Quarterly Bulletin

2011 Q1 | Volume 51 No. 1

BANK OF ENGLAND

BANK OF ENGLAND

Quarterly Bulletin

2011 Q1 | Volume 51 No. 1

Foreword

The recovery in the United Kingdom looks set to continue. This edition of the *Quarterly Bulletin* discusses a number of issues, both domestic and international, that will be important in determining the strength and durability of that recovery. How are financial markets responding to the various issues associated with the aftermath of the financial crisis and the continuing but uneven recovery in global demand? What factors account for the recent weakness in UK broad money growth and what might this weakness imply for future money spending and inflation? How will the United Kingdom's labour force participation rate — an important aspect of labour supply and so of the potential output of the UK economy — evolve? Will a successful rebalancing of the world economy be achieved? And finally, will China's nascent rebalancing be sustained? In addition, this edition of the *Quarterly Bulletin* contains a summary of the most recent Monetary Policy Roundtable.

The *Bulletin* begins, as usual, by examining developments in financial markets in the regular *Markets and operations* article, covering the period between the previous *Bulletin* and 25 February 2011 (it therefore does not include any financial market reaction to the earthquake and tsunami that hit Japan on 11 March 2011). Markets expected the pace of policy tightening, both in the United Kingdom and abroad, to be faster than at the time of the previous *Bulletin*. Financial market participants remained uncertain how the fiscal challenges facing some euro-area member countries would be resolved and how this might affect financial market sentiment. Nevertheless, the improvement in UK bank funding conditions that began in the second half of 2010 had been sustained. More recently, uncertainty in financial markets increased in response to the emergence of political tensions in a number of countries in North Africa and the Middle East.

Since the start of the financial crisis, UK broad money growth has slowed dramatically. A key issue for monetary policy is what this recent weakness implies for the future outlook for nominal spending and inflation. To gauge the signal contained in weak money growth it is important to understand the relationship between movements in broad money and nominal spending, summarised by the velocity of circulation — that is the rate at which money circulates through the economy to finance the value of transactions. The article in this edition considers the recent weakness in UK broad money growth and the path of velocity. The changes in broad money growth can be linked to three key economic developments: the financial crisis and the associated shock to credit supply; stabilisation of the banking sector; and the MPC's programme of asset purchases. Velocity has followed a 'V'-shaped pattern over the past two years, some of which can be explained by the impact of asset purchases. The experience of the 1990s suggests that velocity's long-run downward trend can be interrupted for extended periods of time. The recent conjuncture suggests that there are economic factors pushing up on velocity relative to its historical trend. These are likely to persist in the near term, suggesting that a given rate of growth in nominal spending is likely to be associated with weaker growth in broad money than was typically the case before the crisis.

The labour force participation rate measures what fraction of the population is actively involved in the labour market, either in employment or seeking work. The participation rate is a key factor determining the pool of available labour in our economy and hence the level of output that our economy is able to produce. As such, when assessing the prospects for inflation, it is important for the Monetary Policy Committee to understand recent movements in participation and how it is likely to evolve in the future. The participation rate held up better in the recent recession than in past downturns. Within that aggregate picture, there have been some marked trends operating across different groups in the population. Examining patterns of participation for those different groups can help shed light on the outlook for aggregate participation. The article in this edition examines the participation decisions for men and women at different ages, and born at different times. How the outlook for labour force participation in the United Kingdom evolves will depend on a number of factors, including the response to the recent recession, changes in the state pension age and changes in the age structure of the economy.

Global macroeconomic imbalances, and the capital flows associated with them over the past decade, contributed substantially to the global financial crisis. In an article on global imbalances, previously published in the February 2011 edition of the Banque de France *Financial Stability Review*, Mervyn King, Governor of the Bank of England, notes that all countries accept the need for global rebalancing, but argues there is a clear difference in the path of adjustment preferred by surplus and deficit countries. Agreement on a common path of adjustment will be necessary, and this should be informed by countries' ability to follow that path in a sustainable way. Many policies, including changes to exchange rates, will be needed to reduce these imbalances. The Governor concludes that, if agreement is not reached on both these issues, then at best, this could lead to a weak world recovery, and at worst, it could sow the seeds of the next financial crisis.

The Chinese economy has grown rapidly in the past 30 years, in part, reflecting a growth strategy focused on expanding exports. This has led to China becoming the world's largest exporter. Since the start of the crisis, a number of reforms and measures have been put in place to rebalance the economy towards domestic demand and away from net exports. The rebalancing of China's economy has important implications for the strength and nature of the global recovery. The article in this edition discusses China's previous export-orientated growth pattern, its rebalancing since the start of the crisis and whether that rebalancing can be sustained.

The recovery of the UK economy was discussed at the Monetary Policy Roundtable, hosted by the Bank of England and the Centre for Economic Policy Research on 14 December. The Roundtable provides a forum for economists to discuss key issues affecting the design and operation of monetary policy in the United Kingdom. A report in this *Bulletin* summarises the main points made by participants at the December Roundtable.

Spencer Dale
Chief Economist and Executive Director — Monetary Analysis and Statistics.

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

Contents

Recent economic and financial developments

Markets and operations 6
Box Operations within the sterling monetary framework and other market operations 8
Box Asset purchases 12

Research and analysis

Understanding the recent weakness in broad money growth 22
Box The counterparts framework for analysis of changes in broad money 26
Box Cross-checking the impact of asset purchases on asset prices 34

Understanding labour force participation in the United Kingdom 36

Global imbalances: the perspective of the Bank of England 43

China's changing growth pattern 49

Summaries of recent Bank of England working papers 57
– Wage rigidities in an estimated DSGE model of the UK labour market 57
– The contractual approach to sovereign debt restructuring 58
– Are EME indicators of vulnerability to financial crises decoupling from global factors? 59
– Low interest rates and housing booms: the role of capital inflows, monetary policy and financial innovation 60
– Mapping systemic risk in the international banking network 61
– A Bayesian approach to optimal monetary policy with parameter and model uncertainty 62

Report

Monetary Policy Roundtable 64

Speeches

Bank of England speeches 68

Appendices

Contents of recent Quarterly Bulletins 74

Bank of England publications 76

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

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

The speeches contained in the *Bulletin* can be found at
www.bankofengland.co.uk/publications/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, between the 2010 Q4 *Quarterly Bulletin* and 25 February 2011.[1] The article also summarises market intelligence on selected topical issues relating to market functioning.

Sterling financial markets

Overview

Over the review period, financial markets continued to be strongly influenced by changes in expectations of future monetary policy developments, and concerns about the sustainability of fiscal positions in some euro-area periphery countries.

In the major economies, market expectations of policy tightening increased during the review period. In the United Kingdom, a continuation of above-target CPI inflation outturns and policy-related statements contributed to expectations of an increase in Bank Rate being brought forward. Financial market measures of UK medium-term inflation compensation were, however, little changed over the review period.

In the euro area, uncertainty about how the fiscal challenges facing some member countries would be resolved persisted. This was compounded by ongoing discussions about how investors might be affected by official proposals on the resolution of banks facing financial difficulty. The improvement in UK bank funding conditions that began in the second half of 2010 was, however, sustained. UK banks made a solid start to 2011, having broadly met their funding requirements in 2010, but a significant funding challenge nonetheless remains.

Contacts reported an increase in uncertainty in financial markets in response to the emergence of political tensions in a number of countries in North Africa and the Middle East. The cut-off date for this article preceded the devastation caused by the earthquake and the tsunami that hit Japan.

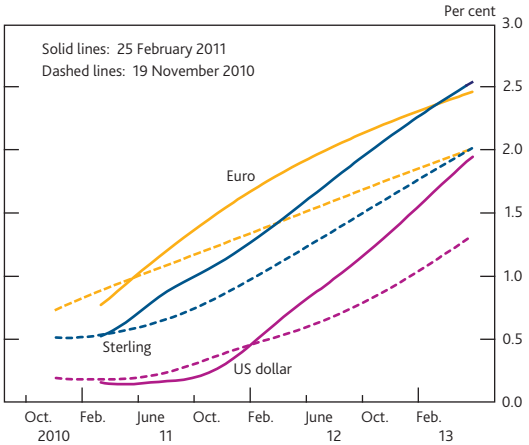
Recent developments in sterling capital markets

Monetary policy and short-term interest rates

The Bank of England's Monetary Policy Committee (MPC) maintained Bank Rate at 0.5% and the stock of purchased assets at £200 billion throughout the review period.

A continuation of above-target CPI inflation outturns and policy-related statements contributed to market participants bringing forward their expectations of the timing of a rise in Bank Rate. And the subsequent pace of monetary tightening was expected to be faster than assumed at the start of the review period. Consistent with this, sterling short-term overnight index swap (OIS) rates rose (**Chart 1**). A Reuters poll released at the end of February showed that most of the economists surveyed expected the MPC to raise Bank Rate in 2011 Q3. That was a quarter earlier than at the time of the 2010 Q4 *Bulletin*, albeit a quarter later than implied by sterling OIS rates. Thirty per cent of economists polled expected the MPC to start unwinding asset purchases during 2011.

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



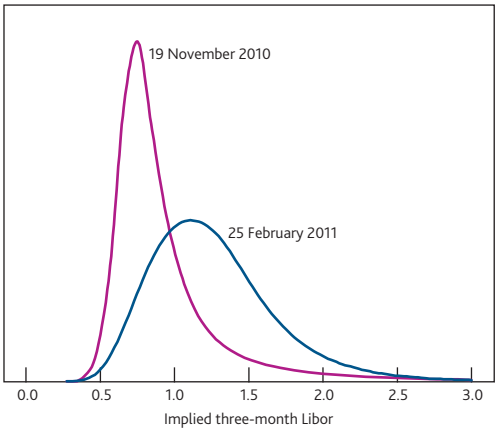
Sources: Bloomberg and Bank calculations.

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

Contacts noted that there had been uncertainty about what weaker-than-expected activity data, combined with stronger-than-expected inflation data, meant for the timing and degree of monetary policy tightening. Consistent with this, the option-implied distribution of six months ahead short-term interest rates widened (**Chart 2**).

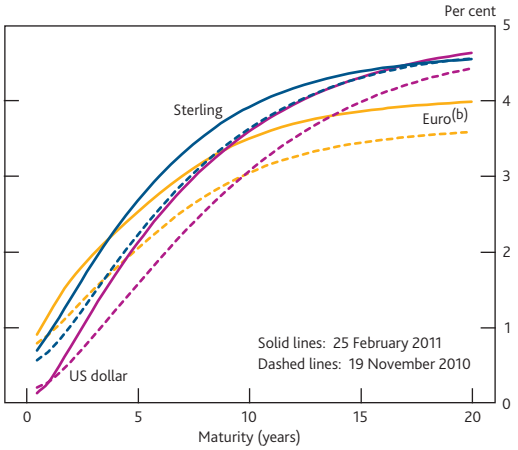
(1) The data cut-off for the previous *Bulletin* was 19 November 2010.

Chart 2 Option-implied PDFs for three-month Libor, six months ahead



Sources: Bloomberg and Bank calculations.

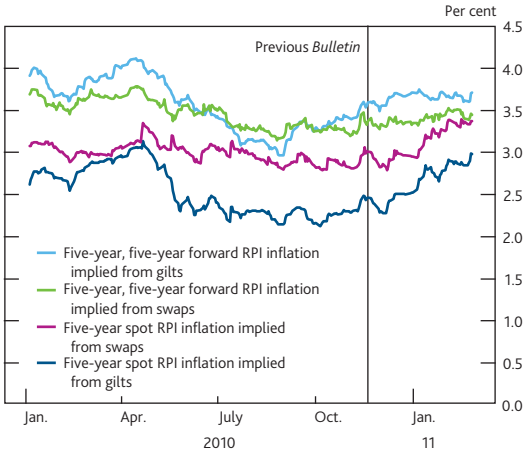
Chart 3 International nominal government bond spot yield curves(a)



Source: Bank calculations.

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

Chart 4 Implied RPI inflation rates(a)



Sources: Bloomberg and Bank calculations.

(a) Derived from the Bank's government liability and inflation swap curves.

Elsewhere, in the United States, the $600 billion of additional asset purchases announced by the Federal Open Market Committee (FOMC) at the start of November 2010 was on course. The FOMC was expected to start raising policy rates from early 2012 and the US dollar OIS curve had steepened as market participants revised up their rate expectations (**Chart 1**). In the euro area, both the expected level and speed of policy tightening were greater than at the time of the previous *Bulletin*. After the review period, the euro OIS curve rose further in response to policy statements by the European Central Bank (ECB) Governing Council.

At the very short end of the money market curve, sterling overnight interest rates generally traded at or around Bank Rate over the review period. The box on pages 8–10 describes the Bank's operations in the sterling money market. In the euro area, the euro overnight index average rate (EONIA) was close to its average in the previous review period. But for short periods in January and February, it moved above the ECB's main refinancing rate, coinciding with temporary falls in the volume of aggregate liquidity held by euro-area banks over and above that necessary to meet reserve requirements.

Long-term interest rates

Bond yields in the major industrial economies rose over the review period (**Chart 3**). By the end of the review period UK, US and euro-area ten-year spot yields had risen between 90 and 110 basis points from their near historic low levels in the autumn of 2010.

In the United Kingdom, the increase in ten-year spot yields largely reflected developments at the shorter end of the yield curve, out to five years. Much of the increase at the five-year horizon could in turn be accounted for by higher implied inflation rates (**Chart 4**). But market contacts noted that a lack of liquidity in short-maturity inflation-linked instruments meant that it was difficult to attribute this rise to any particular maturity within the five-year horizon. The rise was, however, consistent with growing concerns about the near-term inflationary impact of continued price rises across a range of commodities, such as oil and metals (**Chart 5**). Turning to the medium term, five-year implied inflation rates five years forward were little changed over the review period (**Chart 4**).

The cost of purchasing protection against credit events fluctuated for a number of euro-area member countries (**Chart 6**).(1) According to market contacts, this reflected ongoing uncertainty about how the fiscal challenges facing some of these countries would be resolved. These concerns about debt sustainability were also reflected in investors' appetite for investing in less liquid bonds, which, in turn,

(1) For further details, see 'The sovereign credit default swap market' in the 2010 Q1 *Bank of England Quarterly Bulletin*, pages 8–9.

Operations within the sterling monetary framework and other market operations

Over the review period, 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 12–13 provides more detail on the Asset Purchase Facility (APF). This box describes the Bank's operations within the sterling monetary framework over the review period, and other market operations.

Operational Standing Facilities

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

Indexed long-term repo OMOs

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

The Bank offered £5 billion via three-month ILTR operations on both 14 December 2010 and 11 January 2011, and £2.5 billion via a six-month operation on 15 February 2011 (**Table 1**).

Cover in the three-month December operation was similar to earlier ILTR operations. The three-month January operation, however, was the first ILTR operation where the total bids received were less than the amount on offer (known as an uncovered auction). The stop-out spreads (the difference between clearing spreads for wider and narrow collateral) in both the December and January operations were similar to the previous three-month operation in October, although clearing spreads for both collateral sets were around 5 basis points higher (**Chart A**).

The proportion of the three-month funds allocated to wider collateral in the December and January operations rose compared with those held in September and October, from an average of 12% to 19%.

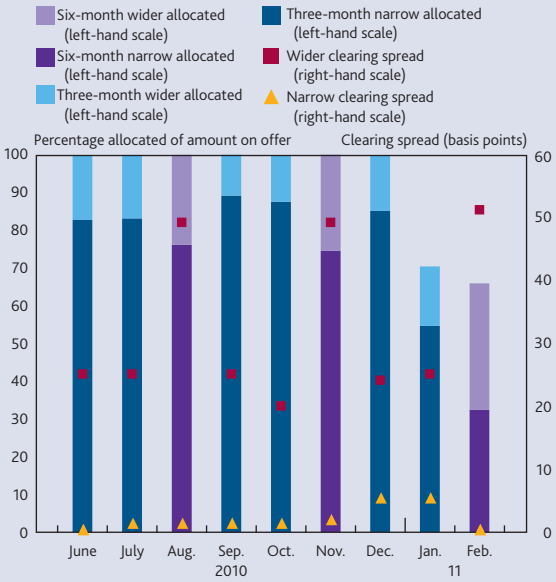
Table 1 Indexed long-term repo operations

	Total	Collateral set summary	
		Narrow	Wider
14 December 2010 (three-month maturity)			
On offer (£ millions)	5,000		
Total bids received (£ millions)[(a)]	7,230	6,445	785
Amount allocated (£ millions)	5,000	4,238	762
Cover	1.45	1.29	0.16
Clearing spread above Bank Rate[(b)]		5	25
Stop-out spread[(c)]	20		
11 January 2011 (three-month maturity)			
On offer (£ millions)	5,000		
Total bids received (£ millions)[(a)]	4,720	2,720	2,000
Amount allocated (£ millions)	3,502	2,720	782
Cover	0.94	0.54	0.40
Clearing spread above Bank Rate[(b)]		5	26
Stop-out spread[(c)]	21		
15 February 2011 (six-month maturity)			
On offer (£ millions)	2,500		
Total bids received (£ millions)[(a)]	2,158	808	1,350
Amount allocated (£ millions)	1,640	808	832
Cover	0.86	0.32	0.54
Clearing spread above Bank Rate[(b)]		0	52
Stop-out spread[(c)]	52		

(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.

The six-month operation on 15 February produced the first uncovered six-month ILTR, with a cover ratio of 0.86. The stop-out spread was 52 basis points. This compares to stop-out spreads of 49 basis points and 48 basis points in the August and November six-month ILTRs respectively. The proportion of reserves allocated against wider collateral in February rose to 51%, from 26% in November, the highest

Chart A ILTR allocation and clearing spreads



proportion in any three or six-month ILTR operation to date. This in part reflected the significantly smaller quantity of bids received against narrow collateral.

Market contacts suggested that the reduced level of participation in January and February reflected the increased availability of term funding in the market at the start of the New Year.

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

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 4 January 2011, the Bank announced that the average daily amount outstanding in the 30-day DWF between 1 July and 30 September 2010 was £0 million. The Bank also announced that the average daily amount outstanding in the 364-day DWF between 1 July and 30 September 2009 was £0 million.

Eligible collateral in the Bank's operations

On 11 February, the Bank announced changes to the eligibility criteria for sovereign, central bank and supranational debt taken as narrow and wider collateral in its operations. All sovereign, central bank and supranational debt currently eligible as collateral in the Bank's operations will remain eligible as either narrow or wider collateral. The narrow collateral set will be expanded to include US and Canadian government securities, which are currently eligible as wider collateral. But a number of other sovereigns, in addition to supranationals, will move from the narrow to the wider collateral set. In addition, the wider collateral set will be expanded by the inclusion of a small number of sovereigns whose debt is not currently eligible as collateral in the Bank's operations. These changes will take effect from 1 July 2011.

As a result of these changes, narrow collateral will in future include only those securities which in the Bank's view are likely to remain liquid in all but the most extreme circumstances, and are issued by sovereigns with sufficiently deep debt markets to facilitate broad access to the Bank's operations, consistent with the monetary policy purpose of narrow collateral. And consistent with the purpose of wider collateral of providing liquidity insurance to the banking system, wider collateral will comprise high-quality securities that would normally be expected to trade in liquid markets.

Haircuts on all narrow and wider collateral will continue to be based on the Bank's estimates of the risks to the value of the collateral — including market and liquidity risk — in the event of the default of the counterparty that has pledged the collateral. The Bank reserves the right to vary haircuts on an individual basis to reflect, for example, changes in market conditions or idiosyncratic risks.

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.

When the drawdown period for the SLS closed at the end of January 2009, £185 billion of UK Treasury bills had been lent under the SLS. In order to prevent a refinancing 'cliff', the Bank has held bilateral discussions with all users of the Scheme to ensure that there are funding plans in place to reduce their use of the Scheme in a smooth fashion. By end-February 2011, £94 billion had been repaid, compared with £75 billion at end-November 2010.

US dollar repo operations

In response to renewed strains in the short-term funding markets for US dollars, from 11 May 2010 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 25 February 2011, there had been no use of the Bank's 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, for example in the Bank for International Settlements, and the Bank's physical assets) and aggregate cash ratio deposits. The portfolio consists of sterling-denominated securities. Securities purchased by the Bank for this portfolio are normally held to maturity; nevertheless sales may be made from time to time, reflecting for example, risk management, liquidity management or changes in investment policy.

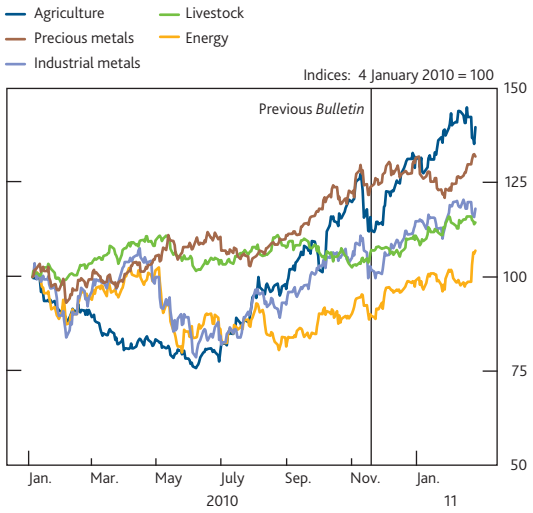
The portfolio currently includes around £3.4 billion of gilts and £0.5 billion of other debt securities. Over the period from 19 November 2010 to 25 February 2011, gilt purchases were made in accordance with the quarterly announcements on 1 October 2010 and 4 January 2011.

The Bank's foreign currency reserves

As part of the monetary policy framework introduced in 1997, the Bank holds its own foreign exchange reserves. These reserves can be used by the MPC in support of monetary policy. In December 2006, the Bank announced that its foreign exchange reserves would be financed by issuing medium-term securities on an annual basis, with a regular timetable, a high degree of transparency, and a group of banks to market and distribute each issue. The first bond was issued in March 2007, followed by issuance each subsequent year in March. Subsequent to the cut-off date for this *Bulletin*, the Bank issued a three-year dollar bond on 28 February 2011.(1)

(1) Further details are in the Market Notice available at www.bankofengland.co.uk/markets/reserves/marketnotice110228.pdf.

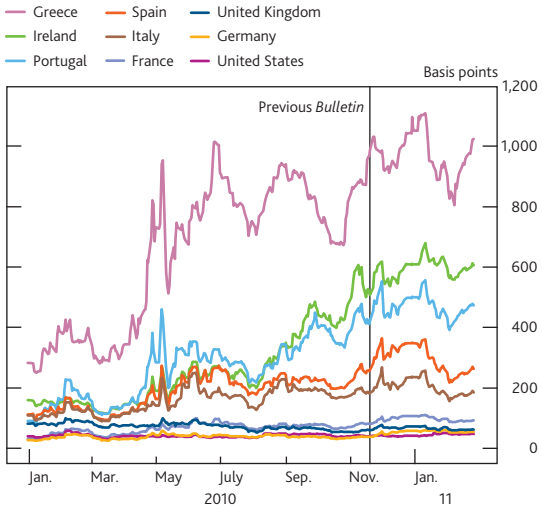
Chart 5 Selected commodity price indices(a)



Source: Standard & Poor's.

(a) Series refer to S&P GSCI total return indices.

Chart 6 Selected sovereigns' credit default swap premia(a)

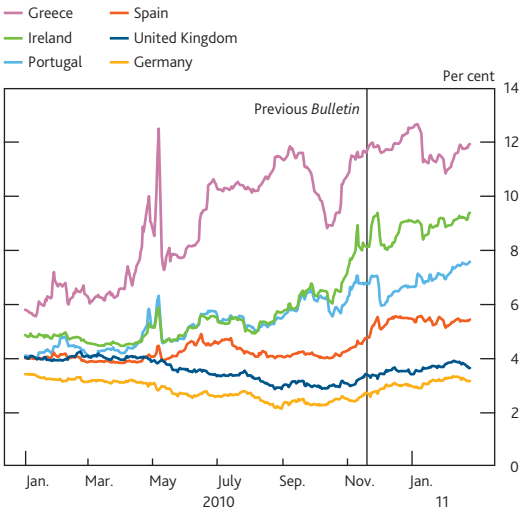


Source: Markit Group Limited.

(a) From five-year credit default swap (CDS) prices.

affected yields in more liquid markets, such as Germany and France. Over the review period, the spread of Irish and Portuguese government bond yields over German bond yields rose. The absolute level of compensation required to invest in government bonds from these countries remained elevated relative to their averages over the past ten years (**Chart 7**).

Chart 7 Selected European ten-year spot government bond yields(a)



Source: Bloomberg.

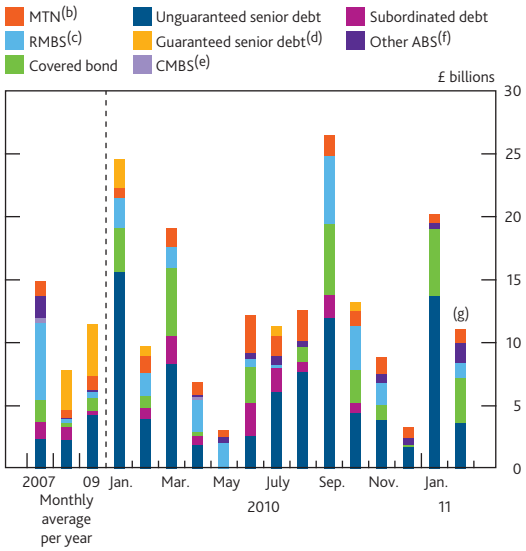
(a) Yields to maturity on ten-year benchmark government bonds.

Bank funding markets

The major UK banks reported that they had broadly achieved, and in some cases exceeded, their term issuance plans for 2010. Banks also made a solid start to 2011, issuing £20 billion of debt in public markets in January, followed by a further £11 billion in February up to the end of the review period (**Chart 8**). This compared with average monthly issuance in public markets of around £13 billion in 2010. A significant funding challenge nonetheless remains for UK banks.

The composition of UK banks' issuance in public markets was somewhat different from previous quarters, reflecting banks' increased use of covered bonds and US dollar unsecured markets. Contacts attributed the increase in the proportion of covered bond issuance to a number of factors. Regulatory developments had made covered bonds more attractive to insurance companies. Moreover, even though a European Commission (EC) consultation paper published in early January stated that its proposals for a crisis management framework would not apply to unsecured debt issued prior to any provisions becoming law, investors appeared more willing to hold covered bonds, which are expected to be outside the scope of any future resolution framework. Investors had also been attracted by the spreads on covered bonds, which were

Chart 8 Term issuance by the major UK lenders in public markets[a]



Sources: Bank of England, Dealogic and Bank calculations.

(a) Includes debt issued by Banco Santander, Bank of Ireland, Barclays, Co-operative Financial Services, HSBC, Lloyds Banking Group, National Australia Bank, Nationwide, Northern Rock and RBS. Term issuance refers here to securities with an original contractual maturity or earliest call date of at least 18 months. It includes subordinated lower Tier 2 and Tier 3 capital instruments with debt features.
(b) Medium-term notes.
(c) Residential mortgage-backed securities.
(d) Senior debt issued under HM Treasury's Credit Guarantee Scheme.
(e) Commercial mortgaged-backed securities.
(f) Asset-backed securities.
(g) Data are up to 25 February 2011.

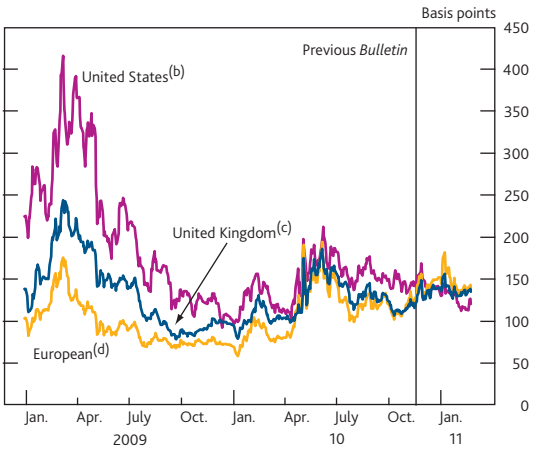
similar to those on unsecured issuance, but offered recourse to the underlying pool of assets in addition to the issuer. Some contacts noted, however, that increased covered bond issuance meant that unsecured creditors had recourse to a smaller proportion of a bank's balance sheet in the event of a bank resolution. Primary market activity in asset-backed security (ABS) markets had remained limited and, according to contacts, reliant on a small number of large investors.

Five-year UK bank credit default swap (CDS) premia, one indicator of long-term funding costs, rose in mid-January (**Chart 9**). Contacts suggested that this rise largely reflected an initially negative reaction to the EC's consultation paper. CDS premia subsequently returned to levels only slightly above those at the time of the 2010 Q4 *Bulletin* for the majority of major UK and European banks, although some tiering among institutions remained. The spread of short-term interbank borrowing rates relative to OIS rates, an indicator of short-term bank funding conditions, was little changed since the previous *Bulletin*.

Corporate capital markets

Equity prices in the United Kingdom and other advanced economies had continued to rise since the previous *Bulletin* (**Chart 10**). Contacts largely attributed these rises to increased corporate profitability stemming from an improvement in global growth prospects. This is consistent with the Bank of America/Merrill Lynch Fund Manager survey which showed that, in February, a net 51% of respondents expected the

Chart 9 Selected international banks' CDS premia[a]

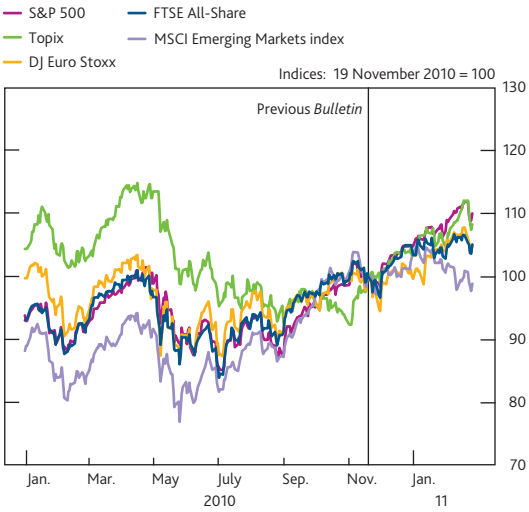


Source: Markit Group Limited.

(a) Unweighted averages of five-year, senior 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.

global profit outlook to improve, up from a net 36% in November 2010. But contacts noted that equity markets in emerging economies had fallen since the start of the year, reversing the rise earlier in the review period. Contacts attributed this fall to concerns about rising inflation and monetary tightening in these economies.

Chart 10 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.

Contacts attributed some of the rise in equity prices in advanced economies to a fall in the risk premium required to hold equities. Perhaps consistent with this, option-implied equity volatility, a measure of equity market uncertainty, fell for most of the review period. Volatility rose, however, towards the end of the period as political tensions in North Africa and the Middle East intensified (**Chart 11**).

