, the weakness in economic activity was the prime factor accounting for the fall in investment during the recession, rather than tighter credit supply. And despite recent improvements in credit conditions for some businesses, reports from the Bank's Agents are consistent with only a gentle recovery in investment rather than robust growth.

Overall, evidence from surveys and the Bank's Agents suggests a role for both tight credit supply and subdued credit demand in the weakness of bank lending to companies. Such evidence can provide little steer, however, in quantifying the relative contribution of changes in demand and supply.

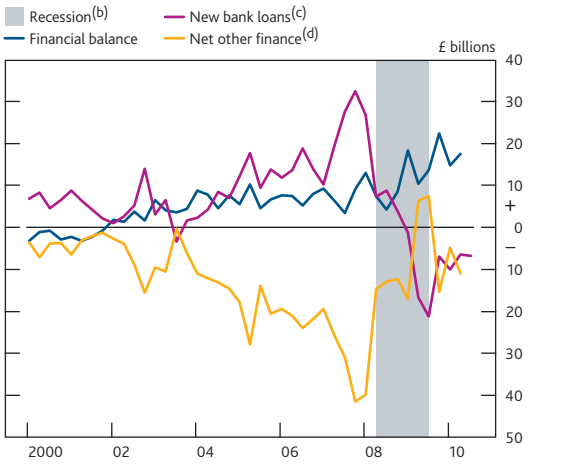
Evidence from non-bank sources of finance

Developments in non-bank finance may provide indirect evidence of changes in demand for bank loans. If households and companies reduce their borrowing from banks and switch to another source of finance, the resulting weakness in bank lending is more likely to reflect tighter credit supply than weaker demand.

For households, there are few alternative sources of finance. Probably reflecting that, the contraction in lending to the household sector since mid-2007 has been broadly matched by a higher household saving ratio as households have reduced spending relative to disposable income.

By contrast, some businesses — particularly large companies — can raise finance by issuing equities or debt, including corporate bonds and commercial paper, although these are unlikely to be perfect substitutes for bank borrowing. The decline in bank lending to companies since early 2008 has been associated with less negative flows of other types of finance alongside a rise in financial saving (**Chart 8**). Indeed, PNFCs' net equity and bond issuance was considerably higher in 2009 than its 2003–08 average, although it has fallen back to around average so far in 2010. That suggests that demand for finance held up for those companies raising capital market finance.

Chart 8 PNFCs' financial transactions(a)



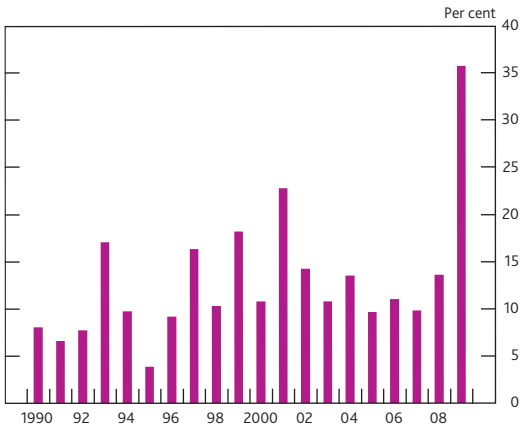
(a) The latest observation is 2010 Q3 for new bank loans and 2010 Q2 for the remaining series.
(b) The recession is defined as at least two consecutive quarters of falling output (at constant market prices) estimated using the latest data. The recession is assumed to end once output began to rise.
(c) Sterling and foreign currency loans to PNFCs.
(d) Calculated as a residual: the sum of the financial balance, new bank loans and net other finance is equal to zero.

That is borne out by company-level evidence of switching away from bank loans towards bond finance during the financial crisis. To assess this, we construct a panel of large UK PNFCs that have raised finance using bond markets from 1990–2009 for which data on total long-term borrowing as well as bond issuance are readily available.(1) In each year, the share of total borrowing by those companies accounted for by bond issuance is calculated. Preliminary results suggest a marked shift towards bond finance since 2007 (**Chart 9**). That is consistent with a tightening in the supply of non-bond finance. These findings are broadly consistent with US

(1) With thanks to Giuseppe Vera, who carried out the analysis.

company-level evidence discussed in Becker and Ivashina (2010). And in 2010 there has been an increase in the number of UK PNFCs accessing the corporate bond market for the first time.

Chart 9 Share of bonds in total borrowing for businesses with demand for credit(a)

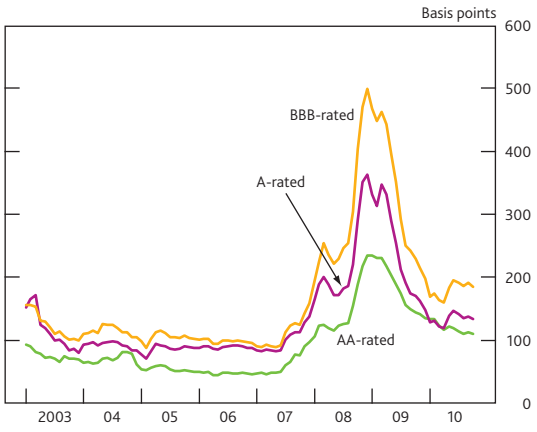


Sources: Dealogic, Thomson Reuters Worldscope company accounts database and Bank calculations.

(a) Data are based on a panel of 97 UK PNFCs for which equity is listed in the United Kingdom and that have issued at least one corporate bond between 1990 and 2009. For each year, we then select only those companies that raised long-term finance (as per the financial statement variable 'long-term borrowing', which is defined as borrowing with maturity over one year). The chart shows the proportion of long-term borrowing accounted for by corporate bonds, averaged across the sample of companies.

Developments in the cost of non-bank finance may also provide information about the cost of bank loans. For example, because some large companies can choose between issuing corporate bonds and taking out a loan, their respective prices should be influenced by each other. Corporate bond spreads (relative to gilts) for UK investment-grade PNFCs rose sharply in 2008 and peaked around the start of 2009 (**Chart 10**). That rise may underestimate the increase in spreads on bank loans: reports from the major lenders suggest that some PNFCs repaid bank loans using the proceeds of capital market issuance, suggesting that those loans were more expensive than bond finance.

Chart 10 UK PNFC corporate bond spreads by rating(a)



Sources: Merrill Lynch and Bank calculations.

(a) Average option-adjusted spreads between sterling corporate bond yields and government bond yields of corresponding maturity. Monthly averages of daily data. The latest observations are October 2010.

It is possible to use an econometric approach to assess the extent to which increases in corporate bond spreads reflect tight credit supply relative to changes in credit risk.(1) The analysis assumes that any systematic variation in corporate bond spreads for individual companies that is unrelated to changes in their equity price and macroeconomic indicators reflects changes in credit supply.(2) Stripping out these factors is assumed to control for changes in both company-specific risk (through the company's equity price) and changes in economy-wide risk (through the macroeconomic variables). Preliminary analysis using this approach suggests that tighter credit supply accounted for the bulk of the rise in corporate bond spreads between August 2007 and early 2009, although it has become less important since then. Even after controlling for credit quality, supply conditions appear to have tightened by more for high-risk borrowers.

Overall, evidence from both volumes and prices of non-bank finance suggest a role for both tight credit supply and weak credit demand. But tighter credit supply is likely to have been a somewhat more important driver of weak bank lending than independently low demand.

Econometric identification of credit supply shocks

Another way to identify the impact of changes in credit demand and credit supply on lending is to use an econometric identification scheme. One such approach is to estimate a structural vector autoregression (SVAR), and identify shocks to credit supply.(3) The intuition for this approach, following from the simple demand and supply diagrams discussed above, is that a credit supply shock is associated with both a reduction in the quantity of lending and an increase in spreads. Such a credit supply shock would be associated with a reduction in the demand for credit as spreads increased, but that would be in response to tighter credit supply rather than an independent credit demand shock. The model estimates the extent to which such shocks have been observed historically. The box on page 319 describes the SVAR approach in more detail.

The results of the SVAR suggest that the credit supply shock may account for a large part of the slowdown in annual real bank lending growth (**Table C**). So far in 2010, however, other factors have also become important. Given the lags included in the estimation, the contributions from the different factors reflect both shocks occurring in each period and lagged responses to previous shocks. The estimates are highly uncertain. For example, although the estimates based on the mean parameters suggest that credit supply shocks detracted

(1) The analysis follows the method proposed by Gilchrist *et al* (2009), and was carried out by Giuseppe Vera.
(2) This identification strategy is likely to provide a lower bound for the impact of the credit shock, as any contemporaneous impact of credit supply shocks on equity returns or the macroeconomy will be attributed to increases in credit risk.
(3) With thanks to Alina Barnett and Ryland Thomas, who carried out this analysis.

Estimating the contribution of credit supply using a structural vector autoregression (SVAR)

The SVAR approach involves estimating a set of equations, where each variable is regressed on past movements of itself and the other variables in the system. The SVAR includes standard macroeconomic variables — CPI inflation, GDP growth and Bank Rate — and a number of credit and financial market variables — M4 lending (adjusted for the effects of securitisations and lending to intermediate other financial corporations), investment-grade corporate bond spreads (as a general proxy for credit spreads) and equity prices. One disadvantage of this SVAR approach is that it is based on the empirical relationship between a small number of macroeconomic variables, and may provide a misleading description of a more complicated reality.

Using these equations, each variable can be decomposed into a component that is 'explained' by its own past outturns and those of other variables in the model, and an 'unexplained' residual. The unexplained component of each variable is then decomposed into the impact of different fundamental, or 'structural', shocks.

The shocks used in the SVAR are identified according to assumptions about how they are likely to affect the variables included in the model. For example, a credit supply shock is defined as one that is associated with weak lending and high credit spreads. The remaining shocks identified in the model can all be thought of as affecting demand for credit. For example, an 'aggregate demand' shock, which is identified as moving inflation and GDP in the same direction, would also be expected to affect credit demand. It is difficult to identify shocks separately in this way, as it requires a number of assumptions about the direction and timing of the impact of each shock. The results are preliminary and should be interpreted with caution.

Table C Decomposition of four-quarter real M4 lending growth using SVAR[a]

Percentage points

	Averages		
	2008	2009	2010 H1
Credit supply shocks	-1.4 (-3 to 4)	-8.3 (-9 to -4)	-6.1 (-7 to -2)
Other shocks	-0.6 (-5 to 1)	1.8 (-2 to 2)	-2.6 (-6 to -2)
Trend	5.8 (5 to 6)	5.8 (5 to 6)	5.8 (5 to 6)
Lending[b] (per cent)	3.8	-0.7	-3.0

Sources: Bank of England, ONS and Bank calculations.

(a) For details of the model behind this decomposition, see the box above. The latest observations are 2010 Q2. The model is estimated using data from 1966 Q4–2010 Q2. Averages of quarterly data. Figures in parentheses are estimates of the uncertainty surrounding the contributions to lending from the various factors. They are based on estimating the 16th and 84th percentiles of the distribution around the parameters of the model (these percentiles are commonly chosen in econometric analysis).
(b) The series is constructed as M4 lending (excluding securitisations) growth prior to 1998 Q4 and the equivalent measure excluding borrowing by intermediate other financial corporations thereafter. The series is deflated using seasonally adjusted CPI data.

from real lending growth in 2008, a plausible range around the parameters in the model results in a decomposition that encompasses a boost from credit supply factors in 2008 (**Table C**). In 2009 and 2010 H1, however, the whole range suggests a negative credit supply shock.

The results are broadly consistent with recent preliminary work by Bassett *et al* (2010) for the United States. That uses individual lenders' responses to the *Senior Loan Officer Opinion Survey* to construct a measure of credit supply controlling for changes in credit risk and demand. It then uses a similar system of econometric equations to the SVAR discussed above, and finds that tighter credit supply during the crisis was associated with a large reduction in core lending capacity in the United States.

Conclusion

Bank lending to UK households and businesses weakened sharply following the start of the global financial crisis in mid-2007. While it is difficult to disentangle the factors driving weak bank lending, the evidence discussed in this article suggests a significant role for a persistent tightening in the supply of credit, independent of changes in credit quality and Bank Rate. In part, that is likely to have been a reaction to the unusually loose conditions that existed immediately prior to the crisis. Credit demand is also likely to have weakened during the recession, weighing on bank lending. That is consistent with reports from the Bank's Agents.

Overall, the analysis in this article suggests that the weakness in bank lending since mid-2007 reflects a combination of tighter credit supply and weaker credit demand. Qualitatively, tight credit supply is likely to have been the dominant influence. For example, independently weak demand would typically be associated with lower spreads on loans, rather than higher spreads. And it is not consistent with the switch into capital market issuance by some PNFCs during the financial crisis. But it is difficult to assess the relative contribution of demand and supply more precisely.

While there is some evidence that credit supply conditions have improved somewhat since the peak of the financial crisis, especially for large companies with access to capital markets, constrained credit supply continues to be one of the main factors holding back the economic recovery. The Bank will continue to monitor developments in bank lending and the banking sector closely.

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Evolution of the UK banking system

By Richard Davies and Peter Richardson of the Bank's Financial Institutions Division and Vaiva Katinaite and Mark Manning of the Bank's Prudential Policy Division.[1]

The financial system provides three key services: payment services, intermediation between savers and borrowers, and insurance against risk. These services support the allocation of capital, and the production and exchange of goods and services, all of which are essential to a well-functioning economy. While the basic financial services are relatively timeless, the characteristics of the system providing them change continuously, in response to both economic and regulatory developments. This article tracks the evolution of a core component of the financial system in the United Kingdom, the banking sector, describing how technology has transformed the economics of banking, and how deregulation in the 1970s and 1980s freed banks to take advantage of new opportunities through globalisation and financial innovation. The result has been the emergence of large, functionally and geographically diverse banking groups. Post-crisis, public-policy attention has been focused on the costs of a banking sector dominated by large and complex institutions that are seen as too important to fail.

Introduction

The Bank of England has a longstanding interest in the structure of the financial system. System structure can affect financial stability through influencing the cost and availability of the financial services on which households and businesses depend.

The basic services provided by the financial system are relatively timeless, but the structure of the system that provides them continues to evolve. While new products and players have emerged over the past 50 years, UK banks have become ever larger and more central to the provision of the full range of financial services.

Post-crisis, public-policy attention has been focused on the potential costs of this evolution. In particular, the emergence of large, highly interconnected universal banks has transformed the financial network, increasing the likelihood of system-wide contagion in the event of an individual bank's distress. To the extent that these banks are 'too important to fail', private incentives are distorted and resources misallocated (Haldane (2010)). Acknowledging this, efforts are under way both domestically and internationally to address the risks associated with too important to fail institutions.

This article examines the structure of today's banking system and explores the drivers of change over recent decades. It begins with an overview of the services provided by the financial system and describes how the provision of these has changed over time. It goes on to identify key economic and regulatory drivers for change, before taking stock of the policy challenges ahead.

The role of the financial sector

The financial system provides a range of services that support the real economy. It is convenient to distinguish three main types of financial service:

- **Payment, settlement and transaction services**. These services include the provision of deposit and custody accounts, as well as services to support the efficient settlement of payments between households and companies.

- **Intermediation**. Household savings are typically pooled in deposit accounts, pension funds or mutual funds. They are then transformed into funding for households, companies or government.

(1) The authors would like to acknowledge valuable comments from Michael Anson, Paul Bedford, Roger Clews, Paul Collazos, Iain de Weymarn, Andrew Haldane, Simon Hall, Andrew Mason, Colin Miles, Amandeep Rehlon, Victoria Saporta, Peter Sinclair, George Speight and Belinda Tracey, as well as assistance with charts and data from Clare Rogowski and Laura Wightman.

- **Risk transfer and insurance**. Deposit accounts allow households and companies to insure themselves against liquidity shocks, while securitisation, derivatives and other insurance contracts facilitate the dispersion of other financial risks within the economy. For example, foreign exchange derivatives allow companies to protect their international revenues from fluctuations in foreign exchange rates; and securitisation markets package and disperse banks' loan exposures.

Evolution of the role of banks in the financial system

At the end of the 1950s, around 100 banks provided information to the Radcliffe Committee, which had been established to review the workings of the UK monetary system. Of these, the 16 London and Scottish clearing banks held around £8.3 billion in assets, amounting to 85% of total UK banking assets and more than 30% of UK GDP (**Chart 1**).(1)

Chart 1 Financial intermediation in 1958(a)

Source: Committee on the Working of the Monetary System (1959).

(a) The chart shows assets for each of these groups used in the Radcliffe report. Data are generally for end-1958.

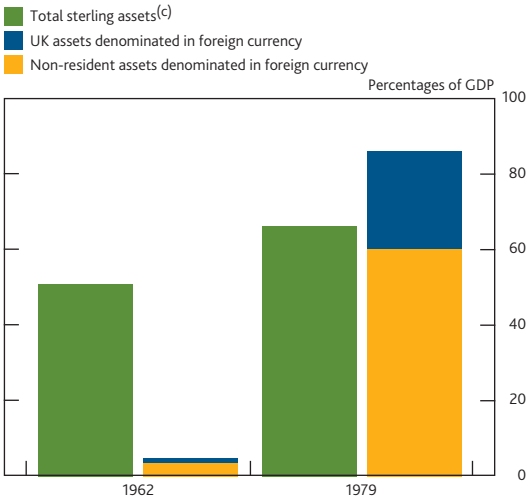
The clearing banks were relatively narrowly focused on the provision of payment services, deposit-taking activities and short-term corporate lending. They were almost entirely funded by customer deposits, 60% of which were held in current accounts (which paid no interest and were accessible on demand). A further 35% of deposits were held in interest-bearing time deposit accounts.

These deposits generally funded low-risk and liquid assets. Indeed, in 1960, 35% of London clearing banks' assets were held in cash, Treasury bills and discounted bills, with a further 28% of assets held in gilt-edged securities.(2) Customer loans constituted just 30% of the London clearing banks' assets.

Other financial institutions were important lenders to households. That included the building society sector, which in 1960 held £2.6 billion of predominantly mortgage assets (around a third of the value of clearing bank assets). Hire purchase and finance companies — not included in **Chart 1** — also engaged in consumer lending.

Banks' and building societies' sterling assets grew steadily over the next two decades, together increasing from around 50% of GDP to 65% between 1962 and 1979 (**Chart 2**). One of the most striking trends in this period was the emergence of London as a truly international financial centre. During the 1960s and 1970s, foreign-owned banks began to expand their presence in the United Kingdom (Davies (2002)). This contributed to a sharp increase in holdings of foreign currency assets by both domestically and foreign-owned banks operating in the United Kingdom. Indeed, by 1979, UK monetary and financial institutions held £172 billion of foreign currency assets — over half of their total assets. Foreign-owned banks were predominantly engaged in wholesale activity, in part reflecting the rise of the eurocurrency market.(3)

Chart 2 Monetary financial institutions' sterling and foreign currency assets(a)(b)

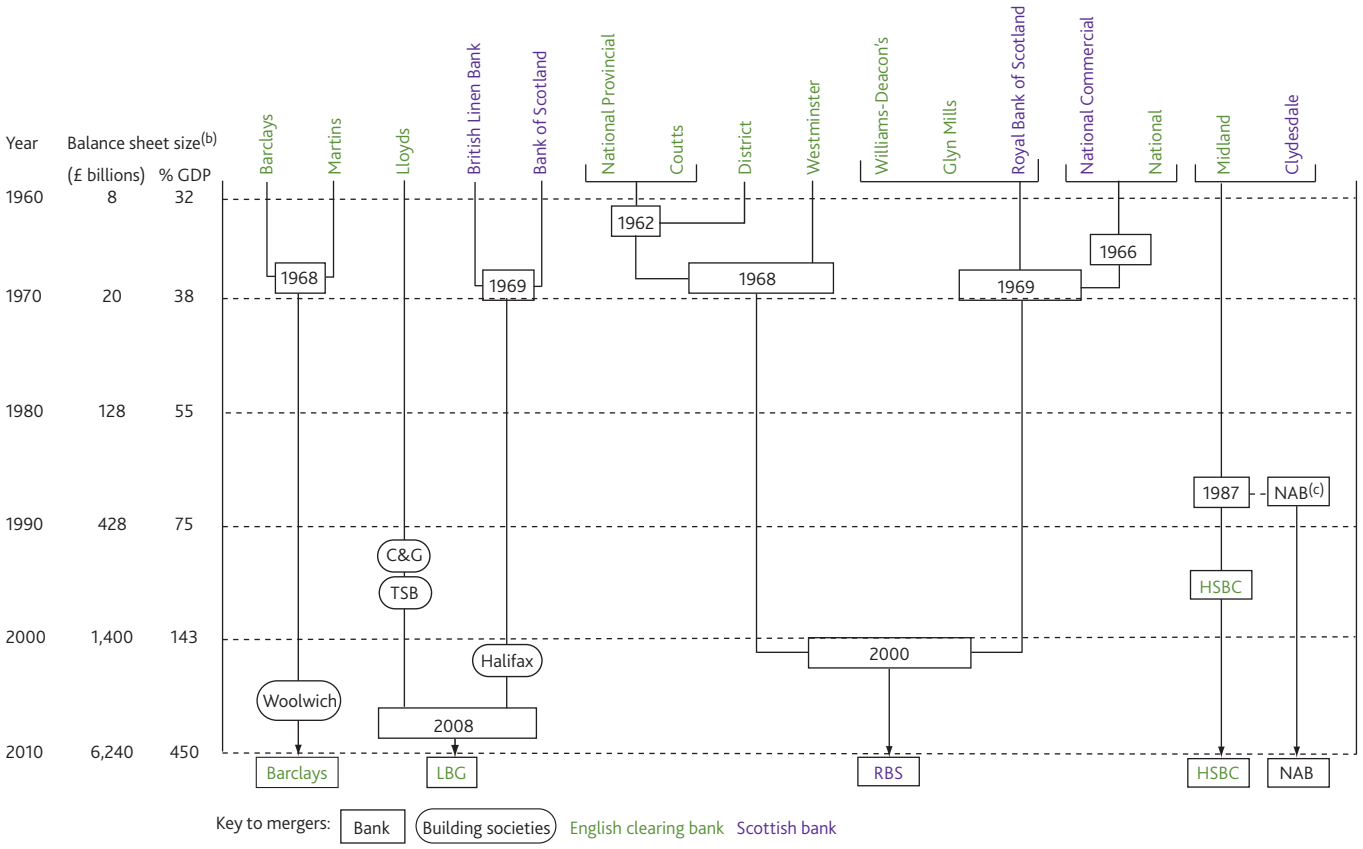


Source: Committee to Review the Functioning of Financial Institutions (1980).

(a) Values for 1979 use building society assets in 1978.
(b) Some components of foreign currency assets in 1962 are unavailable. In such instances, data from the first available period are used. This is likely to overstate the 1962 foreign currency component.
(c) All building society assets are assumed to be sterling.

(1) Here, the term clearing bank refers to a bank that is a member of an organised arrangement for clearing customer cheques and settling the resulting claims between banks. In London, formal daily cheque clearing arrangements were established around 1775. From 1854, settlement between banks took place across accounts at the Bank of England. For a history of clearing and settlement arrangements, see Manning *et al* (2009).
(2) The high level of government debt holdings in part reflected the build-up of debt during World War II.
(3) The eurocurrency market, which initially developed in response to regulatory constraints in the United States, is where financial transactions (eg loans, deposits) in a given currency take place outside of the jurisdiction in which that currency is legal tender.

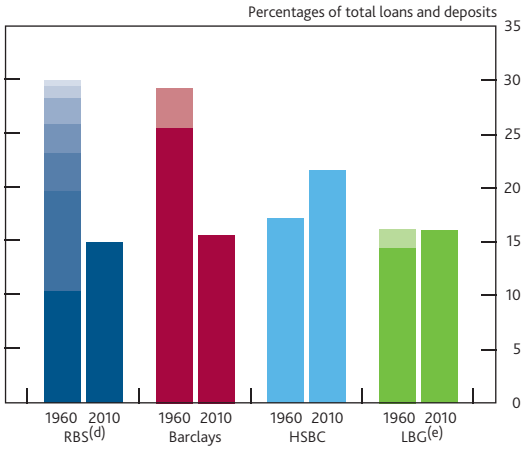
Figure 1 Consolidation of the UK banking sector 1960 to 2010[a]



Sources: Bankers Magazine, Collins (1988), published accounts and RBS Archives.

(a) The figure shows bank mergers involving the 16 London and Scottish clearing banks present in 1960, together with their acquisitions of building societies and demutualised building societies.
(b) The balance sheets of institutions are included from the point of merging or acquisition.
(c) Clydesdale was owned by Midland Bank until 1987 when it was sold to National Australia Bank.

Chart 3 Deposit-taking and lending services by the clearing banks in their 1960 and 2010 forms[a][b][c]



Sources: Bankers Almanac (1961–62), Bankers Magazine (1960), Committee on the Working of the Monetary System (1959) and interim and full-year published accounts.

(a) The shading in 1960 represents the component clearing banks that later consolidated into the banks shown. Clydesdale is excluded.
(b) Values used are total loans and deposits to customers in all currencies.
(c) The total value in 1960 refers to the loans and deposits of the London and Scottish clearing banks, foreign-owned banks and building societies in 1958. The 2010 total includes the loans and deposits as stated in the 2010 interim published accounts of financial groups providing more than 1% of the stock of loans and deposits to UK households and private non-financial companies in 2009.
(d) The value of RBS in 1960 includes RBS, Williams-Deacon's and Glyn Mills.
(e) Values for British Linen Bank are included in the 1960 consolidated accounts of Barclays, who were, at this time, its majority owner.

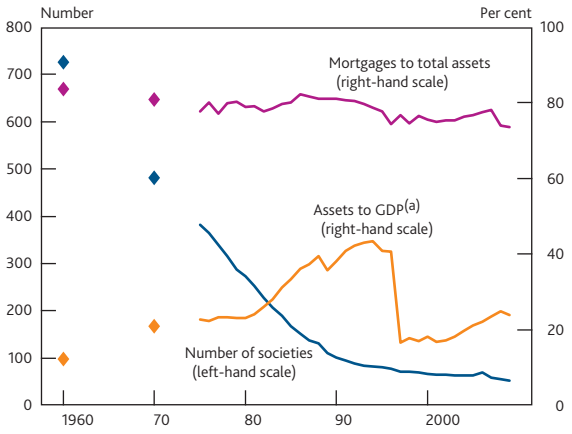
Today, more than 300 banks and building societies are licensed to accept deposits in the United Kingdom. However, the provision of retail banking services is highly concentrated. Of the 16 clearing banks present in 1960, fifteen are now owned by the four big UK banking groups: RBS, Barclays, HSBC and Lloyds Banking Group (LBG) (**Figure 1**).[1] These banks, along with Nationwide and Santander, together account for almost 80% of the stock of UK customer lending and deposits. Collectively, however, the four largest groups account for a smaller share of the market for these services than the banks from which they originated (**Chart 3**).

The building society sector, having continued to expand during the 1980s and 1990s, saw a sharp contraction in the mid-late 1990s, as many building societies demutualised and became banks (**Chart 4**). Over the past 50 years, the number of societies declined from over 700 in 1960 to just 52 today.

As the clearing banks have grown and consolidated over recent decades, they have also taken on a broader range of

(1) The only clearing bank among the 16 present in 1960 that is not now owned by one of the four large UK banking groups is Clydesdale, which was acquired by the National Australia Bank from Midland Bank in 1987.

Chart 4 Building societies, 1960–2010

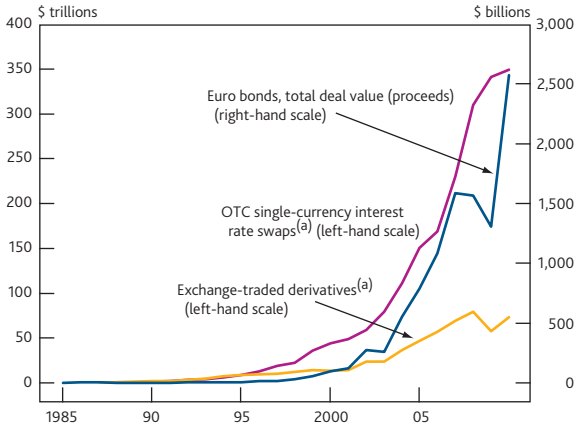


Sources: Building Society Association and Bank calculations.

(a) The steep decline in building societies' assets relative to GDP in the mid-1990s was mainly driven by the conversion to bank status of a number of societies (following Abbey National's lead in 1989): Halifax (in 1997), Alliance & Leicester (in 1997) and Northern Rock (in 1997) (British Bankers' Association (2002)). This resulted in over half of building society assets, equivalent to 15% of GDP, being transferred out of the sector.

functions. The largest banks have become truly 'universal' banks, their activities encompassing securities underwriting and trading, fund management, derivatives trading and general insurance.(1) This expansion coincided with a period of significant growth in securities markets and the markets for foreign exchange and derivatives (**Chart 5**).

Chart 5 Expansion of OTC interest rate swaps, exchange-traded derivatives and euro bond markets



Sources: *BIS Quarterly Review*, Dealogic and ISDA Market Survey.

(a) Notional amounts outstanding.

The UK banks have established themselves as major global players in these markets (**Table A**). For instance, recent market surveys place three UK banks among the top ten worldwide in several markets, including bond underwriting, foreign exchange trading and interest rate swaps.

The evolution to universal banking is reflected in an increase in the contribution of non-interest income to banks' earnings. Today, non-interest income accounts for more than 60% of banks' earnings, having been a minor share three decades ago (**Chart 6**).

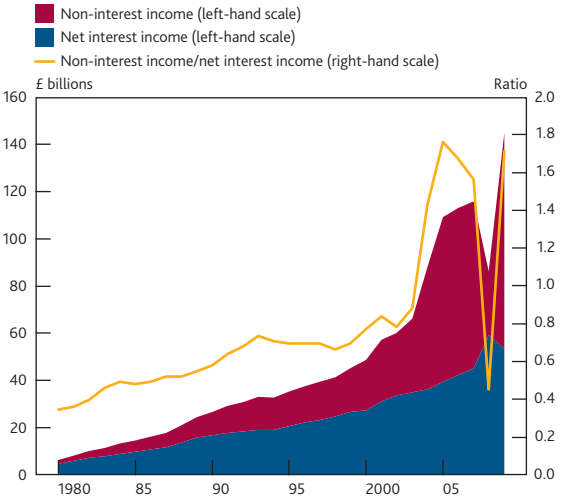
Table A Peer rankings of UK universal banks in selected market segments in 2010

	International bonds(a)	Corporate bonds(a)	Foreign exchange(a)	Interest rate swaps(b)
Barclays	1	4	3	1
HSBC	4	8	7	–
RBS	8	10	5	3

Sources: Bloomberg, Euromoney Foreign Exchange Survey (2010) and Risk Corporate Survey (2010).

(a) Positions are based on market shares.
(b) The results on interest rate swaps — drawn from the Risk Corporate Survey — are based on the responses of 40 global large companies on their top three preferred dealers.

Chart 6 UK banks' sources of earnings(a)



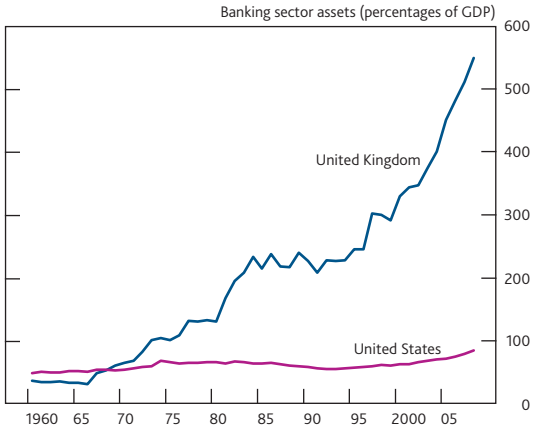
Sources: Bank of England and published accounts.

(a) The data are a backwardly consistent sample of institutions providing banking services in the United Kingdom in 2009. The sample includes the following financial groups: Barclays, Bradford & Bingley, HSBC, Lloyds Banking Group, National Australia Bank, Nationwide, Northern Rock, RBS and Santander UK. Where data are consistently available for the UK component of the banking group, these have been used.

Collectively, UK banks' balance sheets are now more than 500% of annual UK GDP, with much of this growth having occurred over the past decade (**Chart 7**). Three of the four largest banks individually have assets in excess of annual UK GDP. Relative to the size of the national economy, the UK banking system is second only to Switzerland among G20 economies, and is an order of magnitude larger than the US system.(2) The expansion of the UK banking sector, particularly since the late 1990s, far exceeds that in other financial sectors (**Chart 8**).