Asset purchases[1]

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

Corporate bonds

The Bank continued to offer to purchase and sell corporate bonds via the Corporate Bond Secondary Market Scheme. Reflecting the improved conditions in the corporate bond market since the Scheme was introduced in March 2009 the Bank announced on 15 November 2010 that it would adapt its reserve prices to permit relatively more sales of corporate bonds in the future. The Scheme continues to serve a useful role as a backstop, particularly during periods of market uncertainty.

Over the review period, activity in the Bank's auctions continued to be driven by broader market conditions. Sales of corporate bonds rose, while purchases fell, and so as of 24 February 2011 the Bank's portfolio totalled £1,304 million, compared to £1,516 million at the end of the previous review period. Market contacts suggested that this pattern of usage of the Scheme reflected more positive market sentiment and continued limited new issuance. The higher level of corporate bond sales, and lower level of purchases, is in part also likely to have reflected the adjustment in reserve prices announced on 15 November 2010.

Commercial paper

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

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

Table 1 APF transactions by type (£ millions)

Week ending[a]	Commercial paper	Secured commercial paper	Gilts	Corporate bond		Total[b]
				Purchases	Sales	
18 November 2010[c][d]	0	0	198,275	1,516		199,792
25 November 2010	0	0	0	8	4	4
2 December 2010	0	25	0	23	3	45
9 December 2010	0	0	0	0	23	-23
16 December 2010	0	25	0	2	4	23
23 December 2010	0	0	0	0	14	-14
30 December 2010	0	0	0	0	0	0
6 January 2011	0	0	0	6	0	6
13 January 2011	0	0	0	0	48	-48
20 January 2011	0	25	0	0	45	-20
27 January 2011	0	0	0	0	26	-26
3 February 2011	0	0	0	0	22	-22
10 February 2011	0	0	0	0	5	-5
17 February 2011	0	25	0	2	8	19
24 February 2011	0	0	0	0	6	-6
Total financed by a deposit from the DMO[d][e]	0	25	–	283		308
Total financed by central bank reserves[d][e]	0	0	198,275	1,021		199,297
Total asset purchases[d][e]	0	25	198,275	1,304		199,605

(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 18 November 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.

Secured commercial paper facility

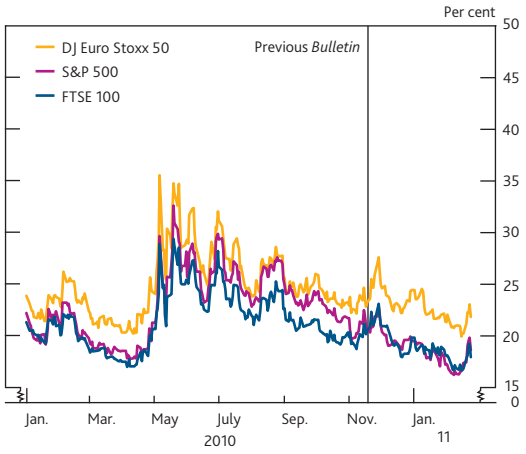
The Bank continued to offer to purchase secured commercial paper (SCP) backed by underlying assets that are short term and provide credit to companies or consumers that support economic activity in the United Kingdom.(3) The Bank announced on 15 November 2010 that it had made a programme eligible for this facility. This programme has subsequently issued SCP to the APF.

Gilt lending facility(4)

In the three months to 31 December 2010, a daily average of £1,241 million of gilts were lent as part of the gilt lending facility. This was an increase from an average of £279 million in the previous quarter. The increase in the amount of gilts lent to the DMO resulted from an apparent lack of availability of particular gilts, which meant that market participants chose to borrow from the DMO rather than obtain the gilts in the market.

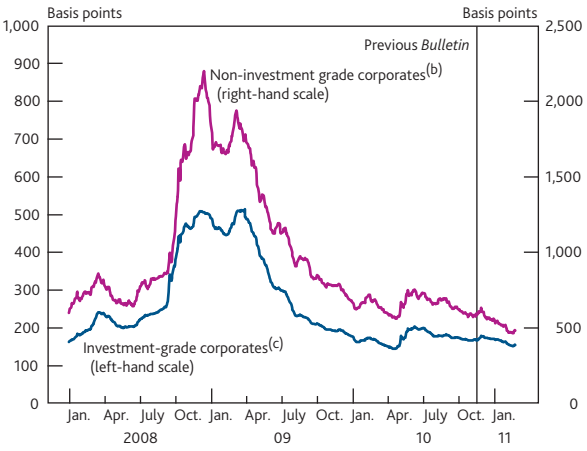
(1) The data cut-off for this box is 24 February 2011, unless otherwise stated. For further discussion on asset purchases, see the *Asset Purchase Facility Quarterly Report* available at www.bankofengland.co.uk/publications/other/markets/apf/quarterlyreport.htm.
(2) Further details of individual operations are available at www.bankofengland.co.uk/markets/apf/gilts/results.htm.
(3) The SCP facility is described in more detail in the Market Notice available at www.bankofengland.co.uk/markets/marketnotice090730.pdf.
(4) For more details on the gilt lending facility, see the box 'Gilt lending facility' in the *Bank of England Quarterly Bulletin*, Vol. 50, No. 4, page 253.

Chart 11 Six-month option-implied volatility for international equity indices



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

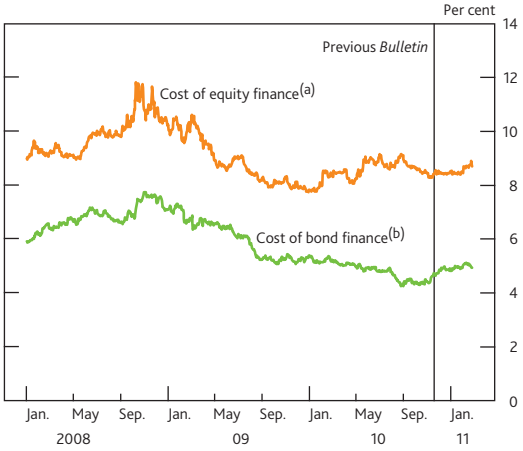
Chart 12 Corporate bond spreads in advanced economies(a)



Source: Bank of America/Merrill Lynch.

(a) Option-adjusted spreads over government bond yields.
(b) Based on the Bank of America/Merrill Lynch Global High Yield index.
(c) Based on the Bank of America/Merrill Lynch Global Broad Market Corporate index.

Chart 13 Indicative cost of sterling corporate bond and equity finance



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

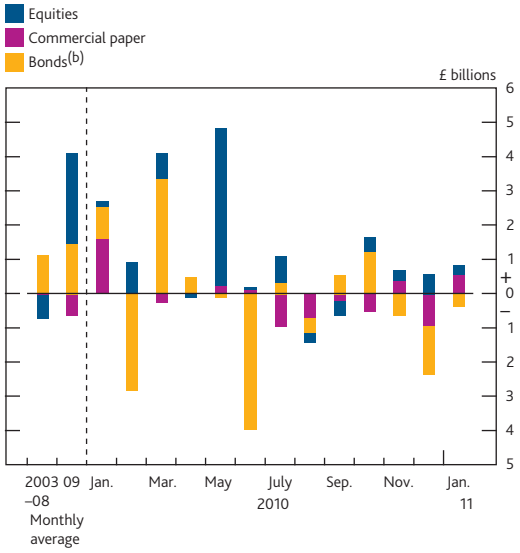
(a) The cost of equity is measured as a risk-free rate plus an equity risk premium. The risk-free rate is approximated by a ten-year nominal gilt yield and the equity risk premium is inferred from a dividend discount model. For further details of the latter, see Inkinen, M, Stringa, M and Voutsinou, 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.

The yields on investment-grade and non-investment grade corporate bonds fell relative to government bond yields (**Chart 12**). Demand for high-yield bonds had reportedly been strong. According to market contacts, this was dominated by pension funds and insurance companies, including investors that had not previously been active in high-yield bond markets, rather than leveraged investors.

In the United Kingdom, despite the reduction in sterling corporate bond spreads, the cost of corporate bond finance for investment-grade non-financial companies increased slightly, on account of the rise in government bond yields. An indicative measure of the nominal cost of equity finance for UK companies had also risen slightly (**Chart 13**).

Over the review period, gross corporate bond issuance by UK private non-financial corporations (PNFCs) was broadly in line with the average between 2003 and 2008 but below the 2009 level. But aggregate net bond issuance by PNFCs was negative as the amount of maturing bonds exceeded that of new bond issuance (**Chart 14**).

Chart 14 Net capital market issuance by UK PNFCs[a]



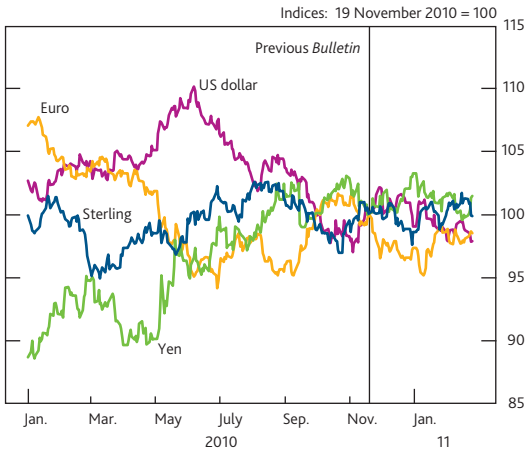
(a) Non seasonally adjusted.
(b) Includes stand alone and programme bonds.

Gross equity issuance and equity issuance net of share buybacks declined from the level in 2009. Contacts suggested that an increasing number of companies had used new equity capital to fund investments as opposed to deleveraging. Consistent with this, respondents to the *Deloitte Chief Financial Officer Survey* reported that UK companies' balance sheets were, on average, considered to be appropriately leveraged in 2010 Q4, having been overleveraged in 2009. Equity issuance by UK non-financial companies is described in more detail on pages 15–16.

Foreign exchange

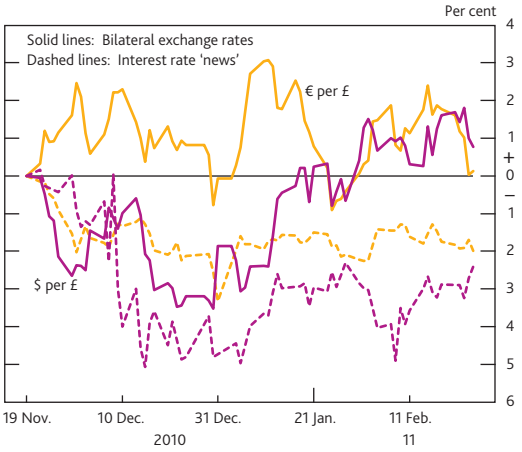
Internationally, the major exchange rate indices were little changed from their levels at the time of the 2010 Q4 *Bulletin*, but changes in sentiment about fiscal positions in some euro-area member countries contributed to movements in the euro ERI within the review period (**Chart 15**).

Chart 15 International nominal effective exchange rates



These changes in sentiment towards the euro were also reflected in bilateral exchange rates. Movements in the sterling-euro exchange rate within the review period could not be accounted for by changes in relative interest rates, suggesting that changes in relative risk premia accounted for the moves (**Chart 16**). Sterling depreciated against the dollar in late 2010, consistent with movements in relative interest rates. Sterling ended the period against the euro and the US dollar little changed.

Chart 16 Implied contribution of interest rate 'news' to cumulative changes in sterling bilateral exchange rates since the previous *Bulletin*[a]

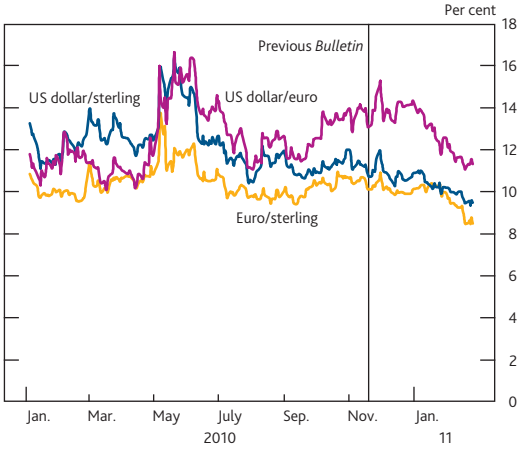


Source: Bank calculations.

(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 fell for a number of currency pairs over the review period (**Chart 17**). Contacts noted, however, that the recent civil and political unrest in North Africa and the Middle East could lead to increased volatility in some exchange rates.

Chart 17 Three-month implied exchange rate volatility



Sources: Bloomberg and Bank calculations.

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 a context for policy formulation, including the design and evaluation of the Bank's own market operations. And the Bank conducts occasional market surveys to gather additional quantitative information on certain markets.

Based on intelligence of this kind, this section first reviews developments in primary public equity issuance markets for UK non-financial companies in recent years. It then describes some initial results from a pilot survey on sterling money markets.

The primary market in equities for UK non-financial companies

Public equity markets enable companies to raise capital by selling shares to investors. The means by which they do so depends on their motivations and the amount of capital being sought. Privately owned companies can raise equity capital via an initial public offering (IPO). Companies that are already publicly listed can raise further capital via follow-on issues such as open offers, placings and rights issues. This section examines the structure of the primary equity market for UK non-financial companies and reviews recent trends in issuance.

Market participants

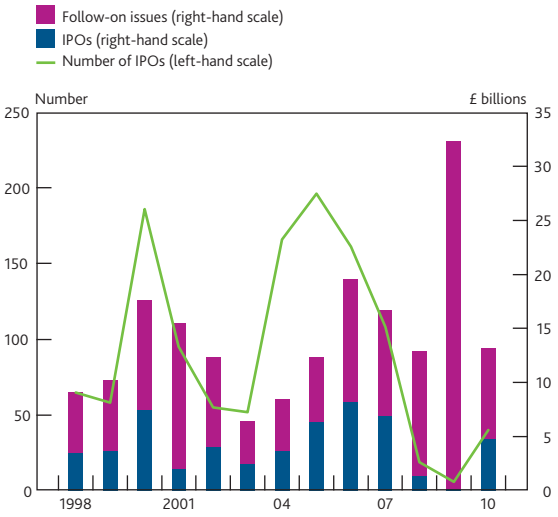
In most cases, companies looking to issue equity appoint a selection of banks to intermediate between themselves and potential investors. The main function of this 'syndicate' is to underwrite the sale of shares. In addition, members of the syndicate will provide advice and help ensure that all legal requirements are met. Historically, syndicates were typically comprised of investment banks, although they have broadened in recent years to more frequently include commercial banks with which issuing companies have established lending relationships.

Underwriting services can be provided on a 'best efforts' or a 'hard' basis, depending on the type of issue. Banks underwriting on a best-efforts basis do not guarantee that shares will be sold at certain prices, but simply act as an intermediary between companies and potential investors. By contrast, hard underwriting locks the underwriters into selling a fixed amount of shares at a pre-specified price, with any excess being purchased by the underwriters at that price. Typically, IPOs are underwritten on a best-efforts basis while follow-on issues are underwritten on a hard basis.

Recent trends in equity issuance

During 2009, the primary market in equities functioned well for those companies that had previously accessed public equity markets. Over £30 billion of follow-on equity was issued by UK private non-financial companies in 2009 (**Chart 18**).(1) This was mainly in the form of rights issues, which give a company's existing shareholders first refusal to purchase new shares or allows them to sell this option to other investors. Contacts said the proceeds were used largely to reduce leverage and strengthen balance sheets, reflecting the response of companies and investors to a worsening macroeconomic outlook and uncertainty about future access to capital markets. Follow-on equity issuance fell back in 2010 and was thought to have been used more to fund investment as the macroeconomic outlook improved and investors became more comfortable with companies' leverage.

Chart 18 Equity issuance by UK non-financial companies(a)



Sources: London Stock Exchange (LSE) and Bank calculations.

(a) LSE provides data on all new and follow-on equity issuance. This series excludes equity issuance by financial institutions, such as banks, insurers and asset managers.

The price at which new shares are offered can be compared with the hypothetical price of a share following the issuance of further shares — the theoretical ex-rights price (TERP).(2) New shares tend to be offered at a discount to this TERP in order to encourage current investors to take up their option to inject further capital into the company, or to sell their rights to other

(1) For more information on follow-on equity issuance by UK companies, see Office of Fair Trading (2011), 'Equity underwriting and associated services' available at www.oft.gov.uk/shared_oft/market-studies/OFT1303.pdf.

(2) The theoretical ex-rights price equals the market value of the company prior to the offer plus the amount of capital intended to be raised, divided by the number of shares outstanding prior to the offer plus the number of new shares offered.

investors who would inject capital. Contacts noted that this discount increased in 2009 and remained higher than historical averages in 2010.

According to market contacts, the increase in discounts reflected, at least in part, a reduced willingness of investors to inject capital into companies looking primarily to reduce leverage. It may have also reflected higher underwriting costs, with banks being more reluctant to commit capital to underwriting services, and a reduced willingness by institutional investors and other banks to sub-underwrite offerings. Some of these factors were reported to have since subsided.

Turning to first-time equity issuance, there was little issuance in late 2008 and 2009, as investors' appetite to take risk fell and companies reduced investment. IPO volumes increased in 2010, although remained below historical averages. UK non-financial companies issued £5 billion during 2010 via IPOs, accounting for around 35% of total equity issuance.

Contacts noted that the low volume of IPOs during 2010 partly resulted from the high number of companies that had intended to issue but withdrew from the market prior to issuance, or failed to attract sufficient investor demand to complete the issue. This feature was common to the global IPO market and reflected the response of both companies and investors to periods of substantially higher-than-anticipated volatility in equity markets.

Some contacts reported that the high number of failed IPOs was somewhat exacerbated by structural features that impeded the success of executing an IPO during volatile market conditions. First, contacts noted that the nature of equity markets meant that, other than the price, it was hard to adjust the details of an IPO in response to unanticipated volatility. There are few details that can be changed in an IPO besides the price. This contrasted with bond markets, which could relatively easily adjust coupons, size, maturity, covenants and execution dates close to the time of issue to respond to investor preferences.

Second, contacts noted that the average number of banks participating in a syndicate had risen to nearly four, from around two prior to 2008. That was reported to reflect both the increasing prominence of companies that look to advise on IPOs helping to foster competition among banks, and the increasing inclusion within the syndicate of banks with which the issuing company had an established lending relationship. Contacts suggested, however, that the reputational loss accorded to any individual member of the syndicate for overseeing a failed issuance was likely to be less in a larger syndicate. This in turn reduced the incentives to ensure that an IPO succeeded in volatile conditions. That said, contacts suggested that the growing prominence of advisory companies may help to ensure that reputational considerations remain important.

Third, according to contacts, banks were updating prospective investors about the size of the order book on a more frequent basis. This helped to enhance market transparency, but contacts suggested that it also meant that the success of an IPO became more dependent on the early bidding behaviour of key large investors, which other investors used to inform their investment decisions.

In response to the incidence of failed IPOs, contacts reported that companies had increasingly looked at alternatives to becoming publicly listed. Contacts noted that many companies were planning an IPO while simultaneously looking at the alternative of attracting investment from private equity companies, which appeared to be less sensitive to short-term volatility in secondary markets.

Preliminary results of the Money Market Liaison Group pilot survey of the sterling money market

There is limited consistent information about the size, structure, liquidity and efficiency of the sterling money market.(1) To fill this gap, the Money Market Liaison Group (MMLG) — a discussion forum for structural issues concerning the sterling money market, chaired by the Bank — has agreed to conduct a regular, six-monthly survey of the sterling money market.(2)

The survey will be launched in May 2011 and cover activity in the sterling money market during that month. To help improve the design of the survey, the MMLG ran a pilot survey covering activity in the sterling money market during November 2010. This section reports a selection of preliminary findings from the November pilot survey. The Bank intends to provide a more comprehensive analysis of the results of the May 2011 and subsequent surveys.

The findings reported should be interpreted with caution. Contacts noted that activity in the sterling money market is subject to quarter-end and year-end effects, so any one month may not be representative. In addition, November 2010 was characterised by a rise in market perceptions of risk associated with the banking sector in some euro-area economies, which may have affected activity in the sterling money market. In the light of findings from this pilot, the MMLG may also decide to make changes to improve the content or the coverage of

(1) One consolidated quantitative data source on the secured market that is currently available is the International Capital Market Association (ICMA) European repo survey.
(2) The Money Market Liaison Group comprises representatives from market participants, trade associations and the authorities. For further details see: www.bankofengland.co.uk/markets/money/smmlg.htm.

subsequent surveys. Despite best endeavours to ensure the accuracy of the results presented here, any such changes could alter the results from May onwards.

Composition of the pilot survey

A sample of 31 commercial banks, building societies and investment banks took part in the November 2010 pilot survey. These institutions were selected based on the scale of their involvement in the Bank of England's sterling market operations during the period 2006–09, and are likely to account for the overwhelming majority of bank participation in the sterling money market. Non-bank participants, such as pension funds and large non-financial corporates were not surveyed.

The survey comprised both quantitative and qualitative questions, covering the secured and unsecured segments of the sterling money market. The quantitative questions asked survey participants to record the value, volume and type of sterling money market activity conducted over the survey period. Qualitative questions were designed to ascertain how market liquidity and efficiency were evolving.

Quantitative survey questions

The pilot survey asked participants to record sterling money market borrowing and lending transactions conducted via their main London desks during November 2010. For each, they were asked to record the amounts traded and the number of trades according to maturity and instrument type in both the secured and unsecured market. Participants were asked to record all these flows on a daily average basis, based on activity over the whole month.

Money market borrowing and lending was defined as having a maturity no longer than one year. Participants were also asked to exclude non-sterling and intragroup trades, trades conducted with the Bank of England and the DMO, along with any retail business.

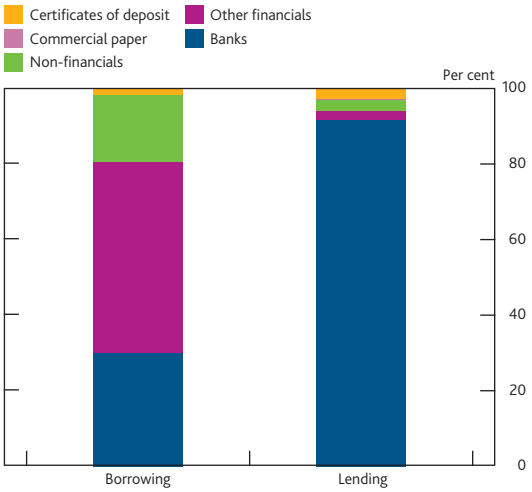
Sterling money market flows split by activity type

Survey respondents reported greater amounts of sterling money market borrowing than lending. This was true for both secured and unsecured transactions, although the difference was materially smaller for the former.

The survey suggests that when banks lend unsecured it tends to be to other banks (**Chart 19**). In contrast, while 30% of banks' unsecured borrowing flows were attributed to deposits from other banks, half of unsecured borrowing was attributed to deposits from the non-bank financial sector. This is consistent with market intelligence that some banks fund themselves by absorbing unsecured deposits from non-bank participants, such as money market funds.

Chart 19 also shows that sales or purchases of certificates of deposit (CDs) and sterling commercial paper (CP) accounted for a small proportion of reported unsecured flows. But these deals were typically longer maturity than other unsecured activity. And the survey did not cover the US dollar or euro-denominated CP markets, which are both much larger than the sterling CP market, and are likely to represent a more important source of funding for banks included in the survey.

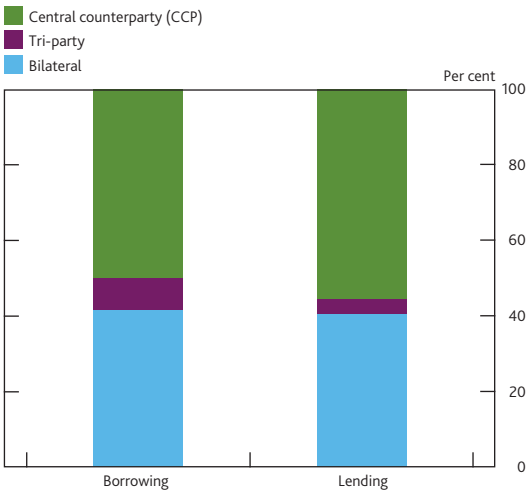
Chart 19 Unsecured flows by source of borrowing and destination of lending(a)



(a) Purchases of sterling CP issued by non-banks/building societies not included.

Half of secured borrowing was conducted via a central counterparty (CCP), with the CCP transacting with both the borrower and the lender, taking on any credit risk (**Chart 20**). The remainder of secured borrowing was largely conducted bilaterally, with the lender and the borrower transacting directly. A minority of deals were transacted via a tri-party arrangement, with a third party acting as agent, holding associated collateral in a custodian capacity. The split between CCP, bilateral and tri-party activity was similar for secured lending. Survey responses also suggested that a majority of secured borrowing and lending flows were interbank.

Chart 20 Secured flows by transaction type



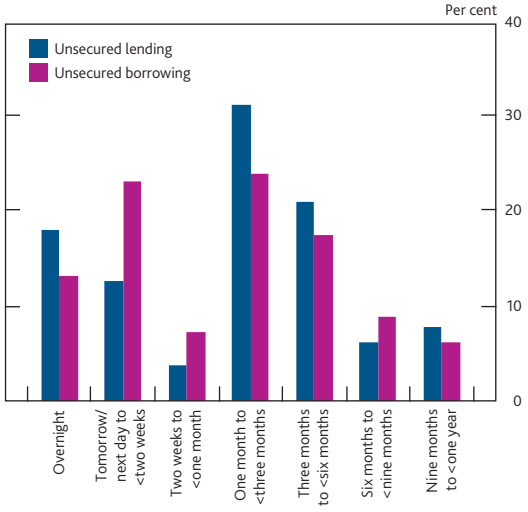
Secured money transactions are predominantly against the highest quality, liquid collateral. Over 90% of the collateral used in secured transactions (by value) consisted of Unstripped British Government (UBG) debt, which is mainly comprised of gilts but also includes UK Treasury bills and Bank of England bills.

As discussed in the previous *Quarterly Bulletin*, market contacts report that there has been an increase in secured wholesale market borrowing using other forms of collateral over the past year. But reportedly, this activity is mainly for terms in excess of one year, so would not be captured in the MMLG sterling money market survey.

Sterling money market flows split by maturity

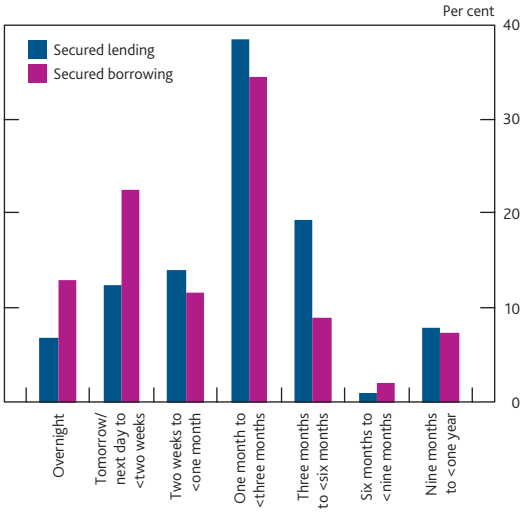
The majority of flows captured in the pilot survey were overnight, reflecting the volume of overnight transactions which are rolled over each day. But scaling reported flows according to the approximate term of the transaction highlights the importance of unsecured lending and borrowing at longer maturities (**Charts 21** and **22**).(1) Contacts report that incoming FSA liquidity regulations provide an incentive for banks to borrow at maturities greater than three months.

Chart 21 Unsecured flows by maturity(a)



(a) Flows have been scaled by term of transaction.

Chart 22 Secured flows by maturity(a)



(a) Flows have been scaled by term of transaction.

Qualitative survey questions

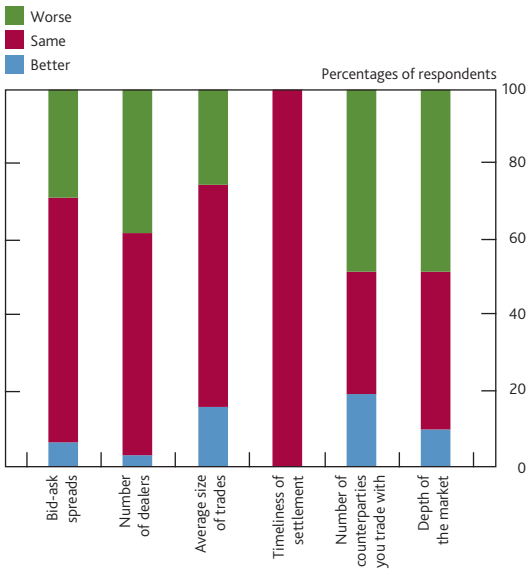
The qualitative section of the November 2010 pilot survey contained six questions on both the secured and unsecured markets. These questions asked participants about different aspects of the functioning of the sterling money market at the end of November 2010 relative to the situation six months earlier. They were:

(1) Are bid-ask spreads tighter, the same or wider?
(2) Is the number of dealers higher, the same or lower?
(3) Is the average size of trades larger, the same or smaller?
(4) Is the timeliness of settlement better, the same or worse?
(5) Has the number of counterparties you trade with increased, stayed the same or decreased?
(6) Has the depth of the market got better, stayed the same or got worse?

Survey responses suggested that, overall, the functioning of both the secured and the unsecured sterling money market had remained broadly the same (**Charts 23** and **24**). Two exceptions were that around half of respondents reported that the number of counterparties they trade with, and the depth of the unsecured market had got worse, compared with six months earlier. This deterioration may have been an artefact of the increasing concerns about some euro-area banking systems during November.

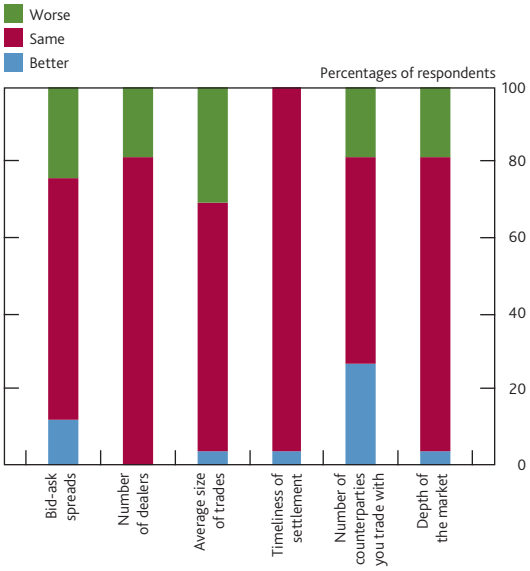
(1) The ECB presents the maturity of money market flows on a similar maturity-weighted turnover basis when reporting the results of its *Euro Money Market Survey*: www.ecb.int/press/pr/date/2010/html/pr101221.en.html.

Chart 23 Qualitative results for the unsecured market[a]



(a) Better (worse) = tighter (wider) bid-ask spreads; higher (lower) number of dealers quoting; larger (smaller) average size of trades; better (worse) timeliness of settlement; increased (decreased) number of counterparties; better (worse) depth of the market.

Chart 24 Qualitative results for the secured market[a]



(a) See footnote (a) to **Chart 23**.