(1) The 'universal' banking model was already an established feature of some other banking systems. For instance, in Germany, banks had an established role in facilitating funding for long-term industrial investment projects (Gerschenkron (1966)). The UK universal banking model is somewhat different to that in Germany however, since UK banks' lending to corporates remains typically relatively short term.
(2) See Demirgüç-Kunt and Huizinga (2010).

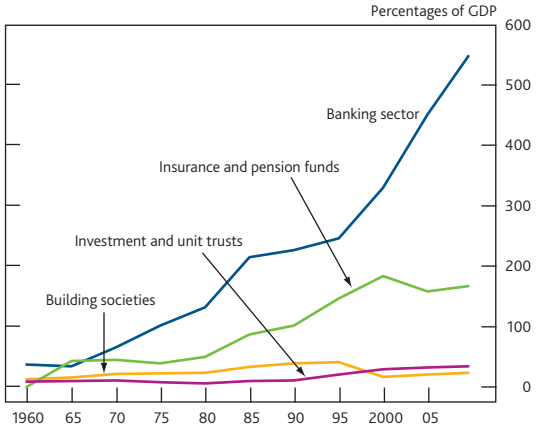
Chart 7 Sizes of the UK and US banking systems[a]



Sources: Sheppard (1971), Bank of England, Federal Deposit Insurance Corporation and ONS.

(a) The definition of UK banking sector assets used in the series is broader after 1966, but using a narrower definition throughout gives the same growth profile.

Chart 8 Assets of UK financial subsectors



Sources: Sheppard (1971), Watson (2004), ONS and Bank calculations.

Drivers of banking sector evolution

This section examines the factors that have influenced the evolution of the banking sector. It first examines the evidence on economies of scale and scope, before exploring how the economics of banking and the evolution of the market structure might have been influenced by changes in demand and regulation. It closes with some thoughts on the potential role of 'too important to fail' in the evolution of the banking system.

Economies of scale and scope

One reason for the observed development of the banking sector may be banks' pursuit of economies of scale and scope. These arise, respectively, when the unit cost of providing a given banking service declines as the scale of provision of that service increases, or when the unit cost of providing a mix of services jointly is lower than the sum of providing each separately. The presence of such efficiency gains would be consistent with both consolidation in the banking industry and the expansion of banks' roles beyond their traditional functions.

The nature of these efficiency gains is likely to have changed over time, driven by technological advances, financial innovation and the globalisation of markets. Furthermore, banks' ability to take advantage of such economies has also evolved. In the past, institutional and regulatory restrictions on banks' activities prevented banks from fully responding to economic drivers. Financial deregulation in the 1970s and 1980s removed these constraints. At the same time, deregulation also introduced stronger competitive forces in the banking sector, encouraging banks to expand into new markets offering higher (albeit more volatile) margins.

Recent banking industry studies have examined the potential cost efficiencies inherent in the universal banking model. These studies emphasise efficiencies arising from: spreading fixed costs over a larger volume of output; and risk diversification through capital pooling.[1] For large banks, it is estimated that around 15%–20% of total costs are fixed. Of these, the largest components are technology costs and corporate centre costs (eg head-office functions), for which 50%–60% and 80%–90%, respectively, are estimated to be fixed (JPMorgan (2010)).

However, these industry studies rely primarily on case studies and anecdotal evidence to support their claims. The majority of academic studies, on the other hand, do not find positive evidence for economies of scale and scope beyond a relatively small size. For instance, Saunders (1996) surveys at least 20 empirical studies and finds little evidence of scale economies for banks with assets greater than $5 billion. Similarly, in a survey of more than 50 studies by Amel *et al* (2004), the minimum efficient scale in retail commercial banking appears to be somewhere below $10 billion in assets, depending on the sample, country and time period. Applying these findings to the global population of banks in 2008 would suggest that several hundred are above the threshold at which no positive evidence for economies of scale could be found. Beyond a certain size there may even be *diseconomies* of scale, possibly due to the complexity of managing large institutions (Haldane (2010)). While some recent studies are more supportive of the existence of scale economies in banking, including a review of studies of mergers and acquisitions in banking by DeYoung *et al* (2009), taken together the bulk of the empirical literature to date has failed to identify material economies of scale in commercial banking beyond a relatively modest size.

(1) The notion of risk diversification is consistent with anecdotal evidence in Frontier Economics (2009) that large global banks are more likely to continue to lend during an economic downturn.

The evidence on scope economies is mixed and inconclusive. Empirical research in this area is complicated by the low incidence of specialist companies against which to compare the outcomes of functionally diverse companies. Stiroh and Rumble (2006) fail to identify substantial economies of scope, and in a study of financial conglomerates, Laeven and Levine (2007) find evidence of a conglomerate *discount*, rather than a premium (ie the market value of a conglomerate is less than the sum of the market values of the individual entities from which it is comprised). However, other studies, such as Hughes *et al* (2001) do find in favour of scope economies.

Over time, technological advances have undoubtedly transformed the economics of banking. Automation in retail banking and innovation in both risk management practices and the design of financial products have all triggered changes in the provision of the three core financial services. But the net effect of these changes on economies of scale and scope is unclear. On the one hand, the unit cost of processing power continues to decline. But at the same time, banks have adopted new financial technologies and increased the breadth and quality of their services, requiring increased expenditure (Berger and Mester (2003)). Smaller banks may also have been unable to keep up with the pace of technological change (Wheelock and Wilson (2010)). One outcome of this is increased market-wide reliance on a limited number of large firms in the provision of technology-intensive services, such as trade-execution and post-trade infrastructure provision. For example, as execution services in foreign exchange have become more automated, the banks with the financial capacity to make the largest up-front information technology investment have gained market share (Barker (2007)). Indeed, the ten largest institutions in foreign exchange (by turnover) have a combined market share of around 77%, and the 20 largest 93%.[1] And advances in information technology and telecommunications would seem to have accelerated the globalisation of finance towards the end of the 20th century.

Another factor operating on economies of scale and scope is the value of specialist knowledge and private information. Traditionally, knowledge transfer (either within or across business lines) allows firms to respond quickly to new opportunities, eg as new products and new markets emerge. Economies of scope may also arise from access to private information; for example, deposit-taking activity may generate information relevant for lending decisions. However, the importance of such private information may have declined over time, particularly as judgement-based credit assessments — especially in retail lending — have increasingly been replaced with credit-scoring models. Indeed, potential information loss arising from increased use of models as a bank grows in size, instead of basing decisions on judgements and relationships, could itself generate diseconomies of scale.

Interaction with demand-side drivers

The functional expansion of UK banks may reflect the changing demands of the corporate sector. For instance, UK private non-financial corporates increasingly rely on bond and equity finance — currently comprising 65% of total liabilities — rather than bank finance, and therefore seek issuance, underwriting and market-making services. They also increasingly seek to hedge their financial risks via derivatives markets. Of the world's 500 largest companies, 93% of non-financial businesses report using derivatives (ISDA (2009)).

There is evidence that large companies value the provision of investment banking services by their bankers. For example, bonds underwritten by commercial banks appear to outperform those underwritten by investment banks, due to the perceived 'certification' of the issue by a party with privileged information on the borrower (Puri (1996), Gande *et al* (1997) and Yasuda (2005)).

Multinational companies may also value being able to work with one bank present in a range of countries. Indeed, according to Frontier Economics (2009), banks often enter new markets purely on the basis of demand from their multinational clients. However, the Association of Corporate Treasurers noted that, while some very large companies will occasionally find it convenient to deal with one or two large banks, corporate customers generally 'do not need very large banks' (Association of Corporate Treasurers (2009)).

The interaction of regulatory and economic drivers

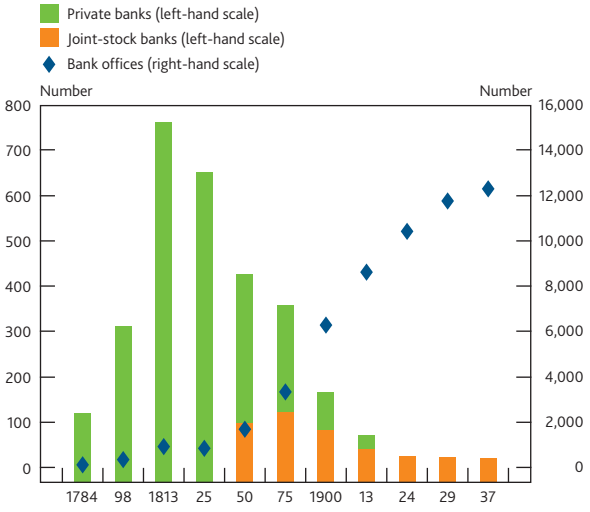
Regulation influences banks' behaviour by shaping the competitive environment and setting the parameters within which banks are able to pursue their economic objectives. This subsection examines how these regulatory changes may have interacted with economic drivers to catalyse the observed changes in the market structure.

The Joint Stock Bank Act, 1826

Banking crises often result in new regulations. In the United Kingdom, a banking crisis in 1824–25 resulted in an important legislative change. Banks were no longer required to be small private partnerships, sponsored by no more than six partners, but rather could be incorporated as joint-stock companies.[2] These new banks, able to raise capital from shareholders, quickly took over older private partnership-based lenders (**Chart 9**).

(1) See Broderick and Cox (2010), drawing on data from BIS (2010).
(2) There were 93 bank failures in England and Wales in 1825–26. In response to this, the Banking Co-partnership Act (May 1826) ended the Bank of England's monopoly on joint-stock status (from 1709 to 1825, the Bank's charter had not permitted other banks to form partnerships with more than six participants). The Joint-Stock Companies Banking Act 1857 permitted banks to register with unlimited liability, which was extended to limited liability in 1858.

Chart 9 Banks in England and Wales, 1784–1937



Sources: Collins (1988), Pressnell (1956) and Bank calculations.

The number of joint-stock banks declined equally quickly, starting around 1875, as banks sought scale through acquisition. Over the same period, the volume of deposits grew rapidly, with banks gaining broader national reach by opening new branches. This meant that by 1900 much more banking was being done, but by far fewer institutions.(1)

Several key regulatory events in the second half of the 20th century were then instrumental in even more fundamentally altering the structure of the UK financial system. These included, most notably, Competition and Credit Control in 1971 and the Big Bang in 1986.

Competition and Credit Control, 1971

Competition and Credit Control was introduced by the Bank of England in 1971, with the aim of promoting competition both within the banking sector and between banks and the non-bank financial sector.

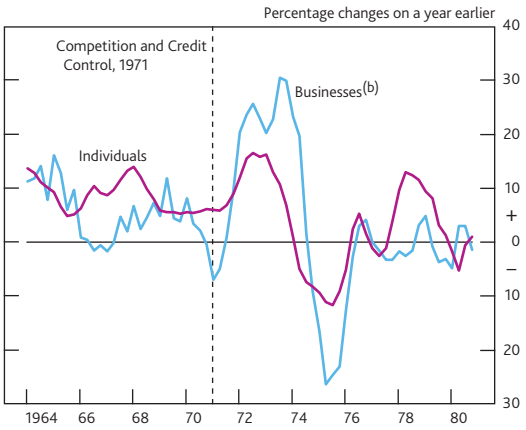
At the time of the reforms, clearing banks were the main providers of retail banking services in the United Kingdom, but had begun to face increased competition from non-bank intermediaries — notably, the so-called 'fringe' banks.(2) Within the banking sector itself, price competition was limited by (open) collusion in setting deposit rates and other customer charges, leaving banks competing primarily on the basis of reputation.

The 1971 reforms sought to end collusion on interest rates and began the process of widening the scope of banks' activities, breaking down old barriers between different types of intermediary. Among the measures introduced, deposit banks were allowed to participate freely in the wholesale market; previously they had only been able to do this through their finance house subsidiaries. The reforms also extended the scope of special deposits.(3) At the same time, liquidity requirements were relaxed. Before 1971, the clearing banks had been required to hold liquid assets equivalent to 28% of deposits.(4) From 1971, this was relaxed and extended, requiring all banks to hold reserve assets equivalent to 12.5% of eligible liabilities.

As such, the reforms improved the relative competitiveness of clearing banks and were expected to trigger a gradual process of reintermediation away from the fringe banking sector (Cameron (1998)). As Capie (2010) notes, however, fringe banks continued to expand after the introduction of Competition and Credit Control, in part reflecting economic expansion during the 1971–73 period and a relaxation of controls on property development.

This combination of regulatory and economic factors coincided with one of the most rapid periods of credit growth in the 20th century (**Chart 10**). It also contributed to an ongoing decline in banks' liquidity holdings, ultimately to below 5% of total assets by the end of the 1970s (**Chart 11**).

Chart 10 Real lending growth in the 1960s and 1970s(a)



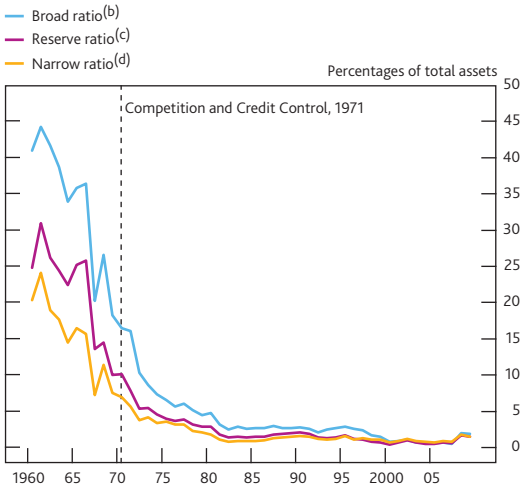
(a) Both series show real values constructed using the ONS GDP deflator.
(b) Sterling lending to UK PNFCs.

Other regulatory changes

From 1939, only authorised UK banks had been permitted to deal in foreign exchange, keep accounts in foreign currency for non-residents, and carry out certain exchange-control functions.(5) In the light of changes in the international monetary system over the course of the 1970s, these

(1) See Newton and Cottrell (1998). This timing contrasts with the United States, where consolidation did not begin in earnest until the 1980s.
(2) See Reid (1978). Fringe banks — or secondary banks — were individually small lenders who were not subject to Competition and Credit Control. Their expansion in the early 1970s ultimately ended in the Secondary Banking Crisis of 1973–75.
(3) Special deposits, whereby clearing banks were required to hold a percentage of their total deposits with the Bank of England, were first introduced in 1958 (implemented in 1960).
(4) From 1951, the clearing banks held liquid assets equivalent to 28%–32% of total deposits. From 1963, this was formalised into a minimum liquidity requirement of 28%.
(5) Delegated to them by the Bank of England (Hadjiemmanuil (1996)).

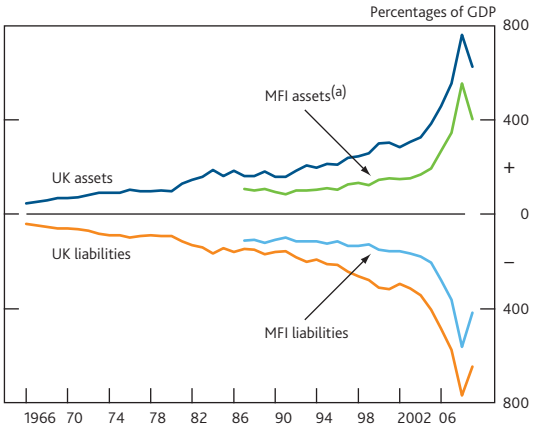
Chart 11 Sterling liquid assets relative to total asset holdings of the UK banking sector(a)



Sources: Bank of England, Bankers Magazine (1960–68) and Bank calculations.

(a) Data before 1967 cover only the London clearing banks.
(b) Cash + Bank of England balances + money at call + eligible bills + UK gilts.
(c) Bank of England balances + money at call + eligible bills.
(d) Cash + Bank of England balances + eligible bills.

Chart 12 UK external position



(a) Monetary financial institutions. These comprise of entities resident in the United Kingdom that are licensed to accept deposits.

arrangements were deemed no longer appropriate, and in 1979 exchange controls were lifted.(1)

At the same time, the 1979 Banking Act was passed. This Act, the first to establish a regime of banking supervision, created a two-tier system of banks and licensed deposit-takers. Although this distinction created some barriers to entry, the combined effect of these changes was increased competition for UK banks from both foreign banks and non-bank institutions.(2)

Judging the specific impact of the abolition of exchange controls is complicated by the presence of other economic factors (such as rising oil prices) and other economic policies of the incoming government.(3) However, following the removal of controls, the differential between domestic sterling and euro sterling interest rates disappeared and international capital flows accelerated. With exchange controls also lifted in several other countries, gross capital outflows as a percentage of world GDP grew from an average of 2.8% during 1980–89, to 4.5% during 1990–99, and further to 8.7% during 2000–09.(4)

This mirrored the globalisation of product markets, consistent with demand drivers playing a part. From the 1980s onwards, UK banks became increasingly global. Many established a presence overseas (either organically or through acquisition) and other cross-border business also expanded. By the peak in 2008, UK financial institutions' external assets were approaching six times GDP (**Chart 12**).

The abolition of exchange controls made subsequent financial liberalisation more likely, because businesses had an option to relocate to less tightly regulated jurisdictions. Such deregulation occurred over the course of the 1980s, particularly in 1986.

The phrase 'Big Bang' refers to a series of reforms that sought to eliminate perceived anticompetitive practices at the London Stock Exchange and put London's financial markets on an equal competitive footing with its international rivals, particularly the United States.(5) Among other things, the reforms sought to remove price rigidities in the provision of securities transactions and dismantle barriers to entry onto the Stock Exchange.(6) Two practices received particular attention: fixed minimum commissions; and so-called 'single capacity', which prevented both brokers from trading on their own account and market makers ('jobbers') from acting for customers.(7)

The abolition of minimum commissions changed the economics of brokerage and market-making, making joint-provision of these functions and foreign entry inevitable.(8) Although the total number of institutions did not increase, there was a marked rise in the number of individual members of the Stock Exchange (**Chart 13**). There was also a wave of consolidation in the broking and market-making industry.(9)

(1) The Bretton Woods era of fixed but adjustable exchange rates was dissolved between 1968 and 1973.
(2) See Matthews *et al* (2007).
(3) See Artis and Taylor (1989). Indeed, one motivation for the lifting of exchange controls had been to facilitate the investment abroad of North Sea oil surpluses.
(4) For example, the United States lifted some exchange controls in 1974, Japan in 1980, Australia in 1983, and France and other European countries in 1986.
(5) Earlier, in 1979, the Stock Exchange rule book had been referred to the Restrictive Practices Court by the Director-General of Fair Trading.
(6) See Plender (1986).
(7) See Gower (1988).
(8) See Piesse *et al* (1995).
(9) London merchant banks acquired stakes in eleven brokers and three jobbers in 1986, and 65 foreign financial institutions acquired stakes in 90 brokers and fifteen jobbers. See Michie (1999).

Chart 13 Stock Exchange membership, 1960–91

Source: Piesse *et al* (1995), drawing on data from the London Stock Exchange.

(a) Individuals acting on behalf of member firms.
(b) Pre-1986, the total number of firms refers to the sum of the broker and jobber firms (single-capacity trading required the market intermediaries to be separated according to their function). Following the abolition of the single-capacity trading requirement in 1986, no distinction is made between the number of brokers and dealers.

Freed from regulatory restrictions, banks began to diversify into new activities, using existing knowledge and infrastructure to cross-sell new products (Melnick *et al* (2000)). This attempt to increase returns from existing assets ultimately led to the emergence of universal banking. Perhaps contributing to this, the managed funds industry saw a marked expansion in the years following these reforms, increasing competition for household savings and reducing margins on retail banking activities.

While the direction of travel in the 1980s was towards ending functional restrictions in the banking sector, this period also saw the beginnings of a shift towards internationally agreed prudential regulation, notably through the introduction of the Basel Accord in 1988. This arguably also generated incentives for banks to grow, by introducing an additional fixed cost of meeting regulatory capital requirements and associated reporting and supervision.

Too important to fail

So far, this section has argued that deregulation during the latter part of the 20th century freed competitive forces in the banking system and allowed banks to pursue efficiencies through functional and geographical expansion.

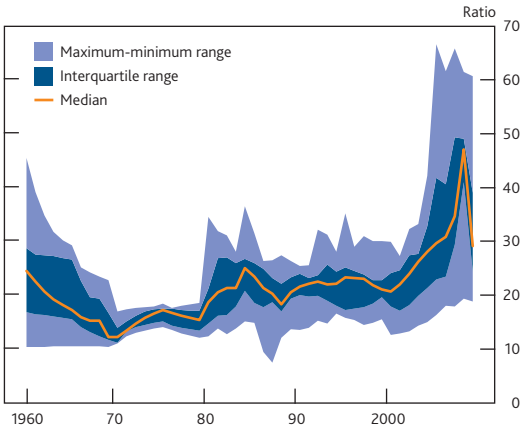
But, as banks grew and broadened their scope post-deregulation, they increasingly became 'too important to fail'. This may have altered their private incentives in a fundamental way.

A financial institution becomes too important to fail when the potential losses to the financial system and wider economy associated with its failure or distress would be so large or uncertain that a government is unable to commit credibly not to intervene in support. These costs might include disruption to critical banking functions, such as payment and transaction services.

The potential economic costs associated with the default of a large, complex, universal bank — particularly one that combines the provision of payments services and trading activities in a single entity — would most likely be sufficiently high that government support would be forthcoming. Such support was, of course, observed during the recent financial crisis. As a result, the banking structure in numerous jurisdictions now exhibits a greater incidence of full and partial public ownership.

Once a bank is perceived to be too important to fail, a wedge is driven between private and social returns to scale and scope, since the bank does not internalise the potential economic costs of its failure. As such, too important to fail banks may be subject to less market discipline, and are likely to grow more rapidly and become more dependent on debt funding — and hence more highly interconnected and leveraged. Indeed, over the period 1969 to 2009, retail deposits became a smaller percentage of total liabilities, declining from 88% to less than 40%. Particularly in the years prior to the financial crisis, banks relied heavily on wholesale funding (Shin (2010)) and their leverage ratios increased rapidly (**Chart 14**).

Chart 14 Leverage, UK banks(a)(b)



Source: Published accounts.

(a) Ratio of total assets to shareholders' claims.
(b) See footnote (a) to **Chart 6**.

Reliance on wholesale funding, as well as functional expansion into derivatives and securitisation markets, have led to the formation of highly connected bank and non-bank intermediaries. This complex network of exposures can propagate isolated shocks, such that distress at one node can quickly spread through the system (Gai and Kapadia (2010)).(1)

(1) Furthermore, more complex interconnectivity can reduce the transparency of the financial network (Haldane (2009)), leading to panic in the financial system in the event of a shock (Caballero and Simsek (2009)).

Institutions that are perceived to be 'too important to fail' may also engage in excessive asset and maturity transformation. As King (2010) remarked: 'greater risk begets greater size, most probably greater importance to the functioning of the economy, higher implicit public subsidies and hence yet larger incentives to take risk...'. Through this dynamic, too important to fail is likely to have amplified the evolution towards universal banking associated with underlying economic forces.

Conclusion

This article has illustrated the significant changes in the structure of the UK financial system over recent decades. It argues that evolution reflects a number of factors, including the natural economic drivers of economies of scale and scope, interacting with demand-side drivers and financial deregulation.

That expansion has given rise to a banking system with large balance sheets, significant functional and geographical diversity and complexity, a high level of leverage, and extensive network interconnectivity. The emergence of large institutions that are deemed 'too important to fail' presents important challenges for public policy. Before the crisis, commentators emphasised the efficiency gains associated with these structural changes, in terms of the availability of credit to households and businesses, the decline in lending spreads, and the availability of a broad array of risk-insurance services. The IMF (2006), for example, observed that globalisation and financial innovation had increased credit availability to the economy.

Since the crisis, however, policymakers and governments have begun to examine the social cost of pursuing such efficiencies (Haldane (2010)). And it is increasingly recognised that having too important to fail institutions is a paradox that must be tackled (Bank of England (2010)).

In response, an Independent Commission on Banking has been established in the United Kingdom to consider the case for structural reform in the banking sector. And, internationally, the Financial Stability Board is examining a broad range of policy options to mitigate the financial stability risks posed by systemically important financial institutions.[1]

(1) See Independent Commission on Banking (2010) and Financial Stability Board (2010).

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The financial position of British households: evidence from the 2010 NMG Consulting survey

By Mette Nielsen of the Bank's Risk Assessment Division, Silvia Pezzini of the Bank's Monetary Assessment and Strategy Division, and Kate Reinold and Richard Williams of the Bank's Structural Economic Analysis Division.[1]

The UK economy has begun to recover over the past year but households' financial positions remain under strain. Elevated unemployment, weak earnings growth and restricted credit availability still pose a problem for some households. But the low level of Bank Rate has continued to bear down on mortgage interest payments for some borrowers. This article examines evidence from the latest survey of households carried out for the Bank by NMG Consulting in late September, which shows how these and other changes have affected households' budgets and spending decisions. The burden of unsecured debt was higher than in the past and concerns about debt levels had increased, leading some to save more in order to reduce indebtedness. A special set of questions this year showed that households' awareness of the fiscal consolidation measures was quite high. They were concerned about the impact on their finances, although the majority had yet to take any action in response.

Introduction

The UK economy has begun to recover over the past year following the deep recession of 2008–09. But households still face difficulties: unemployment remains higher than before the recession, earnings growth is weak and credit availability remains restricted.

The low level of Bank Rate has contributed to a reduction in mortgage interest payments for some borrowers relative to two years ago. To meet the inflation target, the Bank of England's Monetary Policy Committee (MPC) sharply cut Bank Rate to 0.5%, a level it has remained at since March 2009. As a further stimulus, the Bank purchased £200 billion of assets financed by the issuance of central bank reserves between March 2009 and January 2010.[2]

The implication of these various developments for aggregate household spending and for the incidence of debt payment problems is likely to depend, in part, on how their impact is distributed across different households. Disaggregated data can illuminate the differences in impact and can indicate how different groups have responded to recent developments.

In late September 2010, NMG Financial Services Consulting carried out a survey of about 2,000 British households on behalf of the Bank. The design of the survey is described in the box on page 344. Households were asked a range of questions about their finances. These included questions about how much they owed, whether their borrowing was secured or unsecured, whether they found it to be a burden and whether they had difficulty accessing credit.[3] The survey is the eighth that the Bank has commissioned NMG Consulting to conduct on household finances.[4] Results from this year's survey were used in the November 2010 *Inflation Report* to assess both the position of household balance sheets and the effects of fiscal measures on households' finances.[5] The results have also been covered in a recent speech by the Bank's Chief Economist (Dale (2010)).

This article describes the results from the survey in more detail.[6] The first section discusses the impact of weak labour and housing markets on households' income and housing wealth and how this interacted with tightening credit conditions. The impact of the monetary policy response to the

(1) The authors would like to thank Tomas Hellebrandt and Kishore Kamath for their help in producing this article.
(2) For more information on the Bank's programme of asset purchases, see Bank of England (2010a).
(3) The NMG Consulting survey is carefully designed and weighted to be representative of British households. But, as in any small sample of a population, care must be taken in interpreting small changes in results from year to year because they may not be a reliable guide to changes in the population.
(4) The results of each year's survey have been reported in the *Quarterly Bulletin*. See Hellebrandt *et al* (2009) for details of the 2009 survey.
(5) For further details, see pages 21–23 of the November 2010 *Inflation Report*.
(6) The raw survey data are available at www.bankofengland.co.uk/publications/quarterlybulletin/nmgsurvey2010.xls.

crisis is also addressed, along with the potential response of households to the fiscal consolidation measures, a topic that is discussed further in the box on page 338. The second section describes households' ability to keep up with debt commitments and household bills, how those suffering from payment problems are resolving them, how concerned households are about their debt levels and what actions, if any, they are taking in response. The third section considers how households changed their spending and saving decisions in response to the recession. The final section concludes.

Impact of the financial crisis and the recession on household finances

Weakness in the labour market

Unemployment increased and earnings growth slowed as a result of the 2008–09 recession. Both of these factors will have pulled down on aggregate household income but the effects are likely to have differed across households. For example, many households may have experienced slower earnings growth but a smaller number will have been affected by rising unemployment. Earnings growth has remained weak over the past year and unemployment remains higher than before the recession, although it has fallen slightly over the past year. The unemployment rate of respondents in this year's NMG survey was similar to the 7.7% recorded in the ONS Labour Force Survey in 2010 Q3.

The NMG survey asked respondents about the level of their 'available' income — income left over after paying tax, national insurance, housing costs (rent, mortgage payments, council tax), loan payments and utility bills — and how it has changed over the past year. **Table A** reports the results according to the housing tenure of the respondent. About a half of households reported a fall in monthly available income, while more than a third reported that their income was unchanged. The falls in income appear to have been broadly based across different types of household by housing tenure.

Some factors affecting available income may be more specific to particular groups of households. For example, unemployed households reported a larger-than-average fall in available income, although this was smaller than in last year's survey. And the group of households mentioning a heavy burden of unsecured debt reported a fall in available income about twice as large as the average household. This could reflect higher loan interest payment costs following the increase in credit card interest rates over the past year.

Weakness in the housing market

Following more than a decade of consistently rising house prices, there have been significant changes in house price growth over the past three years. Sharp falls from the end of 2007 left house prices almost 20% below their peak by 2009 Q2.(1) Some of that fall has reversed over the past year, though recently house price inflation has eased again. In October 2010, house prices were around 1% higher than they had been a year earlier; mortgagors in the NMG survey reported a broadly similar change. The average house price in the 2010 NMG survey was £217,000.

Table A Changes in available income by housing tenure(a)(b)

	Outright owners	Low LTV mortgagors	High LTV mortgagors	Renters	Total
Percentages of households	**34**	**31**	**7**	**28**	**100**
Characteristics					
Mean pre-tax monthly income (£s)	2,299	3,832	3,585	1,378	2,560
Mean available monthly income (£s)	799	818	601	361	655
Distribution of changes in monthly available income (percentages of households)					
Down by more than £100	22	33	36	28	28
Down by £51 to £100	15	15	10	17	15
Down by £1 to £50	8	5	7	8	7
Not changed	43	32	21	36	37
Up by £1 to £50	5	4	3	3	4
Up by £51 to £100	2	6	4	4	4
Up by more than £100	5	5	17	5	6
Mean change in available income (£s)	-37	-50	-34	-44	-43

Sources: NMG Consulting survey and Bank calculations.

(a) Questions: 'How much of your monthly income would you say your household has left after paying tax, national insurance, housing costs (eg rent, mortgage repayments, council tax), loan repayments (eg personal loans, credit cards) and bills (eg electricity)?'. 'And how much would you say that your monthly left over income has changed over the past year?'.
(b) The distributions of changes might not sum to 100 because of rounding.

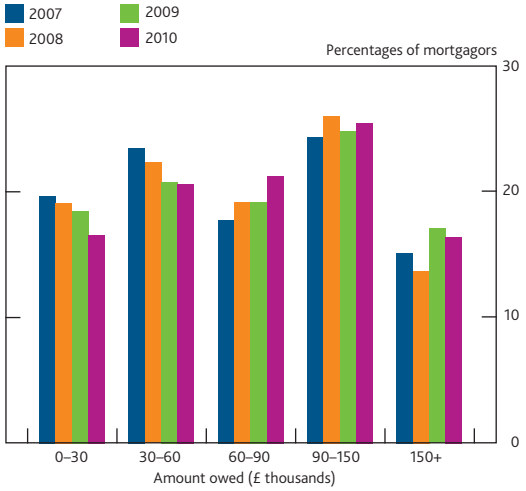
During the year prior to the survey, housing market transactions were low, contributing to muted growth in secured debt. In the NMG survey, the average amount of secured debt held by mortgagors in 2010 was just over £90,000, little changed from 2009. The distribution of that debt was also little changed on the year with slightly fewer mortgagors owing more than £150,000, but a larger proportion with debt between £60,000 and £90,000 (**Chart 1**).

The proportion of households reporting a loan to value ratio of greater than 75% was not much changed in this year's survey at around 19%, consistent with broadly flat house price growth over the year (**Chart 2**). This proportion was higher than in 2007, as house price falls during the recession led to an increase in secured borrowers' loan to value ratios.