Research and analysis

Understanding the recent weakness in broad money growth

By Jonathan Bridges, Neil Rossiter and Ryland Thomas of the Bank's Monetary Assessment and Strategy Division.[1]

The growth of broad money in the UK economy has slowed dramatically since the start of the recession. In part, that weakness reflects reduced borrowing by households and companies during the recession. But money balances held by asset managers also fell as deposits were used to purchase new equity and long-term debt issued by the banking sector in response to the financial crisis. Offsetting the weakness from these two factors was the programme of asset purchases — so-called 'quantitative easing' or QE — conducted by the Bank of England on behalf of the Monetary Policy Committee, which boosted broad money holdings. The evidence from the monetary data suggests that the programme of asset purchases contributed to an increase in asset prices and, ultimately, an increase in nominal demand in the economy, corroborating other evidence from financial market prices.

Introduction

Understanding movements in broad money is important for the conduct of monetary policy. Broad money is the sum of the sterling notes and coin and the sterling bank and building society deposits held by the UK non-bank private sector.[2] The behaviour of broad money is likely to contain corroborative information about the current level of nominal spending in the economy. It may also provide incremental information about future movements in nominal spending and hence is a useful indicator of future inflationary pressure, alongside a range of other indicators.[3] Additionally, the behaviour of broad money may help to reveal the nature of the monetary transmission mechanism, especially when monetary policy is operated through central bank asset purchases, intermediated via the banking system.

Since the onset of the financial crisis in the second half of 2007, money growth has slowed dramatically. By the start of the recession in 2008 Q2, annual broad money growth had dipped below the average rate observed over the previous decade, and by the end of 2009 it had fallen below 1%, although it has recovered a little since. This weakness in money growth is striking, even when viewed in a long-run historical context (**Chart 1**).[4] Growth rates of less than 1% have not been observed since the early 1960s.

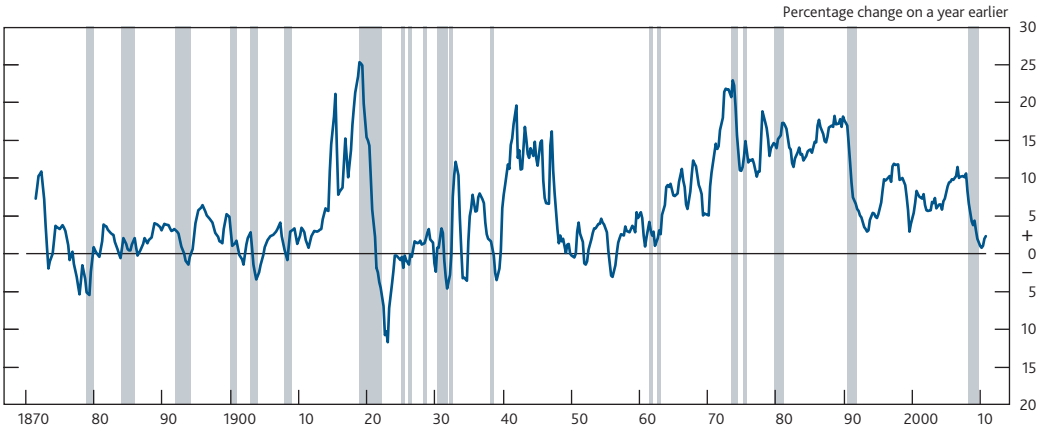
The continued weakness in broad money growth might look puzzling when compared to the recent behaviour of nominal spending in the economy. The growth rate of nominal spending (nominal GDP) has picked up sharply over the past year, despite subdued money growth (**Chart 2**). This means that money has had to circulate at a greater rate in the economy to finance the higher value of transactions — in other words there has been an increase in the velocity of circulation of broad money.[5] That is in contrast to the long-run downward trend observed in velocity since the 1980s.

The incremental information in broad money growth about future nominal spending has to be conditioned on a view of the outlook for the velocity of circulation. Currently broad money growth is weak, which might signal a downside risk to future nominal spending and, ultimately, inflation. But there may be reasons why both the supply of, and demand for, broad money may have changed relative to spending. That would lead to a change in the equilibrium level of the velocity of circulation. So understanding the recent factors influencing velocity and the extent to which they might persist will be important for assessing future inflationary pressures.

The aim of this article is to explain the recent weakness in broad money growth and the path of broad money velocity,

(1) The authors would like to thank Eleanor Broughton, Matt Davies, Dan McGing, Dan Nixon and Martin Udy for their help in producing this article.
(2) Throughout this article, unless stated otherwise, broad money is defined as M4 excluding the holdings of intermediate other financial corporations where available. For further detail on the definition of broad money, see Burgess and Janssen (2007).
(3) For more information on the link between broad money and inflation and on the use of broad money growth as an indicator of future inflation, see Thomas (1996) and Berry *et al* (2007).
(4) For more information on recent economic data in a long-term context, see Hills *et al* (2010).
(5) The velocity of circulation is defined as the ratio of nominal spending to the nominal level of broad money.

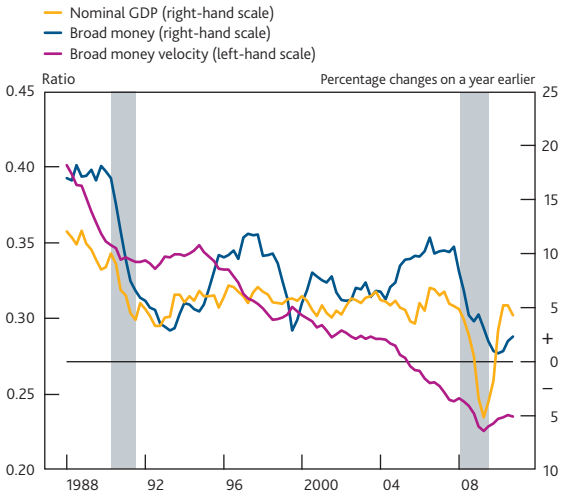
Chart 1 Broad money growth in a long-run context[a][b]



Sources: Bank of England, Capie and Webber (1985) and Hills *et al* (2010).

(a) Peacetime recession periods are shown in grey. Prior to 1924 annual recessions are shown. After 1924 periods of two or more consecutive quarters of negative growth are shown.
(b) M3 up to 1963, M4 1963–98, M4 excluding intermediate 'other financial corporations' (OFCs) 1998–2010.

Chart 2 Velocity, broad money and nominal GDP[a][b][c]



(a) Recession periods are shown in grey. Recessions are defined as in **Chart 1**.
(b) Nominal GDP is measured at market prices.
(c) Broad money velocity is defined as quarterly nominal GDP divided by the outstanding stock of broad money.

and draw out the implications for future nominal spending and inflation. The article is organised into four sections. The first section draws on earlier *Quarterly Bulletin* articles and outlines an established framework for thinking about the determinants of broad money and the relationship between money and nominal spending. The second section then applies this framework to the recent data, by looking at the key factors contributing to the weakness in broad money since the start of the recession. The third section examines the relationship between money and nominal spending over this period and considers what this may imply about the future path for the velocity of circulation. And the fourth section considers the incremental information that we can glean from the money data about the impact of the programme of asset purchases conducted by the Bank of England on behalf of the Monetary Policy Committee (MPC).

The determinants of broad money and the link with nominal spending

In order to understand movements in broad money, it is useful to distinguish between factors affecting the supply of money and factors affecting the demand for money. It is also important to consider the mechanisms through which money supply and demand are made equal.[1]

The supply and demand for money

The supply of broad money is determined by transactions between the banking sector (including the central bank) and the non-bank private sector. The most important of these transactions historically has been the provision of credit by the banking sector to the non-bank private sector. When a bank or building society makes a loan to households or companies it automatically creates a deposit — either for the borrower, or for the recipient of the borrowers' expenditure if the loan is spent immediately (as in the case of purchasing a house, spending on a credit card or drawing on an overdraft facility). More generally, any transaction between the banking sector and the non-bank private sector will involve the creation or destruction of banking sector deposits and will thus affect the supply of broad money. For example, paying out dividends will create money when a bank credits shareholders' accounts with a deposit. Conversely, if banks retain profits that would otherwise have been paid to shareholders as dividends, this will reduce the supply of money. Issuance of long-term debt or equity by banks will also destroy money as asset managers purchase the instruments using their deposits.

The demand for broad money can be understood in terms of its two uses in the economy: first, it is used as a means of

(1) See Congdon (1992, 2005) and Berry *et al* (2007) for a more detailed discussion.

carrying out and settling transactions — its 'medium of exchange' role; second, it is also held as a financial asset in household and company portfolios — its 'store of value' role. So the demand for money is likely to depend on:

(a) *the value of transactions in the economy* — nominal spending on goods and services and the value of asset transactions;

(b) *the overall value of asset portfolios or 'wealth'* — households and companies would be expected, other things equal, to hold a certain share of their portfolio in money;

(c) *the relative rate of return on money* — the yield on money (deposit rates) compared to other assets will determine the share of the portfolio that households and companies choose to hold in money; and

(d) *the degree of uncertainty* — households and companies may choose to hold higher money balances if either the economic outlook or their ability to access credit is unusually uncertain.

The adjustment of money demand and supply to shocks

It is useful to consider the mechanism through which money supply and demand are made consistent. If a set of transactions between the banking sector and non-bank private sector leads to a net increase in the supply of money, then one of the determinants of the demand for money — nominal spending, wealth or relative rates of return — must also move in order for households and companies to be willing to hold more money. Similarly, if there is a rise in the demand for money by households or companies then something must change to induce the banking sector to increase the money supply by lending more to those households and companies; or alternatively one of the other determinants of money demand must change to offset the original increase in demand.

The adjustment in the determinants of the demand for money may not happen immediately. According to standard economic theory, the demand for money by households and companies is a target level of money balances that they wish to hold on average over a given period. But they will often accept holding more or less than that amount in the short term as a (possibly very temporary) means of bridging the gap between payments and receipts. This is generally known as the buffer-stock theory of money demand.(1) The theory suggests that, in the short run, the aggregate stock of money is largely determined by supply factors and is only made consistent with the underlying demand for money over a longer horizon.

The link between money and nominal spending

The key issue for monetary policy is the extent to which shifts in money supply and demand lead to subsequent changes in nominal spending (and ultimately inflation). On the one hand, a shift in either money supply *or* money demand may require a change in nominal spending to restore equilibrium. On the other hand, equal shifts in money supply *and* money demand may lead to no change in nominal spending, but instead result in a change in the velocity of circulation. The outcome will depend on the shocks that hit the economy and the time that they take to propagate.

For example, an increase in competitiveness within the banking sector (such as occurred in the 1980s and early to mid-2000s) is likely to lead to a permanent fall in the velocity of circulation. Greater banking sector competitiveness would act to lower the interest rate on bank loans and increase deposit rates. The resulting fall in the overall cost of financial intermediation for households and companies is likely to induce a substitution towards bank credit from alternative forms of finance, increasing the money supply for a given level of nominal spending. At the same time, the rise in deposit rates relative to the return on other assets will increase the portfolio demand for money. An increase in both the supply of and demand for money at a given level of transactions implies an increase in broad money relative to nominal spending and so a fall in the equilibrium velocity of circulation.(2)

In contrast, a programme of central bank asset purchases from the non-bank private sector is more likely to lead only to an adjustment in nominal spending in the medium term. In the first instance, a fall in the yields of non-monetary assets and a rise in their prices is likely to be required to persuade households and companies to hold a higher stock of money. The increase in money balances will initially lead to a fall in velocity. But the accompanying increase in asset prices will boost financial wealth and so is likely to contribute to an increase in nominal spending over time as wealth effects take hold. Much of the initial fall in the velocity of circulation is therefore likely to be temporary.(3)

In the next two sections, this money supply and demand framework is used to look at the determinants of broad money and its relationship with nominal spending over the recent recession. First, the determinants of broad money are examined from a supply perspective, using both an accounting and economic analysis. The next section then analyses the extent to which these movements in money supply have been associated with movements in nominal spending or movements in the velocity of circulation.

(1) See Laidler (1984) and Milbourne (1988) for a discussion of buffer-stock models.
(2) Nominal spending might also be affected by this shock. The move towards a more competitive banking system and greater financial intermediation might boost potential supply in the economy if it made possible investment projects that were not viable at a higher level of spreads. But how that would affect the price level and nominal spending would depend on the monetary policy response.
(3) For a discussion of the possible monetary transmission mechanism of central bank asset purchases, see Benford *et al* (2009).

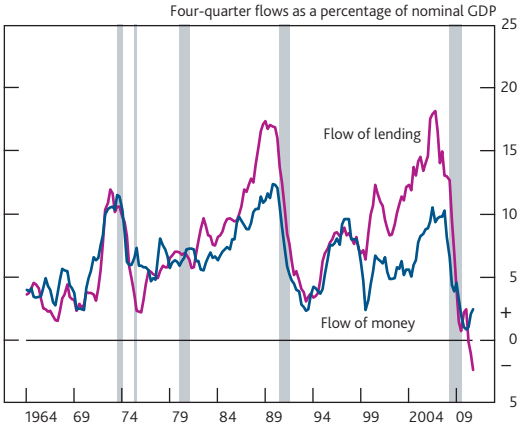
Factors affecting the supply of broad money

Counterparts analysis

Tracing through changes in the composition of the banking sector's aggregate balance sheet can provide a useful insight into the factors affecting the supply of broad money. A change in the stock of broad money is a change to one component of the liabilities of the banking sector, and must have a counterpart elsewhere on the balance sheet: either a complementary change in the assets of the banking sector, such as loans advanced, or an offsetting change in the other liabilities of the banking sector, such as banks' long-term debt or equity. This counterparts framework is discussed in more detail in the box on page 26.

In the past, money and credit flows have been tightly correlated — because the extension of loans mechanically creates deposits, credit has been a key counterpart to money (**Chart 3**). But that relationship is not exact and at certain times credit growth has exceeded money growth. During these periods some of the lending to households and companies is likely to have been funded by issuance of non-deposit liabilities (for example long-term bonds or securitisations) or deposits from non-residents. Changes in other counterparts to money can shed light on these issues.

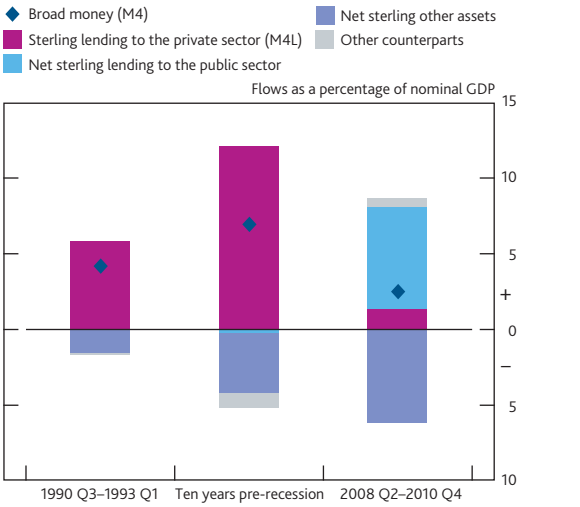
Chart 3 Money and credit flows(a)(b)



(a) Recession periods are shown in grey. Recessions are defined as in **Chart 1**.
(b) Both money (M4) and lending (M4L) flows exclude transactions with intermediate other financial corporations (OFCs) where available. M4L is adjusted to exclude the effects of securitisation.

To analyse the recent weakness in broad money growth it is useful to compare the movements in money and its counterparts during the recent recession to those seen over the previous decade and in the early 1990s recession (**Chart 4**). During both these earlier periods, credit creation was the dominant counterpart to money growth. In contrast, there have been three principal counterparts to the recent weakness in broad money growth since the onset of the recent recession in mid-2008. First, sterling lending to the non-bank private sector (M4L) has been very weak, even relative to the 1990s recession, and, unusually, credit growth has not been the main positive driver of money growth. Second, sterling non-deposit liabilities of the banking sector (such as equity and long-term debt) have grown markedly. This caused a sharp fall in net other sterling assets and was an unusually large drain on money growth. Third, net sterling lending to the public sector has been markedly strong, providing a highly unusual boost to money growth.

Chart 4 Counterparts to broad money growth(a)(b)(c)(d)



Sources: Bank of England and Bank calculations.

(a) M4 and M4L are defined as in **Chart 3**.
(b) Units give the average quarterly inflow into a given counterpart over the period specified, expressed as a percentage of average quarterly nominal GDP over that same period.
(c) 'Net sterling other assets' adjusted to include changes in sterling liabilities stemming from loan securitisations.
(d) 'Other counterparts' is given by residual, for more information on the counterparts, see Brunken and Westley (2002).

Economic factors

The three principal accounting counterparts to the recent weakness in broad money growth can be linked to three key economic developments. First, the financial crisis has been associated with a contraction in the supply of credit. Second, the need to stabilise the banking sector following the financial crisis led to significant balance sheet repair. Third, the severity of the recession led to a programme of asset purchases undertaken by the Bank of England on behalf of the MPC. Each economic development is addressed in turn and its impact on broad money estimated. These estimates are then compared with the principal accounting counterparts to the recent weakness in broad money growth.

I The financial crisis and weak bank lending

The financial crisis and subsequent recession were associated with a marked reduction in the flow of new lending to households and companies. As extending new loans creates deposits, weak lending was a key counterpart to weak money growth.

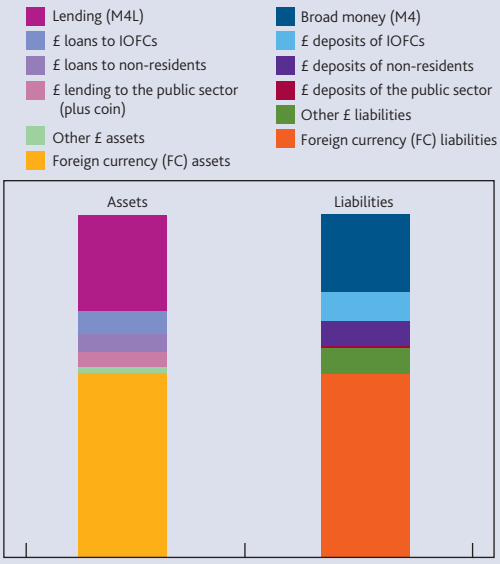
A substantial fall in the flow of new credit is not unusual during a recession and the early stages of recovery. But the lending slowdown in the recent recession has been particularly sharp and aggregate credit flows have reached an unusually low level

The counterparts framework for analysis of changes in broad money

In order to understand movements in broad money supply, it is useful to view them in the context of the balance sheet of the UK banking sector, specifically by examining changes in the counterparts to broad money.(1)

Broad money is one major component of the liabilities side of banks' balance sheets. It accounts for about 23% of the UK banking sector's total financial liabilities (**Chart A**). Alongside broad money, a further 24% of total liabilities are denominated in sterling. That comprises sterling deposits from intermediate other financial corporations (IOFCs), non-residents and the public sector and also non-deposit liabilities, such as long-term debt and equity.

Chart A A stylised balance sheet for the UK banking sector(a)(b)(c)



Sources: Bank of England and Bank calculations.

(a) Bars are scaled to reflect the relative sizes of each component.
(b) UK banking sector includes the central bank.
(c) Lending (M4L) and broad money (M4) both exclude holdings of IOFCs.

On the other side of the balance sheet, the sterling financial assets of the UK banking sector mainly comprise loans to the non-bank private sector (M4L) and, to a lesser extent, loans to IOFCs, non-residents and the public sector. Sterling assets also include a small contribution from banks' holdings of other financial assets.

The remainder of the banking sector balance sheet is denominated in foreign currency and may typically be less relevant for explaining movements in broad money. The gross foreign currency assets and liabilities of the banking sector are large, reflecting the international operations of the largest UK banks. But banks appear to avoid large fluctuations in their net currency exposures over time. And it is that net position that is relevant in accounting for movements in M4.

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

$$\Delta\text{Broad money (M4)} \equiv \Delta\text{Lending to non-bank private sector (M4L)} + \Delta\textit{Net}\ £\ \text{lending to IOFCs} + \Delta\textit{Net}\ £\ \text{lending to non-residents} + \Delta\textit{Net}\ £\ \text{lending to public sector} + \Delta\textit{Net}\ \text{other}\ £\ \text{assets} + \Delta\textit{Net}\ \text{FC assets}.$$

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

(1) For a detailed discussion of the balance sheet counterparts to broad money, see Brunken and Westley (2002).

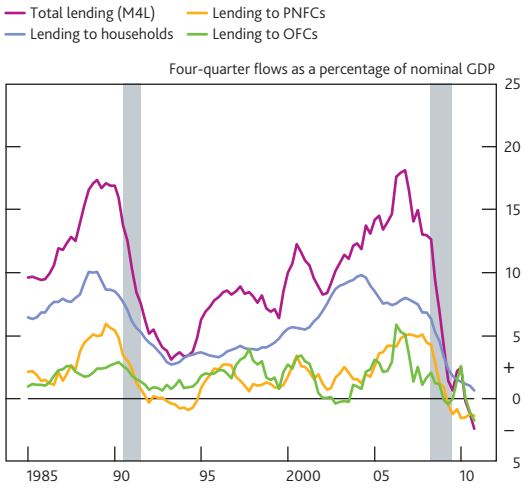
relative to nominal GDP. The lending slowdown has occurred across all sectors: households, private non-financial corporations (PNFCs) and non-bank — or other — financial corporations (OFCs) (**Chart 5**).

The unusually sharp slowdown in bank lending during this episode is likely to in part reflect the role of the financial crisis in instigating and propagating the recession. As the financial crisis intensified, credit supply was tightened as the banking sector increasingly sought to restrain balance sheet growth and improve the quality and profitability of new lending. That reflected a number of factors, including an increase in banking sector funding costs relative to Bank Rate and a reduction in banks' risk appetite. This shock to credit supply appears to account for a large part of the slowdown in annual real bank lending growth since the recession began.(1)

Not all of the slowdown in bank lending might be attributable to a credit supply shock. Demand factors may also have had a role. Weak activity and investment as a result of the recession are likely to have lowered the demand for new loans, despite the extraordinary monetary stimulus imparted by the MPC in response to the recession. However, it is difficult to assess the

(1) See Bell and Young (2010).

Chart 5 Sectoral credit flows[a][b]

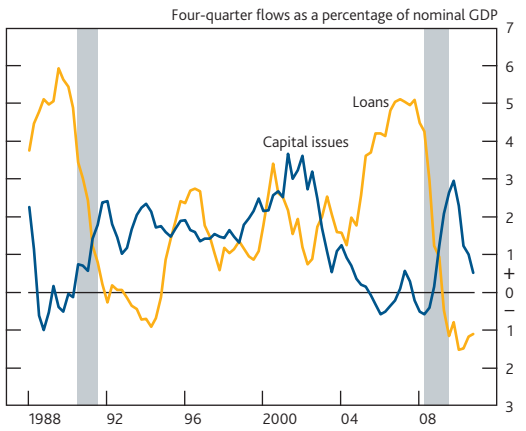


(a) Recession periods are shown in grey. Recessions are defined as in **Chart 1**.
(b) Both total lending (M4L) and lending to OFCs exclude transactions with intermediate OFCs where available. All series are adjusted to exclude the effects of securitisation.

extent to which these factors weighing on credit demand would have occurred independently of tighter credit supply conditions.[1]

Substitution towards alternative forms of finance provides one indication of tightness in the supply of bank credit. A worsening of the cost and availability of new bank loans makes capital market finance relatively more attractive. For instance, large PNFCs, with access to a variety of forms of finance, have substituted towards both bond and equity capital market finance since the onset of the recession (**Chart 6**). This disintermediation from the banking sector also occurred in the previous recession. But the scale and speed of substitution in this recession was somewhat greater. That may in part reflect a larger shock to the supply of banking sector credit following the recent financial crisis. But it might also reflect the impact of the MPC's programme of asset purchases on the relative cost of capital market finance and the demand for credit. This

Chart 6 PNFCs' substitution of bank debt to capital market issuance[a][b][c]



(a) Recession periods are shown in grey. Recessions are defined as in **Chart 1**.
(b) The loans series shows sterling net lending to PNFCs excluding the effects of securitisation.
(c) The capital issuance series shows the net amount raised from sterling issuance of equity, bonds and commercial paper by UK PNFCs.

issue will be explored in more detail in the final section of this article.

Overall, the marked slowdown in aggregate lending appears consistent with the effects of a credit supply shock associated with the financial crisis and the effects of the ensuing recession. The weakness in credit creation was a key factor driving the recent weakness in broad money growth.

II Banking sector stabilisation

A second key factor that pushed down on money growth since the start of the recession was the net effect of the banking system's attempt to repair the capital, funding and liquidity position of its balance sheet in the wake of the financial crisis.

In the third quarter of 2007 the global financial crisis began to affect the United Kingdom as conditions in financial markets, and bank funding markets in particular, deteriorated. As this intensified, and the global economic downturn gathered pace, realised and prospective losses for the UK banking sector increased sharply. These losses eroded capital levels in the banking sector, prompting major banks to rebuild capital levels by issuing additional equity (via rights issues) and also long-term non-equity capital instruments. The banking sector also sought to retain profits (rather than paying them out in dividends or staff compensation), in part to build provisions, but also to rebuild capital.[2] The financial crisis also highlighted the reliance of the United Kingdom and global banking sectors on wholesale funding markets, and the subsequent vulnerability of major institutions to a change of sentiment in (particularly short-term) markets. As a result, lenders focused on increasing the duration of their liabilities by issuing long-term debt instruments.

Large-scale accumulation of these sterling non-deposit liabilities[3] acted to bear down on money growth since the onset of the recession. Issuance of equity or long-term debt would have pushed down on money growth to the extent that the new instruments were purchased by the non-bank private sector, using sterling deposits. UK asset managers, such as insurance companies and pension funds, were significant purchasers of the increased issuance associated with the stabilisation of the banking sector. This issuance therefore acted as a negative shock to the supply of broad money. At the same time, accumulation of equity through the retention

(1) For a thorough discussion of both the supply and demand factors underlying the recent slowdown in bank lending, see Bell and Young (2010).
(2) For detail on the capital raising undertaken by UK — and global — banks, see Bank of England (2008), page 32.
(3) Not all sterling liabilities of the banking sector are included in the United Kingdom's measure of broad money. Specifically, liabilities designed to absorb losses in the event of financial distress at a bank (ie equity and long-term non-equity capital instruments, so-called 'hybrids') and long-term bonds (with an original maturity greater than five years) are excluded, as these are not used to carry out transactions and are not considered close substitutes for less risky and more liquid deposits. These categories of banking sector liabilities are therefore termed 'non-deposit liabilities'.

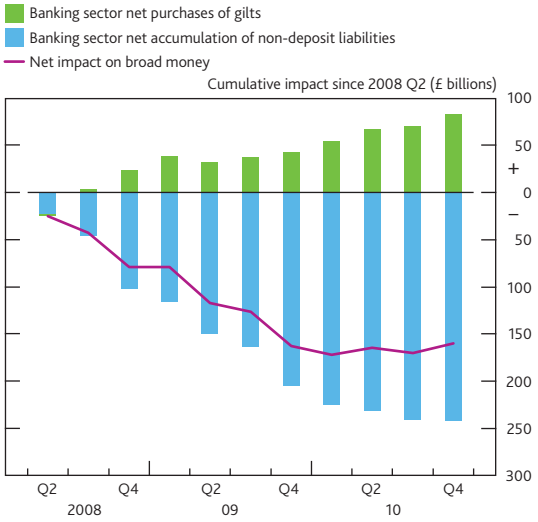
of pre-provision profits would also have dampened money growth, relative to a counterfactual where these profits would have been paid out as deposits to shareholders and employees in the UK non-bank private sector.

The total impact of the banking sector's accumulation of non-deposit liabilities on broad money is uncertain, but likely to be large. Data on the net issuance of sterling equity and long-term debt and private data collected by the Bank's statistical area on the retention of profits suggest that a reasonable estimate for the total drain on broad money from these factors was around £240 billion since the recession began. This estimate is uncertain — the figure could be larger or smaller for several reasons. For example, the figure could be larger if new issues of sterling long-term debt were not issued in public markets and so not captured in the data (so-called private placements). Or the figure could be smaller if not all the sterling equity and long-term debt was purchased by the UK non-bank private sector.

Increased regulatory pressure on banks to hold more liquid assets may have partially offset the drain on money induced by other aspects of banking sector stabilisation. Banks responded to stricter liquidity regulation by increasing their holdings of government bonds by about £80 billion since the start of the recession. If these were purchased from the non-bank private sector, this would have provided an offsetting boost to the money supply.(1)

The overall net impact of banking sector stabilisation is likely to have been a drain on money holdings, representing an estimated negative money supply shock of around £160 billion (**Chart 7**).

Chart 7 Estimated net impact of banking sector stabilisation on broad money(a)(b)



(a) 'Banking sector net accumulation of non-deposit liabilities' comprises net issuance of sterling equity and long-term senior secured (residential mortgage-backed security (RMBS) or covered bonds) or unsecured debt greater than five years in maturity at issue and pre-provision retained profits.
(b) 'Banking sector net purchases of gilts' excludes purchases of gilts by the Bank of England.

III MPC asset purchases (quantitative easing)

As the recession intensified during 2008, the MPC reduced Bank Rate sharply. By March 2009 the MPC cut Bank Rate to just 0.5% — the lowest level in the 300-year history of the Bank of England. Despite that, the MPC judged that further stimulus would be needed for the medium-term inflation outlook to be consistent with the 2% target. The MPC decided that the best way to loosen monetary policy further was to undertake a programme of asset purchases, in order to increase nominal demand and so inflation. The initial announcement was for asset purchases of £75 billion, but between March and November 2009 — in the face of a consistently weak outlook for medium-term inflation — the MPC increased the programme of asset purchases to £200 billion.(2)

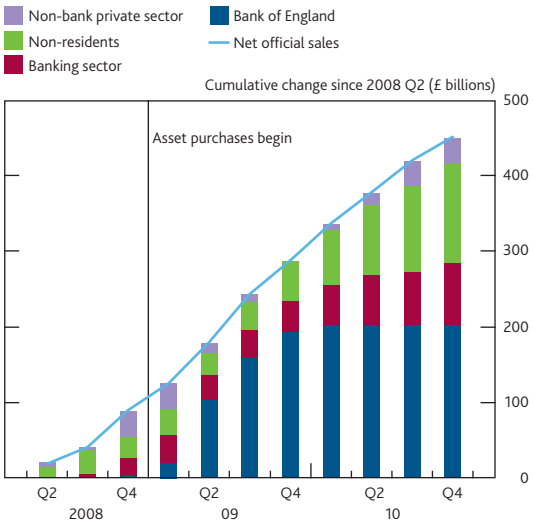
The Bank of England purchased UK government bonds (gilts), and a small amount of corporate bonds and commercial paper. The aim was to purchase these assets largely from UK non-bank financial corporations, such as asset managers, with purchases settled via the banking system. Asset purchases would therefore increase broad money.

It cannot be certain that all assets were purchased from UK non-bank financial corporations: the banking sector or non-resident sector may have sold some of their gilt holdings to the Bank of England. In this case, the money balances of the non-bank private sector would not have risen, so the increase in money holdings may have been less than the programme of asset purchases.

But the leakage of asset purchases outside of the non-bank private sector is likely to have been limited. First, the banking sector held relatively few gilts at the start of the asset purchase programme.(3) Second, both the banking sector and non-resident sector actually increased their holdings of gilts during the period over which asset purchases took place (**Chart 8**). Indeed, over the period since the recession began, the proportion of total gilt issuance purchased by the banking sector and non-resident sector has been broadly in line with the proportions purchased between 1991 and 1993, when the fiscal deficit last rose sharply following a recession. In contrast, the non-bank private sector has barely increased its holdings of gilts when in the 1991–93 period it took up over half the gilts issued. It therefore seems unlikely that a significant proportion of asset purchases were purchased from outside of the non-bank private sector — so the impact on broad money was likely to have been close to £200 billion.

(1) Similarly, if these government bonds were bought directly from the Debt Management Office, that would have also boosted the money supply given that those government bonds would otherwise have been purchased by the non-bank private sector.
(2) The purchases were completed in January 2010.
(3) The UK banking sector's net holdings of UK government bonds at the end of 2008, prior to the onset of asset purchases, was £26 billion.

Chart 8 Change in gilt holdings by sector since the recession began[a]



(a) Gilts acquired through asset purchases are held by the Asset Purchase Facility, a subsidiary of the Bank of England.

Table A Accounting for broad money growth since the onset of the recent recession[a][b][c]

£ billions

Counterparts to broad money (M4)		Estimated impact of economic factors: Weakness in lending	Banking sector stabilisation	Asset purchases	Total
£ lending to the private sector (M4L)	55	55			55
– net £ non-deposit liabilities	243		240		240
+ net £ lending to the public sector	262		80	200	280
+ changes in other counterparts	26				
Change in broad money	**99**	**55**	**-160**	**200**	**95**

Sources: Bank of England and Bank calculations.

(a) The period covers 2008 Q2 to 2010 Q4.
(b) The first column (unshaded) shows the accounting counterparts to money identified in **Chart 4**.
(c) Each of the columns shaded blue show the estimated impact on broad money of one of the economic factors discussed in the text. The total impact of a given factor is shown in the bottom row and the other rows show which accounting counterparts were likely affected by that economic factor.

Summarising the impact of the economic factors

The three economic factors outlined above can broadly account for the weakness in broad money since the onset of the recent recession. They can also largely explain the movements in the principal counterparts to broad money over that period. The actual increase in broad money between 2008 Q2 and 2010 Q4 was £99 billion. **Table A** shows a mechanical decomposition of this money growth into its accounting counterparts. It also shows the quantitative estimates of the impact on money of each of the three economic factors and indicates which money counterpart they affected:

(a) Weakness in lending was associated with a weak inflow into money of £55 billion. That estimate is simply set equal to the amount of lending actually observed, reflecting the conclusion that the financial crisis and credit supply shock can broadly account for much of the observed weakness in lending.

(b) Banking sector stabilisation is estimated to have contributed to a net drain of money of around £160 billion. That consisted of about a £240 billion reduction in money holdings estimated from data on banking sector issuance of long-term debt and equity and retention of profits, in part offset by about £80 billion of gilt purchases by the banking sector over the period.

(c) Asset purchases contributed to a net boost of money of £200 billion, assuming that the assets were purchased from the non-bank private sector.

Despite the ability to explain broad money growth in terms of just three key economic developments, there is significant uncertainty associated with each estimate. They should therefore be taken as indicative guides. For instance, it is impossible to estimate precisely the extent of the leakage of asset purchases to non-residents and the extent to which issuance associated with banking sector stabilisation was purchased by the non-bank private sector.

Money, nominal spending and the velocity of circulation

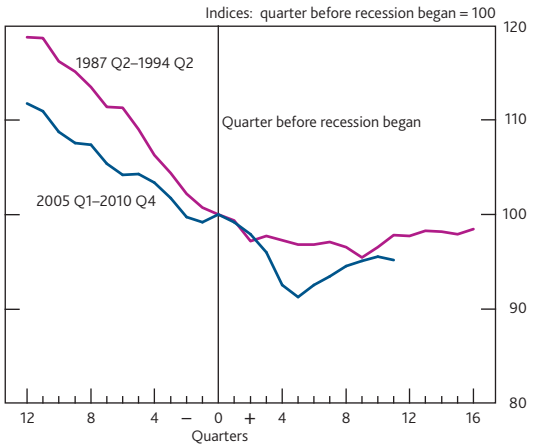
As noted in the introduction, understanding recent movements in the velocity of circulation is important for gauging the signal contained in weak broad money growth about future nominal spending. This section analyses the extent to which weaker broad money has been associated with lower nominal spending and how much has been absorbed in the velocity of circulation.

Understanding the recent velocity profile

It is possible to compare the recent behaviour of broad money velocity with that in the early 1990s, normalised on the quarter before the start of the recession for each period. The early 1990s period provides a useful counterfactual comparison as it represented a period of recession that followed a large expansion of the financial sector. In the 1990s recession, money growth fell rapidly and converged on the rate of nominal GDP growth, after which the two series continued to grow broadly in line for several years — the profile of velocity was thus fairly flat (**Chart 9**).

In the first few quarters of the recent recession, the behaviour of velocity was quite similar to the 1990s recession. But thereafter velocity followed a 'V'-shaped pattern. First velocity fell, which reflected a sharp fall in nominal spending in the first half of 2009, while money growth, although weak, remained slightly positive. Subsequently, velocity recovered, as nominal GDP growth picked up sharply relative to

Chart 9 Velocity compared to the 1990s recession[a]



Sources: Bank of England and Bank calculations.

(a) Broad money velocity scaled to 100 in the quarter before the start of recession — that is 1990 Q2 and 2008 Q1 respectively.

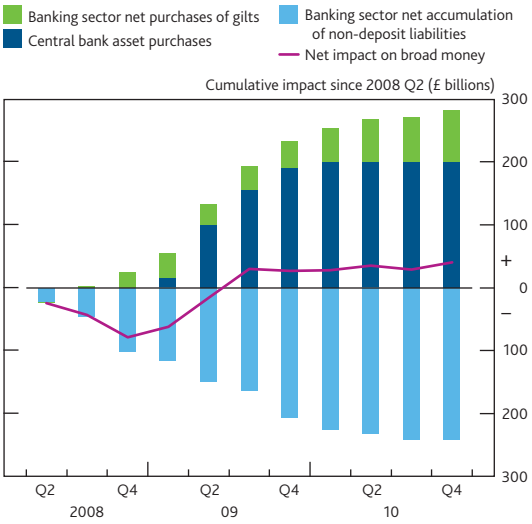
continued weak money growth. During 2010 velocity returned to a similar level relative to the peak of the cycle as in the previous recession.

What might explain the V-shaped pattern of velocity? One potential explanation is the impact of asset purchases. As discussed earlier, a key component of the transmission mechanism of asset purchases is the portfolio rebalancing channel, based on the assumption that gilts and deposits are imperfect substitutes. Asset purchases initially required lower yields and higher asset prices in order for portfolio managers to be willing to hold the additional deposits created. In time, higher asset prices fed through into higher spending by households and companies. Nominal spending was therefore affected with a lag. So, other things equal, asset purchases should have led to an initial fall in velocity during the portfolio rebalancing phase, followed by a subsequent rise as nominal spending increased.

There are two caveats to this explanation of the recent V-shape in velocity. First, asset purchases cannot explain the large fall in velocity observed in 2009 Q1, as they did not begin in earnest until 2009 Q2. Second, banking sector stabilisation may have partially offset the impact of asset purchases on velocity. As discussed in the previous section, banking sector stabilisation is likely to have reduced money holdings significantly. If bank shares are considered imperfect substitutes for bank deposits, that may also have had a lagged effect on nominal spending via portfolio rebalancing channels. So the additional and opposing impact from banking sector stabilisation may have partially dampened the impact of asset purchases on velocity.

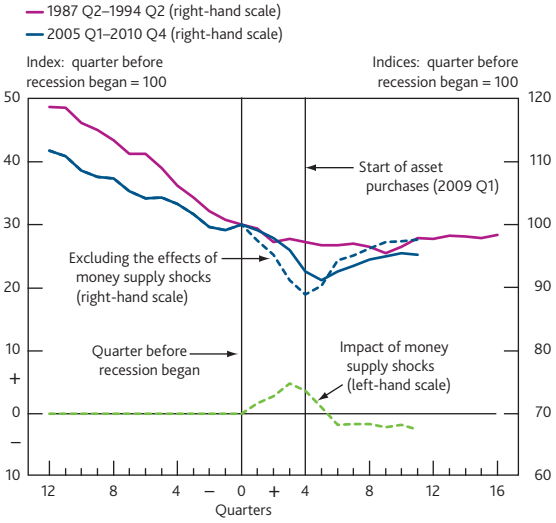
To gauge the behaviour of 'underlying' velocity over the period, a crude attempt can be made to strip out the net impact on the money supply from the combined effects of banking sector stabilisation and asset purchases. Since the onset of the recession, banking sector stabilisation has acted to drain money. But since mid-2009, asset purchases more than offset that effect, such that the net shock to the level of money supply is estimated to have turned positive (**Chart 10**). This net money supply shock can be mechanically removed from the money stock and, making the assumption that the level of nominal spending is unaffected, an alternative 'underlying' path for velocity can be constructed (**Chart 11**). There are two features to note from the underlying profile that results.

Chart 10 Estimated net impact of banking sector stabilisation and asset purchases on broad money[a][b]



(a) 'Banking sector net accumulation of non-deposit liabilities' as defined in **Chart 7**.
(b) 'Banking sector net purchases of gilts' excludes purchases of gilts by the Bank of England.

Chart 11 Velocity compared to the 1990s recession — stripping out the estimated net money supply shock[a][b][c]



Sources: Bank of England and Bank calculations.

(a) Broad money velocity scaled to 100 in the quarter before the start of recession — that is 1990 Q2 and 2008 Q1 respectively.
(b) The green line shows the net money supply shock relating to banking sector stabilisation and asset purchases, as set out in **Chart 10**, translated into velocity space.
(c) The dashed blue line shows the underlying velocity profile when the impact of the net money supply shock is subtracted from the observed velocity profile.

First, a V-shape in velocity remains, but shows a somewhat sharper fall and subsequent recovery. So the trough in velocity is shifted earlier. The sharper V-profile may just reflect a

timing effect, exacerbated by the speed of the downturn. In the second half of 2008, nominal spending began to fall and then fell very sharply in early 2009 — a much sharper decline than seen in the 1990s recession. Given the costs to households and companies of adjusting credit and money holdings, this may have entailed a period when underlying money (after allowing for the effects of asset purchases and banking sector stabilisation), was still adjusting to lower spending in the economy. And given the economic uncertainty at the time, households and companies may have been content to hold a buffer of liquidity, especially if they were anticipating difficulties in obtaining credit in the future. As a result, the recovery in nominal spending in the second half of 2009 could be financed by drawing down those buffers, without households and companies demanding additional money.

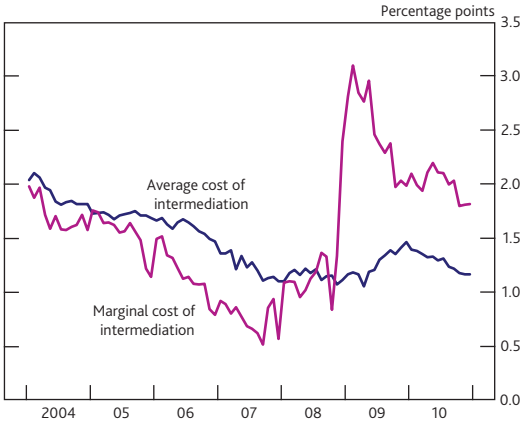
The second feature to note is that the underlying profile of velocity has been fairly flat over the past year, especially if a lagged impact on nominal spending from the net money supply shock is also factored in. Over the past year, the fact that underlying velocity appears to have been broadly flat, at a level close to that implied by the previous recession, indicates that there has been no significant shift in the demand for money relative to spending. This may tell us something about the trend in velocity looking ahead, which will be important in analysing the implications of future broad money outturns for monetary policy.

Prospects for velocity

Since the start of the 1980s broad money velocity has trended downwards, reflecting the growing importance of financial intermediation in the economy. That trend might be expected to reassert itself at some point. But the experience of the 1990s would suggest that the trend can be interrupted for an extended period, if the forces pushing up on velocity are persistent enough. Much depends on how the banking sector evolves and how that affects relative rates of return on borrowing and holding deposits. It is useful to distinguish between two types of relative rates of return. First, rates of return that lead to changes in money and credit for a given path for nominal spending — that is those that change the degree of financial intermediation undertaken by the banking sector. Second, rates of return that change the amount of nominal spending for a given path of money, reflecting shifts between the transactions and portfolio demands for money. The former depends on the cost of bank intermediation (the loan-deposit rate spread); the latter depends on the rate of return on deposits relative to other financial and tangible assets.

The evidence on the likely future cost of banking system intermediation is mixed. For PNFCs, significant disintermediation was observed in 2009, facilitated by issuance on the capital markets (**Chart 6**). But the amount of debt-equity substitution decreased in 2010, suggesting reduced incentives to disintermediate. For households, both loan and deposit rates have generally fallen by less than Bank Rate since the recession began.(1) But the spread between the *average* rate on the stocks of loans and deposits has not changed dramatically (**Chart 12**). For the average household, the cost of maintaining existing intermediation may therefore have changed relatively little over the course of the recession.

Chart 12 Average and marginal cost of intermediation for households(a)(b)(c)



Sources: Bank of England and Bank calculations.

(a) Cost of intermediation based on the loan rate to deposit rate spread. Loan rates are based on the weighted average interest rate on mortgages and personal loans. Deposit rates are based on the weighted average time deposit rate.
(b) Average cost of intermediation calculated from the effective rate on the outstanding stock of loans and deposits.
(c) Marginal cost of intermediation calculated from the effective new business rate on loans and deposits.

In contrast, there has been a significant increase in the *marginal* cost of intermediation for households — the rate on *new* lending relative to the rate of return on *new* deposits (**Chart 12**). That would give an incentive for households to intermediate less via the banking system in the future — namely to pay down a proportion of maturing loans with deposits, rather than to refinance. There are signs though that this incentive may also have diminished somewhat over the past year.

The significance of disintermediation in the future will depend on how persistent the high marginal cost of intermediation proves to be. That in turn will depend on conditions in the banking sector and how loan and deposit rates respond to future changes in monetary policy. For example, the banking sector may seek to close the gap between the stock of loans and deposits, built up in the decade preceding the recession (**Chart 3**). In particular, banks may seek to replace maturing debt liabilities with retail deposits. That would likely require them to bid up deposit rates relative to other rates of return, which would increase money holdings relative to nominal spending.

(1) See Button *et al* (2010).

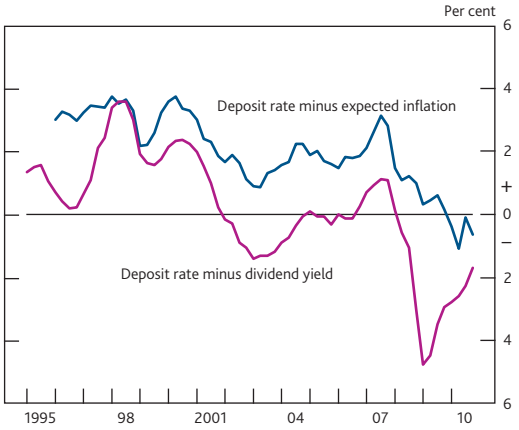
The likelihood of further disintermediation will also depend on the distribution of existing deposits and loans and on how many households and companies face refinancing their loans at high marginal borrowing rates. The extent that disintermediation will increase velocity relative to its downward historical trend is therefore hard to judge.

The outlook for velocity would also be affected if nominal spending were to change for a given amount of money holdings. There may be factors that provide an incentive for households and companies to mobilise existing savings deposits to finance more nominal spending — a process sometimes known as 'dishoarding'. The key factor determining the incentive to dishoard is the rate of return on deposits relative to other assets. If deposit rates are low relative to the return on financial assets (or the marginal utility derived from tangible assets such as consumer durables, housing and investment goods), there is an incentive for households and companies to try to run down their money holdings and substitute into these other assets. But money holdings cannot be reduced in aggregate unless some households or companies choose to repay bank debt. So, for a given level of intermediation, dishoarding would lead to money being passed around the economy between households and companies until asset prices and nominal spending rise (and asset yields fall) sufficiently to offset the initial incentive to reduce money. In this scenario, previously idle money balances become active and there is a shift between the portfolio and transactions demands for money. That would allow for greater money spending for a given level of aggregate deposits, pushing up on velocity relative to its downward historical trend.

Simple measures of the relative rate of return on deposits do appear to be historically low. That suggests an incentive to switch out of deposits (**Chart 13**). First, household time deposit rates are currently well below simple measures of the return on holding shares (the dividend yield). That is consistent with strong flows into retail unit trusts recently. Second, the nominal deposit rate has fallen significantly below measures of the rate of inflation expected by households. Other things equal, this fall in real deposit rates suggests a fall in the rate of return on holding money relative to holding real assets such as consumer durables and housing.

These simple measures do not, however, capture the total rate of return on holding alternative assets to deposits. In particular, expected capital gains on financial assets and expected changes in the relative price of tangible assets over the relevant investment period are also important. The relative riskiness of holding alternative assets compared to holding a bank deposit should also be considered. These expectations and perceptions of risk are very difficult to measure. To the extent that expected capital gains on assets such as equities and housing have also fallen over the recent period, or if the perceived riskiness of holding them has

Chart 13 Relative return on household deposits[a][b]



Sources: Bank of England, Barclays Capital, Thomson Reuters Datastream and Bank calculations.

(a) Deposit rate minus expected inflation is defined as the quoted rate on one to two-year fixed-rate bonds minus one year ahead household inflation expectations from the Barclays Basix survey.
(b) Deposit rate minus dividend yield is defined as quoted time (30–90 day notice period) deposit rate minus the quarterly average dividend yield on the FTSE All-Share index.

increased, that would mean the incentives to dishoard are less than the simple measures suggest.

The actual path of velocity may deviate from the underlying path of velocity because of the impact of money supply shocks. For instance, the banking sector may continue to recapitalise at the expense of deposits.(1) Observed velocity may also increase relative to trend if lagged effects on nominal spending from past money supply shocks continue to come through. The final section looks at what the recent money data might have told us about the impact of these money supply shocks on asset prices and nominal spending in the economy.

Has the recent behaviour of money revealed anything about the transmission mechanism?

The analysis in the second section suggested that three factors can broadly account for the behaviour of broad money since the outset of the recession — asset purchases, weak credit creation and the stabilisation of the banking sector. So far, these have been treated as independent shocks. But weaker credit growth and stronger bank issuance may both have been partly influenced by asset purchases.(2)

For instance, both companies and banks may have been able to issue more equity and long-term debt than otherwise as a result of the higher asset prices and lower yields induced by asset purchases. Companies and banks may have used this issuance to lower their bank debt and deposit liabilities respectively. These channels would both work to reduce the

(1) In the longer term, a well-capitalised banking system with longer-term sources of funding might be expected to foster a greater willingness to lend and hence boost money growth further out.
(2) As discussed in Dale (2010), there are a number of ways through which asset purchases might affect the economy.

initial money supply impact of asset purchases. But both are ultimately useful in strengthening the balance sheets of the banking and corporate sectors, which may facilitate higher investment and increased bank lending in the future.

The extent to which increased issuance of debt and equity by banks and companies was facilitated by asset purchases is uncertain. Issuance may have occurred in the absence of asset purchases. For instance, companies also substituted bank debt for capital issuance in the previous recession, albeit to a slightly lesser extent (**Chart 6**). And it is likely that banks would have had to issue more equity to improve their capital position, even in the absence of asset purchases.

If asset purchases have helped to facilitate balance sheet repair for the banking and corporate sectors, that would reduce the initial impact of asset purchases on asset prices. By allowing greater issuance on the capital markets, the overall impact on money from asset purchases would have been reduced. Financial companies (such as asset managers) would have had to absorb less money into their portfolios. So a smaller asset price effect would therefore have been required to accommodate this smaller absorption of deposits.

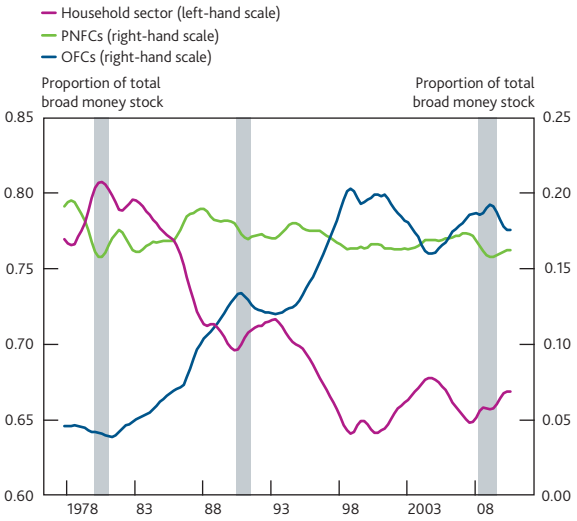
Using empirical estimates of financial companies' money demand, it is possible to estimate the extent to which financial yields and prices would have had to adjust to absorb a given increase in their money holdings. It is then possible to estimate the implied increase in the money supply that would be consistent with the asset price effect of asset purchases, estimated in previous Bank of England work based on event study and econometric analysis.(1)

A money supply increase of around £45 billion–£90 billion would be consistent with the estimated asset price impact of asset purchases derived from other studies (for more detail see the box on page 34). That is broadly consistent with the increase in the money supply that occurred over the period of asset purchases, when the effects of bank stabilisation and PNFC capital market issuance over the same period are taken into account. Although uncertain, a money supply and demand analysis would therefore provide some support for the range of asset price increases attributed to asset purchases in other studies.

Further evidence on the transmission mechanism of asset purchases might be found by looking at sectoral money holdings. Asset purchases would suggest that there should be an initial increase in the share of financial companies' money holdings in broad money as asset managers sold assets to the Bank of England. But over time this share should have declined as companies and households responded to higher asset prices by increasing their spending, and obtaining the money required to finance it by issuing shares to the financial company sector or, in the case of households, liquidating investments with them.

The pattern of sectoral money holdings in 2009 and 2010 has been broadly consistent with the expected transmission of asset purchases (**Chart 14**). But careful interpretation of changes in sectoral money holdings is needed. Some of the sectoral shifts in money may have been expected in the absence of asset purchases. For example, the financial companies' money share has in the past tended to decrease at the expense of other sectors during recessions. That might have been due to the increase in the cyclical component of the budget deficit that typically occurs in recessions. Increased benefit payments to households and concessions on company taxation that were financed by increased government borrowing from the financial sector would be expected to have led to a rise in the share of non-financial companies' and households' money holdings at the expense of asset managers. That might explain part of the fall in the share of financial companies' money in 2010.

Chart 14 Sectoral shares of the broad money stock(a)(b)(c)



(a) Recession periods are shown in grey. Recessions are defined as in **Chart 1**.
(b) Shares based on four-quarter moving average of the break-adjusted stocks.
(c) Money shares calculated excluding the holdings of intermediate OFCs where available.

Conclusions

The recent weakness in broad money growth may be explained by the weakness of bank lending arising from the recession and the impact of banking sector stabilisation. These two factors have been offset by the positive impact of asset purchases on broad money.

The circumstantial evidence from the money data broadly corroborates the estimates of the net impact of asset purchases on asset prices from other empirical work. Sectoral evidence also suggests that asset purchases are broadly working via the balance sheets of households and companies to contribute to an increase in nominal spending.

(1) For more information on the financial market impact of asset purchases, see Joyce *et al* (2010).

Cross-checking the impact of asset purchases on asset prices

The impact of asset purchases on asset prices depends on portfolio rebalancing by asset managers or 'non-intermediate OFCs' such as insurance companies and pension funds. It assumes that these investors view bank deposits as an imperfect substitute for other financial assets such as gilts and equities. Their demand for money will depend on the overall value of their portfolio as well as the rate of return on deposits relative to the yields on gilts and equities. So institutional investors require asset prices to rise and gilt and other financial yields to fall in order to be willing to hold the additional deposits created by asset purchases in their portfolios. That can be summarised according to the following relationship:

Percentage change in money demand
=
Percentage change in the value of financial company assets
+
θ* Percentage point change in (deposit rate – yield on other assets)

where θ is a measure of how substitutable deposits are for other assets — the semi-elasticity of money demand with respect to the opportunity cost of holding a deposit. How much financial asset prices and yields need to change to persuade institutional investors to hold more money depends on θ. If θ is zero then deposits and other assets are perfect complements and money must be held in strict proportion to the value of the overall portfolio. So the percentage change in asset prices must be equivalent to the percentage increase in institutional investors' money holdings implied by asset purchases. If θ is a very large number, deposits and other assets are close substitutes and very little change in asset prices and yields is required for these financial companies to hold more money. Using this relationship and an estimate of θ from the data, the estimated impact of asset purchases on asset prices (derived in other studies) can be cross-checked for consistency with the money supply movements that can be reasonably attributed to asset purchases.

The results of Joyce *et al* (2010) suggest that asset purchases may have lowered gilt yields by around 1 percentage point (and correspondingly increased gilt prices by approximately 10% assuming a ten-year average duration); they also may have had a potentially large, but highly uncertain, effect on equity prices of between 20% and 70%. That would suggest a lower bound increase of around 10%–20% in financial company asset values. Empirical estimates of θ from simple models of financial institutions' money holdings are in the range of 5–10. So a fall in yields of 100 basis points and an increase in asset values of 10%–20% would be consistent with financial companies willing to increase their deposit holdings by 15%–30%. Non-intermediate OFC money holdings were approximately £300 billion during the period over which asset purchases took place, so that would represent a willingness to hold an additional £45 billion–£90 billion in deposits.

Table 1 below suggests that this range encompasses a lower bound estimate of the increase in the money supply that could reasonably be attributed to asset purchases, once the effects of banking sector balance sheet restructuring and PNFC disintermediation (bond, equity and commercial paper issuance) are taken into account. As suggested in the main text, it is plausible that these additional factors may have been related to the programme of asset purchases. **Table 1** shows an estimate of the money supply impact if all of the impact of banking sector stabilisation and PNFC disintermediation over the asset purchase period is assumed to be related to asset purchases. Assuming that less of the impact of banking sector stabilisation and PNFC disintermediation is attributable to asset purchases would be consistent with a money supply impact approaching £200 billion and an overall asset price increase approaching the 70% upper bound estimate of Joyce *et al* (2010).

Table 1 Money supply impacts that could reasonably be attributed to asset purchases(a)

	£ billions
Direct effect of asset purchases	+200
Banking sector stabilisation	-90
PNFC bond, equity and commercial paper issuance	-40
Lower bound estimate of money supply increase attributable to asset purchases	**70**

(a) Note that, unlike **Table A**, the quantities here apply only to the period over which asset purchases were made.

Overall, this suggests that the range of estimates of the asset price impact of asset purchases from Joyce *et al* (2010) are broadly consistent with the range of estimates arising from a money supply and demand approach.

The experience of the 1990s suggests that velocity's long-run downward trend can be interrupted for extended periods of time. The recent conjuncture suggests that there are economic factors pushing up on velocity relative to its historical trend. These are likely to persist in the near term, suggesting that a given rate of growth in nominal spending is likely to be associated with weaker growth in broad money than was typically the case before the crisis. Developments in the banking sector and the relative rates of return on money and credit will be important determinants of whether and when the downward trend in underlying velocity is restored.

Should money growth continue to remain weak, then analysing the causes of this, using the types of analysis employed in this article, will be important in judging whether that weakness is signalling weak nominal spending growth in the future.

References

Bank of England (2008), *Financial Stability Report*, Issue No. 24, October.

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

Benford, J, Berry, S, Nikolov, K, Robson, M and Young, C (2009), 'Quantitative easing', *Bank of England Quarterly Bulletin*, Vol. 49, No. 2, pages 90–100.

Berry, S, Harrison, R, Thomas, R and de Weymarn, I (2007), 'Interpreting movements in broad money', *Bank of England Quarterly Bulletin*, Vol. 47, No. 3, pages 376–88.

Brunken, S and Westley, K (2002), 'Compilation methods of the components of broad money and its balance sheet counterparts', Bank of England *Monetary and Financial Statistics*, October.

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

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

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

Congdon, T (1992), *Reflections on monetarism*, Edward Elgar.

Congdon, T (2005), 'Money and asset prices in boom and bust', *Institute of Economic Affairs Hobart Paper no. 152*.

Dale, S (2010), 'QE — one year on', remarks at the CIMF and MMF Conference, March.

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

Joyce, M, Lasaosa, A, Stevens, I and Tong, M (2010), 'The financial market impact of quantitative easing', *Bank of England Working Paper no. 393*.

Laidler, D (1984), 'The buffer-stock notion in monetary economics', *Economic Journal*, supplement, pages 17–34.

Milbourne, R (1988), 'Disequilibrium buffer-stock models: a survey', *Journal of Economic Surveys*, Vol. 2, No. 3, pages 198–208.

Thomas, R (1996), 'Understanding broad money', *Bank of England Quarterly Bulletin*, May, pages 163–79.

Understanding labour force participation in the United Kingdom

By Andrew Benito of the Bank's Structural Economic Analysis Division and Philip Bunn of the Bank's Inflation Report and Bulletin Division.[1]

Understanding the labour market requires an assessment of labour supply as well as labour demand. Labour supply is a significant component of the overall supply side of the economy which plays a role, alongside demand, in shaping inflationary pressure in the economy. How the economy's supply capacity has been affected by the recession has been raised as an important issue in recent *Inflation Reports*. How labour force participation evolves in the medium term is likely to depend on whether recent trends in participation continue and how those trends are affected by, among other things, the recession. This article presents a disaggregated view of labour force participation in order to assess the role of these influences.

Introduction

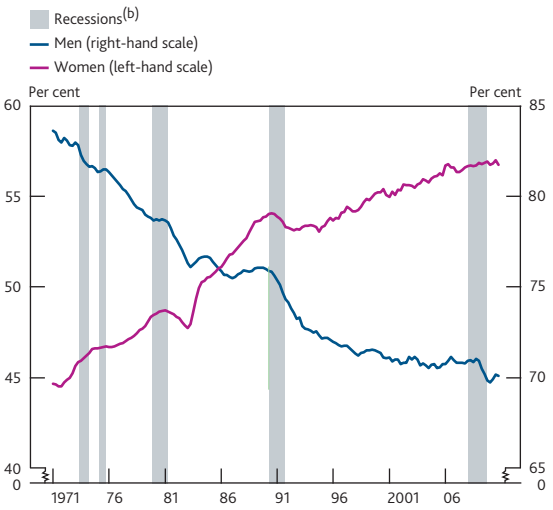
The decision of whether to participate or not in the labour market is a choice of whether to work or search for work on the one hand versus remaining out of the labour market on the other hand. The latter might involve studying, looking after the home or retirement.

The number of people who choose to participate in the labour market is important because it tells us about labour supply. Understanding the labour market requires an assessment of labour supply as well as labour demand. Labour supply is also an important part of the overall supply side of the economy which plays a role, alongside demand, in shaping inflationary pressures in the economy.