The number of first-time buyers in the housing market remains relatively low. While house prices currently lie around 13% below their 2007 Q3 peak, and relatively low mortgage rates have made the housing market more affordable for first-time buyers, the median deposit required for a mortgage remains

(1) Calculated using an average of the Nationwide and Halifax seasonally adjusted quarterly indices.

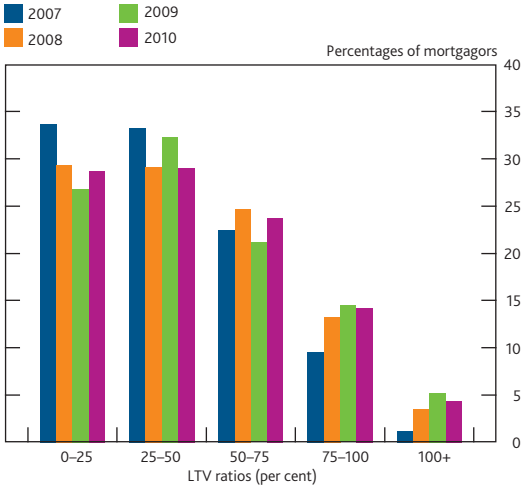
Chart 1 Distribution of secured debt among mortgagors[a]



Sources: NMG Consulting survey and Bank calculations.

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

Chart 2 Distribution of loan to value ratios on mortgagors' outstanding secured debt[a]



Sources: NMG Consulting survey and Bank calculations.

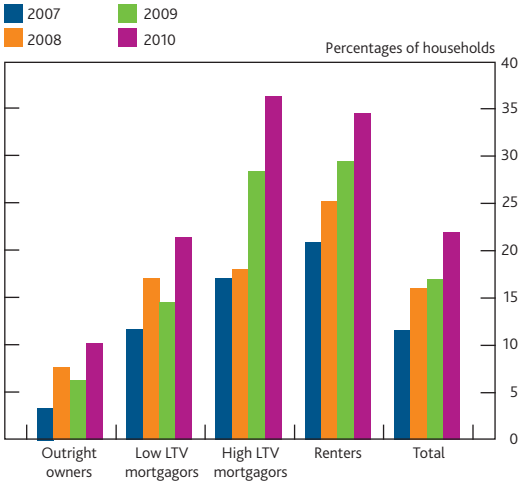
(a) Mortgage debt from the NMG survey captures only mortgage debt owed on households' primary residences.

high. In the survey, around a quarter of renters who reported that they were increasing saving, were doing so to finance a deposit on a property. This may be limiting the number of housing market transactions.

Credit conditions

The financial crisis brought with it disruption to households' access to credit. This was first captured in the 2008 survey when there was a 5 percentage point jump in the proportion of households reporting that they were put off spending by concerns about credit availability. These concerns were broad-based across people holding different types of debt, and remained unchanged in 2009. However, in the 2010 survey there was a further 5 percentage point increase in the proportion of households concerned about credit availability, to 22%. Those concerns were concentrated among households with high loan to value (LTV) mortgages and renters (**Chart 3**). These households tend to use unsecured credit as their marginal source of borrowing — the fraction of high LTV mortgagors with unsecured debt had risen between the 2009 and 2010 surveys, from 68% to 92% — and may find difficulties accessing credit because of their lack of collateral.

Chart 3 Proportion put off spending by concerns about credit availability[a]

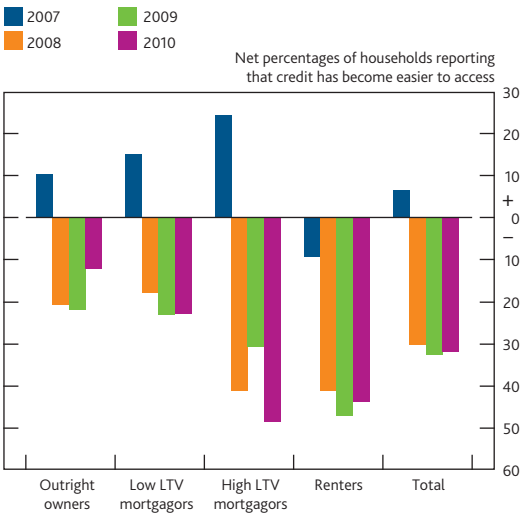


Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'Have you been put off spending because you are concerned that you will not be able to get further credit when you need it, say because you are close to your credit limit or you think your loan application would be turned down?'.

Greater concerns about credit availability are consistent with the large net percentage of households reporting a tightening in credit conditions (**Chart 4**). The net percentage reporting that it has become more difficult to access credit was largest for those with high LTV mortgages and renters, or cutting the sample differently, for households with unsecured debt. These results contrast with those from the *Credit Conditions Survey*,

Chart 4 Changes in credit conditions[a]



Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'Have you found it easier or harder to borrow to finance spending than a year ago?'.

which suggest that, according to lenders, overall household credit conditions were broadly unchanged over the past year (Bank of England (2010b)). But lenders continued to report a general tightening in unsecured credit and tighter credit scoring criteria on secured lending, which might partly explain why unsecured debtors and high LTV households perceived credit as more difficult to access. There may also be a delay before the changes in credit conditions reported by lenders are noticed by households; households will tend to observe credit conditions only once they ask for credit or need to refinance it.

Monetary policy response

Between October 2008 and March 2009, in response to the financial crisis and the weakening economic outlook, the MPC cut Bank Rate from 5% to 0.5%. In addition, they embarked on a programme of asset purchases financed by the issuance of central bank reserves, purchasing £200 billion of assets between March 2009 and January 2010. The low level of Bank Rate and the existing stock of asset purchases continue to provide a substantial stimulus to the economy.

An important way in which monetary policy influences the economy is by affecting the interest rates faced by households. The reduction in Bank Rate — to the extent banks and building societies pass this on to households — makes it more attractive to borrow to finance spending today, rather than to save in order to consume more tomorrow. In addition, borrowers tend to spend more of any extra money they have than savers. Taken together, the net effect of low interest rates through these two channels is to encourage higher spending in aggregate.

Borrowers who are currently on Bank Rate tracker mortgages have seen a substantial fall in their monthly mortgage payments over the past two years (**Table B**). Many households on a standard variable rate (SVR) mortgage have also seen a fall in interest payments. But not all borrowers benefited to the same degree: 48% of mortgagors reported that they had a fixed-rate mortgage, so many of these households have not seen a fall in their mortgage payments. The contrast between those on fixed mortgage rates and those on trackers or SVRs can also be seen from the most recent monthly mortgage payments: despite similar outstanding mortgage balances, fixed-rate mortgagors reported they were paying about £680 a month in comparison with about £530 a month for those on trackers or SVRs.

The falls in mortgage interest rates and therefore interest payments increase the affordability of debt for households. The share of income devoted to servicing secured debt (mortgage repayment gearing) tends to fall as interest rates fall. However, in 2010 the proportion of households devoting more than 20% of their pre-tax income to mortgage repayments had fallen only slightly since 2008 (**Chart 5**). A number of reasons might explain this result: for some households, lower interest payments might have been accompanied by weaker incomes, leaving the ratio between the two unchanged; other households might have preferred to repay more of their mortgage principal as interest payments had fallen, keeping the overall outlay constant; and some of these households would have been holding fixed-rate mortgages, which have not benefited from Bank Rate falls.

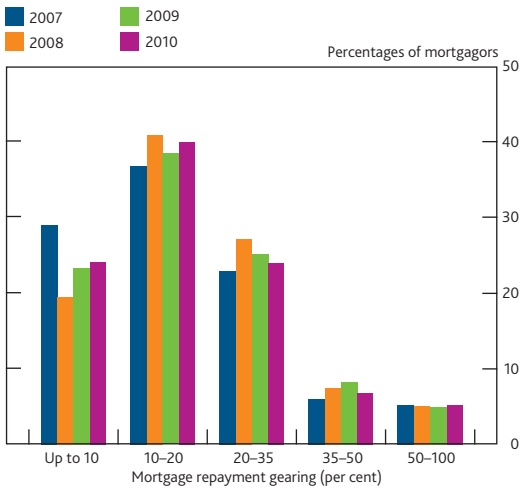
Table B Characteristics of mortgagors and changes in mortgage payments over the past two years by types of mortgage[a]

	Fixed rate	Bank Rate tracker	Standard variable rate	Other	Total
Percentages of mortgagors	48	23	20	9	100
Mean outstanding mortgage balance (£s)	95,869	91,819	89,617	84,270	92,672
Mean last monthly instalment on mortgage (£s)	683	529	531	449	597
Distribution of changes in monthly mortgage repayments (percentages of mortgagors)					
Down by more than £150	11	45	29	46	26
Down by £1 to £150	16	21	41	11	22
More or less the same	58	30	20	22	40
Up by £1 to £150	7	5	5	13	7
Up by more than £150	7	0	5	8	5
Mean change in monthly repayments (£s)	-19	-158	-89	-127	-76

Sources: NMG Consulting survey and Bank calculations.

(a) The distributions of changes may not sum to 100 because of rounding.

Chart 5 Mortgage repayment gearing[a][b][c]



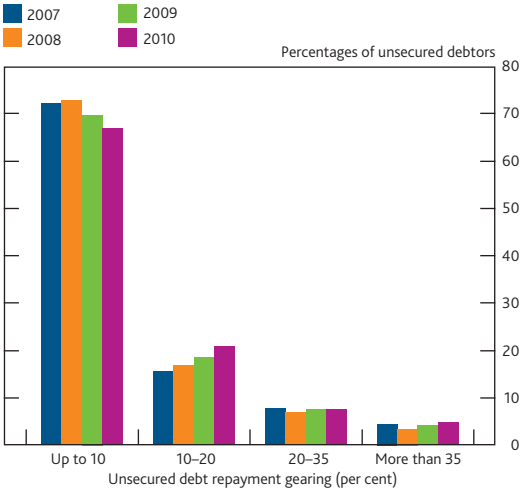
Sources: NMG Consulting survey and Bank calculations.

(a) Mortgage repayment gearing is calculated as total mortgage payments (including principal repayments)/gross income.
(b) Calculation excludes those whose gearing exceeds 100%.
(c) Reported repayments may not account for endowment mortgage premiums.

Interest rates on unsecured debt tend to be much higher than mortgage interest rates and appear to have been less responsive to the changes in monetary policy. Unsecured debt repayments rose a little as a share of household income over the past two years, despite the large fall in Bank Rate (**Chart 6**).[1]

(1) See Button *et al* (2010) for a discussion of the behaviour of unsecured rates on new loans to households in recent years.

Chart 6 Unsecured debt repayment gearing[a][b]



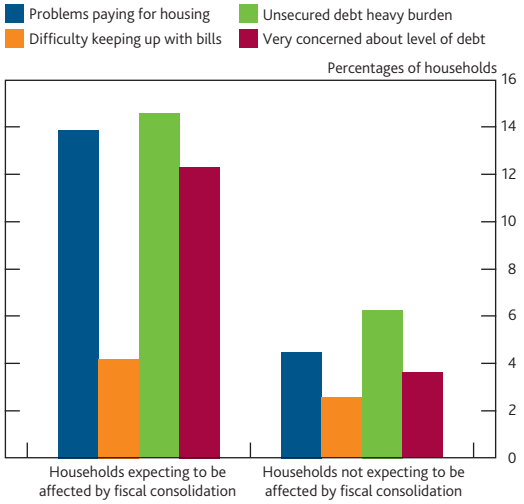
Sources: NMG Consulting survey and Bank calculations.

(a) Unsecured debt repayment gearing is calculated as total unsecured debt payments (including principal repayments)/gross income.
(b) Calculation excludes those whose gearing exceeds 100%.

Fiscal policy

The United Kingdom's fiscal deficit widened sharply in 2008–09, reflecting lower tax revenues and higher government spending as a share of GDP. Fiscal stimulus measures and welfare payments provided support to household and business incomes, but led to higher government debt. In the June 2010 *Budget*, the Government announced a set of measures intended to reduce the size of the deficit, building on plans announced by the previous Government. The 2010 NMG survey included supplementary questions to gauge households' responses to the fiscal consolidation. These are covered in more detail in the box on page 338.

Chart 7 Financial distress by households' expectations of the effects of fiscal measures[a][b][c]



Sources: NMG Consulting survey and Bank calculations.

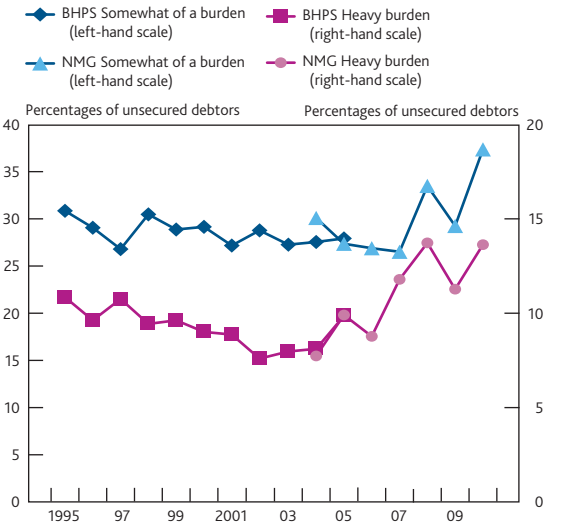
(a) Questions: 'In the past twelve months, would you say you have had any difficulties paying for your accommodation?' (13% of households responded 'Yes'); 'Which of the following statements best describes how well your household is keeping up with bills and/or credit commitments at the moment?' (4% of households responded that they were falling behind on some or many payments); 'To what extent is the repayment of these (unsecured) loans and the interest a financial burden on your household?' (14% of households responded 'Heavy burden'); 'How concerned are you about your current level of debt?' (12% of households responded 'Very concerned').
(b) 'Difficulty keeping up with bills' includes those households who reported 'I am falling behind with some bills or credit commitments' or 'I am having real financial problems and have fallen behind with many bills or credit commitments'.
(c) In this sample, around 90% of households expected to be affected by the fiscal measures and 10% expected not to be affected.

Households that were concerned about the fiscal consolidation typically reported higher levels of financial distress than others (**Chart 7**). At high levels of financial distress, any further reduction in available income through higher taxes, job loss or a reduction in wages and benefits would make servicing debt relatively more difficult.

Repayment problems and how households respond to them

Households reported greater difficulty in dealing with unsecured debt than in 2009. Unsecured debt was held by 52% of all households in the current survey. The proportion of unsecured debtors that found unsecured debt a burden increased to 51%, the highest-recorded level in the NMG and BHPS surveys (**Chart 8**). The percentage of households finding unsecured debt a heavy burden was highest among high LTV mortgagors and renters (24% and 19% respectively) and lowest for owners and low LTV mortgagors (both at 9%). The prevalence of perceiving unsecured debt as somewhat or a heavy burden had increased across all tenure groups relative to 2009.

Chart 8 Burden of unsecured debt[a]



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

(a) Question: 'To what extent is the repayment of these loans and the interest a financial burden on your household?'.

The fraction of households reporting falling behind on some or many payments of bills and credit commitments increased only slightly in the 2010 survey. Relative to 2009, this fraction fell for high LTV households and the unemployed, but increased for renters. But there was an increase in the proportion of households that reported they were keeping up with their bills and credit commitments but struggling from time to time or constantly, from 34% to 40%. The increase

Households' expectations of the impact of fiscal measures on their finances and their responses

The Government set out measures to reduce the size of the United Kingdom's budget deficit in the June 2010 *Budget*, building on plans announced by the previous Government. Additional questions were included in the 2010 NMG survey to gauge households' expectations about the impact the fiscal consolidation might have on their finances and any actions that they were taking in response.(1)

When asked how they expected to be affected by the fiscal measures, most households were aware of the plans, with only 11% of households reporting they had not thought about it (**Table 1**). The vast majority of households also anticipated some impact, with only 10% of households not expecting to be heavily affected. Of those who expected to be affected, the most common channels were through higher taxes on earnings and spending, and reduced spending on services. A fifth of retired households (23% of the sample) reported that they did not expect to be heavily affected, compared with only 7% of working households (66% of the sample). The unemployed and long-term sick (5% of the sample) were most concerned about the loss of income and benefits.

Table 1 How households expect to be affected by the Government's fiscal measures(a)(b)

Percentages of households(c)

	Whole sample	Employed or self-employed	Unemployed or long-term sick	Retired
Higher taxes on spending	42	44	27	43
Higher taxes on earnings	32	40	15	15
Reduced spending on services	27	24	25	35
Loss of own or partner's job	22	30	8	2
Loss of income or benefits	21	16	45	28
Lower wages	17	22	21	3
Loss of public sector contracts for own company/employer	9	12	6	3
Don't think I'll be heavily affected	10	7	8	20
Haven't thought about it	11	10	17	12

Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'Britain's recently elected coalition government announced a set of measures in order to cut the country's budget deficit. When these measures come into force, which of the following will you be most concerned about?'.
(b) Employment status refers to the head of the household.
(c) Percentages do not sum to 100 because households could choose up to three responses.

While the vast majority of households expected to be affected by the consolidation, fewer than half reported they were actively responding. A quarter of households were not taking any action and did not plan to, and a further third were not taking action but may if the need arises (**Table 2**). For those who were responding, the most common responses were saving more, working longer hours or looking for a new job.

There was considerable variation in responses by employment status. Around 80% of retired households were taking no action. The long-term sick and unemployed were most likely to be looking for a job in the same area or relocating for work.

Table 2 Household responses to the Government's fiscal measures(a)(b)

Percentages of households(c)

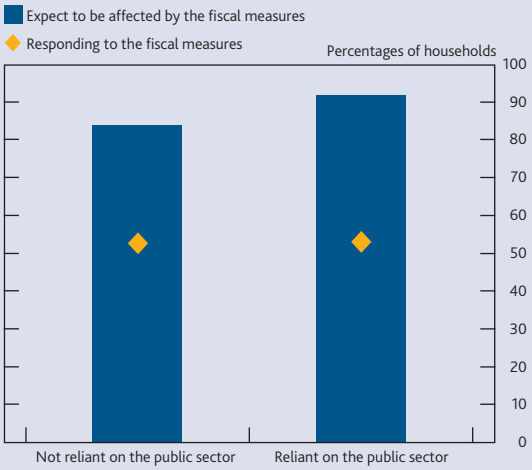
	Whole sample	Employed or self-employed	Unemployed or long-term sick	Retired
Saving more	18	23	11	7
Working longer hours/second job	14	20	5	0
Looking for a job in same area	10	11	23	0
Relocating to find a new job	6	7	12	0
Giving financial help to family/friends	5	5	1	6
Receiving financial help from family/friends	5	5	10	1
Spending more	3	3	5	3
Not taking any action and don't plan to	25	19	28	44
Not taking any action but may if need arises	31	29	24	39

Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'Which, if any, of the following actions are you taking in response to these measures?'.
(b) Employment status refers to the head of household.
(c) Percentages do not sum to 100 because households could choose up to three responses.

Households who received more than half of their work income from the public sector were more likely to expect to be affected by the fiscal consolidation (**Chart A**). But they were not any more likely to be taking actions in response to the plans.

Chart A Concerns and responses to the fiscal consolidation by public sector employment(a)(b)



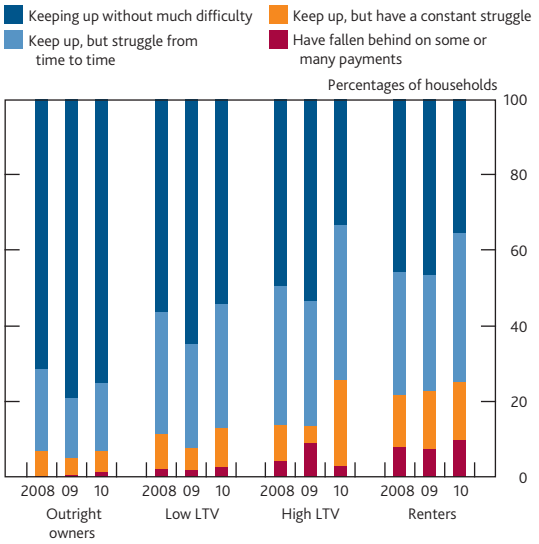
Sources: NMG Consulting survey and Bank calculations.

(a) 'Reliant on the public sector' is defined as a household gaining more than half its work income from the public sector (direct employment or contracts).
(b) Questions as in footnotes to **Tables 1** and **2**.

(1) The survey was conducted after the June 2010 *Budget* and before the *Spending Review* set out in October 2010.

was across all tenure groups (**Chart 9**) and for both the employed and unemployed. However, the increase was more marked for households with unsecured debt (irrespective of whether they had a mortgage) than for mortgagors without any unsecured debt. This is likely to reflect unsecured debtors having benefited less than mortgagors from the fall in Bank Rate, as described earlier. In addition, unsecured debtors experienced a larger increase in unemployment and a greater decline in credit availability than mortgagors without unsecured debt. Looking ahead, if the increase in debt burden and repayment problems is a leading indicator of households' financial difficulties, the proportion of households falling behind on payments may pick up from current levels.

Chart 9 Keeping up with bills and commitments[a]



Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'Which one of the following statements *best* describes how well your household is keeping up with your bills and/or credit commitments at the moment?'.

Households were also asked about the reasons for any difficulty in keeping up with bills and credit commitments. In line with results for 2008 and 2009, the main reasons given were a lack of cash flow that had been or would be resolved in the future (cited by 33% of households with payment difficulties), higher-than-expected household bills (24%), and overspending (21%) (**Table C**). 17% of households with payment difficulties reported a reduction in overtime and 15% reported unemployment as main reasons.

When those households who had difficulty keeping up with bills or credit commitments were asked about the actions they were taking to resolve this difficulty, the most frequent response was cutting back on spending (cited by half of these households, or 22% of all households). About one in five of them said they were working longer hours or taking on a second or better-paid job, and one in six was using cash in savings or other assets (**Table D**). Only a small fraction of households in difficulty were taking more extreme measures such as selling their house (4%), declaring themselves insolvent (1%) or entering into another debt solution (6%). Finally, a quarter of these households were not taking any action to resolve the difficulty.

Table C The main five reasons for difficulty in keeping up with bills and credit commitments[a][b]

	2008	2009	2010
Percentages that mentioned:			
Lack of cash that has been or will be resolved in future	28	31	33
Higher-than-expected household bills	35	20	24
Overspending	13	16	21
Loss of income through reduction or cessation of overtime	7	14	17
Unemployment	9	8	15

Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'What are the main reasons for the difficulty you have in keeping up with bills and/or credit commitments?'.
(b) In 2008 and 2009, respondents were asked to tick all categories that applied. In 2010, they were asked to select no more than three categories.

Table D Actions to resolve difficulties in keeping up with bills and credit commitments[a]

	2010
Percentages that mentioned:	
Cut back on spending	50
Working longer hours/taking on a second or better-paid job	18
Use cash in savings/other assets	16
Getting financial help from family/relatives	11
Enter into another debt solution	6
Take out another loan	5
Sell your house	4
Take out another mortgage on your house	3
Declare yourself insolvent (ie bankruptcy or IVA)	1
None of these	24
Other	2

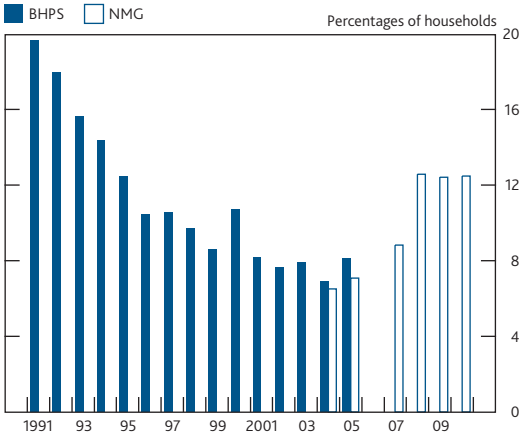
Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'What actions, if any, are you taking to resolve the difficulty you have in keeping up with bills and/or credit commitments? Please select no more than three of the following'.

Housing payment problems — the extent to which households had any difficulties paying for their accommodation in the twelve months before the survey — appeared to remain at a level broadly similar to that in 2009 (**Chart 10**). High LTV mortgagors continued to be more likely than low LTV mortgagors to have problems paying for housing, but the difference was smaller than in 2009.

The 2010 NMG survey also asked households about the extent to which they were concerned about their debt, irrespective of whether they were currently struggling with it. Among households with debt (including mortgages), about one in ten said they were very concerned about their current level of debt (**Table E**). A further third said they were somewhat concerned. High LTV mortgagors and renters were those most concerned about their current level of debt, with low LTV mortgagors typically much less worried. However, concerns about debt appear to have increased over the past two years for a little less than a third of households, spread across all tenure groups.

Chart 10 Housing payment problems[a][b]



Sources: BHPS, NMG Consulting survey and Bank calculations.

(a) Question: 'Many people these days are finding it difficult to keep up with their housing payments. In the past twelve months would you say you have had any difficulties paying for your accommodation?'.
(b) In the 2006 NMG survey, renters and outright owners were not asked this question, so data for 2006 have been excluded from the chart because they are not comparable.

Table E Concerns about level of debt[a]

Percentages of households with debt

	Level of concern			Change in concern		
	Not at all concerned	Somewhat concerned	Very concerned	Decreased	Stayed the same	Increased
All households with debt	54	34	11	12	59	29
Tenure						
Outright owners	68	26	6	16	66	18
Low LTV mortgagors	60	32	8	10	61	29
High LTV mortgagors	34	49	16	10	51	39
Renters	40	40	19	18	48	34
Financial assets						
Less than £500	33	42	24	11	52	37
More than £500	63	32	6	14	60	26

Sources: NMG Consulting survey and Bank calculations.

(a) Questions: 'How concerned are you about your current level of debt? Please consider all debt, including any balances on credit/store cards, loans, or secured debt such as your mortgage'.; 'How has your concern about your current level of debt changed over the last two years?'.

Perhaps unsurprisingly, debt levels were a greater concern for households with fewer financial assets and those that had experienced a decrease in available income. As many as a quarter of households with financial assets of less than £500 reported that they were very concerned about their level of debt, compared with less than one in ten for those with assets of more than £500. And debtors that were very concerned had experienced an average fall in available monthly income of £85 over the past year compared with £31 among debtors that were not at all concerned.

The majority of households who were concerned about their level of debt were taking some form of action to deal with it. The most frequent response was to cut back on spending (**Table F**), while many households also mentioned avoiding getting into further debt. Far fewer households were making overpayments to clear the debt more quickly, perhaps reflecting the pressures on household incomes mentioned previously. Few households mentioned working longer hours, taking a second job or a better-paid job — but this could simply reflect the weakness of the labour market rather than a lack of desire on the part of households.[1] And very few households reported getting financial help from their family. More than a third of households with debt said they were not taking any action to deal with their concerns; most of these households were not at all concerned about their level of debt.

Table F Actions to deal with current level of debt, by degree of concern with level of debt[a][b]

Percentages of households

	Very concerned	Somewhat concerned	Not at all concerned	Total
Cutting back on spending	67	62	19	39
Avoiding getting into any further debt	53	46	16	31
Working longer hours/taking a second job or a better-paid job	30	17	5	12
Making overpayments to clear the debt more quickly	18	15	6	11
Getting financial help from family/relatives	19	11	1	6
Not taking any action	3	8	62	37
Other (please specify)	2	0	0	0
Don't know	0	2	2	2

Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'What actions, if any, are you taking to deal with your concerns about your current level of debt?'.
(b) Households were permitted to give multiple responses, so figures do not sum to 100.

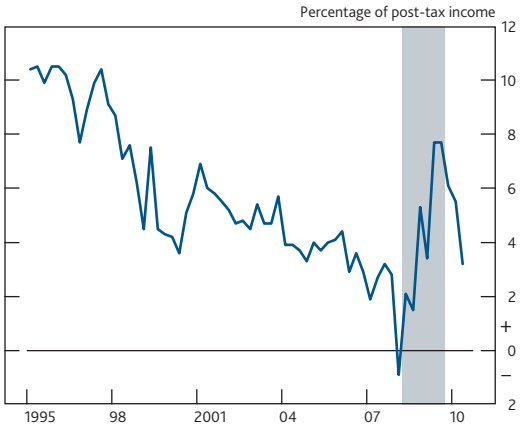
Prospects for spending and saving

Households' saving behaviour is likely to have been affected by a number of factors during the recent recession.[2] Some households may have reduced saving to smooth through what they perceived to be a temporary fall in income. But others may have saved more in response to concerns about levels of indebtedness, the risk of job losses, falls in asset prices, weak house price growth and a general level of uncertainty. And others might have been encouraged to build precautionary buffers of savings if they were uncertain about their access to credit. Different households are likely to have responded differently, meaning that some might have saved more, while others less, than in previous years.

According to ONS data, aggregate household saving as a share of post-tax income increased sharply during the recession. Having turned negative in the first quarter of 2008 (households were, in aggregate, consuming more than their post-tax income), it rose to almost 8% around the time of the 2009 survey. But, more recently, it has fallen back to its 2006–07 average (**Chart 11**).

(1) According to the Labour Force Survey (July-September 2010), 14.7% of part-time workers had part-time jobs because they could not find a full-time job, up from 9.7% two years ago.
(2) For a discussion of further factors affecting household saving, see Benito *et al* (2007) or Berry *et al* (2009).

Chart 11 Household saving ratio[a][b]



(a) The saving ratio is defined as gross saving (ie the net accumulation of financial and housing assets) as a percentage of household post-tax income.
(b) The shaded area indicates recession, defined as at least two consecutive quarters of falling output (at constant market prices).

To understand the near-term prospects for household spending and saving, additional questions were added to the 2009 and 2010 NMG surveys aimed at finding out whether or not households had planned to increase their saving and, if so, why. It is not easy, however, to map these survey answers directly into the aggregate household saving ratio. For example, households may think of saving as the amount they invest in financial assets, whereas it is officially defined as the amount of disposable income that is not consumed.(1) Nonetheless, the NMG survey can shed light on whether households intend to save more and how this varies across different socioeconomic groups.

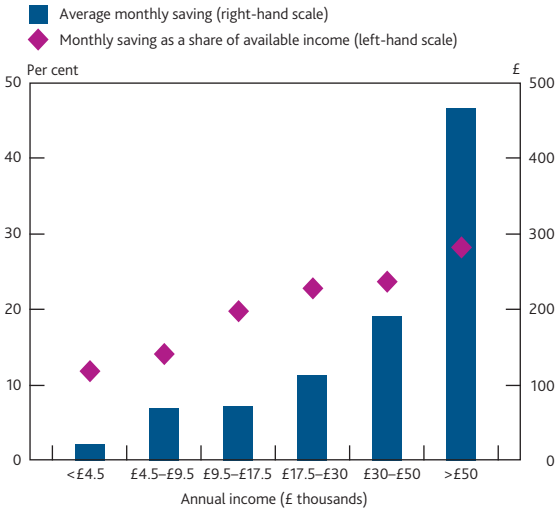
In the 2010 NMG survey, households tended to save, on average, around £160 per month. But there were considerable differences between households, with over a third of respondents not saving anything on a monthly basis, 40% saving positive amounts smaller than £200 a month and around one fifth saving between £200 and £2,000.

The survey suggests that most of the saving in the economy tends to be done by a minority of households on high incomes, both in absolute terms and as a proportion of their income. Households with annual gross incomes over £50,000, which amounted to 17% of the survey respondents, tended to save over a quarter of their available income on a regular basis, equivalent to around £450 per month on average (**Chart 12**).

A little over a fifth of respondents reported having increased or planned to increase their saving, slightly lower than in 2009 (**Chart 13**). And over a third of households, slightly more than last year, said they had 'definitely not' increased or planned to increase their saving. Households on higher incomes were more likely to report having increased or planning to increase saving (**Chart 14**).

The three main reasons cited for the increase in saving were the desire to reduce debt levels, saving for retirement and for

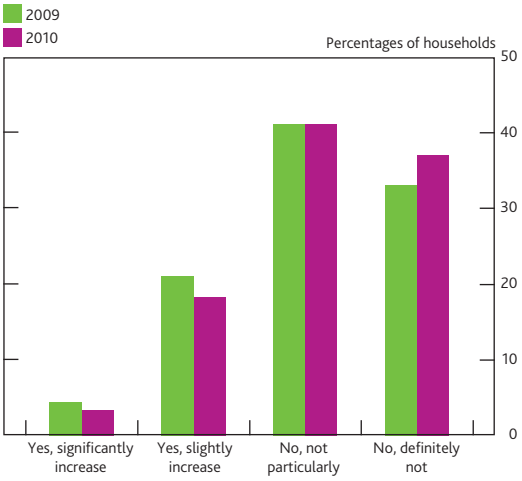
Chart 12 Monthly saving in levels and as a share of available income,[a] by income



Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'How much of your household monthly income would you say that you save every month?'.