Put simply, participants are the employed and unemployed; everyone else is a 'non-participant'. **Chart 1** highlights the contrasting trends in participation rates among men and women over the past 40 years. In that period the participation rate of women has risen by over 10 percentage points while that of men has fallen by over 10 percentage points. These trends reflect quite profound changes in the UK labour market (and indeed in wider society), although those changes have been less marked in recent years.

Through the recent recession, the UK participation rate fell. That decline in participation was concentrated among men, but was still much smaller than in the early 1990s recession. Among women, the participation rate has held up, also rather unlike its pattern in and after some previous recessions (**Chart 1**).

Chart 1 Labour force participation rates(a)



Source: ONS (including the Labour Force Survey).

(a) Percentage of the 16+ population. Rolling three-month measures.
(b) Recessions are defined as two consecutive quarters of falling output (at constant market prices) estimated using the latest data. The recessions are assumed to end once output began to rise.

How the participation rate evolves is likely to depend on whether some past trends in participation among different groups of the population continue. But it will also depend on how these trends are affected by a number of other factors, some of which are associated with the recession.

Whether a person decides to participate in the labour market or not is likely to depend on how the wage offers they receive compare to the wage they require to accept a work offer

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

(known as the 'reservation wage'). Participating in the labour market may also expand the range of work options available to the individual in the future, which may increase their future earnings.

This article describes a cohort-based approach to understanding participation decisions in the United Kingdom. That approach distinguishes between cohorts of the population born at different times and considers each cohort's participation decisions at different points in their life cycle. The first section describes some stylised facts on participation rates. The second section outlines how the cohort-based approach to understanding participation is constructed. The third section discusses the outlook for labour force participation and how it might be affected by a number of behavioural and policy changes.

Stylised facts on participation decisions

Participation decisions are best understood in a life-cycle context — the approach adopted in this article. That is because wage offers and/or reservation wages vary markedly at different ages. Those in turn, generate the strong life-cycle profile in participation rates shown in **Charts 2** and **3**.

Life-cycle effects

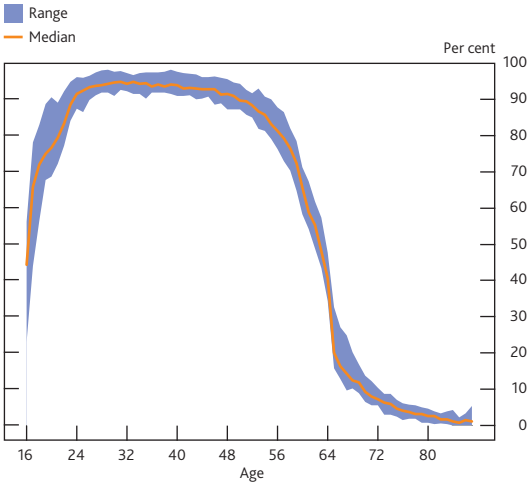
How do participation rates vary over the life cycle? Male participation rates peak in the mid-30s and remain high up to the early 50s, from which point they fall back quite markedly. Among women, there has tended to be a dip in participation at the traditional child-rearing ages from the mid-20s to mid-30s. Participation rates for women then peak around the mid-40s at just above 80%, a lower level than for men. Of course, the precise shape of these life-cycle profiles might be different for people born in the 1950s compared to those born in, say, the 1970s.

Some of the changes in participation rates over time reflect changes in participation decisions at a particular age. Those changes are reflected in the lilac swathes shown in **Charts 2** and **3**.

Chart 2 shows that over the past 25 years the variation in participation rates by age for men has been most marked for young (under 25) and older (65 and over) age groups. In general that variation has been less pronounced than among women for whom it has been especially notable at typical child-rearing ages (**Chart 3**).

Life-cycle profiles are particularly important if they are combined with anticipated changes to the age structure of the population — that will shift the proportions of the population at different points in the life-cycle profile. The changing age structure of the UK population is discussed later in this article.

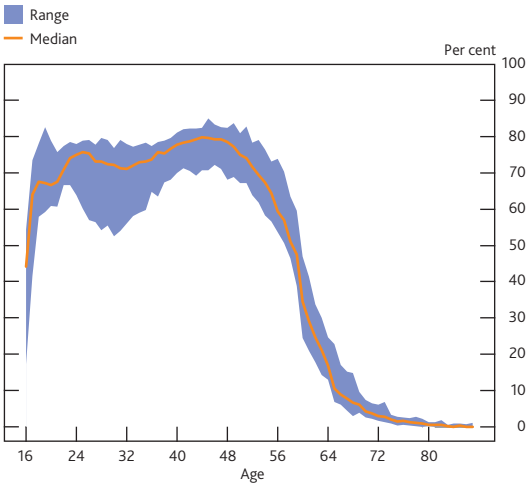
Chart 2 Participation rate over the life cycle — men[a]



Sources: Labour Force Survey and Bank calculations.

(a) Participation rates at each age between 1984 and 2010. Based on data for the three months to June between 1992 and 2010 and the three months to May between 1984 and 1991. Data are non seasonally adjusted.

Chart 3 Participation rate over the life cycle — women[a]



Sources: Labour Force Survey and Bank calculations.

(a) Participation rates at each age between 1984 and 2010. Based on data for the three months to June between 1992 and 2010 and the three months to May between 1984 and 1991. Data are non seasonally adjusted.

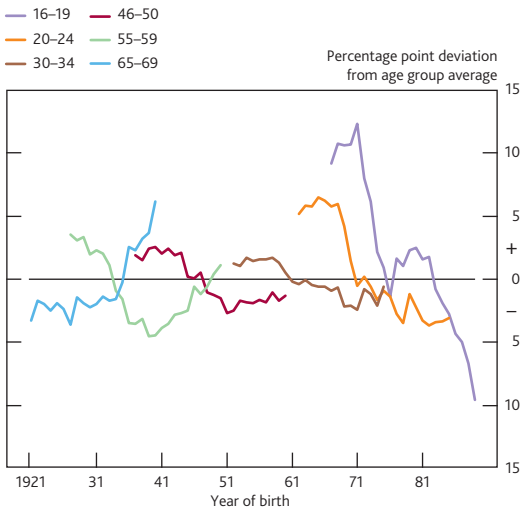
Cohort effects

A cohort can be defined by when a group of individuals was born. A cohort can be associated with different participation rates from average across their life cycle, and that is the 'cohort effect'. For instance, the participation rate of those born in the early 1950s may be influenced by a different set of social customs, incentives and constraints than someone born in the early 1970s, even when the two groups are at a similar age. The effects might reflect institutional and policy differences across cohorts and social mores, for instance.

These cohort effects are hinted at in **Charts 2** and **3** by the range of participation rates observed at a given age (the lilac swathe). That variation is particularly pronounced for women. How the experience of different cohorts has varied over time is

shown more clearly in **Charts 4** and **5**. Each line in **Charts 4** and **5** represents a different age group and shows how the participation rate of different cohorts varies at a particular age relative to the average over the whole period between 1984 and 2010.

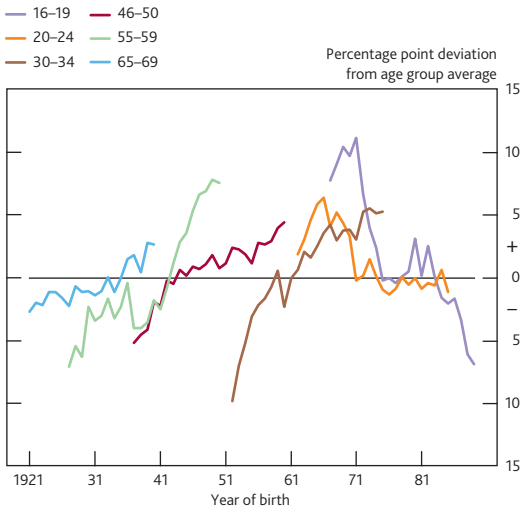
Chart 4 Male participation rates[a]



Sources: Labour Force Survey and Bank calculations.

(a) Based on data for the three months to June between 1992 and 2010 and the three months to May between 1984 and 1991. Data are non seasonally adjusted. Only observations where a cohort is observed for all years within an age group are shown. For clarity not all age groups in the population are shown.

Chart 5 Female participation rates[a]



Sources: Labour Force Survey and Bank calculations.

(a) Based on data for the three months to June between 1992 and 2010 and the three months to May between 1984 and 1991. Data are non seasonally adjusted. Only observations where a cohort is observed for all years within an age group are shown. For clarity not all age groups in the population are shown.

These cohort charts reveal a number of interesting observations. First, among the young (those aged less than 25 — shown towards the right-hand side of **Charts 4** and **5**) participation rates have fallen quite markedly. For those aged 16–19, participation rates have fallen by around 15 to 20 percentage points (lilac lines at the right of the charts). That mainly reflects higher enrolment rates in further and higher education. Second, among women, participation rates have been increasing for successive cohorts from their late 20s to their late 30s (**Chart 5**). This could reflect easier and cheaper access to child care, as well as social mores encouraging female participation, including a quicker return to work after childbirth (eg Gregg *et al* (2007)). Housing market factors may also have played a role in some of these trends. The rise in house prices to earnings may have both reflected and reinforced a trend towards higher female labour participation. Third, at older ages (the lines shown towards the left-hand side of each chart), participation rates have been rising markedly — at least since the early 1990s recession among men and continually so since the early 1980s for women. That may be related to changes in the type of work people do, changes in pension provision and increased life expectancy, among other things.

Understanding participation: a cohort-based approach

From aggregate data on participation rates over time (**Chart 1**), it is not possible to identify trends in households' participation choices by different cohorts. Adopting a cohort-based approach to participation decisions is needed in order to uncover those trends. The outlook for the participation rate is likely to depend on how those disaggregated trends continue to evolve.

The aim of this approach is to understand and quantify the factors affecting the participation decisions for men and women at different ages, and born at different times. The cohort approach tracks each year of birth cohort as it ages during the period 1984 to 2009. Men and women are considered separately, with each cohort observed for up to 26 years of their life cycle. For example, this means one cohort tracks a representative man (and separately, a woman) born in 1950, aged 35 in 1984, then aged 36 in 1985 etc, until s/he is aged 60 in 2009. In this way, the analysis follows a 'representative' individual for the cohort as this representative person ages through time — even though no single individual is traced through time.

For this exercise the raw data are derived from 3 million individuals surveyed in successive Labour Force Surveys (LFS). Using successive years of the LFS, this approach can allow for age effects, cohort effects, a cyclical effect associated with lagged aggregate unemployment and several other effects. The approach follows that of Aaronson *et al* (2006) applied to US data and Balleer *et al* (2009) for euro-area economies.

The outlook for labour force participation

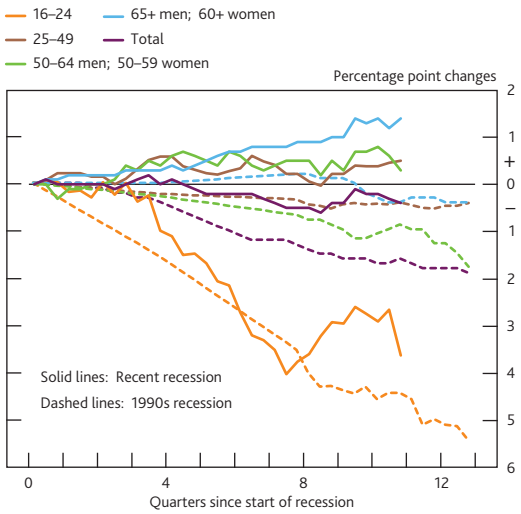
The analysis can be used to help shed light on a number of influences likely to shape the outlook for labour force participation in the United Kingdom. This discussion of the future outlook for participation is inevitably more uncertain than the discussion of past trends.

The business cycle

Past downturns have typically seen participation rates decline. This is sometimes termed a 'discouraged worker effect'. As well as the aggregate cyclical pattern of participation associated with a downturn, it is possible to consider which groups experience the strongest cyclical responses.

Chart 6 compares the profiles for the participation rate by age group through the recent recession (solid lines) and that of the early 1990s (dashed lines). It shows that the participation rates of the young tend to vary most through a recession. A striking feature of **Chart 6** is that the fall in the participation rate in and after the recent recession has, so far at least, been restricted to the young (aged under 25). Older-worker participation has risen modestly. That is in marked contrast to the experience of the early 1990s recession when participation rates among all those of working age declined.

Chart 6 Changes in participation rates by age in recessions[a][b]

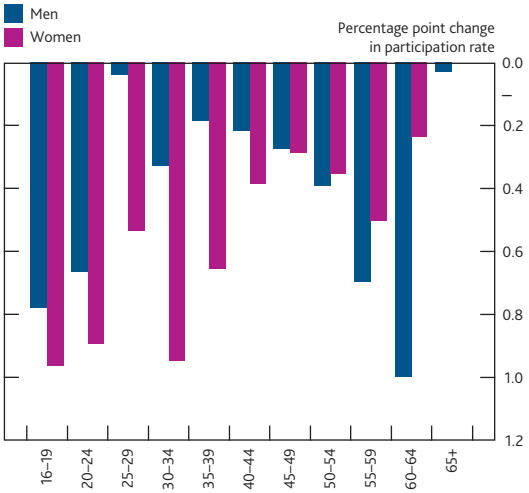


Sources: Labour Force Survey and Bank calculations.

(a) Rolling three-month measures. Observations prior to the three months to May 1992 are based on non seasonally adjusted annual data for the three months to May in each year; rolling three-month data are linearly interpolated over this period.
(b) Recessions are defined as in **Chart 1**. Solid lines show changes from 2008 Q1, dashed lines refer to changes from 1990 Q2.

One way of representing the various influences on participation rates (eg age and cohort effects, business-cycle effects) is through a regression model. Some results from that regression model, estimated on data between 1984 and 2009, are illustrated in **Chart 7**. Those results indicate how the cyclical response of participation varies across different age groups on average over the past. These point estimates are uncertain, however.

Chart 7 Estimated response of participation rates by age to a 1 percentage point increase in aggregate unemployment[a]



Sources: Labour Force Survey and Bank calculations.

(a) Response to a 1 percentage point change in aggregate unemployment one year earlier. Responses are from a regression model estimated between 1984 and 2009. The model also includes a range of other explanatory variables including age, cohort effects, health problems, education, life expectancy, financial wealth and number of children.

The estimations suggest that, among men, more of the relatively young and relatively old respond to higher unemployment rates by withdrawing from the labour market. Among older men in particular, the early 1990s recession saw a pronounced fall in participation rates. For women, the response among the young to unemployment is also relatively strong. These groups are likely to find it easier to substitute alternative activities for work or job search, with the young tending to invest in human capital — for example deciding to be students — and the relatively old taking early retirement. A similar pattern was found by Aaronson *et al* (2006) for the United States.

The rise in unemployment since mid-2007 might be expected to push down on participation rates as work is more difficult to find. Offsetting this effect to a degree, some people may of course enter the labour force, for instance if their partner has lost his or her job — sometimes described as an 'added worker effect'. Since 2008, the aggregate participation rate has declined slightly, especially among men (**Chart 1**). That suggests that the discouraged worker effect has dominated, but to a lesser extent than estimates based on the average of the past would imply (**Chart 7**).

Certain institutional features that eased the transition of older workers from the labour market in and after the early 1990s recession seem unlikely to operate in the same way following the recent recession. For instance, the relatively generous early retirement provisions available from occupational pensions and the availability of disability benefits were

important in helping account for the fall in participation after the early 1990s recession (Blundell and Johnson (1997)). These features of the policy environment have changed since the early 1990s. Defined benefit occupational pensions are less widely available, and where schemes are available generous early retirement provisions may not be. That may alter the cyclical response of participation and make participation less sensitive to the cycle than in the early 1990s. That may help explain why, in **Chart 6**, the participation rates of the older age groups have tended to rise since the onset of the 2008/09 recession, unlike during the early 1990s.

Financial wealth

Economic theory suggests that a reduction in financial wealth raises labour supply (and participation rates). Among older workers, for instance, lower pension wealth implies lower annuity income and an incentive to delay retirement to raise that pension income. Among younger workers these are likely to be less affected since they have generally accumulated less wealth, and above the age of 25 participation rates are close to their peak, implying that there is less scope to increase participation rates. If asset prices are lower than had been expected for those close to retirement, this may cause them to defer their retirement and push up on participation rates.

Changes in the structure of pension provision might also affect incentives for early retirement. An increased incidence of defined contribution pensions makes more employees directly exposed to asset returns. Among those with defined benefit pensions the declines in asset returns may make the availability of early retirement packages more restrictive. These factors may help account for the ongoing rise in participation rates at older ages including through the recent recession.

Changes in the state pension age

The state pension age for women, previously 60, was raised in April 2010 and is scheduled to rise steadily until it is equalised with male state retirement age by 2018. And further rises in the state pension age for men and women have been proposed.

There is a sharp drop in participation rates at the state pension age, a fall that is more pronounced than at the surrounding ages. This is likely to partly reflect liquidity constraints. Since it is difficult to borrow against future pension wealth, some employees with low levels of wealth may need to work until they receive the state pension.

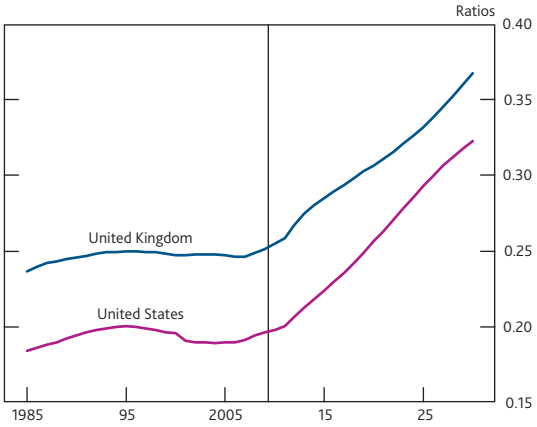
By observing how the participation rate varies by age at the previous state retirement age (60 for women and 65 for men) compared with how it changes at surrounding ages, it is possible to estimate the effect of changing the state pension age on participation rates. For instance, in the 2009 data the female participation rate falls by 13 percentage points on turning 60. However, the participation rate falls by 4 percentage points a year on average between the ages of 55 and 65 (excluding 60). That suggests that reaching state retirement age may reduce the female participation rate by around 9 percentage points. Raising that state pension age then translates into a higher participation rate as each cohort must wait to receive their state pension and a fraction of them delay their retirement as a result.

The age structure

In the past 25 years, changes to the age structure appear to have had a neutral influence on the aggregate participation rate. That may change over the next decade, as the 'demographic bulge' associated with the ageing baby-boomers (often used to refer to those born between 1946 and 1964) reach older ages where participation rates are lower.

Chart 8 shows that ONS projections imply that the proportion of the population aged above 65 is set to rise dramatically over the next ten years, after having been broadly stable since the 1980s. The dependency ratio (the population aged 65 and over divided by that aged 16 to 64) is expected to rise from one in four of the population in 2010 to around one in three of the population by 2020. The trend is expected to continue beyond 2020. A similar profile, but at slightly lower levels throughout, is expected in the United States. Work by Aaronson *et al* (2006) assesses the impact of the changing age structure on participation rates in the United States and finds quite large effects tending to lower participation.

Chart 8 Old-age dependency ratio[(a)]



Sources: ONS and US Census Bureau.

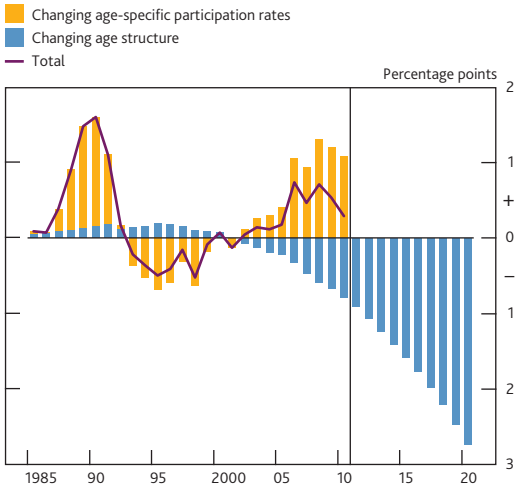
(a) Ratio of population aged 65 and over to 16–64 population. Projections from 2010 onwards.

A changing age structure may have a significant effect on the overall participation rate. The US labour force participation rate has declined in recent years since peaking in 2000. After reaching 67.3% in 2000 it declined steadily by a total of around 1.5 percentage points by 2005. Aaronson *et al* (2006) suggested that much of the decline immediately after 2001 was due to cyclical factors. Cyclical factors may have also

been at work more recently as the US participation rate dipped below 65%. But through this period Aaronson *et al* (2006) also suggest the changing age structure has been important and that could continue in the United States, with future cyclical moves occurring around a declining trend in the participation rate.(1)

The age structure is 'slow moving', changes are rarely large year on year. But those changes may cumulate over time to something more pronounced.(2) And the unprecedented changes in the age structure — alongside the strong life-cycle profile in participation that was described earlier — imply that there is scope for population ageing to have an important influence on the aggregate participation rate over time. All else the same, the projected changes to the age structure could, cumulatively, lower the aggregate participation rate by 2 percentage points by 2020, compared with 2010 (**Chart 9**). This of course reflects the pattern described earlier: more of the population is projected to be at those ages where participation rates are lower.

Chart 9 Contributions to cumulative changes in aggregate participation since 1984(a)



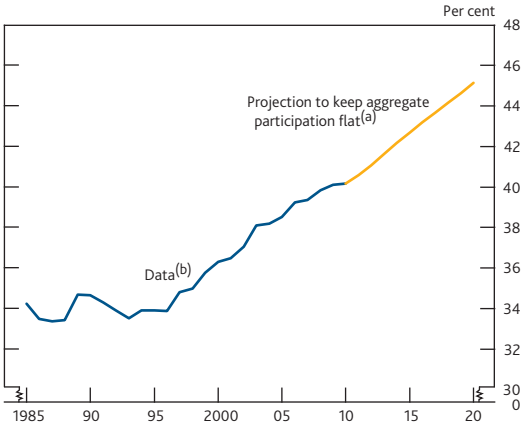
Sources: ONS (including the Labour Force Survey) and Bank calculations.

(a) Annual data for the three months to June. Contribution of the changing age structure up to 2010 is constructed using the LFS microdata by calculating the difference between the actual participation rate in each year and a measure of the participation rate using current year age-specific participation rates and population weights from the previous year. The demographic contribution prior to 1992 is calculated using data for the three months to May. The contribution from changing age-specific participation rates is calculated as a residual. Beyond 2010, projections for the impact of the changing age structure are calculated by assuming that age-specific participation rates remain at 2010 levels and that the age structure of the population evolves in line with ONS population projections.

The 'composition effect' associated with changing demographics and illustrated in **Chart 9** is not the end of the story, of course. In recent years, there have been more than offsetting 'behavioural effects', meaning that at a given age, participation rates have been increasing, as employees have been delaying their retirement relative to earlier cohorts. This is another source of uncertainty. The contribution of those changes to the age-specific participation rates is also shown in **Chart 9**. As the compositional effect increases in importance in future years, reflecting the change in age structure of the population, this offsetting behavioural effect would need to increase in size for the participation rate to remain stable. Of course there is also some uncertainty around the precise nature of the changing age structure, although this relates to how large the downward influence of demographics will be, not whether these effects will be negative or not.

How large an offset from rising participation rates, particularly among older groups might we need or expect to see for this to offset the changing age structure of the population? **Chart 10** shows a stylised scenario which demonstrates the likely size of the increase in the participation rates of older workers that would be required to offset the demographic effects shown in **Chart 9** and keep the aggregate participation rate flat. That suggests that little more than a continuation of recent trends seen over the past decade would offset the effects of the changing age structure. However, in addition to the clear uncertainty present in any calculations of this kind, it should also be noted that the increases in participation rate of older workers over the past decade were much larger than in the 1990s.

Chart 10 Participation rate among those aged 50+



Sources: ONS (including the Labour Force Survey) and Bank calculations.

(a) The participation rate at each age between 50 and 74 is assumed to increase by the same number of percentage points in each year in order to keep the aggregate participation rate at its 2010 level. Participation rates for those aged 22 to 49 and those aged 75 and over are assumed to remain at 2010 levels. Participation rates for those aged 16 to 21 are assumed to fall at the same rate as between 2000 and 2010. The age structure of the population is assumed to evolve in line with the ONS population projections.
(b) Annual data. Based on data for the three months to June between 1992 and 2010 and the three months to May between 1984 and 1991. Data are non seasonally adjusted.

Although the scale of the increase in older-worker participation rates that would be required to offset the impact of population ageing on the overall participation rate may be quite large, it does not appear implausible. Moreover, the scenario assumes that the recent downward trend in participation rates among the young continues. Those

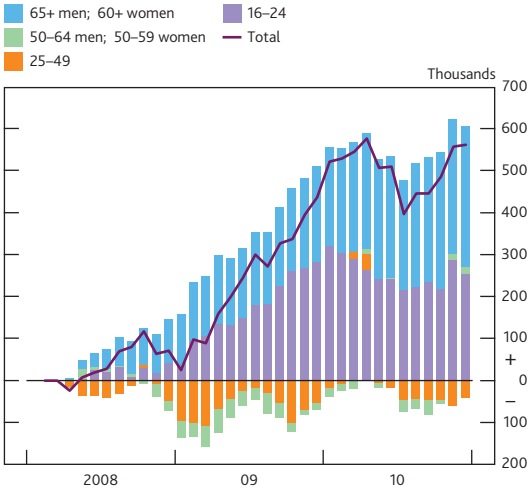
(1) The 'old-age dependency ratio' does not pick up all of these changes in the age structure. For example, participation rates generally fall through ages 50–64. So changes in the population proportion at these ages also affect participation without being reflected in a higher old-age dependency ratio.
(2) See Miles (1999) and Young (2002) for studies of how projected changes to UK demographics might affect the UK economy.

pronounced trends (**Charts 4** and **5**) could slow. In the illustrative scenario, the participation rates of those aged between 22 and 49 remain at 2010 levels. Higher participation among these groups would reduce the increase in older-worker participation needed to keep the overall participation rate stable. Clearly, there are many scenarios that might be considered. And for the aggregate participation rate to decline slightly — as it did at several points in the past — need not represent a problem for the economy.

The latest labour market data also point to the start of the changing age structure and its effect on the participation rate. The latest data suggest both the presence of the behavioural effect — older people extending their working lives — and the compositional effect associated with greater numbers of older people with a lower participation rate than younger people. **Chart 6** showed that participation rates of older workers have risen since the onset of the recent recession. But **Chart 11** shows that — despite those rising participation rates — the numbers of inactive older persons has been rising — reflecting the greater numbers of older people in the population.

The findings echo results found for the United States and the euro area (see Aaronson *et al* (2006) and Balleer *et al* (2009), respectively). A changing age structure may, by itself, have a downward effect on the participation rate. Age-specific participation rates will be affected by a range of influences, and these may differ across these economies. In the United Kingdom, several of these influences, including those discussed in this article, will tend to raise the aggregate participation rate by raising the participation rate at a particular age — and especially so at older ages.

Chart 11 Changes in inactivity by age since 2008 Q1



Source: Labour Force Survey.

Conclusion

This article has described an approach to understanding an important aspect of labour supply — the participation rate. That approach exploits the variation in several million individuals' participation decisions. The discussion has highlighted the range of influences — both disaggregated and aggregate — that are likely to shape the outlook for labour force participation in the United Kingdom. How the participation rate evolves in the medium term is likely to depend on whether some disaggregated trends in participation continue and how those trends are affected by, among other things, the recession.

References

Aaronson, S, Fallick, B, Figura, A, Pingle, J and Wascher, W (2006), 'The recent decline in the labor force participation rate and its implications for potential labor supply', *Brookings Papers on Economic Activity*, Vol. 37, pages 69–134.

Balleer, A, Gomez-Salvador, R and Turunen, J (2009), 'Labour force participation in the euro area: a cohort based analysis', *ECB Working Paper no. 1049*.

Blundell, R and Johnson, P (1997), 'Pensions and retirement in the UK', *NBER Working Paper no. 6154*.

Gregg, P, Gutierrez-Domenech, M and Waldfogel, J (2007), 'The employment of married mothers in Great Britain, 1974–2000', *Economica*, Vol. 74, pages 842–64.

Miles, D (1999), 'Modelling the impact of demographic change upon the economy', *Economic Journal*, Vol. 109, pages 1–36.

Young, G (2002), 'The implications of an ageing population for the UK economy', *Bank of England Working Paper no. 159*.

Global imbalances: the perspective of the Bank of England

By Mervyn King, Governor, Bank of England. This article was first published in the Banque de France *Financial Stability Review*, No. 15, February 2011, 'Global imbalances and financial stability'.[1]

In 2009, demand in the world's major economies fell, relative to its pre-crisis trend, by around US$2.5 trillion or 5% of GDP. The financial crisis damaged virtually every country. Global imbalances helped to fuel the financial crisis. And today they threaten the sustainability of the recovery in global demand. Global imbalances are a reflection of today's decentralised international monetary and financial system. All the main players around the world are rationally pursuing their own self interest. But the financial crisis has revealed that what makes sense for each player individually does not always make sense in aggregate. These actions had collective consequences. The main lesson from the crisis is the need to find better ways of ensuring the right collective outcome. Improved financial regulation will help to intermediate the flows associated with global imbalances. But the global economy will remain vulnerable to the risks associated with imbalances if they are not tackled at source. Two principles should underpin the way ahead. First, discussions should focus on the underlying disagreement about the right speed of adjustment to the real pattern of spending and hence the reduction in these imbalances. This discussion should be informed by countries' ability to follow that path in a sustainable way. Second, many policies, in addition to changes in exchange rates, will be needed to reduce imbalances. If agreement is not reached on these two principles, at best there will be a weak world recovery; at worst, the seeds of the next financial crisis will be sown.

In 2009, demand in the world's major economies fell, relative to its pre-crisis trend, by around US$2.5 trillion or 5% of GDP. The financial crisis left almost no country unscathed. While unprecedented policy measures allowed the world to escape a second Great Depression, the global recovery so far has been uneven and it remains fragile.

This article looks at the role global imbalances played in fuelling the financial crisis, and the importance of achieving a rebalancing of global demand in order to foster a sustainable recovery. Its key message is that, in today's highly interconnected global economy, a top priority for national policymakers must be to find ways to rebalance global demand. That is important to ensure both (i) the level of world demand is sufficient for the world recovery to continue and (ii) that future crises are avoided.

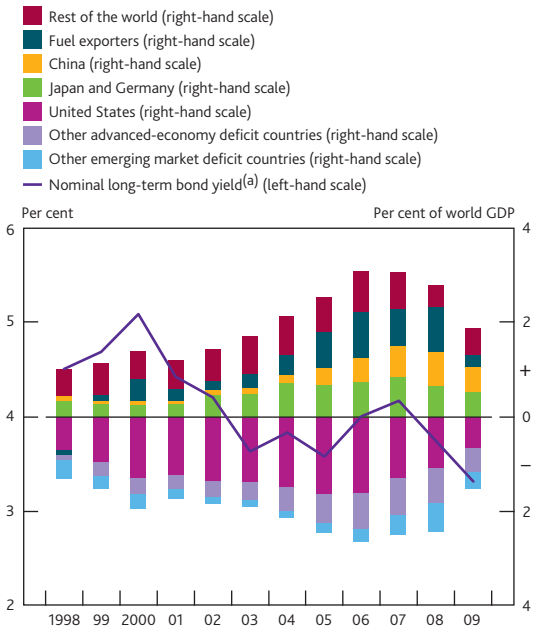
Imbalances contributed to the financial crisis

Since the breakdown of the Bretton Woods system in the early 1970s, international monetary arrangements have evolved into a decentralised system. Countries are free to make independent choices about their monetary, exchange rate and financial stability policies. Greater capital mobility has also been one of the defining features of the current regime. In the run-up to the recent crisis, net capital flows more than doubled in less than a decade (**Chart 1**) and global imbalances widened to near unprecedented levels (**Chart 2**).

Increased capital flows can raise global output to the extent that they seek out the most productive investment opportunities, transferring savings from countries where the marginal product of capital is low to countries where the marginal product of capital is high. But in today's system, some advanced economies such as the United States and the United Kingdom have been running large and persistent current account deficits, while emerging market economies, in particular in Asia and among oil exporters, have been running current account surpluses. This 'uphill' flow of capital from the dynamic, labour-abundant emerging economies to the

(1) This article was also published on the Bank of England's website on 18 February 2011, see www.bankofengland.co.uk/publications/speeches/2011/speech473.pdf.

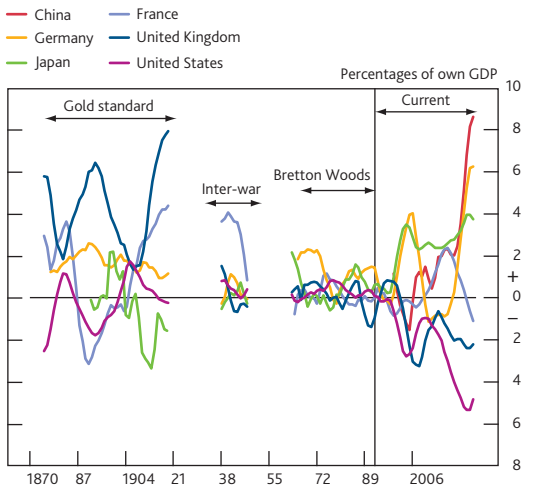
Chart 1 Current account imbalances and long-term interest rates



Source: IMF *World Economic Outlook*.

(a) Advanced economies.

Chart 2 Current account balances(a)



Sources: IMF *World Economic Outlook*, Taylor (2002) and Bank calculations.

(a) Five-year moving average.

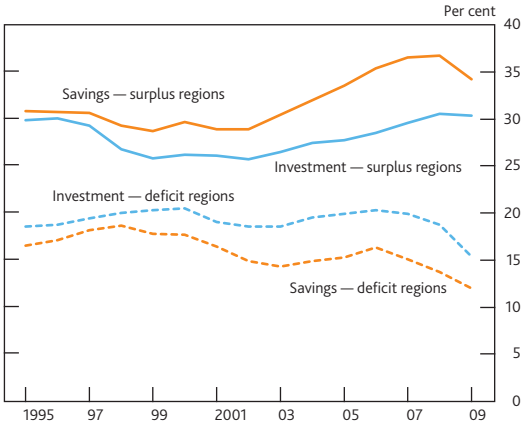
mature advanced economies is, at least in some instances, puzzling. So factors other than differences in the marginal product of capital must have been at work (Lucas (1990)). It is notable that the purchasers of foreign assets have been emerging market *public* sectors rather than private sectors. As a result, there has been a more than tenfold increase in reserve holdings over the past fifteen years. The governments in those economies have been playing an intermediary role, channelling domestic saving away from the local economy and into international capital markets. And emerging market economies' asset of choice has been safe, typically sovereign financial assets.

These growing *flow* imbalances have been accompanied by growing *stock* imbalances. The US net external liability position quadrupled in size in the course of a decade, rising to US$3.5 trillion in 2008 (25% of GDP). And the net external asset positions of Japan and Germany rose by around US$1.7 trillion and US$0.8 trillion respectively (around 35% and 25% of 2008 GDP) over the same period, while Chinese net external assets reached US$1.5 trillion, a third of GDP, in 2008.

What drove these net capital flows 'uphill'? **Chart 1** illustrates that these flows were associated with a decline in long-term interest rates, pointing to either a fall in *desired* investment or an increase in *desired* saving at the global level. Were such changes to occur in any given country, they would tend to increase that country's current account balance, leading either to a smaller deficit or a larger surplus. But the fact that global current account imbalances were growing over this period indicates that these shifts in saving-investment balances occurred in countries that were already running surpluses.

Chart 3 demonstrates that rising saving-investment imbalances in surplus countries were driven primarily by increased saving, rather than decreased investment. Although investment had been high and rising in surplus countries, saving had been even higher, and increasing at a faster rate. A 'savings glut' in surplus countries created ever-larger net capital outflows that allowed the United States — and other deficit countries — to finance continued borrowing.

Chart 3 Savings and investment rates in current account deficit and surplus regions(a)



Note: Per cent of GDP shown as per cent of surplus regions' GDP and per cent of deficit regions' GDP.

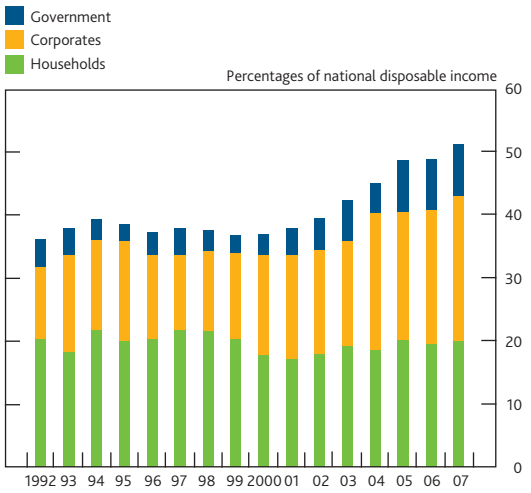
Source: IMF *World Economic Outlook*.

(a) Surplus regions are those with current account surpluses greater than 1% of GDP in 2008 and include Commonwealth of Independent States and Mongolia, Developing Asia, Japan, Middle East and Newly Industrialised Asia; deficit regions are those with current account deficits greater than 1% of GDP and include Central and Eastern Europe, Sub-Sahara Africa, United Kingdom and United States.

In an accounting sense, the increase in emerging market saving as a share of world GDP reflected two factors. Taking China as an illustration, **Chart 4** shows that in China, national savings

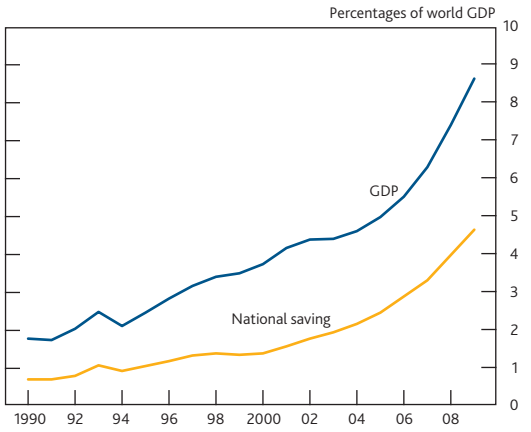
increased as a percentage of national disposable income from 2001 onwards. **Chart 5** shows that Chinese GDP has doubled as a share of world GDP since 2001 — accentuating the increase in Chinese savings as a share of world GDP.

Chart 4 China's national savings



Source: Speech by Governor Zhou Xiaochaun, 3 July 2009, www.pbc.gov.cn/image_public/UserFiles/english/upload/File/AddressattheGlobalThink-tankSummit[1]..pdf.

Chart 5 China's national savings and GDP



Source: IMF *World Economic Outlook*.

There are three possible, interconnected, reasons why domestic saving in emerging economies increased. First, many of these economies adopted a strategy of *expanding manufactured exports to create employment*. This required maintaining highly competitive exchange rates and resulted in a substantial accumulation of foreign exchange reserves. Second, in the aftermath of the Asian crisis governments decided to accumulate reserves for *precautionary reasons*. And third, *low levels of financial development* may have played an important role through a variety of channels including (i) households choosing to self-insure because of incomplete access to domestic insurance markets (Mendoza *et al* (2009)); (ii) an insufficient supply of 'safe' financial assets at home which encouraged emerging market investors to accumulate 'safe' assets from advanced economies' financial markets (Caballero *et al* (2008)); (iii) the scaling back of government-provided social safety nets and provision of health and education services, which encouraged households to build up saving buffers (Chamon and Prasad (2010)); and (iv) inadequate provision of financial services, which forced companies to retain earnings to finance future investment.

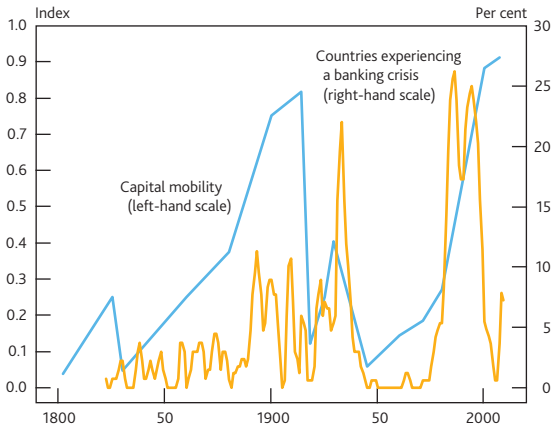
Meanwhile, policymakers in advanced economies followed a strategy of aiming to maintain an adequate level of overall demand consistent with steady, low inflation. In some cases, that implied that they ran substantial current account deficits. At the time, all the economies seemed to gain: just as the high-saving countries created employment, the low-saving economies enjoyed faster real consumption growth as the price of imported manufactured goods fell.

Within their own terms, all these actions were rational. All the main players — countries, regulators, central banks and commercial banks — were rationally pursuing their own self interest. But what made sense for each player individually did not make sense in aggregate. These actions had collective consequences.

In particular, the 'glut' of savings helped push down on government bond yields — Warnock and Warnock (2009), for example, estimate that if there had been no foreign official purchases of US government bonds in the year to May 2005, the ten-year Treasury yield would have been around 80 basis points higher. In an attempt to maintain returns at previous higher levels, other investors 'searched for yield', which encouraged risk-taking, much of it under the guise of 'financial innovation', resulting in an underpricing of risk. This was evident in reduced discrimination between assets of differing credit quality and the development of increasingly complex financial instruments employing leverage to generate higher returns. Such risk-taking was possible because of inadequacies in financial regulation and supervision.

The pattern of growth, with the associated imbalances and mispricing of risk, was not sustainable: as we know only too well, the ensuing financial crisis threatened the entire stability of the financial system. Indeed, as **Chart 6** illustrates, financial crises have been a hallmark of the current incarnation of the international monetary and financial system (IMFS), with the reappearance of global financial instability coinciding with the rapid increase in capital mobility. **Chart 7** shows that the change in countries' non-performing loan (NPL) ratios between 2007 and 2009 and their current account balance in 2007 are correlated, though of course the direction of causation could go both ways. By comparison, the relationship between the change in countries' NPL ratios and their banks' capital ratios is insignificant. **Table A** also shows that relative to Bretton Woods, today's IMFS has proven

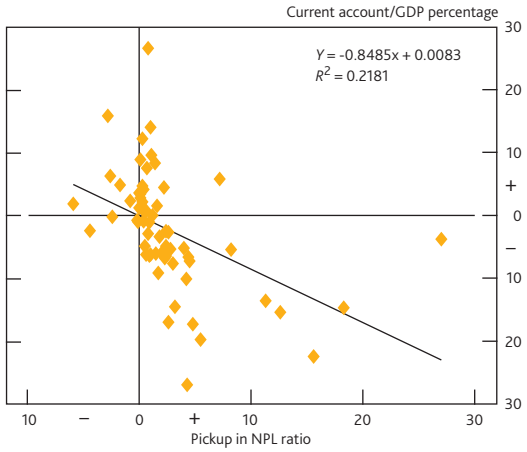
Chart 6 Capital mobility[a] and the incidence of banking crises[b]



Sources: Bordo *et al* (2001), Obstfeld and Taylor (2004), Reinhart (2010) and Bank calculations.

(a) Obstfeld and Taylor's capital mobility index is judgemental and takes values between 0 and 1.
(b) Three-year average.

Chart 7 Current account balances and non-performing loan (NPL) ratios[a]



Sources: IMF *Global Financial Stability Report* and *World Economic Outlook*.

(a) Current account balance as a share of GDP in 2007 and change in NPL ratios between 2007 and 2009.

durable, but it has also coexisted, *on average*, with: slower, more volatile, global growth; more frequent downturns; higher inflation and inflation volatility; larger current account imbalances; and more frequent banking crises, currency crises and external defaults. However, to some extent these period-average metrics obscure significant improvements over the current period, with the 'great moderation' period post-1990 associated with much better outcomes than those achieved in the 1970s and 1980s. Nevertheless, with the important exception of inflation, the outcomes achieved during the Bretton Woods period were better than those attained since 1990. While this does not imply causation of course, it does suggest that better outcomes may be possible.

Indeed, the main lesson from the crisis is the need to find better ways of ensuring the right collective outcome. Reforms to financial regulation and the structure of the banking system need to take place in order to prevent another financial crisis. Many of these reforms are already under way. Improved financial regulation will help to intermediate the flows associated with global imbalances. But we cannot expect too much of regulation: it may well be circumvented or diluted over time, and there will be leakages, both across borders and through the shadow banking system. So the global economy will remain vulnerable to the risks associated with imbalances if they are not tackled at source. That will require some way of ensuring that countries' policies result in a sustainable outcome.

Rebalancing of global demand is the key to a sustainable recovery

All countries accept that global rebalancing is necessary. But there is a clear difference between the *ex-ante* path of adjustment desired by the surplus countries, which are faced with the need for a structural shift away from reliance on exports, and the *ex-ante* path of adjustment preferred by the deficit countries, which are under greater pressure to reduce the burden of debt in both private and public sectors. Talk of currency conflicts is a symptom of a deeper disagreement on the appropriate time path of real adjustment. The reason this matters is that, since surpluses and deficits must add to zero for the world as a whole, differences between these desired *ex-ante* adjustment paths are reconciled *ex post* by changes in the level of world output. And the risk is that unless agreement on a common path of adjustment is reached, conflicting policies will result in that *ex-post* path taking place at an undesirably low level of world output.

Today's IMFS has become distorted. The major surplus and deficit countries are pursuing economic strategies that are in direct conflict. And there are some innocent victims. Those emerging market economies which have adopted floating currencies are now suffering from the attempts of other countries to hold down their exchange rates, and are experiencing uncomfortable rates of capital inflows and currency appreciation. So there is more to this issue than a bilateral conflict between China and the United States.

Current exchange rate tensions illustrate the resistance to the relative price changes that are necessary for a successful rebalancing. The need to act in the collective interest has yet to be recognised, and, unless it is, it will be only a matter of time before one or more countries resort to protectionism as the only domestic instrument to support a necessary rebalancing. That could, as it did in the 1930s, lead to a disastrous collapse in activity around the world. Every country would suffer ruinous consequences. But, to borrow a phrase, in order to be tough on protectionism, we need also to be tough on the causes of protectionism.

So what needs to be done? I would suggest two principles for the way ahead. First, focus discussion on the underlying

Table A Selected metrics for measuring the performance of the IMFS over time

Panel A	World GDP (per capita)[a]		World inflation[b]	
	Growth Annual average Per cent	Volatility Coefficient of variation	Average Per cent	Volatility Standard deviation Percentage points
Pre-gold standard (1820–69)	0.5	–	–	–
Gold standard (1870–1913)[c]	**1.3**	**1.2**	**0.6**	**3.0**
Inter-war period (1925–39)[c]	**1.2**	**3.3**	**0.0**	**4.6**
Bretton Woods (1948–72)[d]	**2.8**	**0.3**	**3.3**	**2.1**
Memo: 1948–58[d]	*2.7*	*0.4*	*3.1*	*2.9*
1959–72	*3.0*	*0.3*	*3.5*	*1.3*
Current (1973–2008)	**1.8**	**0.7**	**4.8**	**3.5**
Memo: 1973–89	*1.4*	*0.8*	*7.5*	*3.4*
1990–2008	*2.2*	*0.6*	*2.3*	*0.9*

Panel B	Downturns		Current account imbalances
	Years of negative world GDP growth Share of period Per cent	Years of negative country GDP growth[e] Share of period, median country Per cent	Surpluses and deficits Per cent of world GDP[f]
Pre-gold standard (1820–69)	–	–	–
Gold standard (1870–1913)[c]	**7**	**19**	**2.4**
Inter-war period (1925–39)[c]	**21**	**27**	**1.2**
Bretton Woods (1948–72)[d]	**0**	**4**	**0.8**
Memo: 1948–58[d]	*0*	*0*	*0.8*
1959–72	*0*	*0*	*0.8*
Current (1973–2008)	**0**	**13**	**2.2**
Memo: 1973–89	*0*	*18*	*1.6*
1990–2008	*0*	*11*	*2.8*

Panel C	Incidence of crises		
	Banking crises[g] Number per year	Currency crises[h] Number per year	External default[i] Number per year
Pre-gold standard (1820–69)	0.6	–	0.7
Gold standard (1870–1913)[j]	**1.3**	**0.6**	**0.9**
Inter-war period (1925–39)	**2.1**	**1.7**	**1.5**
Bretton Woods (1948–72)	**0.1**	**1.7**	**0.7**
Memo: 1948–58	*0.0*	*1.4*	*0.3*
1959–72	*0.1*	*1.9*	*1.1*
Current (1973–2009)	**2.6**	**3.7**	**1.3**
Memo: 1973–89	*2.2*	*5.4*	*1.8*
1990–2009	*3.0*	*2.4*	*0.8*

Sources: Bordo *et al* (2001), Global Financial Data, Hutchison and Noy (2006), IMF *World Economic Outlook*, Maddison (2006) updated data are available from www.ggdc.net/MADDISON/oriindex.htm, Mecagni *et al* (2009), Reinhart (2010), Taylor (2002) and Bank calculations.

(a) Denominated in constant international dollars, as defined by Maddison (2006).
(b) Nominal GDP-weighted average of twelve countries.
(c) Where world-level data are unavailable, a subset of reporting countries is used.
(d) World GDP data begin in 1950.
(e) Sample of current G20 countries (including EU countries), where data available.
(f) Sum of absolute values of surpluses and deficits. Based on available data for a sample of G20 and EU countries.
(g) Based on a sample of 56 countries, using data based on methodology developed by Bordo *et al* (2001).
(h) Based on a sample of 56 countries, using data based on methodology developed by Bordo *et al* (2001) and supplemented by Reinhart (2010), Mecagni *et al* (2009) and Hutchison and Noy (2006).
(i) Based on a sample of 45 countries. External defaults as defined by Reinhart (2010).
(j) Currency crises data begin in 1880.

disagreement about the right speed of adjustment to the real pattern of spending. This discussion should be informed by countries' ability to follow that path in a sustainable way. Without agreement on this, policies will inevitably conflict. Once broad agreement is reached, it should then be easier to agree on the instruments of policy. Second, in terms of policy instruments, put on the table many potential policy measures — not just the single issue of exchange rates. That should include, in addition to exchange rates, rules of the game for controlling capital inflows, more efficient means for countries to self-insure, plans to raise saving in the deficit countries, structural reforms to boost demand in the surplus countries and even the role and governance of the international financial institutions.

What is needed now is a 'grand bargain' among the major players in the world economy. A bargain that recognises the benefits of compromise on the real path of economic adjustment in order to avoid the damaging consequences of a move towards protectionism. Exchange rates will have to be part of such a bargain, but they logically follow a higher level agreement on rebalancing and sustaining a high level of world demand.

A natural forum in which to strike a bargain is the G20 Framework for Strong, Sustainable and Balanced Growth. So far, the process has failed to achieve a move to a better outcome. If we cannot achieve co-operation voluntarily then a more rules-based automatic system may need to be considered to restore global demand and to maintain future global economic and financial stability.

Global imbalances contributed to the financial crisis and a rebalancing of global demand is the key to a sustainable recovery. While financial regulation will help to intermediate the flows associated with global imbalances, it has limitations. If we, collectively, do not deal with these problems at best we will have a weak world recovery and at worst we will sow the seeds of the next financial crisis. It is in our hands to avoid both those outcomes.

References

Bordo, M, Eichengreen, B, Klingebiel, D and Martinez Peria, M S (2001), 'Is the crisis problem growing more severe?', *Economic Policy*, Vol. 16(32), pages 51–82.

Caballero, R, Farhi, E and Gourinchas, P (2008), 'An equilibrium model of 'global imbalances' and low interest rates', *American Economic Review*, Vol. 98(1), pages 358–93.

Chamon, M and Prasad, E (2010), 'Why are savings rates of urban households in China rising?', *American Economic Journal: Macroeconomics*, Vol. 2(1), pages 93–130.

Hutchison, M and Noy, I (2006), 'Sudden stops and the Mexican wave: currency crises, capital flow reversals and output loss in emerging markets', *Journal of Development Economics*, Vol. 79, pages 225–48.

Lucas, R (1990), 'Why doesn't capital flow from rich to poor countries?', *American Economic Review*, Vol. 80(2), pages 92–96.

Maddison, A (2006), *The world economy*, OECD Publishing, Vol. 2.

Mecagni, M, Atoyan, R and Hofman, D (2009), 'The persistence of capital account crises', *IMF Working Paper no. 09/103*.

Mendoza, E, Quadrini, V and Rios-Rull, J (2009), 'Financial integration, financial deepness and global imbalances', *Journal of Political Economy*, Vol. 117(3), pages 371–416.

Obstfeld, M and Taylor, A (2004), *Global capital markets: integration, crisis, and growth*, Cambridge University Press.

Reinhart, C (2010), 'This time is different chartbook: country histories on debt, default, and financial crises', *NBER Working Paper no. 15815*.

Taylor, A (2002), 'A century of current account dynamics', *Journal of International Money and Finance*, Vol. 21(6), pages 725–48.

Warnock, F and Warnock, V (2009), 'International capital flows and US interest rates', *Journal of International Money and Finance*, Vol. 28, pages 903–19.

China's changing growth pattern

By Ed Dew and Jeremy Martin of the Bank's International Economic Analysis Division, Julia Giese of the Bank's Prudential Policy Division and Gabriele Zinna of the Bank's International Finance Division.[1]

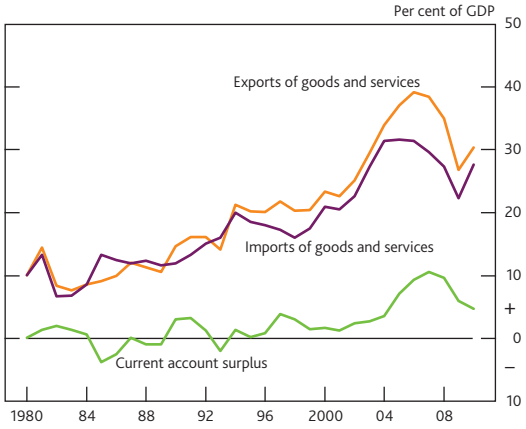
China's growth over the past 30 years has been remarkable. In part, that reflects a strategy pursued by many emerging market economies in the past with a focus on expanding exports. More recently, China's current account surplus has shrunk, reflecting the collapse in world trade during the financial crisis, and the domestic stimulus China introduced in response. This article discusses China's previous growth pattern and asks whether the nascent rebalancing will be sustained, considering implications for the rest of the world.

Introduction

China's growth strategy has been remarkably successful over the past 30 years: real GDP per head has increased almost thirtyfold;[2] the fraction of the population living on less than a dollar a day has fallen from around two thirds to around one tenth;[3] and China's share of world GDP rose to 13% in 2010 from 2% in 1980, even as its share of the world's population fell to 20% from 25% (IMF (2010)).

Over the same period, China's GDP growth has become much more focused on external trade and investment. Between 1980 and 2000, the share of gross exports and imports in China's GDP increased steadily (**Chart 1**). But between 2001 and 2007 the trade share, and particularly the share of exports, increased much more rapidly. That led to a widening of the current account surplus and, more recently, to China emerging as the world's largest exporter. These trends were mirrored by a rise in China's national savings rate.

Chart 1 China's trade and current account



Sources: IMF *World Economic Outlook* (*WEO*) database, October 2010 and Bank calculations.
The 2010 numbers are IMF staff estimates.

The increase in China's current account surplus was part of a widening of global imbalances prior to the world financial crisis. A number of advanced countries experienced growing current account imbalances, among them the United States and United Kingdom which had current account deficits of 5.1% and 2.6% of GDP in 2007, respectively. The substantial global macroeconomic imbalances, and the capital flows associated with them over the past decade, have been identified as causes of recent financial instability (Astley *et al* (2009), King (2011) and Wolf (2008)). In response, the Group of Twenty (G20) has discussed the pattern of global imbalances and is considering ways to make the global economy more balanced. As G20 host for 2011, France has made this discussion one of the central elements of its agenda.

China's current account has already shrunk considerably since the start of the global financial crisis, falling to 5% of GDP in 2010 compared to 11% in 2007 (**Chart 1**). This reflected both the collapse in world trade at the start of the financial crisis and a substantial domestic stimulus subsequently introduced by the Chinese authorities.

The Chinese authorities see rebalancing away from exports and investment, and towards consumption, as desirable in the long term. A growth strategy based on exports and investment rising as a proportion of GDP cannot be sustained indefinitely. Premier Wen Jiabao has said that to 'unleash domestic demand holds the key to long-term and steady development of China's economy' (Wen (2010)). It is not clear, however, whether the rebalancing following the financial crisis will be sustained in the short term. As this article

(1) The authors would like to thank Rachana Shanbhogue and William Speller for their help in producing this article.
(2) IMF (2010), measured at purchasing power parities.
(3) World Bank (2009), measured at purchasing power parities.

discusses, that will depend on the authorities' policy choices and developments in the rest of the world.

China's growth pattern matters for the rest of the world. Any path towards global rebalancing will, by definition, mean that rebalancing in deficit countries will be a mirror of that in surplus countries. Therefore the rebalancing of China's economy, and the speed with which that is achieved, will have an important bearing on the export prospects of other countries, including those such as the United Kingdom that are currently running a current account deficit and wish to rebalance their economies towards net exports. It is therefore perhaps not surprising that, as King (2011) notes, countries running a current account deficit tend to have a preference for a faster pace of rebalancing than surplus countries where structural changes are required.

The rest of the article is structured as follows. The first section looks at the composition of China's GDP growth in the decade leading up to the world financial crisis, during which exports and investment grew rapidly. The second considers the factors behind China's high savings rate. The third describes China's rebalancing since the start of the crisis. The fourth section considers whether this rebalancing can be sustained. And the final section puts China's rebalancing in a global context.

China's growth pattern: 1997–2007

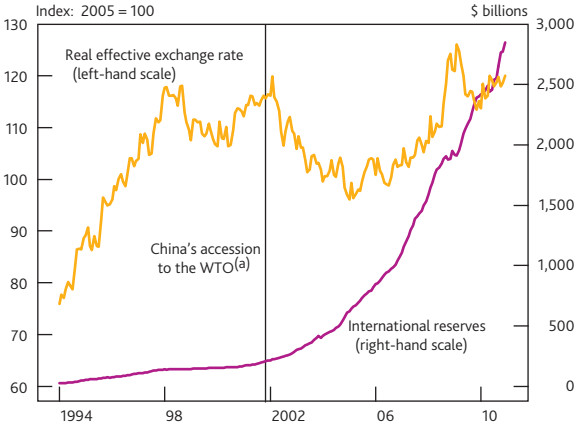
China's growth strategy of export promotion has had marked consequences for the country's growth pattern. While net exports have tended to only make small contributions to growth, the policies designed to promote exports also encouraged rapid investment growth.

China's 'export promotion' growth strategy

An export-oriented growth strategy involves promoting exports by reducing trade barriers, and sometimes subsidising (explicitly or implicitly) exports (see Todaro and Smith (2006) and Rajan (2010)). It also typically involves high levels of investment as the production of tradable manufactured goods tends to be relatively capital-intensive.

By this definition, China has followed an export promotion strategy for most of the past 30 years and, in particular, in the decade leading up to the world financial crisis (Branstetter and Lardy (2006)). China joined the World Trade Organisation (WTO) in 2001, which led to a reduction in trade barriers and a removal of explicit export subsidies. Around this time, however, it also started to accumulate foreign exchange reserves at a much faster pace (**Chart 2**). This offset the upward pressure on the renminbi from China's rising competitiveness, supporting exports and making imports more expensive. Despite the renminbi's nominal appreciation between 2005 and 2009, it remains around its 2001 level in real trade-weighted terms.

Chart 2 China's international reserves and exchange rate



Sources: Bank for International Settlements and Thomson Reuters Datastream.

(a) 11 December 2001.

China has not been alone in pursuing an export promotion growth strategy — Japan and several other Asian economies have followed similar models in the recent past, as did some advanced economies, such as the United Kingdom, in the early stages of industrialisation. There are a number of good reasons why countries might want to follow export-oriented growth strategies. First, and most importantly, it allows a developing country to tap foreign demand for goods for which the domestic market is initially small. This lets them grow much more rapidly than would otherwise be the case. Moreover, trade liberalisation can allow countries to take advantage of gains from trade by specialising in their comparative advantage (Ricardo (1817)), thereby increasing overall productivity.

But this is not the full story. Rodrik (2006) finds that China, similar to some other export-oriented countries, has to some extent avoided specialising in its initial comparative advantage, which lies in its abundant supply of labour. In particular, it exports far more sophisticated — and capital-intensive — manufactured goods than might be expected given its large potential labour force and low level of labour cost.

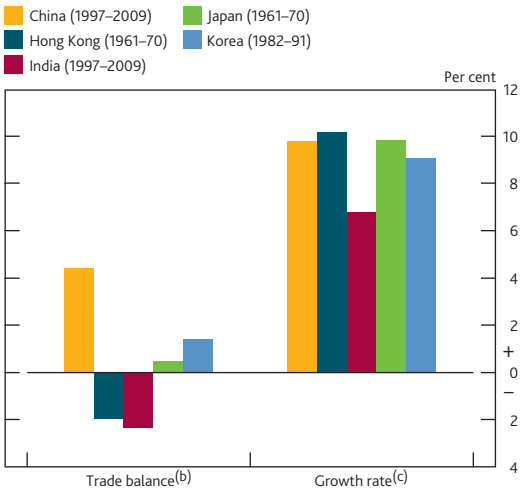
Rodrik argues that this specialisation in tradable manufactured goods — 'industrial tradables' — has been an important contributor to growth in countries that have pursued export-oriented growth strategies, including China. These industries may be important in generating positive productivity spillovers, for example through technology transfer and learning. Typically, in developing countries these industries tend to be hampered by weaknesses in institutional arrangements, infrastructure and human capital. Circumventing these market failures by subsidising industrial tradables could thus provide a 'second-best' solution to kick start these industries and increase productivity.