Chart 13 Proportion of households who have increased, or are planning to increase, their saving[a]



Sources: NMG Consulting survey and Bank calculations.

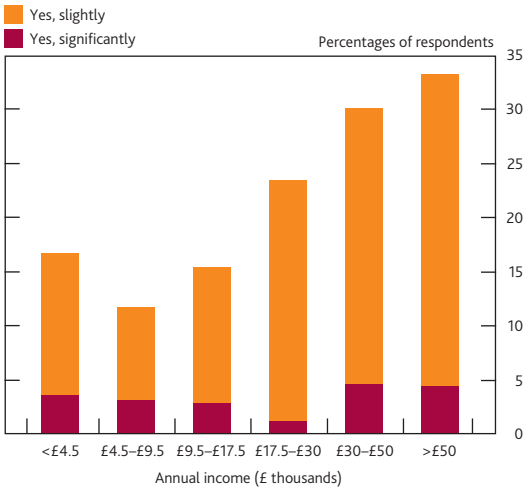
(a) Question: 'Are you planning to/or have you already started to increase the amount of money you save?'.

additional personal commitments (**Table G**). Next came concerns over job losses and saving for a big item, followed by general fears of future interest rate or tax increases. Around one in ten households who said they had or were planning to increase their saving were doing so for a deposit on a property.

Young respondents (ie 18–24 years of age) tended to report the lowest share of regular saving out of available income. But they were also more likely to report that they had or were planning to increase their saving (**Chart 15**). In contrast to the middle to old age group, this proportion had risen since 2009. This shift in age pattern could be related to higher deposits being required by banks in order to obtain a mortgage, as

(1) In the National Accounts, saving can be used by households to add to the value of their assets (financial investments or housing net of debt) or reduce their debts.

Chart 14 Proportion of households who have increased, or are planning to increase, their saving, by income[a]



Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'Are you planning to/or have you already started to increase the amount of money you save?'.

Table G Ten main reasons for actual or planned increase in savings[a][b][c]

2010

	Percentages of responses	Percentages of population
Trying to reduce debts	25	5
Saving for retirement	25	5
Additional personal commitments	25	5
Fear of redundancy/job insecurity	18	4
Saving for a big item, eg car, holiday	18	4
Worried about future interest rate increases	12	2
Saving for deposit on house/flat	10	2
Worried about future tax increases	9	2
Extra cash from increased income/second job, etc	9	2
Extra cash from lower mortgage payments	8	2

Sources: NMG Consulting survey and Bank calculations.

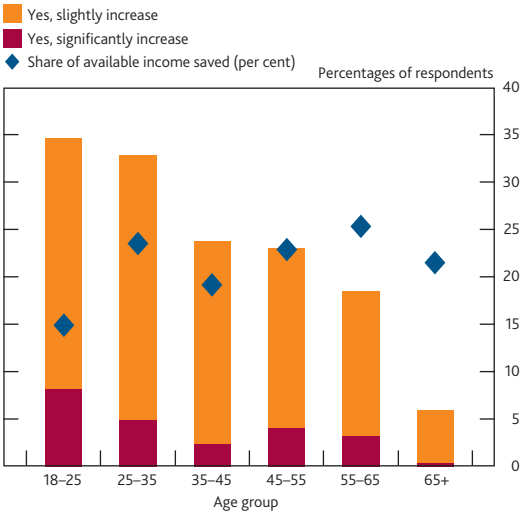
(a) Percentages do not sum to 100 because respondents were able to select up to four responses.
(b) Since only 20% of the survey population answered this question, the last column reports the share of the overall sample.
(c) Question: 'What would you say are the main factors driving this increase (in saving)?'.

highlighted earlier, or to labour incomes being more volatile in a recession than pensions.

Among housing tenure groups, households with high LTV mortgages reported the highest intention to save more and were also highly likely to want to reduce their debt levels. This is consistent with this group of households being more likely to build precautionary buffers of savings given that, as discussed earlier in this article, bank credit has been relatively tighter for them than for other households (**Chart 3**).

As expected, households saving little or nothing on a regular basis and having little in the way of financial buffers were more likely than the average household to report that they were falling behind on some or many bills or credit commitments. Respondents with debt distress or debt concerns tended to save less than the average (around £35 per month).(1) They also tended to have accumulated fewer financial and other

Chart 15 Actual or planned increase in saving and monthly saving as a share of available income,[a][b] by age group



Sources: NMG Consulting survey and Bank calculations.

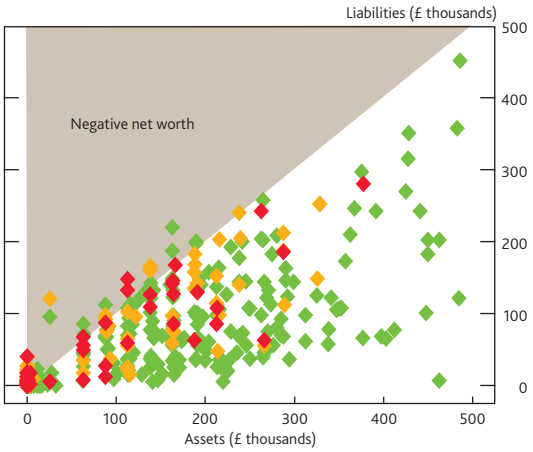
(a) Question: 'Are you planning to/or have you already started to increase the amount of money you save?'.
(b) Question: 'How much of your household monthly income would you say that you save every month?'.

assets to rely on (around £3,500 in financial assets versus an average of £21,000 for the whole sample).(2) This low level of financial buffers makes them more vulnerable when their income falls, for example due to job losses or reductions in working hours, or when their expenditures have to rise (eg due to having a child). Relative to 2009, however, a larger fraction of households on low incomes — who generally tend to save the lowest amounts both in absolute and relative terms — had increased or were planning to increase their saving.

It is not only those households with little or no assets that face financial problems, but also those whose debts closely match the value of their assets, ie they have little net wealth. **Chart 16** plots the stock of liabilities of each household against their stock of assets.(3) Households with significant financial problems — coloured in red and amber according to the number of problems reported — are mostly either clustered around the origin or along the 45° line.(4) This indicates respectively that households with financial distress either had little or no assets or liabilities or they were of similar value. Around three quarters of mortgagors and renters had positive or zero net assets.

(1) Debt distress is defined as having problems paying for accommodation or finding unsecured repayments a heavy burden for the households. Debt concern is defined as being very concerned by the current level of debt.
(2) The ONS survey of Wealth and Assets (ONS (2009)) reported that in 2006–08, 25% of households had net financial wealth that was negligible, zero or negative. Consistent with this result, around a third of households in this year's NMG survey had low levels of gross financial savings and investments overall; these households also tended not to have other assets, such as a property, land or entitlement to a private pension.
(3) Assets include a household's main home as well as their financial savings and investments, while the liabilities include any mortgage secured on the property as well as any unsecured debt. For more on the joint distribution of assets and liabilities at the household level, see the ONS survey of Wealth and Assets (ONS (2009)) and Barwell *et al* (2006).
(4) Financial problems are defined as having difficulties in paying for accommodation, finding unsecured repayments a heavy burden, and having serious difficulties keeping up with bills and credit commitments.

Chart 16 Debt distress and the joint distribution of assets and liabilities among mortgagors and renters[a][b]



Sources: NMG Consulting survey and Bank calculations.

(a) Households in red reported financial problems along any two or three of the following dimensions: paying for accommodation, finding unsecured repayments a heavy burden and having fallen behind on some or many payments of bills and credit commitments. Households in amber reported problems along any one of the three dimensions. Households in green are the remaining households who did not report any of these problems.
(b) Outright owners are not included because they were not asked the question about the value of their house. Respondents with assets or liabilities in excess of £500,000 are not included in the chart.

Summary and conclusions

This year's NMG survey has highlighted the continuing difficulties facing households. Household responses were consistent with weak earnings growth and elevated unemployment depressing household incomes, while credit conditions for households remained tight. The low level of Bank Rate means that some borrowers have benefited from lower mortgage interest payments than before the recession and housing payment problems are unchanged this year. But the burden of unsecured debt has risen this year, most likely reflecting a combination of weak earnings growth and the interest rates on unsecured debt remaining high over the past two years despite falls in Bank Rate.

Nearly half of all households with debt were either somewhat or very concerned about their level of debt. And a net balance of households reported that their concern had increased over the past two years. To deal with these concerns, a number of households mentioned cutting back on spending and avoiding getting into further debt.

A little over a fifth of households said they had increased or planned to increase saving, slightly lower than in last year's survey. Households on higher incomes were more likely to report plans to increase saving, although this year a larger fraction of low-income households than in 2009 reported plans to increase their saving. Most respondents were saving to reduce debts, to provide for retirement and to cover additional personal commitments. Households with little in the way of financial assets were more likely to be concerned about their debt levels and report difficulties in keeping up with their bills and credit commitments.

Survey method

The survey was undertaken between 24 and 30 September 2010 by adding 31 questions related to household finances and housing wealth to a regular monthly survey, MarketMinder, carried out by NMG Consulting. Interviews were conducted on 1,960 households in the respondents' homes using Computer Assisted Personal Interviewing (CAPI). The results were weighted to help correct for any bias in the sample using nationally defined profiles for age, social grade, region, working status and housing tenure.

A limitation of all surveys about sensitive issues such as household finances is that some people are reluctant to discuss them in face-to-face interviews. Because of embarrassment, those who face the most financial stress might be more likely than others to refuse to answer certain questions or to understate their difficulties. As in previous years, the survey was designed to reduce these possibilities. In order to encourage respondents to divulge sensitive information, they were told that the survey was being carried out on behalf of the Bank of England and would be useful in assessing how spending might be affected by its monetary policy decisions and in judging the risks to financial stability. They were assured that their replies would be treated in the strictest confidence, would not be passed to any third party at any stage in the future and would not under any circumstances be used for sales or marketing purposes. Also, to avoid embarrassment in revealing sensitive information to the interviewer, replies to questions were coded on show cards and recorded on a computer in such a way that the interviewer would not know the content of respondents' answers.

Response rates for the 2009 and 2010 surveys were generally higher than those in previous years. Only those respondents who were the chief income earner or main shopper were asked for their income. On a weighted basis, this meant that 11% of respondents were not asked about their income. A further 24% of households refused to provide (14%) or did not know (11%) their household income. And 11% of mortgagors refused to say or did not know how much secured debt they owed. A similar percentage of unsecured debtors did not provide information about the size of their unsecured debts, with 6% not knowing how much they owed and 3% refusing to say how much. There was quite a large overlap between those households who refused to provide information about their income and those that refused to provide information about their debts.

All calculations reported in this article have been carried out using all available responses in each individual survey question. As discussed in the 2009 article (Hellebrandt *et al* (2009)), this could in principle introduce a bias in the results if non-responses are not distributed uniformly across groups in the survey population, but in practice, the overall results are not very sensitive to the imputation method used.

Although the sample is weighted in order for it to be representative of the population, the results from the survey may not be representative for some questions. For example, collectively, survey respondents are known to systematically underrecord the value of their unsecured debt and overrecord the value of their housing assets (Redwood and Tudela (2004)). Since these biases do not tend to vary over time, changes in the distribution of balance sheets over time may be taken as representative of changes in the population as a whole.

Finally, as in 2008 and in 2009, the ratios calculated in this article assume that each respondent's weight is uniformly distributed between the minimum and maximum value of the ratio consistent with the buckets selected. For example, all mortgagors who reported having an outstanding mortgage balance of '£20,000–£29,999' and a house worth '£100,000–£124,999' are assumed to have a loan to value ratio of anywhere between 16% (for a mortgage of £20,000 and a house value of £124,999) and 30% (for a mortgage of £29,999 and a house value of £100,000), with all values in between equally likely. This means that in producing **Chart 2**, 64% of these mortgagors' weight would be assigned to the 0–25 bucket and 36% to the 25–50 bucket. The percentages are obtained by calculating the proportion of the mortgagor's range of possible loan to value ratios that lies in each of the two buckets. While this approach has shortcomings of its own (the ratio of two uniform distributions is not uniform), internal analysis has shown that it is a more accurate representation of the raw information provided by the respondents than the method using mid-points, which instead tends to generate lumpy aggregate distributions of ratios (eg distribution of loan to values) with too few respondents falling in the extremes of the distribution (eg the percentage of households in negative equity). The 'mid-point' approach was used, however, in computing monthly saving as a proportion of monthly income, as the size of the buckets of these two variables was similar enough to generate relatively little distortion.

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Changes in the transmission of monetary policy: evidence from a time-varying factor-augmented VAR

Summary of Working Paper no. 401 Christiane Baumeister, Philip Liu and Haroon Mumtaz

Several recent studies have documented that the volatility of output and inflation in the United States showed a remarkable decline after the mid-1980s in common with the experience in many countries. In addition, there is evidence to suggest that the persistence of inflation also fell after this date. A growing empirical literature has examined this apparent change in the dynamics of the US economy. These papers usually employ empirical models that contain a limited amount of macroeconomic variables — typically using systems of equations known as vector autoregressions (VARs): a set of equations where the explanatory variables in each equation are the complete set of lagged variables in the system. GDP growth, inflation and the nominal interest rate are the typical variables included in simple VARs that describe the transmission mechanism of monetary policy. If, in reality, the central bank examines a wider set of variables when setting policy, estimates of the monetary policy shock derived from these small empirical models may be biased — ie not completely disentangled from non-policy shocks. As a consequence an accurate assessment of structural shifts may be hampered.

This paper therefore explores the dynamics of the US macroeconomy using a VAR model that incorporates a larger amount of economic information than a tri-variate model. In particular, we use an extended version of the 'factor-augmented VAR' (FAVAR) model recently proposed in the literature. The idea behind the FAVAR model is that the bias created by the difference in the information set of the researcher and the agents described in the model can be alleviated by augmenting the standard VAR with *common factors* that are extracted from a large set of macroeconomic indicators. These common factors summarise the relevant information in the macroeconomic indicators and therefore provide a proxy for the information set of agents in the model.

Our FAVAR model for the United States contains common factors extracted from data on real activity, inflation, money and credit and asset prices in addition to a short-term nominal interest rate. The innovation in our work is that we also allow the coefficients of the model and the variances of the shocks to vary over time. When this model is estimated on artificial data, it provides robust inference on changes in impulse response functions suggesting that the model is well suited to the task at hand.

The model is estimated over the period 1960 Q1 to 2008 Q3 (largely predating the recent recession). Our main results suggest that time variation is indeed a pervasive feature of key macroeconomic variables like output measures, price indices, money aggregates and asset prices. In this respect, we find important differences in the responses obtained from our FAVAR specification compared to low-dimensional systems. More specifically, in our data-rich environment we find that economic activity declines by less in more recent times after a restrictive monetary policy shock, whereas no time variation is detected in small-scale VARs.

We find no evidence of a 'price puzzle' (the common and counterintuitive finding that prices rise after a monetary contraction) for any of the aggregate price measures throughout the sample period. This may suggest that the extra information captured by the factors leads to more robust structural estimates in that it mimics the central bank's practice of examining and reacting to a wide variety of data series. However at the disaggregate level, a considerable portion of sectoral price responses displays a significant price puzzle at short horizons during the 1970s which ameliorates from the early 1980s onwards. Our evidence therefore provides a case for the price puzzle not being a puzzle at disaggregate level, but rather a distinctive feature of sectoral dynamics. This should allow us to infer something about the price-setting behaviour of firms in reaction to monetary surprises.

Our results suggest that durable goods are most sensitive to interest rate innovations and show a considerable fall in consumption volumes and a decline in the price level. Durable goods also contribute the least to the dispersion of sectoral prices since individual impulse responses are closely aligned. Instead, non-durable goods and to some extent services account for a large share of cross-sectional heterogeneity, with price responses widely dispersed, covering a broad range of positive and negative values.

DSGE model restrictions for structural VAR identification

Summary of Working Paper no. 402 Philip Liu and Konstantinos Theodoridis

Monetary policy making in central banks requires a profound understanding of the way the economy reacts to the shocks that continually bombard it. So banks call upon a wide range of economic models to help them in this undertaking. Since the pioneering work of Sims, vector autoregressive (VAR) models have been used extensively by applied researchers, forecasters and policymakers to address a range of economic issues. These models comprise equations explaining a small number of key macroeconomic variables where each equation includes the same set of explanatory variables, lagged values of all the variables in the system. The basic VAR is therefore unable to tell us about the detailed structure of the relationship or shocks, which is what the policymaker really wants to know, as it is a 'reduced-form' model. To unpack the shocks hitting the system and their effects on the economy, we need to 'identify' the model with extra assumptions.

Although VARs have been very successful in capturing the dynamic properties of macroeconomic time-series data, the decomposition of these statistical relationships back to coherent economic stories is still subject to a vigorous debate. However, the outcomes of the VAR analysis depend crucially on these assumptions and the various competing identification restrictions cannot be easily tested against the data. Even though several procedures have been proposed in the literature, shock identification remains a highly controversial issue.

A type of model that is not susceptible to this problem is the dynamic stochastic general equilibrium (DSGE) model. In this case, economic theory is used to define all the linkages between variables. The tight economic structure solves the identification problem, but at a cost. As theory is never able to fully explain the data, an agnostic VAR will almost certainly 'fit' the data better.

This paper proposes an identification strategy for VARs that extends an idea introduced by Harald Uhlig, a 'penalty function' that effectively weights various restrictions suggested by theory — in his case, the signs of various effects. So we construct a penalty function that is based on *quantitative* restrictions implied by a DSGE model. To assess the usefulness of the proposed identification strategy, we present a series of Monte Carlo experiments (where many experiments are carried out on an artificial model, randomly differing in the shocks hitting the system). First, we investigate the ability of the method to recover the true set of structural shocks; second, we examine the source of bias in the identified VAR responses relative to the true data generating process; and third, we assess how the proposed identification strategy performs using restrictions from a misspecified model. We also present an application using a seven-variable VAR model estimated on US data. The structural shocks are identified using restrictions from a classic medium-scale DSGE model developed by Frank Smets and Raf Wouters.

A number of interesting results emerge from the analysis. First, by using the correct model restrictions, the identification procedure is successful in recovering the initial impact of the shocks from the data. Second, despite using restrictions from misspecified models, the data tend to push the VAR responses away from the misspecified model and closer to that of the true data generating process. Third, the proposed identification strategy systematically gives smaller bias compared with other popular identification schemes.

Monetary policy rules and foreign currency positions

Summary of Working Paper no. 403 Bianca De Paoli, Hande Küçük-Tuğer and Jens Søndergaard

Over the past decade, international financial markets have become increasingly integrated. This process of financial globalisation is reflected in the rapid expansion of the external balance sheets of countries which record cross-border ownership of assets and liabilities. In this world of interlinked balance sheets, exchange rate movements can lead to significant shifts in a country's external position. This 'valuation effect' depends crucially on the size as well as currency composition of a country's external position. For example, if a country's foreign assets are predominantly denominated in foreign currency, a weakening in the domestic currency will increase the domestic currency value of its net foreign asset position.

The empirical evidence suggests that an indirect link exists between the currency composition of a country's external position and its monetary policy. In particular, inflation-targeting countries appear to hold relatively more foreign debt liabilities denominated in foreign currency than non inflation targeting countries.

This paper formalises this empirical link between monetary policy and foreign asset holdings. It uses a model of endogenous portfolio choice explaining why agents hold particular assets, under the assumption of incomplete markets (that is, in the absence of complete insurance against risk). A framework is developed where optimal foreign currency portfolios are directly linked to exchange rate dynamics. Whether the domestic currency depreciates or appreciates in periods of relatively low consumption determines whether investors take a long or short position in the foreign currency (in other words, whether their portfolio is overweight or underweight in foreign bonds).

The key insight of this analysis is that different monetary regimes change the cyclical properties of the exchange rate and hence alter agents' hedging incentives (whereby agents take positions that protect themselves against adverse movements in their consumption). For instance, if the central bank is assumed to target money growth — or follow an interest rate setting 'Taylor rule', ie a rule that has interest rates responding not only to movements in inflation but also some measure of output growth or the output gap — agents would choose a portfolio that is underweight (short) in domestic bonds and overweight (long) in foreign bonds. Intuitively, any adverse real country-specific shocks will — with these particular monetary policy rules — be associated with a nominal depreciation of the domestic currency. Being overweight in domestic currency denominated assets is therefore a bad hedge.

On the other hand, when the central bank conducts policy through an inflation-targeting Taylor-type rule, the same adverse shock will trigger a nominal domestic currency appreciation. So holding domestic currency denominated assets is a good hedge and agents will choose an optimal portfolio that is overweight in domestic currency denominated bonds.

The paper also illustrates how the endogenous portfolio choice determines the cross-border transmission of monetary policy shocks via a valuation channel. In the case of money-growth rules, agents are overweight in foreign bonds. So monetary policy shocks that cause a domestic currency depreciation generate an increase in the domestic country's net external wealth position. Thus the valuation effects of monetary policy shocks are beggar-thy-neighbour. By contrast, monetary policy shocks with an inflation-targeting Taylor rule cause international valuation effects that are beggar-thy-self. Since agents are holding a portfolio short in foreign bonds, a domestic nominal depreciation will imply a decline in the country's net external wealth.

The impact of payment splitting on liquidity requirements in RTGS

Summary of Working Paper no. 404 Edward Denbee and Ben Norman

This paper examines the impact that payment splitting could have upon the liquidity requirements and efficiency of a large-value payment system, such as the United Kingdom's CHAPS. Under payment splitting, a threshold value for payments is defined. Any payments larger than this threshold are split into equal pieces, each smaller than the threshold, and are then settled. In this study we use real UK payments data and the Bank of Finland Payment and Settlement Simulator to test two hypotheses: that (i) payment splitting can reduce the length and impact of payment queues prior to settlement; and, equivalently, (ii) payment splitting can reduce the liquidity requirements of the system.

A number of systems worldwide already adopt payment splitting, either as a formal mechanism or through informal guidance and practice, as a means of being more liquidity efficient. In CLS, a foreign exchange cash settlement system, a currency threshold is set for each currency that it processes. Any eligible transaction above this threshold, in either currency, is split into smaller, equally sized transactions. The Swiss SIC payment system, the Japanese large-value payment system, BoJ-Net and the Canadian securities settlement system, CDSX, all have guidelines or rules that encourage participants to split the largest payments into smaller pieces to aid payment co-ordination and liquidity efficiency.

Our results suggest that if banks were liquidity constrained and, hence, payments were queued prior to settlement, payment splitting could significantly reduce the length of these queues. Splitting allows partial settlement of payments where otherwise none would have been possible. This directly reduces the value of payments queued. Beyond this the recipient bank may be able to use this liquidity to settle queued payments of its own resulting in a favourable 'payment cascade' effect. Reducing the splitting threshold generally results in greater reductions in payment queues.

We also find that, equivalently, payment splitting can reduce banks' liquidity requirements. Splitting payments into smaller pieces and releasing them piecemeal can help banks to co-ordinate their incoming and outgoing payments resulting in less demand for liquidity. By spreading the largest-value payments over time, banks are able to use incoming payments to fund the remaining pieces of an outgoing split payment.

Given the potential benefits from payment splitting, it is worth asking why it is not more widespread. We identify two issues that may discourage systems from adopting payment splitting. First, the liquidity savings that result from this approach are not uniformly distributed. In our simulations, most banks made savings, whereas a few saw an increase in their liquidity needs. The latter tended to be those banks whose payment flows are most dependent on the arrival of incoming payments. In practice we expect that these banks would change their behaviour following the introduction of payment splitting.

Second, we recognise that some legal questions could be raised by payment splitting: above all, if a bank goes into administration after having only partially completed a payment, what is the status of that payment? Whether, and (if so) to what degree, this introduces risk depends upon the type of transaction (if any) that is underlying the payment. While a risk for some underlying transaction types, we conclude that in some cases splitting may actually reduce credit risk. We do not attempt to address the legal questions in detail but merely highlight the issues that a system operator would need to consider if it were to implement payment splitting functionality.

This paper does not seek to propose the adoption of payment splitting functionality in the United Kingdom but rather contributes to the growing literature on mechanisms for making real-time gross settlement payment systems more liquidity efficient.

Monetary policy, capital inflows and the housing boom

Summary of Working Paper no. 405 Filipa Sá and Tomasz Wieladek

A range of hypotheses have been put forward to explain the boom in house prices that occurred in the United States from the mid-1990s to 2007. This paper considers the relative importance of two of these hypotheses. First, global imbalances increased liquidity in the US financial system, driving down long-term real interest rates. Second, the Federal Reserve kept interest rates low in the first half of the 2000s. Both factors reduced the cost of borrowing and may have encouraged the boom in house prices. We develop an empirical framework to separate the relative contributions of these two factors to the evolution of residential investment and real house prices. Two types of shocks are identified: an increase in capital flows to the United States and an expansionary monetary policy shock.

The results suggest that capital flows shocks played a much larger role in increasing house prices than monetary policy shocks. We find that compared to monetary policy, the effect of a capital inflows shock on US house prices and residential investment is about twice as large and substantially more persistent. This finding is confirmed by the results of variance decompositions which show that, at a forecast horizon of 20 quarters, capital flows shocks explain 15% of the variation in real house prices, while monetary policy shocks explain only 5%.

A simple counterfactual exercise suggests that if the Federal Reserve had kept policy rates constant since the end of 1998, house prices might have been 8% lower by the end of 2007. Similarly, if policy rates had been set according to the Taylor rule, house prices might have been 5.5% lower. House prices would have been considerably lower (13%) if the ratio of the current account deficit to GDP had remained constant since the end of 1998.

The evidence suggests that global imbalances played an important role in generating the housing boom that characterised the run-up to the current crisis. This result would lend support to calls for the development of policies to prevent the build-up of large current account imbalances in the future, making the international monetary system more resilient to crises like the one we recently experienced.

Forecasting in the presence of recent structural change

Summary of Working Paper no. 406 Jana Eklund, George Kapetanios and Simon Price

Forecasting is a central activity for central banks, not least because policy takes effect with a lag. Inevitably, policy is forward looking. Thus in many central banks, including the Bank of England, the published forecast is a key tool in communicating judgements about monetary policy and the economy. The Bank's forecast, published in the *Inflation Report*, represents the judgements of the Monetary Policy Committee and is not mechanically produced by a single model. However, many forecasting models — a 'suite' of models — help the Committee determine its judgement, including simple largely atheoretical models of the type considered in this paper.

One common cause of forecast failure is that structural changes or 'breaks' keep on occurring in the underlying relationships in the economy, and this paper addresses that problem. Dealing with this has two aspects. First, detection; and subsequently the right forecasting strategy. Consequently, there are many papers on the identification of breaks, and forecasting methods that are robust to them. But these are mainly in the context of fairly distant events. The fact that in practice forecasters have to forecast after recent changes has received remarkably little attention. Yet this is a pervasive and profound problem.

Furthermore, in practice we may be continually 'monitoring' for breaks, and this raises a subtle issue. In that case the forecaster inevitably carries out repeated tests. This matters, because if statistical tests are repeated enough times, then even if one never occurs in reality by pure chance they must eventually flag a break. Luckily, there are methods to take care of this. But the subsequent problem of how to then adapt the forecasting strategy has hardly been discussed. We therefore address two important issues. First, we ask whether the forecaster should attempt to detect and react to breaks each period, or instead adopt robust forecasting strategies. Second, we consider two quite different environments. In one case, breaks are unique events (or are rare enough to be treated as such), and in the other they recur.

The monitoring strategy we examine is to look for evidence of breaks and then combine forecasts from models that do and do not use data before the change. And the alternative is simply to use methods that are robust to breaks. We examine several commonly used methods of this type, all of which work by in one way or another giving more weight to recent observations (less likely to be affected by breaks).

We first derive some analytical results for the forecast performance of the robust methods relative to a benchmark using the full sample. For random breaks in a simple model we obtain rankings, but not under deterministic breaks. Clearly, it is hard to draw theoretical conclusions. So we experiment with 'Monte Carlo' simulations (creating many randomly drawn artificial data sets) for a variety of cases. The best methods can vary widely according to the particular break and choice of parameters. With the monitoring method we find the gains are small, although equally the costs (in cases where there are small breaks) are also small. Other methods can do much better where there are large breaks. The results make it hard to recommend a single method. But a method based on averaging over many different samples often improves on the full-sample benchmark and rarely comes with a large penalty where there are frequent or small breaks.

Finally, we take the methods to real data. We examine simple forecasting models using about 200 US and UK time series. For the United Kingdom, where there are relatively many breaks identified in the full sample, the best-performing method is forecast averaging, consistent with the Monte Carlo results.

We conclude that monitoring for breaks will not lead to a deterioration in forecast performance relative to using the full sample, but not much benefit either. Instead methods that discount past data in various ways are to be preferred. The averaging method we explore seems to be a useful default choice.

Extracting information from structured credit markets

Summary of Working Paper no. 407 Joseph Noss

Assessing the stability of an economy frequently involves assessing the risk of bad states of the world materialising. It is often necessary to judge how many firms are likely to default on their debt obligations over a certain time horizon. The likelihood of a large number of firms defaulting is of particular interest to policymakers, particularly if this is caused by some 'systemic shock' that presents a particular threat to financial stability.

Structured credit instruments are created by collecting defaultable assets, such as mortgages or corporate bonds, into portfolios and issuing claims of different seniority against these portfolios. Claims' seniorities determine the order in which they receive cash flows from the underlying assets, with more senior claims being paid first. Their prices therefore reflect market perceptions about the chance of these cash flows materialising, or equivalently, the likely extent of defaults of the underlying credit instruments. While the values of standard credit instruments, such as corporate bonds, offer an insight into the market-perceived probability of a given firm defaulting, the values of structured credit instruments provide a richer view of the likely extent of corporate defaults away from this central case. Claims of different seniorities incur loss only if defaults reach different magnitudes; their relative value therefore affords an insight into the likelihood of losses being of different severities.

Information can be recovered from the prices of structured credit by modelling the default of the different underlying credit instruments and then fitting the resulting modelled prices to those observed in the market. Correctly modelling the distribution of defaults, and in particular their codependence, is crucial in order to find a model whose tranche premia fit those traded in the market. For example, only if a large number of firms default together will senior claims incur loss. Previous attempts to model this interdependence have used a 'Gaussian copula model', based on the Gaussian or normal distribution, to capture the correlation between firms' defaults. However, this gives insufficient weight to the 'tail event' of multiple firms defaulting together.

The framework presented here instead uses a gamma distribution that is more able to capture the possibility of extreme dependence between defaults. It is therefore more successful in matching the traded prices of structured credit products. The model is also extended to include 'catastrophe' and 'becalmed' states that represent the possibility of very high degrees of systemic risk in credit markets, and its reduction perhaps due to government intervention; it therefore offers an intuitive explanation for the large fluctuations in codependence witnessed during the recent credit crisis.

This work offers three key outputs. First, it allows the market-implied probability distribution of firms' defaults to be inferred from the traded value of structured credit instruments. These distributions may be of use to policymakers, particularly because they offer an insight into the risk of 'tail outcomes' involving the default of large numbers of firms. This is likely to be of particular interest to policymakers seeking to measure and mitigate systemic risk. Second, the model offers an insight into the nature and magnitude of the risks firms face. It allows the average probability of a firm defaulting to be decomposed into components relating to default events of different severities. For example, it can estimate how the probability of a particular firm defaulting depends on the likelihood of a very severe event such as widespread financial crisis. Finally, in common with other models of structured credit that go beyond the Gaussian copula, this work is of potential use to those who trade structured credit products. It gives rise to a set of parameters that determine the structure of the codependence of default between credits, which could form the basis of an investor's 'hedging strategy' that allows positions in different tranches to be hedged against each other. This has the potential to protect them from changes in the nature of default codependence that reduce the value of their portfolio.

Reports

The foreign exchange and over-the-counter interest rate derivatives markets in the United Kingdom

By Tristan Broderick of the Bank's Monetary and Financial Statistics Division and Chris Cox of the Bank's Foreign Exchange Division.[1]

In April this year, the Bank of England conducted its usual three-yearly survey of turnover in the United Kingdom's foreign exchange and over-the-counter (OTC) interest rate derivatives markets. This forms part of the latest worldwide survey co-ordinated by the Bank for International Settlements (BIS). The results show that the value of foreign exchange activity in the United Kingdom rose by one quarter between April 2007 and April 2010, increasing the UK share of the global market to 37%. Turnover in OTC interest rate derivatives also rose considerably over the same period. This report sets out the results of the UK survey, and then considers the potential underlying drivers in these markets over the past three years.

Introduction

In April this year, central banks and monetary authorities in 53 countries, including the United Kingdom, conducted national surveys of turnover in the foreign exchange (FX) markets[2] and in OTC interest rate derivatives markets. These surveys have taken place every three years since 1986[3] and measure turnover in the whole of April. They are co-ordinated on a global basis by the BIS, with the aim of obtaining comprehensive and internationally consistent information on the size and structure of the corresponding global markets.

This article begins by outlining the results of the latest UK contribution to the BIS global survey.[4] The article will concentrate largely on developments in foreign exchange markets, highlighting the significant increase in UK turnover since the previous survey. But the survey results on OTC interest rate derivatives are also summarised, in a box on page 358. The second part of the article considers the main factors behind recent trends in FX turnover in the context of structural changes in the UK foreign exchange markets in recent years.

The timings of the latest surveys (in April 2007 and April 2010) mean that the article can only report snapshots of activity in foreign exchange markets before and after the height of the recent financial crisis. But, as discussed in a recent paper by the London Foreign Exchange Joint Standing Committee (FXJSC),[5] FX markets seem to have been affected only modestly by the financial turbulence between mid-2007 and 2009. As a result, market contacts report that, by 2010, structural influences re-emerged as the dominant forces on activity in foreign exchange markets.

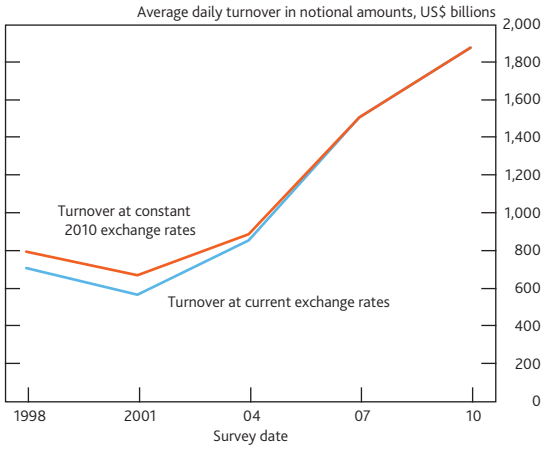
The results of the UK survey

The UK survey was conducted by the Bank of England and covers the business of 47 institutions (both UK-owned and foreign-owned) located in the United Kingdom. The box on pages 356–57 discusses the types of trades captured in the survey. Average daily turnover in the UK foreign exchange market during April 2010 was $1,854 billion, 25% higher than

(1) The authors would like to thank Perry Francis, Jake Horwood, David Osborn and James Wackett for their help in producing this article.
(2) Unless otherwise stated, turnover figures published here are adjusted to remove double counting of trades between UK principals that will have been reported by both parties (so-called 'local double counting').
(3) In the 1986 survey four countries, including the United Kingdom, reported data to the BIS. The first published global data were for the 1989 survey, which also included results of the 1986 survey. OTC derivatives were included for the first time in 1995.
(4) The Bank published a summary of the UK results on 1 September 2010 (see www.bankofengland.co.uk/publications/news/2010/066.htm). The BIS global results can be found on the BIS website: www.bis.org/publ/rpfx10.htm.
(5) The paper is available at www.bankofengland.co.uk/markets/forex/fxjsc/fxpaper090923.pdf. Similar studies were also undertaken by relevant committees in North America (see www.newyorkfed.org/fxc/news/2009/overview_nov_2009.pdf) and Canada (see www.cfec.ca/files/developments.pdf).

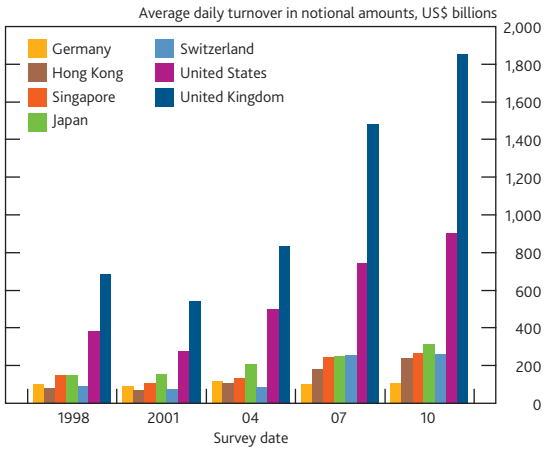
in 2007 at both current and constant exchange rates (**Chart 1**).(1) This was slightly less than the strong growth seen in 2007 and extends the upward trend of foreign exchange turnover since the late 1980s.

Chart 1 Foreign exchange turnover at constant and current exchange rates — average daily turnover in notional amounts



The latest pickup in FX turnover in the UK market was part of a global development, with other major centres showing similar rises in percentage terms (**Chart 2**). But the United Kingdom recorded the strongest growth in notional values, and consolidated its position as the largest centre of foreign exchange activity, accounting for 37% of the global market in 2010.

Chart 2 Foreign exchange turnover in the United Kingdom and other centres — average daily turnover in notional amounts



Source: BIS.

The United Kingdom's share of the global FX market has exceeded 30% in each of the past five surveys. The next largest centre was the United States, with 18% of the global market, followed by Japan, with a market share of 6%. The majority of turnover in the UK foreign exchange market was cross-border business — some 71% of total turnover in April 2010 — reflecting the United Kingdom's role as an international financial centre. The US dollar continued to be the dominant currency in the UK foreign exchange market, with 85% of all trades having one side denominated in dollars (**Table A**).

Table A Foreign exchange turnover — currency breakdown

Per cent(a)

	2001	2004	2007	2010
US dollar	90.9	88.4	87.6	84.7
Euro	41.5	42.7	41.6	44.3
Pound sterling	23.7	26.7	21.5	17.8
Japanese yen	18.7	16.3	14.6	17.2
Swiss franc	5.5	5.7	6.2	5.9
Canadian dollar	3.7	3.1	3.0	4.4
Australian dollar	3.5	4.0	4.3	5.9
Other currencies	12.6	13.1	21.3	19.8

(a) Because two currencies are involved in each transaction, the sum of the percentage shares of individual currencies totals 200% instead of 100%. Components may not sum to the total due to rounding.

Broadly speaking, these results for UK FX turnover were echoed in outturns for OTC interest rate derivatives — see the box on page 358. The rest of this article will, however, concentrate on the results for the FX market. The remainder of this section highlights some of the key trends that emerge from the survey before the subsequent section examines the underlying factors that have contributed to those developments.

Increase in spot transactions

FX turnover in the United Kingdom in spot and outright forwards grew markedly since 2007, while turnover in foreign exchange swaps fell slightly (**Chart 3**). Foreign exchange spot showed the largest increase, up 108% to $697 billion per day, slightly higher than the rise in outright forwards which increased 84% to $228 billion per day. Spot transactions accounted for 38% of all foreign exchange turnover. The large increases in spot and outright forward transactions coincided with a 14% fall in FX swaps, to $775 billion from $899 billion per day in 2007. Turnover in foreign exchange options grew 27% to $135 billion per day, while currency swaps showed slight growth with turnover of $18 billion per day.

Increased diversity of market participants

Turnover with 'other financial institutions', a category that includes hedge funds, pension funds and central banks, continued to increase and now represents the largest single counterparty (**Chart 4**). Turnover within the category rose by 39% compared with April 2007, to $866 billion per day, accounting for 47% of all turnover. Interbank trading grew 22% to $809 billion per day but deals with 'non-financial institutions' fell by 10%, to $178 billion per day.

(1) Constant exchange rate measures are constructed by converting each leg of a foreign currency transaction, other than the US dollar leg, into original currency amounts at the prevailing average April bilateral exchange rates and then reconverting into US dollar amounts at average April 2010 exchange rates.

BIS triennial survey definitional issues

Participants

Forty-seven institutions, mainly commercial and investment banks, participated in the UK survey. This compares with 62 participants in 2007. Others active in the UK market were not directly involved in the survey, but their transactions with participating principals will have been recorded by those institutions.

The questionnaire

Survey participants completed a questionnaire prepared by the Bank of England, based on a standard format agreed with other central banks and the Bank for International Settlements (BIS). Participants were asked to provide details of their gross turnover for the 20 business days in April 2010. Gross turnover (measured in notional values) is defined as the absolute total value of all deals contracted; there was no netting of purchases against sales. Data were requested in terms of US dollar equivalents, rounded to the nearest million. The basis of reporting was the location of the sales desk of the trade, as per the 2007 survey. The questionnaire asked for data broken down by currency, instrument and type of counterparty.

The survey distinguished the following types of transaction:

Foreign exchange

- *Spot transaction*: single outright transaction involving the exchange of two currencies at a rate agreed on the date of the contract for value or delivery (cash settlement) usually within two business days. The spot legs of FX swaps and FX swaps that were for settlement within two days (ie 'tomorrow/next day' swap transactions) were excluded from this category.

- *Outright forward*: transaction involving the exchange of two currencies at a rate agreed on the date of the contract for value or delivery (cash settlement) at some time in the future (more than two business days later). Also included in this category were forward foreign exchange agreement transactions, non-deliverable forwards, and other forward contracts for difference.

- *Foreign exchange swap*: simultaneous transaction that involves the exchange of two currencies, first the near leg and then, subsequently, a reverse transaction at a forward date, the far leg. Short-term swaps carried out as overnight and 'tomorrow/next day' transactions are included in this category.

- *Currency swap*: contract which commits two counterparties to exchange streams of interest payments in different currencies for an agreed period of time, and to exchange principal amounts in different currencies at a pre-agreed exchange rate at maturity.

- *Currency option*: option contract that gives the right to buy or sell a currency against another currency at a specified exchange rate during a specified period. This category also includes currency swaptions, currency warrants and exotic foreign exchange options such as average rate options and barrier options.

Single-currency OTC interest rate derivatives

- *Forward rate agreement (FRA)*: interest rate forward contract in which the rate to be paid or received on a specific obligation for a set period of time, beginning at some time in the future, is determined at contract initiation.

- *Interest rate swap*: agreement to exchange periodic payments related to interest rates on a single currency. Can be fixed for floating, or floating for floating based on different indices. This category includes those swaps whose notional principal is amortised according to a fixed schedule independent of interest rates.

- *Interest rate option*: option contract that gives the right to pay or receive a specific interest rate on a predetermined principal for a set period of time. Included in this category are interest rate caps, floors, collars, corridors, swaptions and warrants.

Reporting institutions were asked to distinguish between transactions with:

- *Reporting dealers*: financial institutions that are participating in the globally co-ordinated survey. These institutions actively participate in local and global foreign exchange and derivatives markets.

- *Other financial institutions*: financial institutions that are not classified as reporting dealers. Thus, it will mainly cover smaller commercial banks, investment banks and securities houses, and in addition mutual funds, pension funds, hedge funds, currency funds, money market funds, building societies, leasing companies, insurance companies, other financial subsidiaries of corporate businesses and central banks.

- *Non-financial customers*: covers any counterparty other than those described above, ie mainly non-financial end-users, such as businesses and governments.

In each case reporters were asked to separate local and cross-border transactions (determined according to the

location, rather than the nationality of the counterparty) to permit adjustment for double counting.

Market conditions

Participants were asked whether they regarded the level of turnover in April 2010 as normal. The responses, summarised in **Table 1**, suggest that the survey results can be regarded as representative.

The aggregate responses (adjusted for double counting) for the main sections of the questionnaire are shown in **Tables C**, **D** and **E** (at the end of this article). The BIS published a report on FX activity at end-November and further analysis of the global survey results in its December *Quarterly Review*.(1) A survey of global outstanding positions in the derivatives markets (measured at the end of June 2010) was also undertaken, and global results for this survey were published in November.(2)

Table 1 Survey participants' estimates of foreign exchange turnover levels

In April 2010

	Number of banks	Percentage of turnover(a)
Below normal	5	3
Normal	34	83
Above normal	8	15

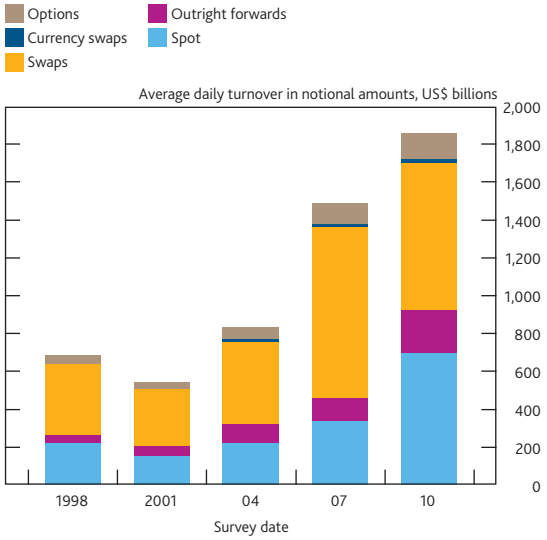
In preceding six months

	Number of banks	Percentage of turnover(a)
Decreasing	6	3
Steady	27	47
Increasing	14	51

(a) Percentages may not sum to 100% due to rounding.

(1) The BIS report on FX activity can be found on the BIS website at www.bis.org/publ/rpfxf10t.htm.
(2) Results of the BIS Amounts Outstanding global survey can be found on the BIS website at www.bis.org/publ/otc_hy1011.htm.

Chart 3 Foreign exchange turnover by instrument type — average daily turnover in notional amounts(a)



(a) For a discussion of the different instrument types, see the box on pages 356–57.

Chart 4 Foreign exchange turnover by counterparty

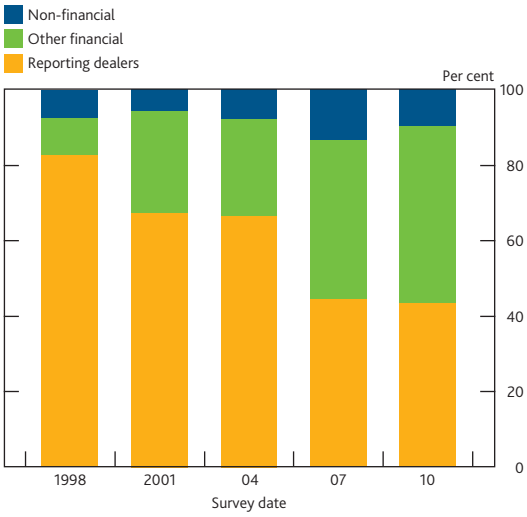


Table B Foreign exchange turnover — market concentration

Per cent

	Spot	Forwards	FX swaps	Currency swaps	Options
Top five institutions	68	62	49	72	67
Top ten institutions	87	84	72	88	91
Top twenty institutions	97	97	90	99	100

The market has become more concentrated since April 2007. The combined market share of the ten institutions with the highest level of turnover increased from 70% to 77%, and the share of the top 20 from 90% to 93%. **Table B** shows how concentration varied by instrument.

Developments in trade execution

Electronic trading has become an increasingly popular way to execute trades, rising by 71% since April 2007. Trades conducted on electronic broking systems and electronic trading systems each account for around 20% of all foreign exchange turnover (**Chart 5**). Customer direct trades are the most widely used trading method in the United Kingdom with average daily turnover of $473 billion, up from $408 billion recorded in 2007.(1) Interdealer direct turnover decreased over the past three years, from $427 billion to $405 billion. Trades

(1) Customer direct trades executed between the reporting dealer and either a customer or a non-reporting dealer that are not intermediated by a third party: for example, a transaction between a reporting dealer and a non-reporting dealer that is executed via direct telephone communication or direct electronic dealing systems such as Reuters Conversational Dealing.

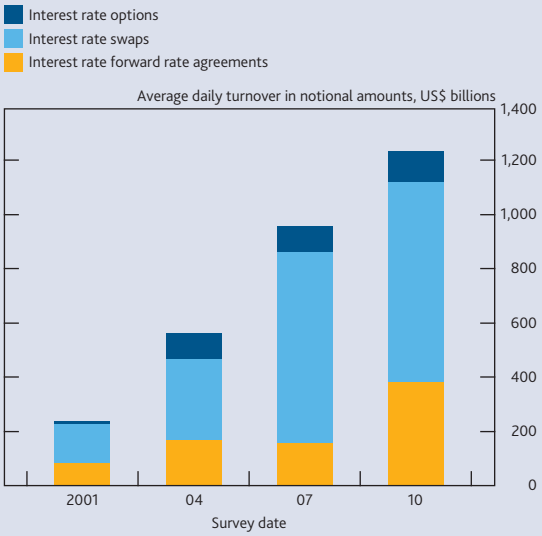
OTC interest rate derivatives turnover in the United Kingdom

Average daily turnover for OTC interest rate derivatives in the United Kingdom was $1,235 billion in April 2010, a 29% increase since 2007. Within this, turnover in forward rate agreements recorded the largest increase between 2007 and 2010, up 147% (**Chart A**). Turnover in interest rate options also increased, up 23% from $93 billion to $114 billion. The smallest increase came in activity in interest rate swaps, which rose just 4%. Nevertheless, they still accounted for 60% of the turnover in the OTC interest rate derivatives market, down from 74% in 2007.

The United Kingdom remained the main centre for OTC interest rate derivatives trading, increasing its share of the global market to 46% in April 2010, compared with 44% in 2007. The next largest centre was the United States (24%), followed by France (7%). Cross-border trades with UK reporting dealers comprised around two thirds of OTC interest rate derivatives turnover, reflecting London's role as an international financial centre.

The euro remained the dominant currency in the OTC interest rate derivatives market, accounting for 54% of total turnover, up from 51% in 2007. Compared with the foreign exchange market, the currency concentration was higher in the OTC interest rate derivatives market. Currencies other than the top four — US dollar, euro, sterling and yen — account for just 5% of the interest rate derivatives market, compared with 18% for foreign exchange.

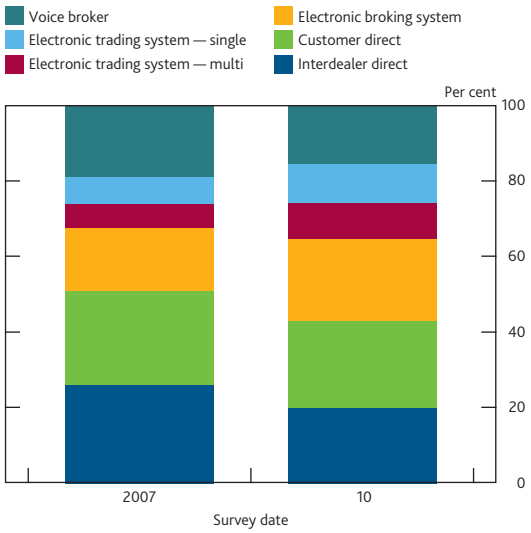
Chart A OTC interest rate derivatives turnover by instrument type — average daily turnover in notional amounts



Most of the increase in activity has been with other reporting dealers, consistent with the market remaining centred around interbank trading flows. Indeed, interbank business has grown 39% since April 2007 and accounted for 54% of all turnover in OTC interest rate derivatives. Customer business has grown 19% since the previous survey, driven by growth in turnover with non-financial customers. Factors contributing to the increases in customer business could also include the growing prime brokerage business.

executed through voice brokers stood at $320 billion in April 2010.(1)

Chart 5 Foreign exchange execution method



Underlying factors behind the continued strength of FX turnover

Currency markets, along with most other financial markets, were clearly affected by the recent financial crisis. But activity in foreign exchange markets seems to have held up relatively well, and overall market functioning remained relatively resilient. Indeed, while there were some brief episodes of heightened volatility — especially in late 2008 — market contacts suggest that the financial crisis did not have a lasting impact on currency trading. Structural changes in foreign exchange markets continued to be the dominant drivers of FX turnover.

More specifically, contacts identified three key interconnected themes that supported the growth in FX turnover over the past three years: further developments in the infrastructure for trading foreign exchange; the continuing influence of new

(1) In contrast to the news release published on 1 September 2010, execution method data are presented here on an unadjusted basis to allow comparisons with 2007.

entrants to the market; and the attractiveness of foreign exchange to investors as a distinct asset class. This section discusses each of these factors in turn.

Developments in market infrastructure

As in 2007, the introduction of new trading technologies has allowed 'traditional' foreign exchange market participants to adopt more sophisticated and efficient trading strategies, as well as enabling a growing number of new market participants to access the market directly.(1) Many of the large banks continued to invest heavily in building and innovating their systems, particularly their proprietary trading platforms that distribute prices to their customer base, allowing them to trade electronically. Investment in systems has resulted in reduced latency,(2) increased capacity and greater sophistication — for example through offering customers advanced or algorithmic execution tools. Some banks have also invested significantly in automated risk management.

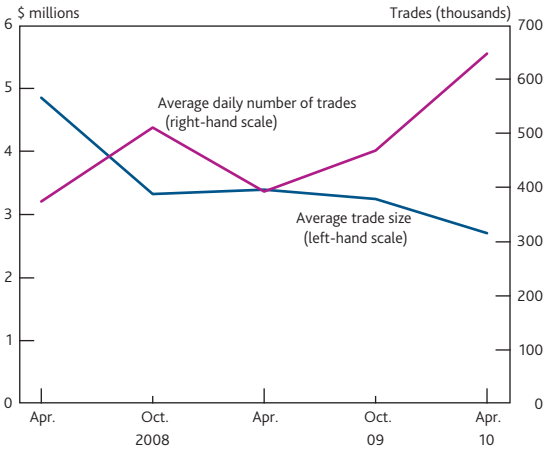
Market commentators note in particular the growing ability of banks' proprietary platforms to manage risk exposure automatically, in many cases with little manual intervention. Through the use of algorithms, systems can be programmed to make decisions in order to manage market risk — similar to the traditional role of a trader. As a result, banks are able to manage increasing amounts of risk from multiple customers simultaneously, and, in many cases, automatically.

According to contacts, such technological innovation has been key to banks maintaining, and capturing, market share. But despite the increase in concentration, competitive conditions in the FX market reportedly remained tight. Bid-offer spreads stayed narrow, and transaction costs for end-investors have been reduced further.

More generally, contacts suggest that developments in banks' electronic trading systems have contributed to an increasingly competitive market place. This has encouraged investors, especially asset managers, to trade on a more frequent basis and in smaller notional amounts to hedge and manage currency risk more efficiently. Data published by CLS Bank show that the average number of trades in April 2010 was 351,415 per day, from 128,696 in April 2007. Furthermore, over the three years, the data show a significant increase in turnover for deals with a value of less than $1 million. Separately, the April 2010 FXJSC survey indicated that the average trade size had almost halved over the previous two years, to an average of $2.7 million (**Chart 6**).(3) The consistency between the BIS and FXJSC surveys is discussed further in the box on page 360.

Technological developments have also impacted the ways in which banks manage liquidity. Banks' own systems are able to access a greater number of liquidity sources, thus further

Chart 6 Average trade size and daily volume



Source: London Foreign Exchange Joint Standing Committee survey.

enhancing the price discovery process. In particular, market commentators note the continued growth in liquidity sourced from within institutions using 'internal' flow. That is, instead of transacting via traditional interbank markets, a bank may try to enter into an offsetting position with another customer. This process of offsetting trades has reportedly been facilitated by developments in banks' electronic trading systems, and has given banks the ability to manage risk more efficiently, largely through reduced transaction costs.

New market participants

Investment in technology continued to lower barriers to entry, encouraging new participants to the foreign exchange market. As highlighted above, turnover involving 'other financial institutions' surpassed that between reporting dealers for the first time in the survey's history (**Chart 4**). Market commentators note two key reasons for the growth within this category: an increase in non-bank participants acting as market makers;(4) and an increase in central bank turnover. Non-wholesale investors too have reportedly increased their interest in currency markets, although their presence in the UK market remains modest.

Non-bank market makers

The 2007 *Quarterly Bulletin* article on the BIS triennial survey results noted how some non-bank market participants — often referred to as high-frequency traders — used models to profit from exploiting 'latency arbitrage'(5) opportunities. But growing efficiencies in FX markets over the past three years have reduced opportunities for exploiting such pricing inconsistencies. Instead, in a bid to maintain profitability,

(1) For a discussion of the 2007 results, see Christodoulou and O'Connor (2007).
(2) Latency is the time it takes to deliver an executable price to a client plus the time it takes for the trade record to return to the price maker.
(3) Results of the FXJSC turnover survey can be found at www.bankofengland.co.uk/markets/forex/fxjsc. The FXJSC survey began recording data on the number of trades transacted in April 2008.
(4) A market maker is a company, or an individual, that quotes both a buy and a sell price in a financial instrument or commodity.
(5) Taking advantage of small delays in price dissemination, usually between different price sources.

BIS triennial survey and the Foreign Exchange Joint Standing Committee survey

Since October 2004, the London Foreign Exchange Joint Standing Committee (FXJSC) has been publishing foreign exchange turnover data for the United Kingdom. The FXJSC is a UK market liaison group established by the banks and brokers of the London foreign exchange (FX) market and chaired by the Bank of England. Data are published on a six-monthly basis, for April and October. Further details of the FXJSC can be found on the Bank's website at www.bankofengland.co.uk/markets/forex/fxjsc.

The FXJSC survey collects similar information to the foreign exchange section of the BIS triennial survey. But there are two important differences, in institutional coverage and definition. First, more institutions participate in the BIS survey (47 compared with 31 in the respective April 2010 surveys). Second, the reporting basis for the FXJSC survey is based on the location of the price-setting dealer or trading desk (where transactions are executed), whereas the BIS triennial survey is based on the location of the sales desk (where transactions are arranged).

Despite these differences, the two surveys are broadly comparable. Institutions that are common to both surveys report very similar results (**Table 1**). And these institutions account for the vast bulk of turnover in the BIS survey (**Table 2**). The FXJSC survey does therefore provide a good, and more frequent, measure of activity within the UK foreign exchange market.

Table 1 Comparison of BIS triennial and FXJSC data for FXJSC reporting institutions[a]

Daily average in $ billions, unadjusted

	BIS triennial	FXJSC	Difference
Spot	771	741	30
Outright forwards	228	205	23
FX swaps	849	885	-36
Currency swaps	19	19	1
FX options	151	131	20
Total	**2,018**	**1,980**	**38**

(a) Components may not sum to the total due to rounding.

Table 2 FXJSC reporters' contributions to the BIS triennial data[a]

Daily average in $ billions, unadjusted

	Total BIS triennial	*Of which*, FXJSC reporting institutions	Per cent
Spot	779	771	99
Outright forwards	241	228	94
FX swaps	873	849	97
Currency swaps	20	19	95
FX options	151	151	100
Total	**2,065**	**2,018**	**98**

(a) Both the totals and percentages are calculated from unrounded data.

these non-bank participants have reportedly become market makers in their own right, in particular for FX spot markets, by providing their prices to buy or sell a currency (much like a bank does) to the wider market via FX Electronic Communication Networks (ECNs).(1) They typically obtain the necessary liquidity to sustain this activity through the use of prime brokerage services offered by banks themselves.

Consistent with this development, FX turnover conducted through multi-bank trading systems — which include FX ECNs — rose by 85% in the latest BIS survey. Moreover, while the BIS survey does not collect data on prime brokerage, data from the April 2010 FXJSC survey showed that transactions financed by prime brokerage rose by over 30% since April 2008,(2) accounting for 14% of all FX turnover recorded in the survey.

In general, the increase in the number of market makers outside of banks continues to broaden the number of venues supplying market liquidity, which some contacts noted should helpfully reduce the reliance on the banks as pricing providers. However, the entry of new non-bank market-making participants could potentially create a liquidity 'mirage': the ability and desire for such participants to continue pricing could evaporate quickly in periods of heightened volatility.

Central banks

Central banks have become increasingly active in currency markets over the past three years, both in terms of reserves growth and diversification. They have also, in some cases alongside sovereign wealth funds, become more sophisticated, using a wider range of strategies in order to execute their trading. According to the IMF's Currency Composition of Official Foreign Exchange Reserves (COFER) survey, global foreign exchange reserves rose 41% from 2007 Q2 to 2010 Q2, to stand at $8,422 billion. Given the scale of overall reserves, even relatively modest changes in reserve allocations can create large FX transactions that can noticeably impact foreign exchange turnover.

Non-wholesale investors

In a global context, non-wholesale foreign exchange trading has grown markedly. This growth was most pronounced in Japan, where so-called retail aggregators reportedly generated

(1) An FX Electronic Communication Network facilitates trading of foreign exchange products between the end-user and market-making institution.
(2) The FXJSC survey began recording details on prime brokerage turnover in April 2008.

over half of FX customer trading volumes in 2009 (compared with 27% in 2008) (Greenwich Associates (2010)).(1) As with many developments, the proliferation of electronic trading in FX markets is thought to be a key driver of this growth. In the United Kingdom, non-wholesale FX is thought to be a much less dominant feature of FX markets. Data from the FXJSC survey in April 2010 showed that less than 2% of overall turnover is attributable to deals with retail aggregators.

FX as a separate asset class

Over the past three years, institutional investors have continued to invest more in foreign exchange products as a separate part of their portfolios. In particular, contacts report that investors who traditionally focused on equity and credit markets increasingly sought to diversify their portfolios using foreign exchange linked products, referencing both developed and emerging currencies. A number of banks advertise foreign exchange as an asset class and provide various trading strategies to investors. The banks cite the liquidity advantages of FX, combined with low correlation to bond or equity markets, and high potential returns.

The way in which foreign exchange investments are used has also evolved. According to contacts, some market participants that were unable to access certain markets during the financial crisis (either through impairment or closure) would instead express their trading views using the foreign exchange market through so-called 'proxy' trades. As other asset markets started to function more normally again, contacts noted that the need to use FX in this way diminished somewhat. Nonetheless, increased awareness of how deep, liquid and resilient foreign exchange markets were during the turbulence is thought to have provided a boost to FX turnover over the past three years.

Conclusion

Average UK foreign exchange turnover continued to increase, rising 25% over the past three years to $1,854 billion per day. The United Kingdom remained the largest centre of foreign exchange activity.

Against the backdrop of generally rising turnover, the foreign exchange market has continued to grow, develop and innovate. The proliferation of electronic trading continues to lower barriers to entry and encourage new participants to the market. The UK FX market provided a liquid and resilient alternative during the financial crisis, which may have ultimately attracted some new investors to the asset class.

(1) A retail aggregator is either a financial institution or an intermediary that serves as a portal through which retail investors can trade foreign exchange on a margin basis. Margin trading allows an investor to take a position (long/short) on a currency by depositing a portion of the purchase price.

References

Christodoulou, G and O'Connor, P (2007), 'The foreign exchange and over-the-counter derivatives markets in the United Kingdom', *Bank of England Quarterly Bulletin*, Vol. 47, No. 4, pages 548–63.

Greenwich Associates (2010), 'Global Forex: the rise of retail', available at www.greenwich.com/Greenwich0.5/CMA/campaign_messages/campaign_docs/gtsf-10-global-forex-insert-jay.pdf.