Encouraging foreign direct investment (FDI) into China has played an important role in China's export promotion

strategy. FDI inflows to China reached $148 billion in 2008, up from $3.4 billion in 1989. Most of the FDI has gone into the manufacturing sector, as flows into the service sector have faced more restrictions (Long (2005)). Clusters of production have formed, allowing firms to take advantage of industry-wide increasing returns to scale. China has also become a hub for the production of manufactured exports with foreign firms taking advantage of low labour costs and China's proximity to other Asian countries.

While China's growth strategy is in many ways similar to that pursued by other economies in the past, one difference is the size of the current account surplus that China has run. The experience of other Asian economies suggests that a strategy of promoting the tradables sector does not, in itself, necessarily lead to a current account or trade surplus. A number of these countries imported substantial quantities of raw materials, capital goods and machinery as they grew (Rajan (2010)). Indeed, during comparable phases of their growth strategies, trade balances have been broadly balanced or even in deficit (**Chart 3**).

Chart 3 International comparisons of trade balance and GDP growth[a]



Sources: Thomson Reuters Datastream and Bank calculations.

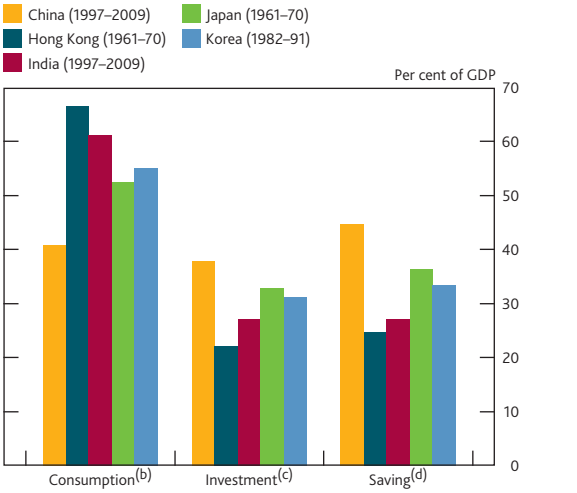
(a) Periods of fastest-growing decades taken from Razmi (2008). Periods for China and India have been updated.
(b) Period average of the external balance on goods and services as a percentage of GDP.
(c) Period average of annual GDP growth.

Different means of promoting the tradables sector have different implications for the current account. Trade liberalisation can increase gross production of tradables without necessarily affecting the trade balance. Following its accession to the WTO in 2001, trade liberalisation in China likely contributed to the rapid increase in both the country's gross exports and imports. WTO rules also constrained China's use of direct production subsidies to support exports. As a consequence, China's intervention in the foreign exchange market to limit the degree of currency appreciation may be seen as an alternative means of promoting exports. By increasing the domestic price of foreign goods and reducing the foreign price of domestic goods, this has tended to increase China's trade surplus and change the composition of internal demand.

The composition of demand

China's unusually large current account surplus is mirrored in a correspondingly low proportion of spending on domestic demand. China's household consumption as a per cent of GDP is lower than that of other Asian countries during similar stages of development. It has fallen from 51% of GDP in 1985 to 35% of GDP in 2009. This, in part, reflects relatively high Chinese gross domestic savings (defined as all public and private sector saving), which has allowed China to invest a higher proportion of its GDP compared to other countries at a similar stage of development (**Chart 4**). It also mirrors a decrease in household disposable income relative to GDP.

Chart 4 International comparison of consumption, investment and savings[a]



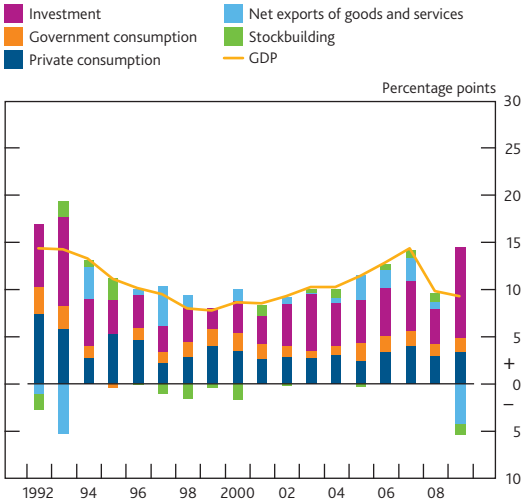
Sources: Thomson Reuters Datastream and Bank calculations.

(a) Periods of fastest-growing decades taken from Razmi (2008). Periods for China and India have been updated.
(b) Period average of household final consumption expenditure, except for Hong Kong which is from 1965 to 1970.
(c) Period average of gross fixed capital formation, except for Hong Kong which is from 1965 to 1970.
(d) Period average of gross domestic savings.

In terms of contributions to GDP growth, net trade has made relatively small but consistently positive contributions over the past decade (except for 2009), while consumption has made a steady contribution to growth. Investment has made the largest contribution (**Chart 5**). Moreover, the relatively slower growth of consumption meant that the extra supply capacity arising from rapid investment was not fully absorbed. Thus China has had to rely to some degree on external demand and a widening trade surplus to absorb additional supply. The other side of the same story is that strong investment, in part, reflects the promotion of exports which are more capital-intensive.

Growth has been heavily dependent on capital deepening: Prasad (2009) suggests that employment only grew by 1% per annum between 2000 and 2008 — one tenth of China's GDP

Chart 5 Contributions to annual real GDP growth in China



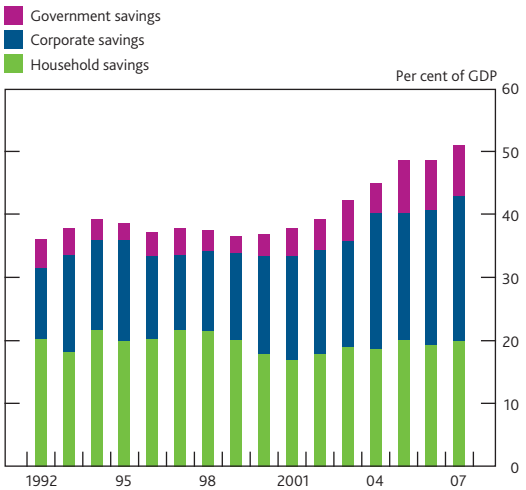
Sources: IMF *WEO* database, October 2010, IMF staff estimates and Bank calculations.

growth rate. The 2010 OECD *Economic Survey of China* reviews studies on the composition of GDP growth and comes to the conclusion that the growth of physical capital accounted for almost 50% of total growth and labour for only a little over 10% over recent decades (although this would be somewhat higher if the increased quality of labour was taken into account). Total factor productivity contributed the remaining growth, partly driven by the reallocation of labour from the rural sector to manufacturing.

Why is China's savings rate so high?

As noted before, China's gross savings are high compared to other countries, explaining why the country's current account surplus has been large despite high investment. But it is not only China's households that have contributed to the high national savings rate. Indeed, the household savings rate has been broadly unchanged since the early 1990s as a proportion of GDP, whereas corporate and government savings have increased (**Chart 6**).(1) China is unique among its Asian counterparts with respect to both the overall scale and composition of its savings. All three sectoral components (household, corporate and government) are near the highest in the region (Qiao and Song (2009)).

Chart 6 China's national savings



Source: Zhou (2009).

Household savings

While household savings have not been the key driver behind the rise in aggregate savings, the household savings rate — standing at nearly 30% of disposable income in 2009 for urban households — is high by international comparison. Precautionary motives appear to be behind much of this. Households' savings decisions reflect concerns over the so-called 'three mountains' — education, pensions and healthcare — following the decline in the provision of public services (Blanchard and Giavazzi (2006) and Chamon and Prasad (2008)).

Such concerns are particularly prevalent among older generations who have lived through extremely turbulent times and, since 1978, seen state support for healthcare, pensions and education reduced during reforms of state-owned enterprises (SOEs). The introduction of the one-child policy in the late 1970s also implied an increased need for old-age self-provisioning. But the evidence for any inherent bias in China for high savings is weak. Modigliani and Cao (2004) find evidence that households only saved about 5% of their income before 1978. And in contrast to the old, the middle-aged and young may come to decide that they can rely on steady growth in income to build up the required savings. This may partly explain the evidence presented in Chamon and Prasad (2008), showing that middle-aged Chinese households, contrary to those in other countries, save relatively less than the old and young. For the young, the precautionary savings motives discussed above may outweigh the income effect.

Nevertheless, aggregate household savings remain high. And besides limited social safety nets and these demographic factors, domestic regulation has also played a role. In particular, limited competition in the service sector and hence a lack of service provision may be constraining consumption and boosting saving. While SOEs face tough competition from private companies in most industrial sectors, the 2010 OECD *Economic Survey of China* suggests that barriers to entry remain high in some service sector industries, such as banking, telecommunications and the media. Services contributed just over 40% to GDP in 2009. This is low compared to other developing countries such as India and Brazil where services make up around 55% and nearly 70% of GDP, respectively. But it is similar to other export-oriented economies at a comparable stage of development. Moreover, the current level of financial sector development and regulation means that households have to save more in order to build up pension

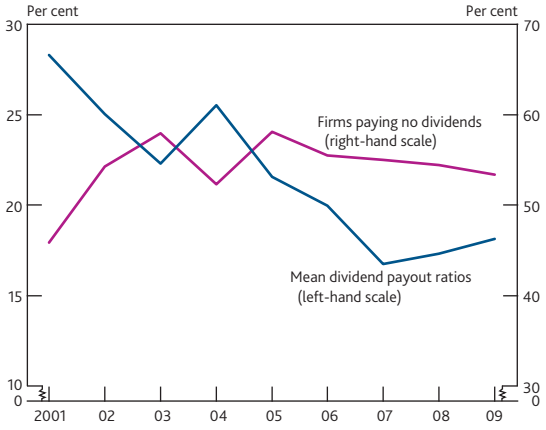
(1) However, aggregate Chinese data do not always correspond to more granular data. See, for example, Bayoumi, Tong and Wei (2010).

cushions: interest rates on savings accounts are capped by regulation and opportunities to invest in other financial assets are limited. Credit is also not readily available to many households, implying the need for higher savings to purchase a house or consumer goods.

Corporate savings

The high level of China's corporate savings rate is linked to firms' tendency to retain earnings. According to Worldscope data, over half of listed Chinese industrial firms did not pay a dividend over the past decade (**Chart 7**).(1) This compares to an average of around 35% for a sample of four other Asian countries.(2) And the dividend payout ratio, which shows the percentage of earnings paid to shareholders in dividends, declined by roughly 10 percentage points since 2001.

Chart 7 Percentage of firms paying no dividends and dividend payout ratios by listed Chinese firms(a)



Sources: Worldscope Thomson Reuters Datastream and Bank calculations.

(a) The chart shows dividend payout ratios, defined as dividends over earnings per share, and firms paying no dividends for a rolling sample of listed Chinese firms. The sample covers those firms in the Worldscope database as of 31 January 2011.

Given the role of retained earnings, growth in corporate savings is closely linked to growth in corporate profits. Corporates have enjoyed profit growth of around 30% per annum since 2000, significantly outperforming wage growth, which averaged 15% per annum. Part of the explanation for strong profit growth lies in the large pool of surplus rural labour which has suppressed wage growth and boosted profits.

The growth of private firms has also been a factor driving profit growth (Kuijs (2006)). The increasing importance of small private firms may, moreover, be an explanation for why earning retention has increased. Small firms tend not to have access to bank finance to the extent that large SOEs do. They are therefore more reliant on retaining earnings to finance investment.

In addition, the increased efficiency of SOEs (Kuijs (2006)) as well as government support may have boosted profitability in the non-private corporate sector. By depressing the value of the nominal exchange rate, official purchases of foreign currency have supported relative competitiveness and thus the corporate profits of exporters and import-competing firms. Low borrowing rates — the consequence of a heavily regulated financial system — may have also played a role in lifting corporate profits, particularly for SOEs. Between 1992 and 2007, net interest payments by the non-financial corporate sector more than halved as a share of GDP, contributing 30% of the rise in corporate savings (Ma and Yi (2010)).

Government savings

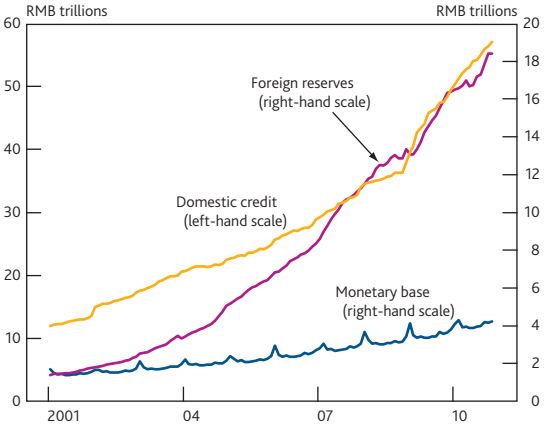
Government savings have been a relatively small and, in the period leading up to the global financial crisis, fast-growing component of China's national savings. They accounted for around a quarter of the overall increase in national savings between 1992 and 2007 (**Chart 6**). Rising government savings have reflected a combination of higher government income thanks to strong economic growth, tax reform, land sales and higher social welfare contributions from the private sector and a flat government consumption to GDP ratio (Ma and Yi (2010) and Qiao and Song (2009)).

China's recent rebalancing

There are signs that China's growth model has, at least temporarily, shifted course. Since the start of the global financial crisis, China's external imbalances have narrowed sharply, with the current account surplus falling to 5% of GDP in 2010, from 11% in 2007 (**Chart 1**).

The value of China's exports fell by 16.7% between October 2008 and November 2009, largely reflecting a fall in external demand. China's policymakers compensated with a significant fiscal stimulus to maintain growth and employment, worth around RMB 4 trillion or 12% of GDP over two years. This was, in part, financed through bank borrowing by local governments. The central government budget, which had been in surplus of 6.1% in 2007, moved to a deficit of 2.3% of GDP in 2009, while bank lending increased by 31.7% in that

Chart 8 Reserves, monetary base and domestic credit



Source: CEIC.

(1) The profits of Chinese listed firms accounted for 36% of all enterprise profits in 2008 (Bayoumi, Tong and Wei (2010)).
(2) India, Japan, Korea and Singapore.

year (**Chart 8**). Bank lending expanded rapidly through 2010 as well, reflecting the continuation of projects started in 2009. But to the extent that rapid credit growth could place upward pressure on inflation, this rate of growth is unlikely to be sustained. Indeed, Chinese authorities have sought to tighten monetary policy over the past year.

The stimulus packages contained a number of measures aimed at boosting both investment and consumption, leading to a reduction in the current account surplus.

Investment

A major part of the stimulus package announced in 2008 related to investment, particularly in infrastructure. These measures included upgrading railways, roads, airports and power grid infrastructure, reconstruction in Sichuan following the devastating earthquake there, rural and ecological projects, and additional funding for research and development. By boosting demand for commodities and hence raising import growth, some of these policies directly contributed to the decline in China's current account surplus.

Moreover, these measures boosted China's domestic demand in 2009 and 2010 without leading to further capacity in export sectors. Over time, infrastructure investment in particular may help rebalancing if inland regions, which are less export orientated, can develop more quickly.

Consumption

Some stimulus measures were aimed at boosting consumption. The government directly subsidised purchases of some consumer durables. Perhaps most strikingly, purchases of cars in 2010 were 92.4% higher than in 2008, at least in part reflecting government-financed discounts for traded-in cars and fuel-efficient cars. The Chinese Ministry of Commerce estimated that central government would allocate more than RMB 80 billion (0.2% of GDP) to direct consumption subsidies in 2010. The central government also took a number of steps to boost the income of poorer households directly, and some provincial governments raised minimum wages.

The government funded a number of new social support schemes which may contribute to a reduction in household savings in the future. In November 2008, the government allocated RMB 900 billion (2.9% of GDP) to constructing affordable housing. It also initiated a three-year healthcare plan with a focus on medical infrastructure in rural areas. In 2009, it introduced a rural pension scheme and made it possible to transfer pension accounts across regions.

The direct subsidies to households will have boosted consumption in the short term. And the structural reforms should increase consumption and reduce savings over the longer term. For example, increases in minimum wages, reforms to healthcare and the pension system, as well as relaxation of the 'hukou' registration system that has restricted migrant workers' ability to permanently settle in cities, could reduce household savings and boost consumption.

Is the recent rebalancing likely to be sustained and extended?

Whether the rebalancing towards domestic demand during the crisis will be sustained will depend on what replaces the temporary stimulus-related demand. And that will depend on the speed with which the Chinese authorities want to shift the country's growth pattern.

Building on the recent reforms and stimulus measures, China's twelfth five-year plan, ratified in March 2011, included the broad goal of 'a new growth pattern that is jointly driven by consumption, investment and exports'. But it is not clear how quickly the authorities will want to, and will be able to, reorient the drivers of growth towards more consumption and away from investment and exports. In the short term, they may see benefits in reverting to a reliance on the latter.

China's primary economic policy goal is to maintain full employment with rapid economic development. Guo and N'Diaye (2009a) argue that new (and likely more) employment opportunities would follow structural rebalancing as domestic markets replace external ones. But shifting capacity to the domestic sector, in particular services, might entail a temporary increase in unemployment, for example if skill mismatches mean that, in the short run, workers cannot seamlessly switch between sectors.

Nonetheless, a return to the previous export-oriented growth pattern may be difficult to sustain for several reasons.

First, under some circumstances, exchange rate intervention to limit a currency's appreciation can generate inflationary pressures — leading to real exchange rate appreciation, even without appreciation of the nominal exchange rate. Purchases of foreign exchange by the central bank typically lead to increases in the domestic money supply as foreign currency is bought with domestic currency. In normal circumstances, that would eventually increase credit growth and put upward pressure on inflation. That, in turn, would increase the production costs of exports, leading to an appreciation of the real exchange rate and a reduction in the trade surplus.

Over the period 2001–09, China's reserve accumulation did not feed into a substantial rise in inflation. This was because it was largely sterilised, ie offset by selling domestic bonds such that the monetary base was increasing much more slowly than reserves (**Chart 8**). Furthermore, quantitative restrictions on bank lending mean that the relationship between changes in the monetary base and credit growth may be loose. For

example, in early 2009 bank lending increased, reflecting the 2009 stimulus package as discussed above, despite little change in the trend of the monetary base (**Chart 8**).

But sterilisation does have fiscal costs. If central bank sterilisation bonds are sold with a yield above that on the foreign currency assets purchased, there is a net cost to the government. Given China's large stock of foreign exchange reserves and the low yields on US Treasury bonds, these fiscal costs could be substantial. That cost could be transferred to banks by requiring them to purchase the bonds at submarket yields, but as China's banks are largely state owned, this has little impact on the government's consolidated balance sheet. Furthermore, by increasing the supply of local currency bonds, sterilisation can increase domestic interest rates, thus attracting further capital inflows and increasing pressure for currency appreciation. This suggests that large-scale sterilisation may be increasingly costly in the long term.

Second, for exports to remain at the present proportion of China's GDP they would have to increase as a share of world GDP. This reflects the fact that China's GDP tends to grow much faster than world GDP. One way to do this would be by reducing export prices further. But Guo and N'Diaye (2009b) argue that the scope for this is limited, relative to what would be needed, as productivity growth and profit margins have already slowed over recent years in key export sectors. So in order to further increase its world export market share, China must break into new markets or keep increasing the share of value that is added domestically to exports — in other words, reduce the import content of exports.

Indeed, according to Guo and N'Diaye (2009b), China has already made progress in recent years in moving up the value chain. However, they conclude from the experiences of Asian economies that had similar export-oriented growth, such as Japan and Korea, that China cannot raise its market share continually. China's world export market share stands at around 10%, higher than Japan's peak share in 1986. Although China's large labour force suggests that its limiting market share may be above that of other countries, raising the share is likely to become increasingly challenging as China's dominance of markets grows — China already exports more than any other country.

Third, there is a risk that China's high investment rate will lead to overcapacity. A 2009 European Chamber of Commerce report found that there was 'severe overcapacity' in the steel, aluminium, cement and chemical sectors. There are, however, other sectors in which there appears to be potential for productive investment — for example, in transport infrastructure and energy. Whether such savings will be channelled into productive domestic investment will depend, to a large extent, on the quality of the banking system.

So there are some risks associated with rebalancing, which might make the Chinese authorities reluctant to move quickly. But it is unclear that a return to an export-oriented strategy of the same intensity as in the past, would be sustainable in the longer run.

If domestic demand growth does indeed increase, net exports would need to fall as a proportion of GDP in order to prevent the economy from overheating. That would require a shift in relative prices, either through an increase in the domestic price level or through an appreciation of the nominal effective exchange rate. Given the costs and risks of high inflation, the authorities recognise the benefits of nominal exchange rate flexibility. The Deputy Governor of the People's Bank of China, Hu Xiaoloan, recently stated, 'China cannot afford to lose monetary policy independence and subject itself to the economic policies of other countries. Adopting a more flexible exchange rate regime serves China's long-term interests as the benefits of long-term price stability and economic restructuring far exceed the cost in reorganising certain industries and removing outdated capacities.'(1)

China's rebalancing in a global context

At the 2009 Pittsburgh summit, the G20 set a goal of achieving 'strong, sustainable and balanced global growth'. That will require both internal and external rebalancing by a number of countries. Private demand growth in advanced economies remains subdued, in part reflecting deleveraging in the wake of the crisis. That weakness has been partially offset by increases in government expenditure and narrowing trade deficits. Going forward, advanced-economy fiscal deficits are likely to fall — some countries are already embarking on fiscal consolidations. Prospects for external demand in advanced economies will therefore play an important role in determining the strength and sustainability of their recoveries.

The G20 has said that tackling global imbalances will be crucial in preventing a recurrence of the recent financial crisis. Before the crisis, capital flows from surplus to deficit countries contributed to a misallocation of funds and the underpricing of risk, generating substantial vulnerabilities in the global economy (see, for example, Astley *et al* (2009), King (2011) and Wolf (2008)). Reducing global imbalances — together with financial sector reform — could help to prevent such vulnerabilities building up again in the future.

The Chinese authorities have recognised the need for rebalancing. In 2009, Premier Wen Jiabao said that China should 'enhance the role of domestic demand, especially final consumption, in spurring growth' (Wen (2009)). But different adjustment paths are desirable for different countries as

(1) See Hu (2010).

discussed in King (2011). Surplus countries faced with structural change, such as China, may prefer a slower path of adjustment than deficit countries, which are under immediate pressure to reduce the burden of debt in both private and public sectors. Finding and following an adjustment path acceptable to both surplus and deficit countries will determine whether the world's recovery will indeed be 'strong, sustainable and balanced'.

References

Astley, M, Giese, J, Hume, M and Kubelec, C (2009), 'Global imbalances and the financial crisis', *Bank of England Quarterly Bulletin*, Vol. 49, No. 3, pages 178–90.

Bayoumi, T, Tong, H and Wei, S (2010), 'The Chinese corporate savings puzzle: a firm-level cross-country perspective', *NBER Working Paper no. 16432*.

Blanchard, O and Giavazzi, F (2006), 'Rebalancing growth in China: a three-handed approach', *China and World Economy*, Vol. 14, No. 4, pages 1–20.

Branstetter, L and Lardy, N (2006), 'China's embrace of globalization', *NBER Working Paper no. 12373*.

Chamon, M and Prasad, E (2008), 'Why are saving rates of urban households in China rising?', *NBER Working Paper no. 14546*.

European Chamber of Commerce (2009), 'Overcapacity in China — causes, impacts and recommendations', November, available at www.europeanchamber.com.cn/images/documents/marketing_department/beijing/publications/overcapacity_en.pdf.

Guo, K and N'Diaye, P (2009a), 'Employment effects of growth rebalancing in China', *IMF Working Paper no. 169*.

Guo, K and N'Diaye, P (2009b), 'Is China's export-oriented growth sustainable?', *IMF Working Paper no. 172*.

Hu, X (2010), 'Exchange rate regime reform and monetary policy effectiveness', July, available at www.pbc.gov.cn/publish/english/956/2010/20100804100116452770088/20100804100116452770088_.html.

IMF (2010), *World Economic Outlook: Recovery, Risk, and Rebalancing*, October.

King, M (2011), 'Global imbalances: the perspective of the Bank of England', Banque de France *Financial Stability Review*, No. 15, February, pages 73–80, republished in this *Bulletin* on pages 43–48.

Kuijs, L (2006), 'How will China's saving-investment balance evolve?', *World Bank Policy Research Working Paper no. 3958*, July.

Long, G (2005), 'China's policies on FDI: review and evaluation', in Moran, T H, Graham, E M and Blomström, M (eds), *Does foreign direct investment promote development?*.

Ma, G and Yi, W (2010), 'China's high saving rate: myth and reality', *BIS Working Paper no. 312*.

Modigliani, F and Cao, S L (2004), 'The Chinese saving puzzle and the life-cycle hypothesis', *Journal of Economic Literature*, Vol. 42, March, pages 145–70.

OECD (2010), *Economic Survey of China*, February.

Prasad, E S (2009), 'Rebalancing growth in Asia', *NBER Working Paper no. 15169*.

Qiao, H and Song, Y (2009), 'China's savings rate and its long-term outlook', *Goldman Sachs Global Economics Paper no. 191*.

Rajan, R (2010), *Fault lines*, Princeton University Press.

Razmi, A (2008), 'Is the Chinese investment and export-led growth model sustainable? Some rising concerns', *University of Massachusetts Working Paper no. 22*.

Ricardo, D (1817), *On the principles of political economy and taxation*.

Rodrik, D (2006), 'What's so special about China's exports?', *NBER Working Paper no. 11947*.

Todaro, M P and Smith, S C (2006), *Economic development*, Pearson Addison Wesley.

Wen, J (2009), 'Build up in an all-round way the internal dynamism of China's economic development', speech at the World Economic Forum Annual Meeting of New Champions, 10 September, available at www.china-embassy.org/eng/zt/768675/xw/t583659.htm.

Wen, J (2010), 'Consolidate the upward momentum and promote sustained growth', 13 September, available at www.ccchina.gov.cn/en/NewsInfo.asp?NewsId=25436.

Wolf, M (2008), *Fixing global finance*, Yale University Press.

World Bank (2009), 'From poor areas to poor people: China's evolving poverty reduction agenda: an assessment of poverty and inequality in China', March.

Zhou, X (2009), 'Address at the Global Think-tank Summit', People's Bank of China, July, available at www.pbc.gov.cn/image_public/UserFiles/english/upload/File/AddressattheGlobalThink-tankSummit%5B1%5D..pdf.

Wage rigidities in an estimated DSGE model of the UK labour market

Summary of Working Paper no. 408 Renato Faccini, Stephen Millard and Francesco Zanetti

Dynamic, stochastic, general equilibrium models examine the relationships between economic variables by using economic theory to explain the underlying behaviour of households, firms and the policymaker. They enable us to explore the effects of random ('stochastic') shocks as they work through the economy. Consequently, they have become a powerful tool in the effort to investigate how movements in economic variables relate to the behaviour of inflation. In the New Keynesian framework sticky prices imply that movements in interest rates affect real aggregates and the dynamic behaviour of inflation is driven by the cost to a firm of producing an additional unit of output. This in turn depends crucially on the structure of the labour market. The standard New Keynesian model assumes that firms can immediately adjust employment and hours to whatever levels they wish. But empirical evidence from virtually all the major industrialised countries shows that, in practice, it is costly to adjust either employment or hours as firms have to pay hiring and training costs or overtime payments. These costs will clearly affect the cost of changing output via changes in employment and hours, and so will affect the response of inflation to changes in output. In this paper, we estimate a New Keynesian model characterised by these labour market frictions using UK data and investigate how staggered wage negotiations affect both the response of inflation to changes in economic variables and the ability of the model to fit the data.

In our estimation, we find the degree to which people are willing to work is relatively unresponsive to changes in wages. This low labour supply elasticity reflects the fact that employment is more volatile than average hours. We estimate the ratio of the value of not working to average wages to be about 50%. One feature of the model is that the difficulties of matching jobs to people creates a surplus that is divided between workers and firms in a proportion depending on 'bargaining power' of workers. We find this to be close to 0.9. It follows that wages are close to the marginal product of labour. Another feature is that utility people derive from consumption depends on past consumption, or 'habits', a device that is often used to explain the persistence of economic variables. We find that habit persistence is virtually absent, so the model with frictional labour markets does not need habits to generate persistence in the variables that are made observable to the estimation. We also find that the monetary authority raises interest rates strongly in response to increases in inflation and that they smooth interest rate changes to a degree.

We establish that staggered wage-setting enables the model to fit the data more closely. Nominal wage stickiness has important implications for labour market dynamics. However, our estimates suggest that wage rigidities are irrelevant for inflation behaviour. Although, following a shock, wage rigidities have a direct effect on unit labour cost, their effect on real marginal cost is offset by the contribution of the component related to labour market frictions. This finding stands in contrast with those obtained in standard New Keynesian models where employment and hours can be adjusted immediately and without cost. In the absence of these costs, the dynamics of inflation are only driven by the unit labour costs and so wage rigidities will automatically generate inflation persistence by making unit labour costs more persistent.

Finally, the estimated model also allows us to assess what economic factors are driving UK economic fluctuations. We find that neutral and investment-specific technology shocks are important to explain fluctuations in the data. And, we are able to provide evidence that the volatility of aggregate shocks has somewhat decreased from the mid-1990s until the mid-2000s. These findings suggest that the 'Great Moderation' in macroeconomic volatility in the United Kingdom between the early 1990s and 2008 might have resulted from a lower volatility of shocks during the past decade.

While our results do unveil key features of the UK economy, it should be noted that we were unable precisely to estimate some important parameters of the model, such as the degree of nominal wage stickiness. This suggests a need to refine the model in ways that could improve its empirical performance. Furthermore, although the model developed here allows for a variety of supply and demand shocks to have effects on the economy, in practice, a variety of other aggregate shocks may play a role. Nevertheless, the model advances our understanding of UK inflation dynamics.

The contractual approach to sovereign debt restructuring

Summary of Working Paper no. 409 Sergi Lanau

The resolution of sovereign debt defaults is a complex process. For instance the last Argentine default took four years to settle and over 140 lawsuits were filed against the sovereign. In order to lessen these problems, the international community has been discussing the so-called 'contractual approach' to sovereign debt crises. In short, this approach suggests that debt contracts should include additional provisions to facilitate the resolution of defaults. Two of its main innovations are collective action clauses (CACs) and seniority clauses (SCs). A CAC is a supermajority voting rule to change the payment terms of a contract. For example, 75% of creditors could impose a decision on a dissenting minority; in the absence of CACs unanimity would be required. Their policy purpose is to improve creditor co-ordination. SCs establish a priority rule to repay debts in the event of a default: junior debt is not repaid until senior debt has been repaid in full. Without SCs, all debts have the same footing. This opens the door to debt dilution and could yield under or overborrowing.