Table C Average daily foreign exchange turnover[a]

US$ millions (rounded to the nearest million)

	US dollar against:													Sterling against:	
	Euro	¥	SwFr	Can$	Aus$	Skr	BrL	CnY	HK$	InR	KrW	ZaR	Other	US$	Euro
Spot															
Reporting dealers	**103,864**	**30,127**	**9,909**	**11,783**	**16,556**	**1,367**	**268**	**583**	**3,041**	**306**	**803**	**2,218**	**18,417**	**34,422**	**13,068**
Local	28,221	8,025	2,783	2,273	4,222	403	30	113	660	77	130	571	5,474	12,280	3,975
Cross-border	75,643	22,102	7,126	9,509	12,334	964	239	470	2,381	229	673	1,648	12,943	22,142	9,094
Other financial institutions	**109,408**	**37,803**	**16,965**	**14,274**	**19,964**	**1,591**	**550**	**599**	**2,052**	**624**	**1,844**	**2,003**	**17,377**	**41,262**	**15,716**
Local	35,887	11,773	6,913	4,189	6,072	253	31	215	373	144	576	588	5,919	14,312	6,287
Cross-border	73,521	26,031	10,053	10,085	13,892	1,339	519	383	1,679	481	1,268	1,415	11,458	26,950	9,430
Non-financial institutions	**22,455**	**6,926**	**2,686**	**2,058**	**2,866**	**133**	**30**	**22**	**221**	**13**	**16**	**98**	**1,949**	**6,156**	**2,851**
Local	4,493	1,240	576	574	892	44	16	0	55	1	0	27	624	1,994	992
Cross-border	17,962	5,686	2,110	1,484	1,974	89	15	22	167	12	16	71	1,325	4,162	1,859
Subtotal	**235,727**	**74,856**	**29,561**	**28,115**	**39,386**	**3,091**	**848**	**1,205**	**5,314**	**943**	**2,662**	**4,319**	**37,743**	**81,840**	**31,635**
Outright forward															
Reporting dealers	**21,424**	**3,671**	**2,771**	**2,176**	**2,885**	**1,482**	**684**	**1,287**	**420**	**1,320**	**1,821**	**343**	**7,149**	**6,533**	**2,393**
Local	3,211	894	227	363	738	143	204	229	153	426	391	124	1,896	1,497	465
Cross-border	18,213	2,777	2,544	1,813	2,147	1,338	480	1,058	266	893	1,430	219	5,253	5,037	1,928
Other financial institutions	**23,629**	**30,621**	**2,816**	**6,974**	**5,098**	**773**	**1,477**	**1,536**	**548**	**1,413**	**1,292**	**735**	**11,790**	**13,126**	**6,761**
Local	7,192	2,045	586	1,345	1,546	229	524	728	99	632	523	293	4,627	6,111	3,959
Cross-border	16,437	28,577	2,230	5,629	3,552	544	953	807	448	781	769	442	7,163	7,015	2,803
Non-financial institutions	**4,635**	**25,986**	**467**	**519**	**400**	**85**	**214**	**283**	**57**	**203**	**169**	**68**	**1,463**	**2,100**	**1,391**
Local	1,219	662	284	107	143	23	116	84	11	78	56	17	381	1,215	727
Cross-border	3,416	25,323	183	412	257	62	99	199	46	125	112	51	1,082	885	665
Subtotal	**49,688**	**60,278**	**6,053**	**9,668**	**8,384**	**2,340**	**2,376**	**3,106**	**1,024**	**2,935**	**3,282**	**1,146**	**20,401**	**21,760**	**10,546**
Foreign exchange swaps															
Reporting dealers	**139,851**	**41,186**	**17,269**	**18,952**	**25,934**	**10,345**	**21**	**88**	**3,482**	**145**	**107**	**3,636**	**52,811**	**62,197**	**11,943**
Local	33,633	8,346	2,720	3,370	6,596	1,599	11	20	1,351	10	20	878	13,006	22,467	1,963
Cross-border	106,217	32,841	14,549	15,582	19,339	8,746	10	68	2,130	135	87	2,758	39,804	39,730	9,980
Other financial institutions	**103,923**	**33,930**	**11,257**	**11,950**	**17,986**	**6,172**	**3**	**15**	**2,659**	**67**	**48**	**2,119**	**35,466**	**51,112**	**11,794**
Local	31,948	8,958	1,901	1,813	4,144	1,155	0	1	324	6	10	331	8,118	25,404	3,731
Cross-border	71,975	24,972	9,356	10,136	13,842	5,018	2	14	2,335	62	38	1,788	27,347	25,708	8,063
Non-financial institutions	**21,240**	**5,052**	**3,609**	**3,150**	**3,166**	**1,829**	**9**	**1**	**459**	**18**	**34**	**142**	**12,016**	**7,311**	**3,444**
Local	3,393	1,491	241	714	730	167	1	1	142	14	22	17	1,702	3,650	1,566
Cross-border	17,847	3,560	3,369	2,436	2,436	1,662	9	0	317	3	12	125	10,314	3,662	1,878
Subtotal	**265,014**	**80,168**	**32,135**	**34,052**	**47,086**	**18,346**	**32**	**104**	**6,600**	**230**	**189**	**5,897**	**100,293**	**120,621**	**27,180**
Maturity of forwards and swaps, per cent[b]															
Seven days or less	72	77	76	77	77	78	32	10	78	21	23	78	77	72	77
Over seven days	28	23	24	23	23	21	65	80	19	77	76	22	22	28	23
Over one year	1	1	1	0	0	1	3	10	3	2	1	0	1	1	1
Currency swaps															
Reporting dealers	**2,157**	**416**	**129**	**743**	**738**	**160**	**11**	**4**	**2**	**0**	**1**	**134**	**1,112**	**773**	**97**
Local	543	219	17	28	112	77	0	0	2	0	0	8	703	489	80
Cross-border	1,614	196	112	714	626	83	11	4	0	0	1	127	409	285	17
Other financial institutions	**4,883**	**2,042**	**409**	**137**	**777**	**105**	**11**	**7**	**13**	**5**	**28**	**34**	**845**	**364**	**51**
Local	2,399	558	97	0	338	98	9	1	0	4	0	4	322	143	43
Cross-border	2,484	1,483	313	137	439	7	2	7	13	1	28	30	522	220	9
Non-financial institutions	**379**	**91**	**3**	**20**	**177**	**0**	**0**	**0**	**1**	**0**	**0**	**6**	**115**	**35**	**23**
Local	19	0	0	0	21	0	0	0	0	0	0	0	27	13	23
Cross-border	360	91	3	20	156	0	0	0	1	0	0	6	88	22	0
Subtotal	**7,419**	**2,548**	**541**	**899**	**1,692**	**265**	**22**	**11**	**16**	**5**	**29**	**174**	**2,072**	**1,172**	**172**
OTC options sold															
Reporting dealers	**6,269**	**3,316**	**743**	**481**	**1,140**	**31**	**510**	**354**	**116**	**160**	**406**	**88**	**1,812**	**1,347**	**1,043**
Local	1,995	1,617	318	110	369	7	233	184	37	49	207	38	724	542	421
Cross-border	4,274	1,699	425	371	771	24	277	170	79	111	199	50	1,088	805	622
Other financial institutions	**11,060**	**13,021**	**949**	**584**	**1,351**	**24**	**462**	**525**	**65**	**298**	**400**	**86**	**2,210**	**1,965**	**1,303**
Local	6,077	11,867	533	316	874	1	260	405	15	203	274	17	965	1,015	793
Cross-border	4,983	1,154	417	269	477	23	202	120	50	96	125	68	1,244	950	510
Non-financial institutions	**1,377**	**559**	**334**	**43**	**188**	**2**	**58**	**122**	**118**	**64**	**44**	**8**	**261**	**210**	**246**
Local	405	239	89	15	103	1	26	11	111	35	38	5	62	109	96
Cross-border	973	320	245	28	85	1	32	111	7	29	7	4	199	101	150
Subtotal	**18,706**	**16,896**	**2,026**	**1,109**	**2,680**	**57**	**1,029**	**1,001**	**298**	**522**	**850**	**182**	**4,283**	**3,522**	**2,592**
OTC options bought															
Reporting dealers	**7,576**	**2,613**	**494**	**530**	**1,421**	**31**	**564**	**487**	**155**	**209**	**345**	**84**	**2,061**	**1,393**	**1,229**
Local	2,151	719	133	121	349	9	234	163	62	89	173	39	750	490	463
Cross-border	5,426	1,894	361	410	1,072	23	330	324	93	121	171	45	1,311	904	765
Other financial institutions	**9,790**	**12,385**	**593**	**482**	**1,090**	**17**	**551**	**690**	**37**	**250**	**458**	**64**	**2,160**	**1,828**	**1,357**
Local	4,357	11,167	262	264	604	1	292	556	5	125	386	14	872	761	671
Cross-border	5,433	1,218	331	219	486	16	259	134	32	124	72	51	1,288	1,067	686
Non-financial institutions	**1,310**	**603**	**60**	**82**	**230**	**4**	**58**	**170**	**20**	**46**	**63**	**8**	**344**	**373**	**372**
Local	368	281	15	33	82	0	18	16	4	24	48	3	97	147	91
Cross-border	942	323	45	49	148	4	41	155	16	23	15	5	246	226	281
Subtotal	**18,676**	**15,601**	**1,148**	**1,095**	**2,741**	**53**	**1,173**	**1,347**	**211**	**505**	**866**	**156**	**4,565**	**3,595**	**2,957**
Total options	**37,382**	**32,497**	**3,174**	**2,204**	**5,420**	**109**	**2,202**	**2,348**	**508**	**1,028**	**1,716**	**338**	**8,848**	**7,117**	**5,549**
Total foreign currency turnover	**595,230**	**250,348**	**71,464**	**74,938**	**101,968**	**24,150**	**5,481**	**6,772**	**13,462**	**5,141**	**7,877**	**11,874**	**169,357**	**232,509**	**75,081**

(a) Adjusted for local double counting.
(b) Gross maturities data cannot be adjusted accurately for local double counting. Figures in this table are unadjusted, given as a percentage of gross outright forward and foreign exchange swap turnover.

						Euro against:						Yen against:			Residual	Total,
¥	SwFr	Can$	Aus$	Skr	Other	¥	SwFr	Can$	Aus$	Skr	Other	Aus$	NZ$	Other		all currencies
2,847	**491**	**297**	**445**	**34**	**382**	**13,137**	**8,014**	**855**	**765**	**2,877**	**8,962**	**1,983**	**185**	**2,213**	**2,598**	**292,817**
852	67	52	160	8	188	4,397	1,882	220	149	415	2,321	801	100	880	710	82,440
1,994	424	245	285	27	194	8,740	6,132	635	616	2,462	6,641	1,182	84	1,332	1,887	210,377
4,215	**741**	**414**	**462**	**108**	**629**	**23,778**	**8,765**	**730**	**813**	**2,335**	**7,896**	**2,372**	**262**	**5,656**	**2,861**	**344,070**
721	231	145	151	34	336	10,101	3,412	94	214	472	2,263	591	46	2,492	659	115,491
3,494	511	269	311	75	293	13,677	5,353	636	599	1,862	5,633	1,781	216	3,165	2,203	228,579
541	**66**	**41**	**74**	**18**	**88**	**4,580**	**2,166**	**130**	**121**	**340**	**919**	**404**	**40**	**1,455**	**165**	**59,627**
35	11	16	24	5	53	660	509	26	19	60	154	23	2	17	59	13,198
505	55	25	50	13	35	3,919	1,657	104	102	280	765	381	38	1,439	106	46,429
7,602	**1,298**	**752**	**981**	**161**	**1,099**	**41,495**	**18,946**	**1,715**	**1,698**	**5,552**	**17,777**	**4,758**	**487**	**9,324**	**5,624**	**696,514**
593	**52**	**207**	**96**	**9**	**136**	**993**	**1,083**	**155**	**369**	**314**	**1,451**	**178**	**14**	**516**	**945**	**63,470**
35	28	29	47	2	72	364	226	45	59	92	459	57	10	196	288	12,970
558	24	178	48	8	64	630	857	110	310	222	992	121	4	320	657	50,500
1,126	**325**	**265**	**402**	**143**	**515**	**2,878**	**1,878**	**1,172**	**526**	**876**	**3,256**	**374**	**54**	**889**	**1,073**	**124,339**
518	193	140	265	77	338	1,285	704	888	150	326	1,036	124	4	244	315	37,048
608	131	125	137	66	177	1,592	1,174	284	376	549	2,219	250	50	645	758	87,291
100	**50**	**90**	**79**	**25**	**146**	**214**	**273**	**60**	**117**	**160**	**717**	**46**	**3**	**81**	**111**	**40,314**
38	33	49	25	21	110	66	101	7	7	91	90	13	0	11	26	5,811
62	17	41	54	4	37	148	172	53	110	69	627	34	2	70	86	34,503
1,819	**427**	**562**	**577**	**177**	**798**	**4,085**	**3,235**	**1,387**	**1,011**	**1,350**	**5,423**	**598**	**71**	**1,486**	**2,129**	**228,122**
700	**108**	**28**	**137**	**7**	**69**	**1,838**	**3,500**	**243**	**497**	**777**	**2,553**	**210**	**70**	**437**	**202**	**399,340**
256	33	4	22	6	0	458	267	27	53	62	357	129	58	340	22	98,086
444	75	23	114	1	69	1,379	3,233	216	444	715	2,195	81	12	97	180	301,253
1,165	**236**	**96**	**716**	**154**	**342**	**3,850**	**2,517**	**551**	**855**	**1,063**	**3,869**	**1,315**	**716**	**2,181**	**565**	**308,691**
401	91	65	287	69	214	523	399	48	89	64	590	79	119	277	73	91,230
764	145	31	429	85	128	3,327	2,118	503	767	999	3,279	1,236	597	1,904	492	217,461
353	**106**	**150**	**161**	**65**	**280**	**677**	**721**	**134**	**449**	**511**	**1,546**	**145**	**27**	**230**	**315**	**67,350**
164	40	57	46	35	194	103	93	6	106	20	240	1	0	7	31	14,993
189	66	93	115	30	86	574	628	128	343	491	1,306	144	27	223	284	52,357
2,218	**450**	**274**	**1,014**	**226**	**691**	**6,364**	**6,738**	**928**	**1,802**	**2,351**	**7,968**	**1,670**	**813**	**2,848**	**1,082**	**775,381**
76	77	77	78	32	10	54	54	62	39	34	43	75	91	87	58	71
24	23	23	21	65	80	45	46	37	60	65	55	25	9	13	41	28
1	0	0	1	3	10	1	1	1	1	2	2	1	0	1	1	1
0	**0**	**0**	**0**	**0**	**36**	**34**	**30**	**0**	**15**	**1**	**119**	**1**	**0**	**0**	**2**	**6,716**
0	0	0	0	0	4	6	10	0	0	0	17	0	0	0	1	2,318
0	0	0	0	0	31	28	20	0	15	1	101	1	0	0	1	4,397
5	**2**	**0**	**1**	**0**	**14**	**138**	**194**	**0**	**41**	**17**	**283**	**61**	**0**	**3**	**30**	**10,500**
5	2	0	0	0	0	7	81	0	0	0	17	0	0	3	2	4,134
0	0	0	1	0	14	131	113	0	41	17	266	61	0	0	28	6,366
27	**0**	**0**	**0**	**0**	**15**	**2**	**33**	**0**	**2**	**0**	**31**	**0**	**0**	**0**	**0**	**961**
27	0	0	0	0	8	0	0	0	0	0	5	0	0	0	0	146
0	0	0	0	0	7	2	33	0	2	0	26	0	0	0	0	816
32	**2**	**0**	**1**	**0**	**65**	**174**	**258**	**0**	**58**	**18**	**433**	**63**	**0**	**3**	**33**	**18,177**
111	**74**	**27**	**34**	**13**	**83**	**514**	**988**	**57**	**108**	**273**	**1,244**	**154**	**11**	**167**	**470**	**22,144**
30	34	5	17	6	46	178	346	18	48	86	419	51	6	66	194	8,401
81	40	22	17	7	37	336	642	39	61	188	824	103	5	101	276	13,743
155	**88**	**50**	**66**	**11**	**166**	**1,283**	**1,603**	**111**	**94**	**346**	**2,535**	**194**	**22**	**288**	**456**	**41,771**
81	17	31	39	5	58	407	857	36	60	178	1,111	109	10	141	230	26,984
75	71	19	26	6	108	877	746	75	34	168	1,424	85	12	147	227	14,786
8	**14**	**13**	**22**	**1**	**29**	**241**	**494**	**13**	**21**	**39**	**595**	**30**	**0**	**37**	**69**	**5,258**
2	0	7	21	0	1	136	263	9	15	19	209	6	0	3	15	2,049
6	14	6	2	1	28	105	231	3	5	20	386	24	0	34	55	3,209
274	**176**	**90**	**122**	**24**	**277**	**2,038**	**3,085**	**181**	**223**	**658**	**4,374**	**378**	**33**	**492**	**996**	**69,172**
108	**73**	**30**	**57**	**30**	**103**	**531**	**1,534**	**49**	**119**	**303**	**1,541**	**147**	**15**	**150**	**505**	**24,486**
39	27	17	19	10	45	149	370	19	28	96	478	42	3	62	178	7,525
70	46	13	38	19	58	382	1,163	29	90	207	1,063	105	12	88	327	16,961
165	**89**	**34**	**41**	**26**	**142**	**786**	**1,091**	**133**	**120**	**319**	**1,310**	**197**	**13**	**311**	**474**	**37,004**
89	26	27	20	8	50	341	532	60	72	108	455	100	6	118	204	22,554
76	63	6	22	18	92	445	560	73	48	211	855	96	8	193	270	14,450
10	**29**	**4**	**5**	**1**	**22**	**135**	**337**	**9**	**10**	**66**	**207**	**25**	**4**	**48**	**83**	**4,737**
0	1	2	5	0	1	32	90	7	0	25	23	6	0	7	6	1,428
9	28	2	0	1	21	103	247	2	10	41	184	19	4	41	77	3,309
283	**191**	**68**	**104**	**57**	**268**	**1,451**	**2,962**	**190**	**248**	**688**	**3,058**	**368**	**33**	**509**	**1,062**	**66,227**
557	**367**	**157**	**226**	**81**	**545**	**3,490**	**6,047**	**371**	**471**	**1,347**	**7,432**	**746**	**66**	**1,001**	**2,057**	**135,399**
12,228	**2,544**	**1,745**	**2,799**	**645**	**3,197**	**55,608**	**35,223**	**4,400**	**5,040**	**10,617**	**39,034**	**7,835**	**1,437**	**14,662**	**10,925**	**1,853,594**

Table D Average daily OTC interest rate derivatives turnover[a]

US$ millions (rounded to the nearest million)

	£	US$	€	¥	SwFr	Can$	Aus$	Dkr	HK$	Skr	Other	Total
FRAs												
Reporting dealers	**39,548**	**52,535**	**125,219**	**630**	**1,758**	**754**	**1,349**	**220**	**0**	**4,342**	**6,402**	**232,756**
Local	15,066	13,299	36,035	87	736	230	77	36	0	546	1,889	68,001
Cross-border	24,481	39,236	89,184	543	1,021	524	1,272	184	0	3,797	4,513	164,755
Other financial institutions	**18,896**	**42,994**	**52,440**	**189**	**4,883**	**101**	**325**	**215**	**0**	**2,193**	**2,308**	**124,545**
Local	11,171	15,630	26,178	186	2,565	49	33	19	0	309	288	56,430
Cross-border	7,725	27,364	26,262	3	2,318	52	293	196	0	1,884	2,020	68,115
Non-financial institutions	**337**	**3,245**	**19,782**	**27**	**289**	**0**	**55**	**107**	**0**	**303**	**596**	**24,742**
Local	101	202	2,235	0	0	0	0	0	0	0	12	2,550
Cross-border	236	3,043	17,547	27	289	0	55	107	0	303	584	22,191
Subtotal	**58,781**	**98,774**	**197,441**	**845**	**6,930**	**856**	**1,729**	**542**	**0**	**6,838**	**9,306**	**382,042**
Swaps												
Reporting dealers	**92,627**	**33,191**	**160,009**	**73,723**	**1,306**	**3,482**	**2,797**	**117**	**125**	**1,149**	**8,865**	**377,393**
Local	34,759	7,521	39,790	2,897	287	720	520	18	31	223	1,950	88,716
Cross-border	57,868	25,670	120,219	70,826	1,019	2,762	2,277	99	95	926	6,916	288,677
Other financial institutions	**34,671**	**27,933**	**190,414**	**5,173**	**3,186**	**958**	**1,059**	**39**	**187**	**691**	**4,076**	**268,387**
Local	23,468	15,152	103,920	3,261	1,342	424	470	0	111	242	1,480	149,871
Cross-border	11,203	12,781	86,494	1,912	1,844	534	589	39	75	450	2,596	118,516
Non-financial institutions	**26,717**	**5,727**	**54,579**	**2,671**	**156**	**267**	**556**	**1**	**29**	**213**	**1,936**	**92,851**
Local	8,361	361	21,949	769	85	40	145	0	0	94	159	31,961
Cross-border	18,356	5,366	32,631	1,903	71	227	411	1	29	118	1,777	60,890
Subtotal	**154,015**	**66,851**	**405,002**	**81,567**	**4,649**	**4,708**	**4,412**	**156**	**341**	**2,053**	**14,877**	**738,631**
OTC options sold												
Reporting dealers	**7,631**	**5,227**	**20,809**	**973**	**36**	**0**	**187**	**0**	**33**	**154**	**1,309**	**36,359**
Local	1,287	1,438	3,154	34	10	0	0	0	0	18	108	6,050
Cross-border	6,344	3,789	17,655	940	26	0	187	0	33	136	1,201	30,309
Other financial institutions	**4,662**	**5,123**	**15,272**	**454**	**101**	**16**	**49**	**0**	**2**	**76**	**464**	**26,220**
Local	2,542	2,886	3,530	41	28	0	47	0	0	0	29	9,102
Cross-border	2,121	2,237	11,743	413	73	16	2	0	2	76	436	17,118
Non-financial institutions	**1,282**	**829**	**2,563**	**122**	**0**	**0**	**92**	**0**	**87**	**92**	**310**	**5,377**
Local	199	5	50	5	0	0	0	0	0	0	13	271
Cross-border	1,084	824	2,513	117	0	0	92	0	87	92	298	5,106
Subtotal	**13,576**	**11,179**	**38,645**	**1,549**	**137**	**16**	**328**	**0**	**122**	**321**	**2,083**	**67,956**
OTC options bought												
Reporting dealers	**3,134**	**3,599**	**12,823**	**948**	**89**	**0**	**49**	**1**	**36**	**34**	**400**	**21,113**
Local	838	590	2,503	49	7	0	0	0	0	7	35	4,029
Cross-border	2,297	3,009	10,320	899	82	0	49	1	36	27	364	17,084
Other financial institutions	**3,821**	**4,389**	**11,390**	**684**	**8**	**0**	**47**	**0**	**1**	**0**	**302**	**20,640**
Local	2,829	2,923	3,546	86	5	0	47	0	0	0	202	9,638
Cross-border	992	1,466	7,843	598	3	0	0	0	1	0	100	11,002
Non-financial institutions	**921**	**715**	**2,210**	**155**	**0**	**0**	**57**	**0**	**0**	**114**	**50**	**4,221**
Local	180	14	56	9	0	0	0	0	0	0	0	258
Cross-border	741	701	2,155	146	0	0	57	0	0	114	50	3,962
Subtotal	**7,876**	**8,703**	**26,423**	**1,787**	**97**	**0**	**152**	**1**	**37**	**148**	**751**	**45,974**
Total options	**21,451**	**19,881**	**65,068**	**3,336**	**234**	**16**	**480**	**1**	**159**	**469**	**2,834**	**113,930**
Total OTC interest rate derivatives	**234,247**	**185,506**	**667,511**	**85,749**	**11,812**	**5,579**	**6,621**	**700**	**500**	**9,360**	**27,017**	**1,234,603**

(a) Adjusted for local double counting.

Table E Average daily foreign exchange turnover by execution method[a][b]

US$ millions (rounded to the nearest million)

			Electronic trading systems				
	Interdealer direct	Customer direct	Electronic broking system	Multi-bank dealing systems	Single-bank proprietary platforms	Voice broker	Total
Execution method							
Spot — total	**93,396**	**141,193**	**236,014**	**93,192**	**87,435**	**45,285**	**696,514**
of which: with reporting dealers	89,033	0	103,152	39,379	32,903	28,350	292,817
– local	25,291	0	32,973	7,654	5,156	11,367	82,440
– cross-border	63,742	0	70,179	31,726	27,748	16,984	210,377
Outright forwards — total	**25,095**	**79,804**	**14,992**	**34,487**	**63,043**	**10,702**	**228,122**
of which: with reporting dealers	19,491	0	10,864	4,949	22,060	6,105	63,470
– local	5,971	0	2,491	962	1,644	1,902	12,970
– cross-border	13,520	0	8,373	3,987	20,416	4,204	50,500
FX swaps — total	**168,706**	**176,648**	**134,381**	**50,274**	**45,303**	**200,070**	**775,381**
of which: with reporting dealers	162,380	0	82,293	13,738	12,336	128,592	399,340
– local	44,813	0	15,573	4,645	4,428	28,627	98,086
– cross-border	117,567	0	66,720	9,093	7,908	99,966	301,253
FX options — total	**29,892**	**75,513**	**7,731**	**1,157**	**1,474**	**19,631**	**135,399**
of which: with reporting dealers	29,612	0	3,943	739	406	11,930	46,630
– local	11,892	0	1,151	329	15	2,538	15,926
– cross-border	17,720	0	2,791	410	391	9,392	30,704
Total	**317,090**	**473,158**	**393,118**	**179,110**	**197,254**	**275,687**	**1,835,417**

(a) Adjusted for local double counting.
(b) Does not include currency swaps.

Global finance after the crisis

By Alan M Taylor, Professor of Economics, University of California, Davis, Senior Advisor, Morgan Stanley and Houblon-Norman/George Fellow, Bank of England 2009/10.

This paper presents the text of the annual John Flemming Memorial Lecture, given at the Bank of England on 12 October 2010.[1]

This lecture will address the topic of global finance after the crisis. There are numerous ways to think about that subject, but I want to suggest that we think about it not from a current, short-run perspective but from a very long-run historical perspective. Although much has been written on the events of the last few years in isolation, now, and especially as the dust begins to settle, I will argue instead that lessons from history are important as we take stock after the crisis. In particular, I want to use this perspective as we reassess two key areas in the field of economics: policymaking and economic research.

The role of comparative economic history

It is now more than three years since the world economy encountered financial turbulence of a kind not seen for a generation or two. It is more than two years since we entered the most extreme phase of the global crisis, when banks failed, markets crashed, and policymakers struggled to prevent an utter macroeconomic and financial meltdown.

From a short-run perspective, the crisis has been a tumultuous period of actions and reactions. It has been an alphabet soup of government programmes, and it has been the worst depression since the 1930s, a massive waste of economic resources, one that still isn't completely over. In this short view there is plenty to digest and there is vigorous debate among scholars and policymakers about what went wrong. But as an economist and especially as an economic historian, I am acutely aware that the full ramifications of these events may not be apparent for several more years. And I fear that if we only view the world through such a limited perspective it may obscure some of the deeper forces at work, leaving us unable to see the wood for the trees.

Instead, I think we also need to employ an approach that is central to my own research, an approach that is both empirical and historical, placing the crisis in a wider context as one part of a much broader sweep of events. That is the essence of comparative economic history. And if ever comparative economic history had a time when it could and should speak to issues of global importance, then that moment is surely now. Inevitably, this approach is going to take us on a much longer and more circuitous journey, on a route that traverses more than a century of the history of the global macroeconomy. It will force us to think back to the first era of globalisation in the late 19th century, and reflect on the lessons of the turbulent inter-war years of deglobalisation, culminating in the Great Depression. It involves some detours through the long post-war era of the Bretton Woods regime and its collapse, and the more recent wave of reglobalisation, which brings us up to the present day.

Now you might ask: why should we care about this economic history? I think the key criterion is: is history useful in understanding the present?

I think the answer is yes. To quote a great comparative analyst of political economy questions: 'When the past no longer illuminates the future, the spirit walks in darkness'. I share de Tocqueville's optimistic view. I think that if we view this historical record, and probe it in a variety of ways, with both the quantitative tools of economics and the narrative and institutional insights of history and political science, then we can learn some valuable lessons about how and why we arrived in our present state of affairs.

But I think we can understand that one has to temper such optimism with the realisation that drawing lessons from the past is an exercise rife with pitfalls, since we are not in a real laboratory, but in a historical laboratory, where the experiments are not so clean and controlled. Or to quote another great thinker, and historian, A J P Taylor: 'He was what I often think is a dangerous thing for a statesman to be — a student of history; and like most of those who study history, he learned from the mistakes of the past how to make new ones'.

(1) This lecture series was inaugurated in 2005 in memory of John Flemming, who worked at the Bank of England between 1980 and 1991. A short biography can be found in the box on page 367. Past lectures have been given by Professor Michael Artis, Dr Adam Posen and Professor Thomas Sargent. This article reports the views of the author and does not necessarily reflect the views of the Bank of England or Monetary Policy Committee members.

John Flemming

John Flemming worked at the Bank of England between 1980 and 1991, for much of that time as Chief Economist. Prior to that he was a Fellow in Economics at Nuffield College, Oxford, a position to which he was originally appointed in his early 20s. His association with the Bank began in 1975, when he took leave from Oxford for a year to work as a special adviser to the then Governor, Gordon Richardson. Commuting from Oxford, he took the opportunity the journey provided to write his influential book *Inflation*, a key theme of which was the importance of expectations in determining inflation.

John joined the Bank full-time in 1980 as Chief Economic Adviser, before becoming Chief Economist in 1984 and an Executive Director in 1988. He subsequently departed to become Chief Economist of the European Bank for Reconstruction and Development in 1991 before returning to Oxford as Warden of Wadham College in 1993. Among other activities, he served for many years as a member of the Royal Commission on Environmental Pollution, his contributions to which were cited when he was appointed CBE in 2001.

John was an economist of great standing whose advice and work was much appreciated by his peers. He is best captured, perhaps, by the quote by fellow economist John Helliwell, who said:

> 'If one could choose parts to assemble someone to epitomise the best of Oxford and British Universities in general, the result would match Flemming. He was brilliant without being brassy, incisive in thought, precise in speech, encyclopaedic in knowledge, interested in everything he heard and saw, and a lively companion for all those lucky enough to share a journey, a job or a dinner with him.'

Bearing that in mind, we should by all means enter the laboratory and examine the experiments, but we need to remember to keep our sceptical guard up. There are occupational hazards here. For example, we run into small-sample problems all the time. And we have to be very careful to locate key differences as well as similarities between different historical episodes and what we see today. This, of course, is where economics and history tread the line between art and science.

But once we understand both the possibilities and the limitations of this approach, I believe that we still have much to gain, in two key areas. We have a lot to learn about research in economics and the new priorities we need to reach a better understanding. And we have a lot to learn about economic policy making, and how to reckon with the choices and constraints that face us.

Challenges for economic research

For the first question, how do we reassess economic research priorities? Here are three thoughts that come to mind.

First, consider the macrofinance nexus, or what used to be called 'money and banking' in the olden days. It has been somewhat neglected in macro teaching and research. Money has often been ignored, or only included in a non-essential fashion, in the benchmark models of the last two decades; and the role of banks and credit has been non-existent in virtually all theories, with finance simply seen as a veil. These areas now need modernisation and a full reintegration back into macro thinking. For sure, there has been plenty of research into how banks and financial systems operate at a detached micro level. But it is the macro and systemic causes and consequences of financial structures that now clearly cry out for more study.

Second, it seems clear to me that new importance will be given to empirical macroeconomics. The old consensus was that one should proceed purely from introspection, perhaps guided by a few so-called stylised facts, and to assume that one could thus devise a sensible theory of how the macroeconomy worked, and how policy might be optimally conducted. The results have been mixed, as the previous point makes clear. The crisis and Great Recession have brought calls for rethinking our models, searching for new paradigms, or even abandoning hope altogether for economic theory. Some of this is overreaction. But what does seem likely is what my University of California colleague Barry Eichengreen has referred to as a shift from deductive to inductive approaches. Or put another way, an economics that really is more like the hard sciences, and where empirical evidence matters as much as *a priori* theory in guiding our understanding. Thus, we can hope to see a more evidence-based macroeconomics, which will place much stricter discipline on deficient theories before they get too far off the drawing board.

Third, in keeping with the first two points, I believe that these trends should raise the profile of economic history — and especially, I think, comparative economic history. One can already see this in the reaction to Carmen Reinhart and Ken Rogoff's bestselling book, *This time is different*. But other work is proceeding in this area too. One example would be the work by Robert Barro on extreme tail-events in equity markets.

It also includes my own work on credit crises, which I will mention in a moment. One common feature of all these studies is the recognition that for some economic problems we are dealing with what is called a 'rare event'. For example, recessions are pretty rare, once a decade; but crisis recessions are much rarer, every two decades on average; and globally synchronised crises even rarer still: there have been perhaps four or five in the last 120 years. So just to get a meaningful sample size containing more than a handful of such events, you need more data points: more countries (you need to be a comparativist) and more years of data (you need to develop the skills of an economic historian). These are not easy skills to acquire, but given the importance of the questions at hand after the crisis, I think macroeconomic history is a research area with high marginal product in the years ahead, and my hope is that professors and students will be attracted to it, and rewarded for it.

Challenges for economic policy making

Now consider the second question, how do we reassess economic policy making? Here too I think longer-run perspectives are vital.

One approach is to look *only* to the present and ask 'what went wrong'? Some may see in the recent crisis a black swan event, to use Nassim Taleb's term for certain kinds of extreme events in financial markets. But if our problems truly take the form of a black swan, then a historical laboratory is no use at all: we have one unique and unexpected data point. And it isn't even clear that studying this event is much use: if past and future crises are similarly swan-like, we can no more use the current laboratory to generalise than we can any past experience.

Thus, when the world is ruled by black swans, we risk only making new mistakes by drawing on the past; or, as Hegel so succinctly put it, 'we will learn from history that there is nothing to learn from history'. But in my opinion this is an unduly pessimistic and not very useful way to understand recent events and how they fit into a long-run record of financial instability over 200 years. Rather, I think there is much to be gained from using the past as a laboratory, for two reasons.

First, as we are now learning, crisis events have recurred numerous times — not with unique black swan features every time, but with many repetitive, familiar patterns to them, which are thus amenable to quantitative historical analysis. Second, even when there is some variation, history can still bring into sharp focus how the policy and institutional environment varies subtly between different episodes. These patterns — the commonalities and the contrast — can be put to empirical use. They can help us identify what policy changes could make these events more or less likely, or more or less costly.

Thus, when we do find empirical regularities running through history from the past through to the present we should consider what such signposts might mean. And hopefully, once we have understood the signs and have a better understanding of the surrounding terrain, we can at least be somewhat better placed to navigate the macroeconomic policy challenges going forward.

What economic history has taught us about global finance and crises

The preceding thoughts about the intellectual agenda ahead are somewhat general. But with these thoughts in mind, I would like to narrow the focus, and draw on recent historical research to address two sets of policy-related questions:

(i) How did we get here? (That is, how has the broad macro/finance environment evolved and changed risks?)
(ii) What can we do differently? (That is, how can policy changes provide a beneficial shelter from crises without undue costs?)

So let me now put macroeconomic history to work, and discuss new and ongoing research that I think can help shed light on these questions.

The past

Let me spend some time establishing what we actually know. What does the long-run evidence from the global macroeconomy show? Given the scope of this lecture, I will focus on two key aspects of the historical record: the history of global monetary regimes and the history of financial crises. And under each of these headings I want to locate a few key pieces of quantitative evidence that satisfy two criteria. First, would we consider it a robust and established fact? And second, do we think it has something of first-order importance to say about how the global macroeconomy has evolved, how we got to where we are today?

But first, we could ask, why are these the key areas of interest? The reason is that policy choices surrounding financial liberalisation and exchange rates, and their relationship to the causes and effects of economic crises, are as important and controversial as ever; and are front and centre in public discourse now in many countries. For example, we can think of the heated debates on global imbalances, reserve accumulation, United States-China tensions, capital controls, currency intervention and currency wars. And we know that many of those forces are accused of playing a role in the last crisis, and perhaps in the next one.

But there is one more important thing to recall: which is that these are not in any way *new* debates; they are very, very old debates, as old as the global macroeconomy, and as we shall see the same tensions have existed for a century or more. The persistence of these issues gives us a strong motivation to draw lessons from what has been a unique historical laboratory with many important experiments. I now want to discuss a few important conclusions that can be drawn from recent research in this area with regard to two overarching issues of particular contemporary relevance: the constraints of the trilemma and the problem of financial crises.

The history of the trilemma

The first thing I want to talk about is the trilemma, a useful analytical framework for how to think about policy trade-offs. What is it? It is a bedrock, axiomatic principle in international macroeconomics. It says a government can't pick all three of the following list of potentially desirable policies.

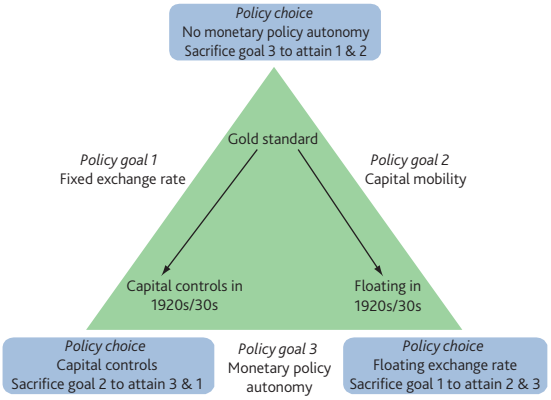
(i) A fixed exchange rate.
(ii) Internationally mobile capital.
(iii) Monetary policy independence.

For example, a credible exchange rate peg (item i) means that you will not devalue and in that case interest arbitrage (item ii) locks your rate to the base country's rate, meaning a loss of monetary autonomy (sacrificing item iii). To break the tight link between the home and foreign interest rate (item iii) the authorities need to either stop arbitrage through capital controls (sacrificing item ii), or else allow the exchange rate to move by going from a peg to a float (sacrificing item i).

For clear-thinking policymakers, it is very well understood how these trade-offs operate in theory. But how hard do these constraints bind in practice? Sometimes it can be hard to see the implications of the trilemma if we zoom in for a high-frequency view, by looking at events on a daily, monthly, or even annual basis. Here history has an important role to play, because when we take a lower-frequency view a clearer picture emerges of what the trilemma means. To do that we need to pull back and zoom out to take in more historical timeframes that look back over the last century or more.

Figure 1 presents a stylised view of what we know about the trilemma before World War II. In the beginning, there was the gold standard, which a majority of countries eventually adopted during the period 1870 to 1913. As a solution to the trilemma this involved items i and ii: open pegs with no monetary policy autonomy. Then after World War I and the Great Depression, and some massive macroeconomic shocks, monetary policy experimentation began. Capital controls emerged in some countries; in others, floating exchange rates; both enabled countries to grasp the levers of monetary policy for the purposes of stabilising their economies, which under the circumstances they desperately needed to do.

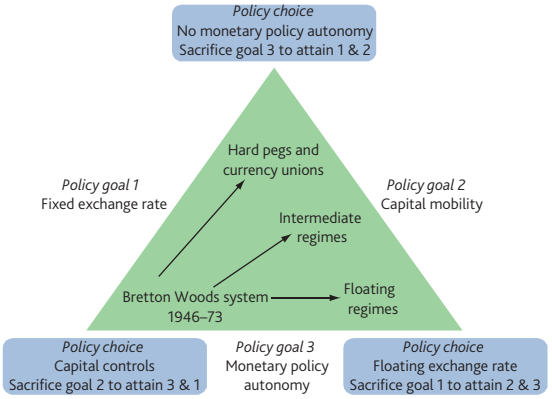
Figure 1 The evolution of monetary regimes and the trilemma before World War II



Source: Feenstra and Taylor (2011).

What happened next? **Figure 2** presents a stylised view of what happened to the trilemma after World War II. At this point there was a return to pegged currencies, but this was only a restoration of a kind of pseudo-gold standard, or rather, a dollar standard, but with very different rules. Now capital controls were applied everywhere, and the desire for monetary policy autonomy was a genie out of the bottle.

Figure 2 The evolution of monetary regimes and the trilemma after World War II

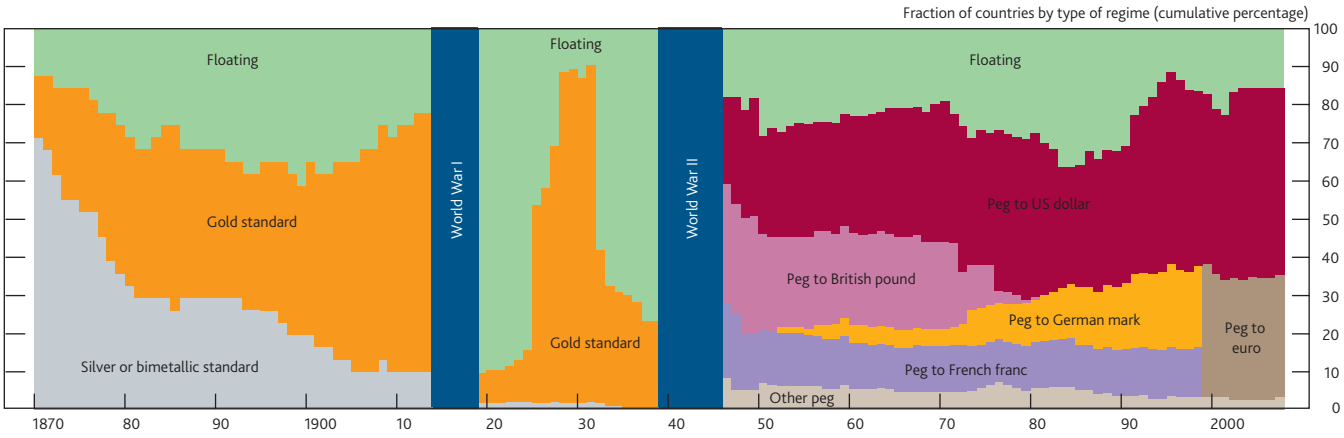


Source: Feenstra and Taylor (2011).

But then in the 1970s, tensions arose which broke the Bretton Woods system, including asymmetric shocks (calling for adjustable pegs), the leakiness of capital controls among the major currencies (bringing the threat of speculative attacks when a peg might move), and the inflationary trend of the United States (exporting inflation to the rest of the world).

We then saw another great wave of policy experimentation. Many developed market countries shifted toward exchange rate flexibility, although not within the eventual euro zone, where preferences for fixed rates were strong. Elsewhere, in

Chart 1 The evolution of exchange rate regimes



Source: Feenstra and Taylor (2011), based on Meissner and Oomes (2009).

the emerging markets, a region of growing macro weight, there was more sentiment for both soft (intermediate) or hard pegs, and a 'fear of floating' mentality held sway.

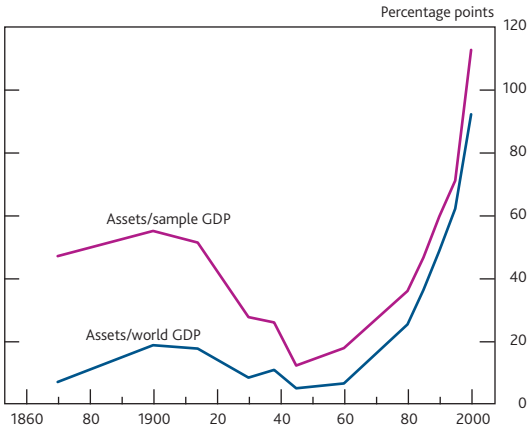
The evidence in **Chart 1** backs up this account and shows the evolution of exchange rate regimes over time. The rise and fall of the gold standard is clear enough, as is the creation of the post-war dollar standard. But for all the talk of a 'collapse of Bretton Woods' the 1970s did not bring about a wholesale switch to floating rates. Even today the vast majority of countries are maintaining fixed not floating-rate regimes. The gold standard may be a long-abandoned 'barbarous relic' but the old-time religion is hard to cast off, and we still find a large number of policymakers worshipping at the fixed-currency altar.

We can also see from **Chart 2** how the story is consistent with the record of ebb and flow in capital movement between countries. And if we had time to go into the detailed narrative and legal histories, we could see it in the record of policy restrictions and capital flows too. An era of high mobility and high flows in finance came to an end in 1913; financial integration then became more and more limited in the 1920s and 1930s, reaching near-shutdown around the time of World War II. Subsequently, finance recovered only slowly under the Bretton Woods design, until a rapid expansion was unleashed when the constraints on capital mobility were dismantled starting in the late 1970s.

This has been only a very brief tour of the most significant trends in global macroeconomics and finance of the last century. But there are a few key lessons here and they can help us understand some aspects of the great and growing tensions in today's global economy.

In particular, history teaches us that the trilemma bites. As we have seen, countries that are financially open, and have elastic capital flows, can end up being faced with a choice: monetary policy autonomy or fixed rates. They can't have all their desires and so they end up fighting the trilemma. Thus we can understand how, when the Brazilian finance minister recently

Chart 2 International financial assets



Source: Obstfeld and Taylor (2004).

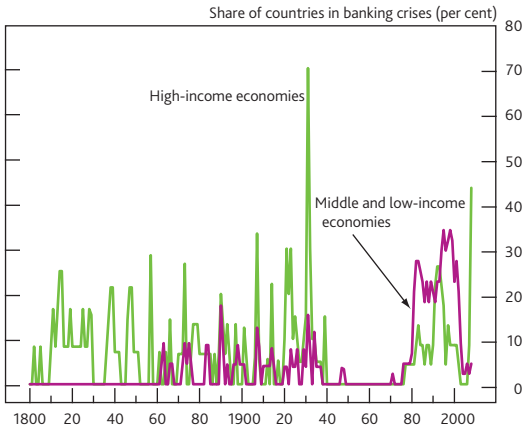
spoke of a 'currency war' and protested the money flowing into his country, the appreciation pressure, and the constraints that this puts on Brazilian macro policies, this was what he was really talking about.

But these challenges are nothing new. We have merely gone back to a financially globalised world with the resumption of large-scale capital flows and a level of financial integration not seen in more than 100 years and beyond. And we have paired that with a world that is trying to juggle fixed and floating currencies, but where the fixed-rate bloc is large and growing in scale. But in addition to these renewed trends, we have also gone back to the future in another way: we have found ourselves in a world of financial instability.

The history of financial crises

Thus, to round out this discussion of what we have learned from macroeconomic history I want to focus on the topic of banking crises, which is an extremely important issue in light of recent events. What do we know about these crises, what does the record show and what have we learned about their causes, and their consequences? **Chart 3** shows what we know about the frequency of banking crises over the last 140 years, and the picture is quite illuminating.

Chart 3 Frequency of banking crises



Source: Qian, Reinhart and Rogoff (2010).

Several features of the data stand out and deserve interpretation. First, it is clear that the post-war period of financial repression (including capital controls but also strict regulation of domestic finance) was a remarkable era in combining rapid economic growth and high investment with a crisis-free but strictly regulated and supervised financial system in most countries. This is a remarkable historical fact that warrants further study. It isn't obvious at all that countries paid a price for harsh financial regulation in that period, and this perspective is relevant as new financial regulations are devised going forwards.

Second, in the 19th century, the emerging markets (low/middle income) generally avoided banking crises as compared to developed markets (high income). But this was not a sign of virtue, rather it was a sign of how small and underdeveloped their financial systems were that they could not, in general, muster enough destructive force to create a banking crisis worthy of the name.

Third, in the last 40 years, crises have been an 'equal opportunity menace', to quote Reinhart and Rogoff, and the similar frequencies in the developed and emerging groups undermine the view that somehow developed markets are different from emerging markets in this respect. They are not, and have proven to be remarkably financially fragile over a century or more, with the exception of one brief 20-year period. So while developed markets may seem to have conquered the problems of inflation and sovereign debt crisis (although sceptics might be worried about how long this can last), it seems clear that we still have much to learn about how to conquer banking and financial sector fragility.

We can use history to gauge not only how often crises happen, but also how costly they are and what other consequences they tend to have. **Chart 4** shows the changes in some key macroeconomic variables in the aftermath of a recession (comparing the four years after the business-cycle peak with the previous four years), breaking this comparison down into several groups: both pre-war and post-war recessions, and also normal recessions versus crisis recessions (the latter associated with a financial crisis in the country) and global financial crises (when several countries simultaneously suffer a crisis, as in 1891, 1907, 1921 and 1929; the 2008 crisis is ignored since the data are incomplete as yet).

Chart 4 Changes in macroeconomic variables following recessions[a]

Chart 4a

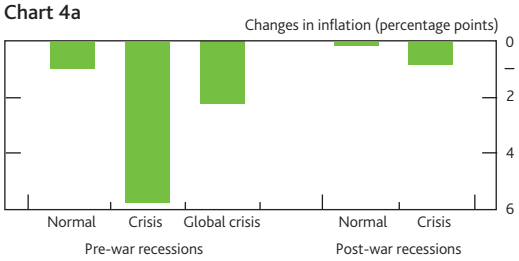


Chart 4b

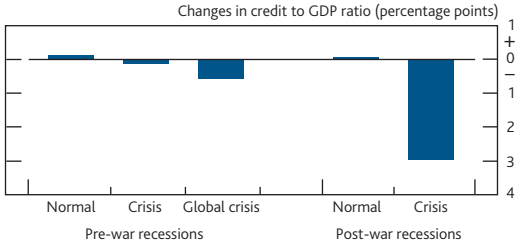
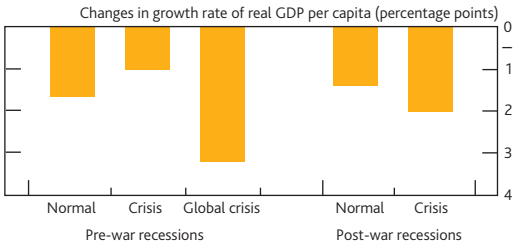


Chart 4c



Source: Jordà, Schularick and Taylor (2010).

(a) Four-year windows before/after recession peak.

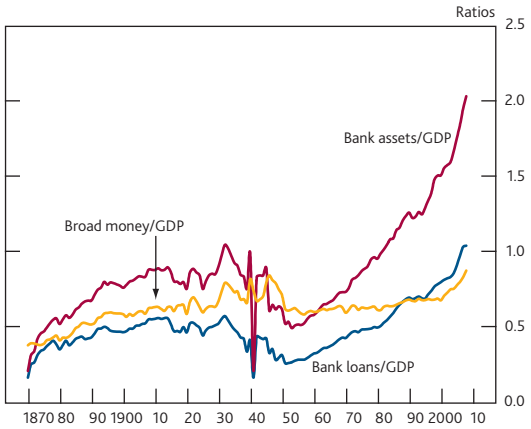
To make these comparisons I can draw on some of my recent collaborative work with Moritz Schularick to build a new massive data set on crises, credit and economic growth covering fourteen advanced countries from 1870 to the present. For brevity here I want to look at just three time series to gain some fundamental insight into what has or has not changed during crisis events. The three variables are inflation (annual rate), credit (change in banks loans as a share of GDP) and growth (of real GDP per capita), based on our results in joint work with Òscar Jordà.

Chart 4a shows a major change for the good in the response to crises, and indeed recessions of all kinds. Up to the Great Depression, adherence to gold standard orthodoxy and 'sound money' dogmas at central banks resulted in strong deflationary pressures during recessions, and especially so during crisis recessions. But central banks seem to have learned their lesson. Since the 1930s policy responses in an era of fiat money have generally been much more accommodative with the goal of preventing a repeat of the

same disinflationary, or outright deflationary, spirals. Judged by the evidence, these shifts in the conduct of monetary policy appear to have been successful in this regard. And although the data are not in from the post-2008 era, we can see that through quantitative easing and other measures central banks are again working hard to keep this record intact, and so ensure that Fisherian debt deflation is known only as a historical curiosity (one contrary case might be the euro-zone peripherals, but by not having central banks of their own, these are exceptions that prove the rule).

Chart 4b reveals a change for the worse, however, when we look at the reaction of credit to GDP ratios. While these ratios did fall in pre-war recessions, the drops are much, much larger in post-war recessions — and especially in crises. Thus, the damaging effects of debt deflation may have been mitigated, but the magnitude of credit crunches has if anything been exacerbated. There are multiple plausible explanations for this development, although at one level the explanation is simple — size and leverage. In today's major economies, the financial sector is very large relative to GDP, and within that sector, debts have grown astronomically relative to measures like broad money (**Chart 5**). Thus, whenever a crisis strikes today, the percentage decline in bank lending may not be that different, but the impact on the real economy is likely to be that much greater simply because we live in a more financialised world.

Chart 5 Money and credit aggregates relative to GDP[a]



Source: Schularick and Taylor (2009).

(a) Fourteen-country averages by year.

After these two patterns are digested, the bottom line for growth in **Chart 4c** comes as not so much of a surprise. In a world of ever-larger debts with greater and greater leverage, the potential for a real economic downturn due to credit market failure is greater. Even if central banks have taken away some of that downside — through liquidity support, quantitative/credit easing, lender of last resort and 'too big to fail' policies, and so on — these new policies may offer at best only a partial risk offset in the face of any problems emanating from an expanding financial sector, as we have recently seen. And so it would seem to be: measured by economic growth, crisis recessions are no less costly (in terms of lost growth) now than they were in the distant pre-war era. This is not to say simplistically that central banks help 'Wall Street' more than 'Main Street'. Rather, it seems that policymakers now have to run faster just to stand still, as the downside risks from financial crises have multiplied over time — although one could argue that some of those very problems are, by dint of the backstops offered, of the policymakers' own creation.

The broader lesson here is that the macrofinancial policy game between, roughly speaking, the central bank and the banking sector has over the last 100 years changed in many fundamental ways. The ability of the economy to originate and withstand real shocks, all else equal, may not have changed all that much; but with a much, much larger financial system in place (relative to GDP) the stakes in the game have grown much larger. If the financial system is a source of shocks, due to bad incentives, or imperfect information, or co-ordination failures, or whatever, then in a more financialised system, these shocks will have greater destructive power. But the same can also be said of a world in which shocks originate elsewhere but are magnified by the financial system's 'accelerator' mechanism.

The other lesson, from another strand of research, including my own work, is that all is not lost here. There is an accumulation of ample evidence, especially after the recent turn of events has provided empirical researchers with another set of unfortunate data points, that credit booms are causal for crises. In my work with Schularick on developed markets, this proposition emerges robustly from 140 years of data for fourteen countries; it has been seen time and again in other contexts using shorter panels from recent times including both emerging and developed markets, notably in the work of the researchers at the Bank for International Settlements. So while the bad news is that a larger financial system may pose a greater danger, the good news is that we now have at our disposal the signals that might tell us when we need policy to take more care, through macroprudential policies or otherwise, to take preventive steps to lean against the wind before a crisis occurs. Thus, in addition to asking rate-setting monetary policy makers to remove the punchbowl at last orders, we can also perhaps rely on credit-braking macroprudential policy makers to also pre-emptively water down the punch itself.

Put another way, the time is ripe for central banks to discover, or rather rediscover, their 'missing mandate' — at their inception, when not acting as fiscal agents of the state (*plus ça change*) the other main task of the central banks was to ensure financial stability by watching over fragile systems and standing ready to provide help in an emergency. But in recent years, this responsibility drifted away from many central banks' purview, often through a combination of regulatory

mission creep and/or benign neglect. The so-called 'Great Moderation' was built on rather weak foundations.

Now, however, the realisation has dawned that perhaps only the central bank itself, with its unlimited resources and (somewhat) intact political independence, can and should be entrusted with this vital role. Other mandates, such as the stability of inflation or output (however weighted in the loss function), are nice things to have, but they are of course completely unattainable in an economy whose financial system is prone to periodic implosion. Financial stability is not a sufficient condition for a sound macroeconomic policy regime, but it is a necessary one.

From the past to the present

That has been a bit of a whirlwind tour, covering a century or more of global macroeconomic history in only the briefest of surveys. It is interesting in its own right, but I think it also helps us understand how we got here and how different economic policy regimes have functioned. So in the time that's left, I would like to draw on the lessons in the past, and focus on present challenges and future choices.

In looking at the present, where we are now, I want to keep in mind our two main themes, monetary regimes and crises. But I also want to focus on how they relate to what I think is the fundamental asymmetry of our own times. And that is the asymmetry between developed market (DM) and emerging market (EM) macroeconomic risk.

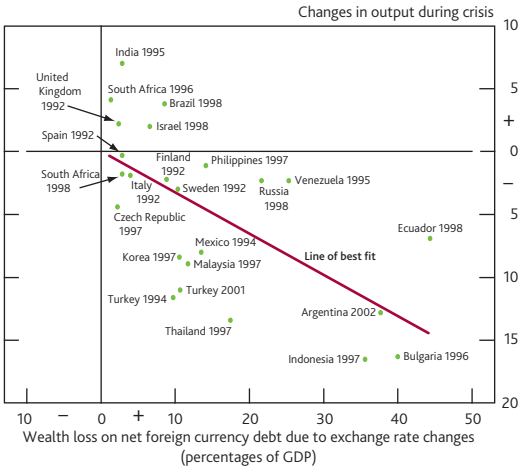
A little ancient wisdom from Asia may allow us to meditate on the question. So let me briefly discuss the *Guanzi*, a remarkable first-century BC Chinese text named after Guan Zhong, Prime Minister to Duke Huan of Qi. (I realise the temptation is to roll one's eyes when an economic historian reaches for some distant analogy like this, but bear with me, it isn't far fetched: believe it or not, the *Guanzi* was actually mentioned on Bloomberg last week.)

The *Guanzi* is all over the map, but is in some ways the earliest economics textbook we have, and those chapters are very focused on one thing: uncertainty and how to cope with it. For example, the text clearly warns that the government should keep abundant reserves of grain for hard times, and that this reserve needs to be very large indeed, maybe a year's output.

What I find even more interesting is that many critical readers and interpreters have taken away one main message from those chapters: namely, that this is a principally mercantilist document. But I don't think that's the only way to read it, and that should inform how we think about the emerging market reserves today.

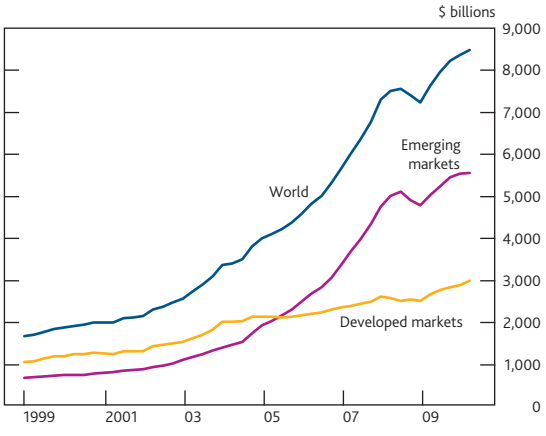
Emerging markets live in a very fragile world of 'fear of floating' and 'original sin': an inability to borrow in their own currency, leaving them open to contractionary devaluations and currency mismatch (**Chart 6**). And also 'sudden stops': the potential disappearance of capital market access, creating rollover/default risk. And also 'capital flight': the risk that local currency deposits attempt to escape at par in times of stress, leading to a devastating internal/external drain. These problems lay at the heart of the 1997 Asian crisis and other emerging market crises in times past. The lesson since 1997 has been clear for emerging markets: accumulate hard-currency reserves as a precaution to avert the sudden stop and also to hedge away the aggregate currency mismatch. And this policy has been extremely successful so far (**Chart 7**). The worst global recession in 80 years passed by the emerging markets, where there was hardly a downturn in real growth and no outbreaks of crisis dynamics. Once left to rely on the kindness of strangers (or the International Monetary Fund (IMF)) in cases like the 1997 crisis, emerging markets now find themselves with enough self-insurance to ride out unprecedented external shocks.

Chart 6 Output losses and wealth losses during contractionary devaluations



Source: Feenstra and Taylor (2011), based on Roubini *et al* (2004).

Chart 7 Foreign exchange reserves



Source: IMF *International Financial Statistics*.

This led EMs to the accumulation of a reserve buffer, both to protect against a run on currency or on bank deposits but also to cushion funding shocks. It was, in its own way, a form of '*Guanzi* economics for the 21st century'.

Now (as with *Guanzi*) other interpreters could have said all of that in a different way, using a mercantilist frame of reference: saying that pegged were the same as 'manipulated' exchange rates, that pegs were driven by large reserve accumulations, and they were used to sustain export promotion. But I don't think that's the only explanation, or even the right one.

Instead, with some historical perspective, we can see some real economic forces and underlying policy regime choices arising from the trilemma. The key lesson is that since 1990 there has been a major shift in global economic equilibrium. We have been adapting all these years to the inclusion of EM countries into the global economy, and their need for *integration with insurance*. That is, I think, what's really been behind the global imbalances.

An old macro joke says: we can't trade with other planets, so the international accounts have to balance. Thus, the financial flows wash up in DM economies. Or, as central bankers have a tendency to say, we have a 'savings glut' problem. Understanding this dynamic has posed challenges for economists and policymakers in the last two decades. There have been many unforeseen and certainly unintended consequences of this reconfiguration of the global economy.

Now for sure the lending flows from EM to DM had to go *somewhere*. And this is I think the big question. Where should all these savings have gone? Did they have to go to housing bubbles or overconsumption? That's just one example of malinvestment, but a big one. It really is a shocking outcome. Could we, could our supposedly advanced financial systems, our so-called efficient markets for allocating capital, really find no genuinely useful projects to invest these funds in? No projects with even a modest social rate of return to exceed the paltry real rate of return being required by patient and risk-averse managers of EM reserves? That we could not (and still can't?) is quite stunning.

The developed markets seemed to have forgotten the past: to think that, well, crises happen to 'them' not 'us'. And I think that complacency affected policymakers as well as financiers and citizens. Of course, EMs faced larger risks: they had pegs which entailed greater volatility and no ability to lean against such winds, and they had weaker institutional and regulatory frameworks. But by and large they have learned the lessons of the 1990s well and emerged in 2008–10 the stronger for it.

But DM leaders/economists/financiers thought they were immune. This was a complacent and ahistorical view, as we saw earlier. It ignored many of the deeper trends that are enduring tensions in the global economy. In the future we shall not make that mistake again, surely?

The next logical question to ask is: will this state of affairs persist? EM countries are at a very different point now than they were 30, 20 or even 10 years ago, but many of their fundamentals are the same. It is their relationship to the external world and how they are managing it that has changed.

The obvious conclusion is that these reserve accumulations are not going away. So that leads to the final major question I want to address tonight: where does that leave the world economy, and the DM?

Looking to the future

To conclude, I now want to move on to how we draw on the lessons of the past, not just to understand the events present, but to look forward and ask how a better, ie more stable, configuration of the global macroeconomy might be built. Let me group my concluding comments under two headings: the challenges facing the EMs, and those facing the DMs.

For the EMs, I think the key question is: will the process of reserve accumulation ever end, and what is the metric for deciding when you have 'enough' reserves? In 2008 these hoards dipped but now they are climbing again. To the extent they fed into the global imbalances they are, if not a cause, at least a necessary supporting force behind our last crisis. Will we now spend the next 10, 20 or 30 years having to cope with more such imbalances? I fear the answer is yes.

Why? First, reserves have been shown to work. They did insulate emerging economies from devastating shocks. Second, they enjoy even stronger political support, at least now their value is understood, and that understanding extends to popular political support (as the example of Chile's Andrés Velasco shows — possibly the first ever finance minster with countercyclical popularity ratings?). Third, there is as yet no credible alternative that doesn't involve major political risk: reserves mean never having to bow and scrape before the IMF, or some other global or regional body. You can control your own destiny and you will not end up signing your political life away as Indonesia's President Suharto did when he sat before the head of the IMF. An image of that photo is surely etched in the minds of all emerging market policy makers. The provision of additional flexible credit, with less onerous conditionality by the IMF could make a difference on the margin, but the sheer volume of insurance needed by EMs (and additional candidate EMs in the decades ahead) will dwarf the scale of any IMF facility. Self-insurance is here to stay, then, until countries somehow 'graduate' from EM status and no longer need such buffers. But that process remains distant and ill understood.

The other possible way in which the emerging world's reserve demands might abate is if they all switched from fixed to floating exchange rates. This might not remove all precautionary needs, but it could lead to some reduction in the need to hold reserves for the defence of a peg or to protect against broad money flight from the banking system. To believe this, however, one would have to think that the dangers of currency mismatch have been banished, leaving these countries no longer in a fear of floating positions. Recent data collected by Philip Lane and Jay Shambaugh say yes, currency mismatch has abated in aggregate. The last decade's reserve accumulation is part of that story on the asset side, along with, on the liability side, the voluntary choice and/or regulatory pressure convincing private sector agents to borrow less foreign currency.

But it is still important to note that in many countries this is only an aggregate story. They are not fully rid of currency mismatch at a micro level. Aggregate risks are now lower but the reserves are in the government sector, while many of the dollar liabilities are still in the private sector. So the hedging isn't on the same balance sheet as the foreign exchange exposure in many cases. For example, one thinks here of some Central and Eastern European or Baltic countries with heavy exposure to euro loans in the private sector but euro reserves on the government side. This configuration still poses a potential moral-hazard risk and thus a political risk going forward, and may still engender a fear of floating in emerging countries. Things may be much better in aggregate, but there is still a price to be paid for original sin.

And of course there remain plenty of other reasons for emerging countries to fix, such as the desire to gain a credible and transparent nominal anchor.

Thus, I expect continued fixing (or highly managed floating) to be an enduring feature of EM economies, and thus to see more reserve accumulation.

Turning now to the developed markets, the chief implication of this global financial architecture is obvious. The balance of payments has to balance, so where will these flows end up? If we are to avoid a repeat crisis, the excess official savings of the emerging world directed at us have to be put to better use. I think this means one of two things will happen. It means either putting a moderate brake on unproductive or bubble credit by DMs at home, or figuring out some mechanism to safely recycle EM official surpluses back as private flows to the EMs themselves. In all likelihood, we are going to get a little bit of both.

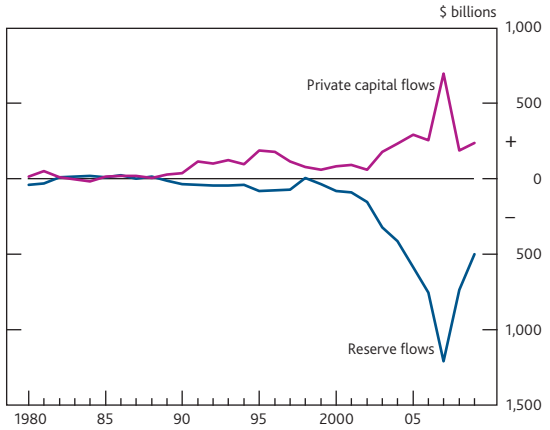
The brakes on credit and capital flows are already much discussed. As I have argued, the concept of a credit bubble was denied or forgotten for too long. And those bubbles are dangerous when they burst. I think going forward we may end up looking for some way to put sand in the wheels of credit growth (like taxes on credit growth as in Croatia, or countercyclical capital requirements as in Spain). We may also see sand thrown at the external imbalances themselves (in the style of the Chilean *encaje* or even the Goodhart-Tsomocos proposal to have intra-euro zone penalties). But we need to be careful to avoid crude controls which are distorting for long-term investment incentives: harsh capital or credit controls could be bad, as compared to milder allocation-neutral frictions on hot flows which are now much more palatable to the international community and less likely to precipitate political tensions, as the post-crisis IMF and G20 leanings have shown.

The other option is recycling of the flows back to the EM via an increase in private capital flows. And, no surprise, this is already happening. But the key concern is this: can the flows to EMs be undertaken this time without a bubble and crash, as in previous episodes of heavy EM investment, like the 1970s and the 1990s? One hope would be more foreign direct investment (FDI) and less portfolio flow, an outcome that would be encouraged by some selective capital controls. But EMs would also need to make themselves more attractive to FDI, making improvements in institutions and policies to support long-term investment. They may not graduate but they do need to move up a few grades, and some have done so (eg Chile is now rated higher than several so-called developed markets). But lack of such institutions is what makes the EMs EMs in the first place. So that tension ideally needs to be reduced and we are moving in the right direction in some countries, even if for many others the trends are less clear.

Private capital flows of late have been very large back to EMs and growing — just never enough yet to eclipse the official flows in the other direction. But we might be getting near to a reversal of that situation. Which allows me to try to end on a positive note, by looking for signs of a benign rebalancing. The data show that we can already start to see the forces building that can push us towards rebalancing (**Chart 8**). Private financial flows are going downhill in greater volume, and uphill official flows starting to be offset. A reversal was starting to happen in the 1990s, then got massively derailed by crises, then picked up again, and then got derailed again by the global financial crisis. The Lucas paradox of uphill flows is, however, somewhat misleading in that all the way through private capital has been going in the downhill direction. Now various factors are creating an extra 'push' on capital leaving the DMs (high saving after financial crisis and low expected growth) and other forces are simultaneously pulling capital into EMs (higher growth prospects and enhanced macro stability on the back of enlarged reserve stocks as proven in 2008–09).

But as we end I also need to sound a cautious note before we get too optimistic. The adjustment of the world to dynamic EMs pulling capital away from sluggish DMs will be a political

Chart 8 Private capital flows and reserve flows in emerging economies



Source: IMF *International Financial Statistics*.

as well as an economic challenge. Think of the doubts about Britain's foreign investments during the Edwardian era of malaise 100 years ago, or think of less than 20 years ago when Ross Perot made headlines with his 'giant sucking sound'. Or think of Brazilian Finance Minister Mantega's warning after his 'currency war' remark, when a few days later he said that the real thing to fear was a trade war. EMs are well positioned to decouple and pull us along, but whether they will be able to do so is a political as well as an economic question. The rebalancing poses major economic challenges (avoiding a new bubble in the EMs) but also political challenges (ensuring that the pain of adjusting to new trade and capital flows does not create a backlash).

So I do worry that even more interesting times are ahead, and I just hope that I am not giving a lecture with exactly the same title ten years from now.

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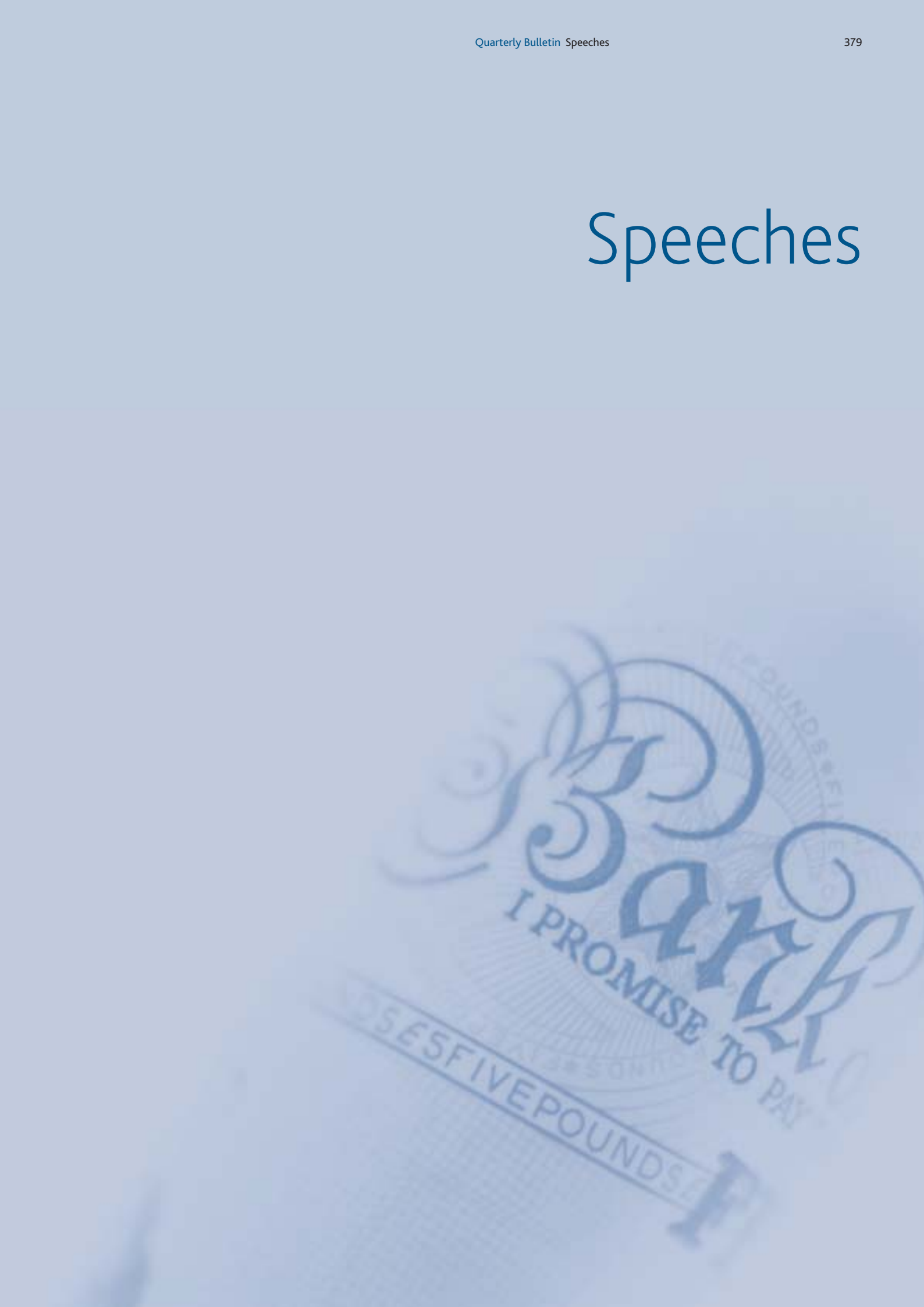

Bank of England speeches

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

2010: a progress report

Spencer Dale, Executive Director and Chief Economist, December 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech465.pdf

In this speech, Spencer Dale provided a progress report for 2010. The pace of recovery to date compared favourably with previous episodes, but economic recovery had to be judged in terms of the level of output. The recovery would be hampered by reduced public sector spending and the position of banks. But the highly accommodative stance of monetary policy and the level of sterling would support economic activity. Another development of 2010 was the announcement of the Bank's planned new responsibilities for macroprudential policy. This was likely to be a major advance in responding to the missing instrument problem. But it was not the solution to all problems associated with financial markets and the international monetary system. He concluded by explaining why, in the face of persistently high inflation, the MPC had not tightened policy. The MPC remained as hard-nosed as ever in their determination to hit the inflation target.

Getting back to business

Andrew Sentance, Monetary Policy Committee member, November 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech464.pdf

In this speech, Dr Andrew Sentance discussed the prospects for the private sector and business activity to sustain UK growth while public finances are rebalanced. He highlighted the strength of the rebound in UK and global activity in the first year of recovery. He also pointed to the resilience of various aspects of UK supply-side performance through the recession, with employment, company finances and business failures being sustained at more healthy levels than in previous downturns. However, inflation has persistently overshot the inflation target and is set to remain high through 2011 and possibly longer. This provides a strong case for a monetary tightening from the very low Bank Rate put in place last year when downside risks were much bigger. Delaying this adjustment risks undermining confidence in low inflation and larger future interest rate rises.

Curbing the credit cycle

Andrew Haldane, Executive Director for Financial Stability, November 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech463.pdf

In this speech, Andrew Haldane examined the causes and consequences of credit cycles, drawing implications for the design of macroprudential policy. Sketching a model of the credit cycle, Andrew demonstrated that a credit cycle arises from a collective action failure among banks. Using a long time series, Andrew showed that empirical evidence is consistent with this result, suggesting a case for state intervention to help co-ordinate lending expectations and actions by banks. Macroprudential policy may provide the answer by helping increase the long-term cost of credit extension to banks during booms and lower costs during busts, hence smoothing credit supply over the cycle. Key factors in the design of such a policy are the need for simplicity and clarity of objectives, particularly given the importance of the expectations channel. Added considerations include the international dimension and the need to police the regulatory boundary to prevent regulatory arbitrage.

Do we know what we need to know in order to lean against the wind?

Adam Posen, Monetary Policy Committee member, November 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech462.pdf

In this speech, Dr Posen challenged the validity of the assumption that monetary policy makers could correctly identify asset price bubbles in time to respond pre-emptively, or at least usefully. Only a relatively small fraction of real estate and equity price booms lead onto busts. Reacting to asset price movements pre-emptively on the basis of price movements alone is likely to cut off more booms that would do no harm than dangerous booms that would be desirably pre-empted, and so could damage productivity growth. It is also difficult for a central bank to credibly commit to pre-empt asset price bubbles as subjectively identifying costly booms in a timely fashion appears unrealistic, and even when achieved it may take time to put a needle through the bubble. Using an early warning indicator approach Dr Posen noted a lack of robust indicators of booms (or busts). This is likely to prove frustrating for policymakers hoping to get ahead of asset price movements. Additionally, there is little evidence that

excessive monetary ease is a precondition for, or cause of, asset price booms.

After the recession: thoughts on the growth potential of the United Kingdom

Martin Weale, Monetary Policy Committee member, November 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech461.pdf

In this speech, Martin Weale discussed the impact of the recent crisis on the level and future growth rate of potential output in the United Kingdom. He reviewed three factors that might affect UK supply capacity: increased cost of capital for companies; skills lost with increased unemployment; and a potential rebalancing of the UK economy away from public spending towards private sector manufacturing. Overall, the financial crisis may have resulted in a loss of output of 2½%–5% of GDP relative to what seemed to be sustainable before the crisis, although a successful rebalancing might offset some of that decline. While uncertain, these calculations implied there was spare capacity of the order of 4%–6½% of current GDP. However Dr Weale added that, with inflation more than 1 percentage point above target, the MPC should be wary of introducing additional monetary stimulus given the possible effect on inflation expectations.

Financial crisis and G20 financial regulatory reform: an overview

Paul Tucker, Deputy Governor, November 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech460.pdf

In this speech, Paul Tucker provided an overview of the contribution of the Financial Stability Board (FSB) to the G20 financial regulatory reform agenda. He highlighted five areas. On surveillance of the financial system, the FSB has been encouraging new machinery to survey and head off risks, as well as establishing its own vulnerabilities group. In the supervision of individual firms, the FSB has sponsored an exercise on effective supervision of Systemically Important Financial Institutions (SIFIs). It has examined the various styles of banking supervision around the world, producing an evaluation of what is needed to supervise SIFIs. On capital and liquidity, the Basel Committee has agreed tougher standards for the definition, deductions from and quantity of capital. Minimum standards will also be introduced for holding resiliently liquid assets and the funding of illiquid assets. And the Basel Committee will undertake a fundamental review of capital requirements for the trading book in 2011 to address the regulatory arbitrage that has existed between the 'banking book' and 'trading book'.

Central to the FSB work has been to address the 'too big to fail' issue. Reforms in this area aim to reintroduce market discipline back into the financial system and ensure that governments do not have to provide fiscal support if a large financial institution gets into trouble. The acid test will be whether, for every financial institution in the world, it could be resolved if it faced distress in a way that does not disrupt the flow of essential financial services and without state solvency support. This could include ideas being developed for putting losses in the largest firms not just onto shareholders but onto their unsecured, uninsured creditors. Beyond the changes to bank regulatory requirements, there has also been work, under the FSB umbrella, to reform capital markets. In particular, the use of central counterparties (CCPs) to clear over-the-counter derivatives and increased transparency around, and much reduced reliance on, credit rating agency ratings. On the latter, too many investors and banks have given up on reaching their own view on borrowers and on instruments, but have effectively subordinated their own judgement to that of the credit rating agencies. The FSB has sponsored and led work to reduce the extent to which credit rating agency ratings are embedded in the regulatory fabric of capital markets.

Institute of International Bankers Annual Breakfast Regulatory Dialogue, Washington DC

Paul Tucker, Deputy Governor, November 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech459.pdf

In this speech, Paul Tucker noted that a big contributor to the financial crisis was the failure of official regimes for regulating and overseeing the financial system to keep up with the evolution of global capital markets. As such, the international programme of regulatory reform is both formidable and transformational. He outlined three key areas of work in the international arena over the past twelve months and two areas for future work.

First, the new Basel Capital Accord, while not quite as rigorous in some respects as the Bank of England would have liked, significantly stiffens the prevailing regime and remedies a number of problems in earlier Accords. However, there is more work to be done on capital, with a fundamental review of the capital requirement for the trading book due in 2011. Similarly, the new Liquidity Accord requires further work, but will for the first time put requirements on holding resiliently liquid assets and funding of illiquid assets. Second, the G20 Financial Stability Board (FSB) has delivered a package of recommendations to address the problem of 'too big to fail'. Those include greater loss-absorbing capacity for the largest and most complex firms, and improved resolution regimes that are equipped with the necessary tools to resolve the large, complex cross-border banks. Third, the FSB work programme on the interconnectedness of global capital markets has

recommended the use of central counterparties in over-the-counter derivative markets. It has also led and sponsored further work on reducing the reliance on credit rating agency ratings.

Looking ahead, as regulation of the banking sector is reformed, it will be necessary to watch out for new forms of regulatory arbitrage. That could manifest itself in the 'shadow banking' sector, which will require having a capability to adapt the regulatory regime when threats to financial stability arise outside the regulatory perimeter. Finally, macroprudential regulation — taking a system-wide perspective to micro regulation — will mean equipping the authorities with a range of tools, including the ability to adjust the regulatory boundary, to increase resilience of the financial infrastructure and leaning against the credit cycle to make the system more resilient when it would otherwise threaten financial stability.

Developing an EU cross-border crisis management framework

Paul Tucker, Deputy Governor, November 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech458.pdf

In this speech, Paul Tucker put forward a number of propositions for developing an EU cross-border crisis management framework. First, it is essential that each Member State, and indeed all countries around the world, have a national US-style resolution regime for conventional commercial banks. That would allow the authorities to take a distressed medium-sized commercial bank and transfer the deposits to another viable bank, transfer or sell the good assets, and put the bad assets into receivership or run-off. Second, tools must be developed that enable the resolution of the largest, most complex financial institutions without the use of taxpayer solvency support and without severe disruption to the flow of essential financial services to the economy. Such tools could include the ability to run down a group from a bridge company and sell off the most attractive parts of the business, as is being pursued in the United States. Another is to be able to write down, or haircut, claims of unsecured, uninsured creditors and impose partial conversion from debt to equity in conditions of distress, in what would be a going concern if the underlying franchise was viable. Third, tools need to be developed to cope with the cross-border element of a financial firm failure within the European Union. Fourth, the largest banks in Europe are global, and so there needs to be arrangements for dealing with global resolution, not least by removing legal obstacles to global co-operation. And fifth, there needs to be improved planning by the regulatory and resolution authorities through the development of firm-specific recovery and resolution plans or 'living wills'.

Measuring recession and recovery: an economic perspective

Charles Bean, Deputy Governor, October 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech457.pdf

In a speech to a conference organised by the Royal Statistical Society, Deputy Governor Charles Bean discussed the role of statistics in the study and control of the business cycle. He described the particular challenges of forecasting downturns in the wake of financial or banking crises, which tend to be less predictable in nature than more conventional downturns. In particular, the complexity of the great financial crisis of 2008 meant that neither its precise evolution, nor the full extent of its impact on the real economy, could have been easily foreseen. Better statistics could not have helped in this task. He went on to note that a particular measurement challenge at the present juncture was the assessment of the degree of spare capacity in the economy, with different approaches to measuring space capacity leading to very different conclusions. He closed by noting the benefits of improved financial sector data for the delivery of the Bank's monetary and financial stability objectives.

Monetary ease and global rebalancing: debunking the Japanese scare story

Adam Posen, Monetary Policy Committee member, October 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech456.pdf

In this speech, Dr Posen discussed the management of global rebalancing and argued that major surplus countries should adjust their current accounts more than they have so far. In particular, Dr Posen argued that, because accommodative monetary policy does not cause asset price bubbles, emerging markets' fear of feeding an asset price bubble is not justification for keeping an exchange rate undervalued. The example of Japan in the 1980s works against that claim, rather than for it. Although monetary ease coincided with the late stages of the Japanese equity and real estate bubbles, those booms began more than two years ahead of interest rate cuts. Dr Posen noted that in 1980s Japan the cause of asset price increases lay in unrealistic expectations of participants regarding trend rates of productivity growth, contradicted by monetary policy. Slow and partial financial deregulation also supported overcapacity in the banking system, and regulatory rather than monetary factors directly encouraged the real estate boom. Moreover, Japanese asset prices have remained subdued since 1995, despite an expanding money supply, zero interest rates and declining prices. The implications are that emerging market asset booms could be better managed at present by a combination of exchange rate appreciation and monetary ease. Raising interest rates in response to the

bubbles (and leaving currencies undervalued) will only attract further capital inflows and exacerbate asset price booms.

Banking: from Bagehot to Basel, and back again

Mervyn King, Governor, October 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech455.pdf

In this speech, the Governor started by explaining how the size, concentration and riskiness of banks had grown markedly in recent decades. The fundamental fragility of banks reflects their use of short-term debt to fund long-term, risky illiquid investments. Therefore to treat banks as if they were riskless was akin to financial alchemy. To work, this requires the implicit support of the taxpayer, which incentivised banks to take on yet more risk.

The Governor then considered a number of proposals designed to offer a solution to this incentive problem. The first proposal was a permanent tax on the activity of maturity transformation. But, the Governor noted that given crises occurred infrequently, it would be almost impossible to calibrate the appropriate size of any levy. Second, the Governor felt that limits on leverage, which were embodied within the capital standards set by the Basel framework, had much to commend them — although, Basel III on its own was unlikely to prevent another crisis.

Other, more radical, reforms could include moving to capital requirements several orders of magnitude higher, ensuring large amounts of contingent capital in a bank's liability structure, introducing 'limited purpose banking' or having some form of functional separation. A key challenge with these more fundamental proposals was to ensure that maturity transformation did not simply migrate outside of the regulated perimeter and end up benefiting from an implicit public subsidy.

In concluding, the Governor stressed that he was not offering a blueprint for reform, which in the United Kingdom was the job of the Independent Commission on Banking. Going forward, the challenge was to think a way through to a better outcome before the next generation was damaged by a future and bigger crisis.

Speech by the Governor

Mervyn King, Governor, October 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech454.pdf

In this speech, the Governor started by outlining the challenge of rebalancing the world economy. All countries accepted that global rebalancing was necessary. But there was a clear difference between the path of adjustment desired by the surplus countries and the path of adjustment preferred by the deficit countries. It was just a matter of time, if no agreement could be found, before one or more countries resort to trade protectionism as the only domestic instrument to support a necessary rebalancing.

The Governor suggested two principles for the way ahead: first, focus discussion on the underlying disagreement about the right speed of adjustment to the pattern of spending; and, second, many potential policy measures should be put on the table — not just the single issue of exchange rates. What was needed was a 'grand bargain'. A natural forum in which to strike such a bargain was the G20.

Turning to domestic policy, the Governor noted that inflation had been high and volatile. The MPC was conscious that the continuing high level of inflation posed the risk that inflation expectations may move up. But, at the same time there was also a risk — at least as large — that once the temporary upward influences on inflation had dissipated, the influence of spare capacity in the economy would push inflation below the target.

The Governor ended by suggesting that the next decade would not be *nice* — non-inflationary consistently expansionary. History suggested that after a financial crisis the hangover lasted for a while. So the next decade was likely to be a *sober* decade — a decade of *s*avings, *o*rderly *b*udgets, and *e*quitable *r*ebalancing.

An unconventional journey: the Bank of England's Asset Purchase Programme

Paul Fisher, Executive Director for Markets, October 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech453.pdf

In March 2009 the Bank of England's Monetary Policy Committee embarked on an 'unconventional' journey. Having cut Bank Rate to a historic all-time low, the MPC initiated a programme of asset purchases financed by the issuance of central bank reserves — commonly known as quantitative easing. In this speech, Paul Fisher recounted why the MPC embarked on this journey and why, in his view, the policy proved extremely successful in meeting its immediate objectives. He also discussed some of the more technical reasons behind the design of the policy, including the motivation for buying assets from the non-bank private sector and the various operational considerations associated with the auction design. Paul also addressed the strategy for eventual exit, while acknowledging the possibility of further purchases in the meantime.

Sustaining the recovery

Andrew Sentance, Monetary Policy Committee member, October 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech452.pdf

In this speech, Dr Andrew Sentance discussed the challenge of creating the right conditions for a sound and sustained recovery. His speech started with a comparison of the current recovery with previous UK cycles, highlighting the resilience of employment. He also noted that the rebound in the global economy was helping to support the United Kingdom's recovery. Despite headwinds to growth from fiscal policy and the banking sector, a similar fiscal adjustment had not prevented private sector-led growth in the 1990s. And recent survey evidence suggested easing credit conditions for firms. There was a risk of overstating UK trend growth following the long expansion prior to the financial crisis, which implied that spare capacity could be eroded quicker over the recovery. That, coupled with persistent above-target inflation, pointed to the need to withdraw monetary stimulus sooner rather than later by gradually increasing Bank Rate.

Leverage and monetary policy

David Miles, Monetary Policy Committee member, October 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech451.pdf

Some argue that one lesson from the financial crisis is that monetary policy tools should be used to prevent asset price booms. On this issue, Professor Miles made three points in his speech. First, not all episodes of rapid asset price inflation are disruptive to the wider economy, but the ones accompanied by sharp increases in leverage generally are. Second, monetary policy tools are not likely to be effective in controlling the leverage of banks. Third, a much more direct and effective tool to control leverage in the financial sector is through capital requirements.

On the immediate UK monetary policy issues, Professor Miles argued that the recovery following the current crisis is not likely to be a normal one and risks of inflation deviating from the target exist on both sides. He concluded that it was not yet appropriate to start withdrawing the extraordinary level of monetary stimulus.

Managing liquidity in the system: the Bank's liquidity insurance operations

Paul Fisher, Executive Director for Markets, September 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech450.pdf

In this speech, Paul Fisher described the various measures the Bank had taken during the crisis to extend liquidity insurance to the financial system. Those measures included increasing the size and maturity of its lending operations, widening the pool of eligible collateral, and the introduction of a Discount Window Facility (DWF) in October 2008. The changes culminated with the introduction of the Bank's indexed long-term repos (ILTRs) in June 2010. Those operations allow counterparties to simultaneously bid against two distinct collateral sets, with the proportion of funds lent against 'wider' collateral responding automatically to changes in demand (and by extension, changes in market conditions).

Paul also discussed how the banks had been making good progress in repaying funds lent under the Special Liquidity Scheme (SLS). Of the £185 billion of Treasury bills initially advanced, £57 billion had already been repaid. While the SLS will not be extended or replaced, the ILTRs and DWF would continue to provide liquidity insurance to the banking system.

The case for doing more

Adam Posen, Monetary Policy Committee member, September 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech449.pdf

Dr Posen presented his case for why monetary policy should continue to be aggressive about promoting recovery, and, at present in the United Kingdom and other major economies, further easing should be undertaken. There remains such a significant gap between what the economy could be producing at full employment and what it currently produces, that if price stability is at risk over the medium term it is on the downside. Dr Posen suggested that tightening prematurely or loosening insufficiently could risk sustained subpotential growth turning into a self-fulfilling prophecy by eating at supply capacity. In both the Great Depression and Japan's Great Recession, nascent recoveries were aborted by premature macroeconomic policy tightening based on underestimates of potential growth, as well as the weight of financial problems accumulated over a period of prolonged slow growth without reform. In discussing how central banks should do more, Dr Posen argued it must primarily take the form of large-scale asset purchases, initially of long-term government bonds — because of market limitations in the United Kingdom, but also the absence of overt financial distress reduces the potential relative advantage of private

credit purchases. Dr Posen also discussed why more should be done now in the United Kingdom specifically — recent data on growth in output offers insufficient reason to characterise the United Kingdom as being in an inflationary recovery (it is indistinguishable from either the United Kingdom in 1991 or Japan in 1993), while comparisons of credit growth with previous recoveries are worrisome.

Inflation, Inflation, Inflation

Spencer Dale, Executive Director and Chief Economist, September 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech448.pdf

In this speech, Spencer Dale argued that although inflation had been above target for much of the past four years, the MPC had not gone soft on inflation. The economy had been hit by a series of large price-level shocks — to oil and other commodity prices, to VAT and to the sterling exchange rate. By raising companies' costs and putting upwards pressure on prices, these shocks could together more than account for the strength of inflation. But it was important to learn from the behaviour of inflation. Changes in the structure of the economy, the nature of the financial crisis, and the different role played by policy had all affected the behaviour of inflation during the downturn. Looking ahead, although inflation was above target and expected to remain so for some time, there were significant risks to both sides of the inflation outlook. This created an unusually difficult balancing act for the MPC.

Remarks by Andrew Bailey on financial reform

Andrew Bailey, Executive Director for Banking Services and Chief Cashier, September 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech447.pdf

In this speech, Andrew Bailey spoke about why the stability of the financial system is in the public interest; why the public should expect the authorities to act in their interest; and why it is important that the case for financial stability is understood.

Andrew made the comparison to the public's understanding of monetary policy tools; and what the public would want from financial stability. He spoke about the tools that would be required to meet the public's expectations that taxpayer money should not be put at risk to save a failing financial institution and noted that at present, there is not a sufficient resolution tool to solve the too big to fail issue.

Andrew went on to discuss how judgement should be at the centre of the new Prudential Regulation Authority. It should be used by regulators to mount a robust challenge to stop dangerous and risky business models. He went on to explain how recovery and resolution plans should be integrated within supervision.

Speech by the Governor

Mervyn King, Governor, September 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech446.pdf

In this speech, the Governor described the fundamental causes of the crisis: the imbalances in world trade and capital flows; and the inability of the banking systems to intermediate such large inflows of capital without taking excessive risk.

The Governor outlined how policymakers could prevent this happening again: first, the financial system needed radical reform. In the long run, banks would have to hold much more capital and be much less highly leveraged. And, second, just as the world economy needed rebalancing, so did the UK economy. This implied a shift in spending and production away from domestic consumption and towards exports.

Turning to domestic policy, the Governor noted that no one could forecast the gusts the economy would face looking ahead. There was considerable uncertainty about the prospects for the United Kingdom's most important export markets, Europe and the United States. At home, business and consumer confidence had weakened, and it would be some time before the banking sector would be able to finance a recovery on the usual terms. The transition to a better balanced economy would be difficult. But, if the recovery was slower than expected, then monetary policy could react and the automatic fiscal stabilisers would act to stimulate demand.

The Governor ended by saying that the costs of the crisis would last for a generation. Policymakers owed it to the next generation to seize this opportunity to put in place the reforms that would make another crisis much less likely and much less damaging.

Appendices

Contents of recent Quarterly Bulletins

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

www.bankofengland.co.uk/publications/quarterlybulletin/index.htm.

Articles and speeches

Speeches are indicated by (S)

2007 Q1

2007 Q2

2007 Q3

2007 Q4

2008 Q1

- 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

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. 394 How do individual UK producer prices behave? (July 2010)
Philip Bunn and Colin Ellis

No. 395 New insights into price-setting behaviour in the United Kingdom (July 2010)
Jennifer Greenslade and Miles Parker

No. 396 Using estimated models to assess nominal and real rigidities in the United Kingdom (July 2010)
Gunes Kamber and Stephen Millard

No. 397 Evolving macroeconomic dynamics in a small open economy: an estimated Markov-switching DSGE model for the United Kingdom (July 2010)
Philip Liu and Haroon Mumtaz

No. 398 The sterling unsecured loan market during 2006–08: insights from network theory (July 2010)
Anne Wetherilt, Peter Zimmerman and Kimmo Soramäki

No. 399 Liquidity costs and tiering in large-value payment systems (July 2010)
Mark Adams, Marco Galbiati and Simone Giansante

No. 400 Liquidity-saving mechanisms and bank behaviour (July 2010)
Marco Galbiati and Kimmo Soramäki

No. 401 Changes in the transmission of monetary policy: evidence from a time-varying factor-augmented VAR (October 2010)
Christiane Baumeister, Philip Liu and Haroon Mumtaz

No. 402 DSGE model restrictions for structural VAR identification (October 2010)
Philip Liu and Konstantinos Theodoridis

No. 403 Monetary policy rules and foreign currency positions (October 2010)
Bianca De Paoli, Hande Küçük-Tuğer and Jens Søndergaard

No. 404 The impact of payment splitting on liquidity requirements in RTGS (October 2010)
Edward Denbee and Ben Norman

No. 405 Monetary policy, capital inflows and the housing boom (November 2010)
Filipa Sá and Tomasz Wieladek

No. 406 Forecasting in the presence of recent structural change (December 2010)
Jana Eklund, George Kapetanios and Simon Price

No. 407 Extracting information from structured credit markets (December 2010)
Joseph Noss

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 papers have been published recently:

No. 29 Risk heterogeneity and credit supply: evidence from the mortgage market (February 2010)
Timothy Besley, Neil Meads and Paolo Surico

No. 30 Macroeconomic stability and the real interest rate: a cross-country analysis (September 2010)
Charlotta Groth and Fabrizio Zampolli

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. Its purpose is to encourage informed debate on financial stability; survey potential risks to financial stability; and analyse ways to promote and maintain a stable financial system. 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:

Quarterly Bulletin

Q1	21 March
Q2	13 June
Q3	19 September
Q4	12 December

Inflation Report

February	16 February
May	11 May
August	10 August
November	16 November

Financial Stability Report

June
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					
	QB, IR and *FSR* package	*QB* and *IR* package	*IR* and *FSR* package	*QB* only	*IR* only	*FSR* 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.

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The Bank of England's website is at www.bankofengland.co.uk.

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