Previous work has studied CACs and SCs assuming that the amount creditors recover after a default does not depend on their actions. Instead, the focus has been on the decisions taken by the debtor (for instance regarding fiscal policy). This paper shows that creditor incentives also respond to changes in the debt contract.

In this paper, the two main elements the creditors have control over are lobbying efforts and litigation for full repayment. As regards the first element, each creditor can put individual lobbying effort to extract more repayment from the sovereign. At a later stage, creditors can also litigate for full repayment. In the model, these lawsuits do not extract more money from the sovereign, they just affect the distribution of repayment that results from lobbying efforts. Both lobbying and litigation suppose a private cost for an individual creditor engaging in either activity.

The first result that follows from this framework is that individual lobbying effort has a positive effect on other creditors (an externality): repayment increases with effort and since it is shared among all creditors according to the contract, all creditors benefit from individual lobbying. The size of creditors is one key determinant of the decision to exert effort: small creditors do not lobby but large creditors do. If a creditor is small, the small fraction of repayment they will receive would not compensate them for the cost of lobbying. The opposite is true of a large creditor.

CACs are also important for effort decisions. If some creditors litigate for full repayment, the rest of the creditors will receive a lower payment and will thus have a weak incentive to incur the lobbying cost. Without CACs, nothing can block the litigators, but in the presence of CACs a coalition of creditors can stop a minority from going to court. Then, CACs have the property of maximising repayment after a sovereign default.

SCs change the incentives to lobby for repayment. Without SCs, all debts have the same priority to recoup repayment and, as explained above, the size of the creditor determines effort. With seniority, a creditor that is holding junior debt may have little incentive to lobby (independently of their size) because repayment will in any case go to senior debts. If these senior loans are big, there would be nothing left for the junior creditor. Then, to avoid low repayment under SCs, creditors not only have to be relatively large but also hold the right mix of junior and senior debt.

The properties of CACs are reinforced when sovereign debt can be traded in the secondary market. Without CACs, creditors are likely to use secondary markets to buy cheap debt and litigate for full repayment. With CACs, litigation is avoided and creditors use secondary markets to buy up enough debt to make lobbying profitable from an individual perspective.

It is worth stressing that this paper does not derive any welfare implications of CACs and SCs. Welfare cases can be made for and against high repayment. If a sovereign has limited access to capital markets, higher repayment in the event of a default could relax the borrowing constraint *ex ante*. In contrast, low repayment could be desirable if a country has been hit by an exogenous shock such as a natural disaster.

To sum up, this paper argues that not only debtor incentives change with innovations in sovereign debt contracts, creditors also respond to new contracts and affect debt repayment. Therefore, it is important to assess the likely response of both debtors and creditors to policy measures aimed at reducing the complexity of sovereign debt renegotiations.

Are EME indicators of vulnerability to financial crises decoupling from global factors?

Summary of Working Paper no. 410 Guillermo Felices and Tomasz Wieladek

Traditional indicators of vulnerability to financial crises in emerging market economies (EMEs) suggest a substantial reduction in vulnerability in recent years. Ratios associated with the onset of a crisis — such as reserves relative to short-term debt, total external debt relative to GDP and the current account balance relative to GDP — have improved significantly compared to their levels of the 1990s and at the turn of the millennium.

A careful look at the data reveals that the improvement witnessed prior to the onset of the current crisis seemed to be present across all regions, despite a great variety in economic policies and levels of development. Therefore some of the improvements in vulnerability indicators seen in EMEs in the past decade may have been driven by the contemporaneous benign global conditions experienced by the world economy.

But the improvement observed in the past decade led several economists to believe that this time was different. The improvement in these indicators of external vulnerability, it is argued, may partly reflect the reforms in macroeconomic policies and institutional frameworks following the financial crises of the past two decades, such as the broad movement towards inflation targeting, flexible exchange rate regimes, the rapid growth of local currency bond markets, the diversification of the investor base, as well as better management of the composition of government debt by individual countries.

Investors and policymakers find it very difficult to disentangle whether these improvements were due to good luck or good policy. Better policies may lead to a permanent improvement in the resilience to adverse external economic shocks. If most of the improvement was driven by global factors on the other hand, vulnerabilities could re-emerge as global factors revert. Some questions then deserve careful attention. To what extent are the indicators of EMEs' external vulnerability driven by external factors? Is this link weakening or strengthening over time?

In this study we attempt to answer these important questions. Economic reforms and globalisation can change the exposure of vulnerability indicators to global factors. On the contrary, robust macroeconomic policy frameworks, such as 'leaning against the wind', could lead to a 'decoupling' from the global factor. We examine both international reserve growth and real exchange rate appreciation for decoupling, as previous studies found these to be the two most useful vulnerability indicators in predicting financial crisis across different countries and crisis episodes. Our results suggest that, on average, 60% of fluctuations in a given country's vulnerability indicators can be explained by global factors. Furthermore, we do not find strong evidence of decoupling in most EMEs during the past decade, implying that most of the improvement in vulnerability indicators has been driven by global factors.

Low interest rates and housing booms: the role of capital inflows, monetary policy and financial innovation

Summary of Working Paper no. 411 Filipa Sá, Pascal Towbin and Tomasz Wieladek

The run-up to the 2008 global financial crisis was characterised by an environment of low interest rates and a rapid increase in housing market activity across OECD countries. Some scholars argue that expansionary monetary policy has been significantly responsible for the low level of interest rates and the subsequent house price boom. Others contend that a scarcity of financial assets led to capital inflows to developed economies, depressing long rates in government bond markets and stimulating an increase in demand for housing. A third school of thought maintains that excessive mispricing of risk associated with financial innovation has led to a misallocation of capital to the real estate sector through securitisation, exacerbating the effect of interest rate movements on housing activity.

Each of these explanations has different policy implications. Should policymakers try to address external imbalances, increase financial regulation or redesign the monetary policy framework to prevent future crises? To shed light on this question, we analyse the impact of both monetary policy and capital inflows shocks on the housing sector across 18 OECD countries. We also assess whether the degree of mortgage market development or legislation permitting issuance of mortgage-backed securities amplify or dampen the impact of these shocks on the housing sector.

Our results suggest that both monetary policy and capital inflows shocks have a significant and positive effect on house prices, credit to the private sector and residential investment. The effects of both shocks are greater in countries with a higher degree of mortgage market development, with the effect of monetary policy shocks roughly doubling. This suggests that excessive financial innovation may act as a propagation mechanism. The existence of mortgage-backed securities has a much larger effect on the transmission of capital inflows shocks. Legislation permitting the issuance of mortgage-backed securities increases the impact of capital inflows shocks on real house prices, real residential investment and real credit to the private sector by a factor of two, three and five, respectively. These results suggest that persistent capital inflows, coupled with securitisation, played a significant role in the housing booms observed in some countries in the run-up to the financial crisis.

Mapping systemic risk in the international banking network

Summary of Working Paper no. 413 Rodney J Garratt, Lavan Mahadeva and Katsiaryna Svirydzenka

An astonishing feature of the 2008 financial crisis was how quickly and extensively the relatively small write-downs in US sub-prime mortgages spread to a situation where only two years later governments worldwide had to provide massive support to their banking systems. International banks played a key role in transmitting contagion through their claims on each other. This paper examines how the interconnectedness of the international banking system impacts the threat of systemic risk in the international banking network.

Cross-sectional systemic risk is the potential for shocks that hit one part of the system to be transmitted to the rest of the system. This potential can be analysed in a variety of ways. However, all approaches look at connections between different entities that are reflected in their balance sheets. A straightforward approach is to simulate shocks to bank balance sheets and examine the repercussions. However, this involves making many assumptions about the type and size of shock, how widespread it is, and how banks adjust to its occurrence. Our approach abstracts from specific details about shocks and looks more at the contagious capacity of the network.

The data we use are the 420 external claims that 21 international banking groups held on each other for each quarter over nearly 25 years. This data set was compiled by the Bank for International Settlements and banking groups are defined by the country where banks do their business.

The aim is to simplify the raw data on claims and liabilities into a map that succinctly summarises how financial contagion moves between international banking groups. We begin by specifying a network of financial linkages in which banks transmit stress to each other via two channels, a funding channel and a lending channel. Stress is transmitted through the funding channel when a bank refuses to rollover a loan and it is transmitted through the lending channel when a bank defaults on a loan. We then apply a network clustering technique developed by physicist Martin Rosvall and biologist Carl Bergstom to determine the most parsimonious yet accurate description of the network that can be used to map the movements of an imaginary traveller, whom we refer to as Mr Contagion. Because this approach is based on tracking movement, it is well suited to help draw a map for the contagion of financial stress.

Under this approach, clusters are formed when stress travels between the members of a cluster with sufficiently greater intensity than it does to the banking groups outside the cluster. As such, a cluster can be thought of as a collection of banking entities that are so interconnected that they can be treated as one group.

Clustering is done at each date from 1985 Q1 to 2009 Q3. The changes in clustering that are observed capture well-known changes in the international banking landscape that have occurred over the past quarter century. In the late 1980s, Japanese resident banks expanded their overseas operations and this move is reflected by the inclusion of Japan in a large supercluster, along with the United Kingdom, the United States and the Cayman Islands. That cluster breaks up by the beginning of the 1990s due to the emergence of the Japanese banking crisis. Over the next decade and a half, European banking groups increase in relative importance and accordingly we see many smaller, but still influential, clusters appear in our maps.

Changes in clustering only tell part of the story. We also examine the extent to which the international banking network became more broadly contagious over time. To do this it is necessary to choose a benchmark modular structure and examine changes in the extent to which contagion spreads out of the fixed clustering. The benchmark we use is the clustering for 1989 Q3 when the United Kingdom, Japan, the United States and the Cayman Islands were combined into one module. This allows us to see how the systemic risk associated with financial problems that originate within these major financial centres increased over time. The amount of contagion flowing outside the fixed modules from 1989 Q3 increased since the end of the 1980s and it peaked in 2008 Q2, just before Lehman Brothers' default, but still remains at a relatively high level.

It is important to understand that our results cannot be used to infer anything about the current riskiness of the system. The reason for this is that our contagion analysis only concerns the cross-sectional component of systemic risk and offers no insights as to changes in the average quality of banks' balance sheets over time.

A Bayesian approach to optimal monetary policy with parameter and model uncertainty

Summary of Working Paper no. 414 Timothy Cogley, Bianca de Paoli, Christian Matthes, Kalin Nikolov and Tony Yates

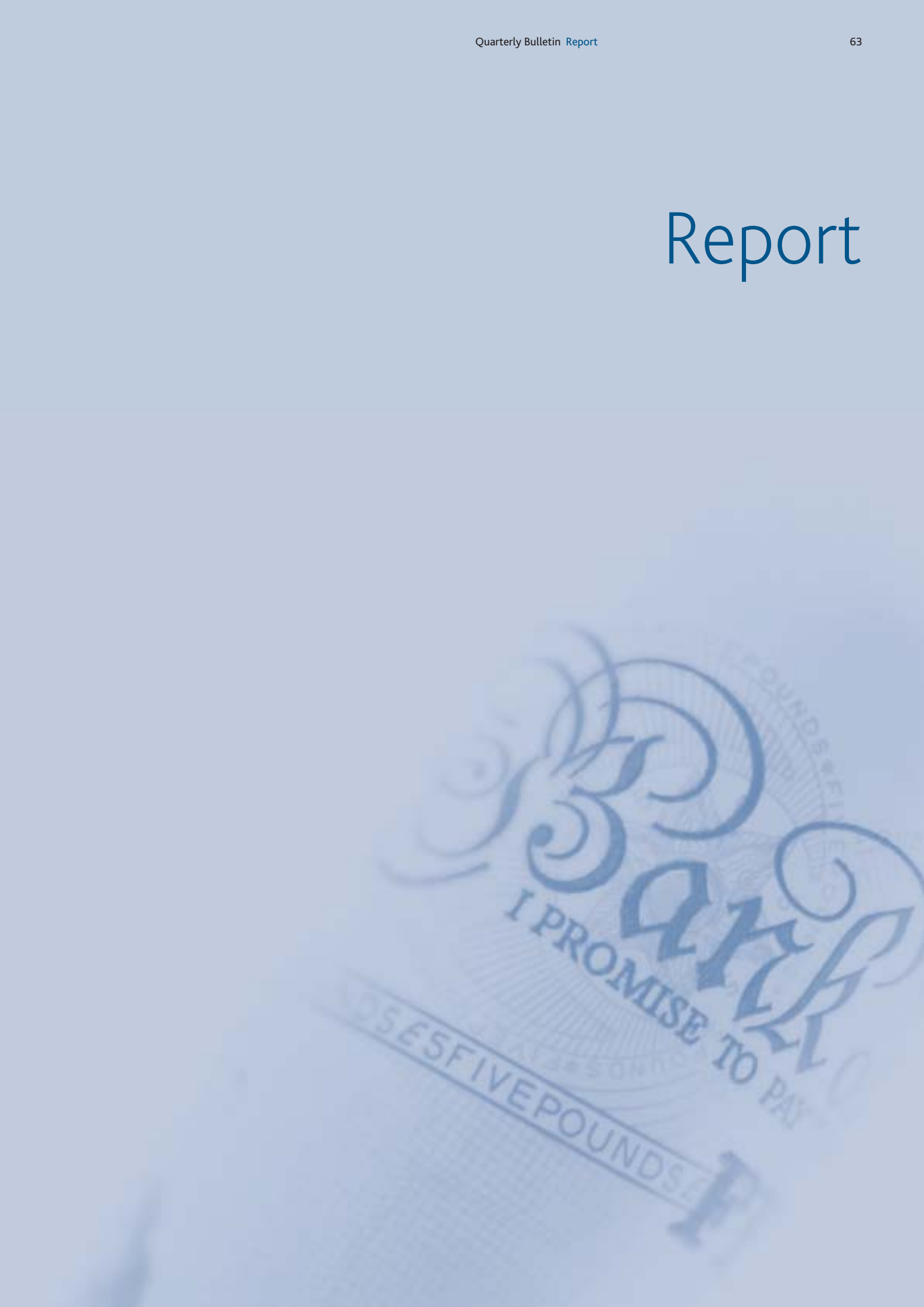
It is widely acknowledged by policymakers and academics alike that uncertainty is pervasive in monetary policy making. This paper implements a recipe for dealing with the many types of uncertainty that confront monetary policy in a systematic way. It deals with uncertainty about the shocks hitting the economy; about the parameters that propagate shocks from one period to the next; and about what model best explains the world. We find the optimal policy by going through the following steps: first, we consider a candidate scheme for monetary policy. Then we work out what social welfare would turn out to be on average, if that policy were pursued, based on the chances of each of the possible outturns for the aspects of the world about which we are uncertain. We repeat this exercise for all candidate monetary policies, and then choose the one that yields the best outcome on average. In the recipe that we follow for finding the optimal policy, our estimate of the chance of the different outcomes for uncertain objects explicitly combines information from the data and information from other sources, such as our prior beliefs. In our application these priors could be used to express beliefs of the policymakers themselves, or could be given to us by a particular model, which rules out some outcomes as inconsistent with the model. In allowing for the incorporation of prior beliefs our approach is explicitly 'Bayesian', as it is essentially driven by Bayes' famous statistical rule that sets out how to update prior beliefs in the light of new evidence.

We make two shortcuts relative to an approach that would be truly optimal and truly Bayesian. First, we restrict attention to monetary policy schemes that involve the policy rate responding to a small number of observables in the model like inflation and output. Second, we rule out experimentation by policymakers. Other work has illustrated that there are (small) gains to be had from injecting otherwise unwarranted volatility into the economy since this acts to reveal more precisely how the economy works to the policymaker. We ignore experimentation partly for simplicity, partly because we do not lose much by making this shortcut (in the sense that policies inclusive of a motive for experimentation are shown not to be too different from those that exclude it), and partly because many policymakers have ruled out experimentation with the macroeconomy on the grounds that it is either hazardous or unethical.

We capture the model uncertainty facing policymakers by estimating four different models of the UK economy. This small suite is designed to encompass competing approaches to macroeconomic modelling. Some of the models are dynamic stochastic general equilibrium (DSGE) models — in which the laws of motion for aggregate variables come from working out how individual agents in the economy would solve the problems they face — and some are not. One model articulates frictions in financial markets, the others do not. One model explicitly describes an open economy, the others do not. Most models encode rational expectations — the assumption that agents in the model know as much as the economists who designed it — but one does not, and is sometimes viewed as a model of backward-looking agents. One model encodes a substantial degree of inertia in inflation, the others do not.

We find that optimal policy differs substantially across the different types of models. Optimal policy in the backward-looking model is for very stable interest rates. Interest rates are recorded to have little effect on goal variables in that model, and the dominant motive is to avoid fluctuations in the interest rate which we assume to be inherently costly. By contrast, in the DSGE rational-expectations models, optimal policy responds much more actively to fluctuations in inflation in particular. We find that these models give very bad outcomes if they are simulated with the policy that would have been optimal in the backward-looking model. Conversely, the backward-looking model gives much better outcomes if we simulate that model with the policy tailored to the DSGE models. The backward-looking model is therefore observed to be more tolerant of policies that deviate from the one that is optimal for that model. This has a bearing on the policy that we find is optimal for the suite as a whole. That policy tends to be tilted towards the policy that is optimal for the DSGE models, since in the event that they turn out to be true they will perform very badly if monetary policy is not sufficiently tailored to their demands, and the benefits from doing this outweigh the smaller costs of conducting a policy that is not suited to the backward-looking model.

Report



Monetary Policy Roundtable

On 14 December 2010, the Bank of England and the Centre for Economic Policy Research hosted the fifth Monetary Policy Roundtable. These events are intended to provide a forum for economists to discuss key issues affecting the design and operation of monetary policy in the United Kingdom.(1) As always, participants included a range of economists from private sector financial institutions, academia and public sector bodies. At this fifth Roundtable there were two discussion topics:

- how different will this recovery be?; and
- how fast can the economy grow without hitting capacity constraints?

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

How different will this recovery be?

History suggests that recoveries from recessions involving banking crises are often more drawn out than standard recoveries, although there is great heterogeneity between cases (see, for example, Reinhart and Rogoff (2009)).(3) This session discussed the nature of the current UK recovery, highlighting differences with previous UK and international episodes, and sought to draw lessons for policymakers.

One participant outlined reasons to be optimistic about the current recovery. Signs were so far promising. The UK and global recoveries had been stronger than expected to date. For example, forecasts for UK and global growth in 2010 had been revised up significantly over the past 18 months. And output growth in the OECD countries during this recovery had recovered to its pre-crisis trend in less than half the time taken during the 'Big Five' financial crises (Spain (1977), Norway (1987), Japan (1990), Sweden (1990) and Finland (1990)).

The speaker noted that a key factor behind the relative strength of the current recovery was the swiftness of the monetary policy response. Global real interest rates had turned negative quickly this time around, in contrast to the Great Depression and the 'Big Five' crises, which had seen real interest rates rise during the early months of the crises and remain elevated for some time. Furthermore, the introduction of quantitative easing in the United Kingdom, United States and euro area had taken place much earlier than in Japan during the 1990s recession.

The speaker pointed out that fluctuations in private investment had driven much of the global cycle to date. Its recovery could continue to provide a fillip to the growth of activity, particularly in the United Kingdom where its level remained low relative to pre-crisis trends. A downside risk stemmed from banks' ongoing efforts to reduce the size of their balance sheets, which could make it harder for businesses to obtain credit. However, the corporate sector financial surplus remained high in the United Kingdom, which would allow businesses to tap into their own funds to invest. And the high rate of return on capital should encourage firms to continue to invest.

Other participants were less optimistic about the prospects for the recovery. One speaker identified three impediments to the recovery, which he characterised as key differences from the United Kingdom's recovery in the 1980s.

First, income growth had been weak, reflecting the composition of the recovery in employment. Employment had recovered particularly quickly during this recovery, perhaps reflecting earlier, unobserved strength of the economy (for example, if the labour market had entered the recession tighter than previously assumed). But that recovery had been predicated on a rise in part-time jobs and self-employment, which had depressed hourly pay growth. Subdued income growth did not augur well for the recovery of consumer spending and the wider economy.

Second, the resilience of inflation had constrained real take-home pay, weighing on consumption and restricting household debt repayments. Some of the causes behind the rise in inflation may have been structural rather than cyclical,

(1) Roundtables are held twice a year: a full-day event in the first half of the year and a half-day event in the second half of the year. The next Roundtables are scheduled for July and December 2011.
(2) This summary was originally published on the Bank of England's website on 20 January 2011. For both this and previous summaries, see www.bankofengland.co.uk/publications/other/monetary/roundtable/index.htm.
(3) Reinhart, C M and Rogoff, K S (2009), *This time is different: eight centuries of financial folly*, Princeton Press, Princeton, NJ.

for example reflecting increasing energy demand from the rapidly growing emerging market economies (EMEs).

Compounding this, the United Kingdom was poorly placed to benefit from strong EME growth via greater trade, as the share of EMEs in UK exports remained low. One participant argued, however, that strong EME energy demand might just result in a step change in the level of commodity prices. If so, the impact on the rate of inflation would dissipate after a couple of years. Another participant noted that, in any case, the high volatility of commodity prices in recent years had been an additional challenge for policymakers.

Finally, there were significant downside risks from the fiscal consolidation. The UK consolidation plans called for an unusually strong private sector response to maintain momentum in the recovery. But evidence from past recoveries offered no clear steer about the reaction of private consumption to government spending cuts. And countries which in the past had experienced fiscal consolidations had benefited from strong export markets, falls in bond yields and transfer payments from the European Union — circumstances that might not prevail this time around.

One participant noted that assessing how this recovery might progress depended crucially on the permanence of the output losses incurred during the recession. If output had been permanently reduced, then the recovery might well be in its final stages.

Most participants agreed that a big downside risk to the recovery stemmed from problems in the euro area, particularly in the peripheral countries. Any deterioration of the growth outlook would be particularly bad news for the United Kingdom, given the high share of the euro area in UK exports.

Finally, one speaker explored the lessons that could be learned from the experiences of the United Kingdom and United States during the Great Depression. Four lessons were drawn.

First, fiscal consolidation can expose the economy to the risk of a double-dip recession if monetary policy is not supportive. For example, US policymakers' decision in 1936/37 to double banks' reserve requirements while balancing the budget had tipped the United States into recession in 1938, following a strong, monetary policy induced recovery in 1933–37.

Second, real interest rates really matter to recoveries. The recoveries in the United States and United Kingdom in 1933 had been underpinned by a sharp fall in real interest rates, into negative territory. In the United States, this had reflected a sizable pickup in inflation expectations, coupled with near-zero nominal interest rates following the exit from the gold standard.

Third, banking crises can lead to permanently lower levels of output. The impact primarily comes through reduced investment and a slower accumulation of the capital stock, as seen in the United States during the 1930s.

Finally, the mix of fiscal consolidation can affect productivity. Consolidation through the reduction of 'non-productive' government expenditure and higher indirect taxes is less detrimental to growth than raising direct taxes (as was the case in the United Kingdom in 1933–37) and cutting back on 'productive' expenditure.

How fast can the economy grow without hitting capacity constraints?

As the economy recovers from the recent deep recession, participants agreed that an important influence on the recovery, and on inflationary pressure, would be the speed at which the economy could grow without hitting capacity constraints. That would be determined by both the current degree of spare capacity in the economy and by the future growth rate of potential output.

Participants discussed how different indicators offered contrasting views of the margin of spare capacity currently within companies. Survey evidence suggested that the degree of spare capacity had narrowed and that only a limited amount remained. But the depressed level of productivity relative to its pre-recession trend pointed to a larger degree of spare capacity.

Surveys of labour market slack had begun to narrow over the past year, but by less than the surveys of spare capacity within companies. When the two sets of surveys were combined, one participant suggested that a composite measure of slack implied that the level of output might be about 2% below its potential, only around half what it was at the height of the recession.

Some participants thought that while surveys of capacity utilisation were useful to assess whether or not there was spare capacity within companies, they were less useful for assessing the extent of that spare capacity. And there was some uncertainty about exactly how companies defined the concept of 'normal' levels of capacity when responding to these surveys, and whether they took into account capacity that was temporarily unavailable. But others argued that the surveys were a good guide and that these data were broadly consistent with recent developments in inflation.

The difficulties of using the gap between productivity and its pre-crisis trend as a measure of spare capacity were also discussed. The trend may be sensitive to the period over which it is calculated. In particular, it could be overstated if it

included the late 1990s, a period of unusually strong productivity growth. And the trend may have been affected by the recession. Participants also noted difficulties in measuring productivity, particularly in the service sector. It was unclear in which direction measurement issues might affect output, and it was possible that hours worked were currently overstated, implying stronger hourly productivity than presently measured. However, it was unlikely that these factors were large enough to account for all of the additional spare capacity currently implied by the weak productivity data.

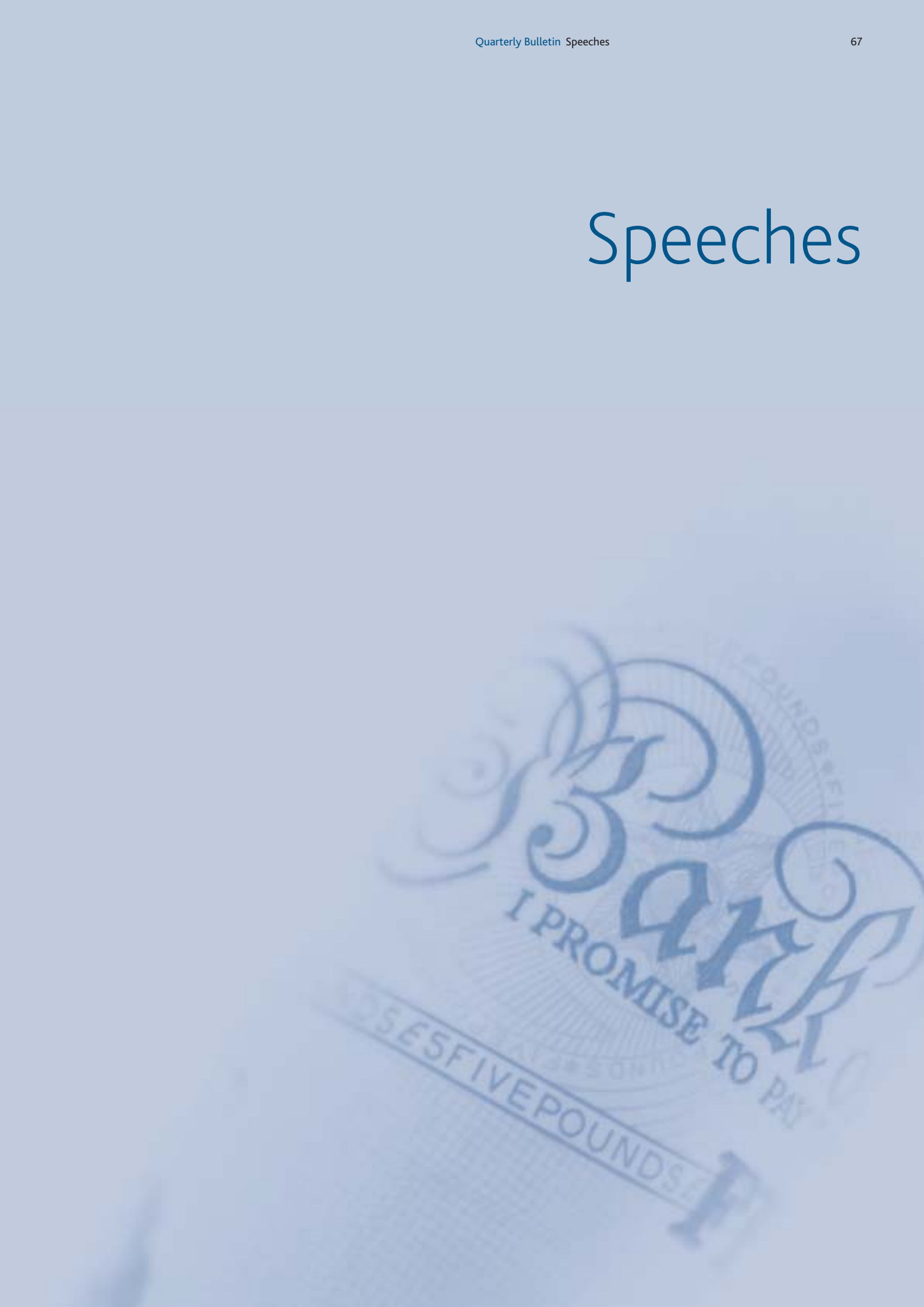
If surveys were accurate, and there was limited spare capacity in the economy, then the depressed level of output relative to its pre-recession trend implied that potential output had fallen by around 7% or 8%. Most participants agreed that it was hard to explain the channels through which a fall of this magnitude may have occurred. But some argued that the lack of a clear explanation for such a large fall in supply did not necessarily mean that it had not happened.

Some participants thought that one reason why the surveys indicated limited spare capacity was that supply was endogenous, and that as demand picked up supply would return. It was noted that there were examples, such as the United States in the 1930s and Sweden in the 1990s, where output had fallen sharply but had eventually returned to its previous trend, suggesting that a loss of actual output does not necessarily imply a loss of potential output.

Some participants thought that the main impact of the financial crisis was likely to be on the level of output rather than its growth rate in the future. Relatively high use of information and communications technologies was one reason why UK productivity growth had been strong relative to other countries prior to the financial crisis. And these technologies were likely to continue to have an important and positive effect on future UK growth. But other participants thought that increases in uncertainty and the cost of capital could reduce future growth. There was some discussion of how cuts in the public sector could affect potential growth. On the one hand, they might release more skilled labour into the private sector. But on the other, reduced spending on infrastructure and research and development could reduce growth in the private sector.

Labour supply is also an important component of potential output growth. It was noted that migration had made a substantial contribution to labour supply growth over the recent past, but recent changes in government policy suggested that migration from outside the European Union might slow. And increases in retirement ages could act in the opposite direction by raising labour force participation rates.

Speeches



Bank of England speeches

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

The MPC's policy dilemma

Charles Bean, Deputy Governor, March 2011.

www.bankofengland.co.uk/publications/speeches/2011/speech479.pdf

In a speech to the Association of British Insurers 2011 Economics and Research Conference, Deputy Governor Charles Bean discussed the sources of elevated inflation in the United Kingdom, whether it was likely to persist and the policy response. He opened by discussing the headwinds to demand: the impact of the financial crisis, fiscal consolidation and depressed domestic demand. Charles Bean went on to discuss three factors behind currently above-target inflation: the rise in the price of energy, an increase in non-fuel import costs following sterling's depreciation and the increase in VAT. Monetary policy had accommodated around half of the impact of these inflation shocks. Charles Bean concluded by assessing the outlook for inflation in the medium term. The MPC would need to balance the risk that inflation may prove more persistent than embodied in its latest projections against downside risks to growth that would put downward pressure on inflation.

Lessons on unconventional monetary policy from the United Kingdom

Charles Bean, Deputy Governor, February 2011.

www.bankofengland.co.uk/publications/speeches/2011/speech478.pdf

In remarks at the US Monetary Policy Forum, Deputy Governor Charles Bean discussed the lessons on unconventional monetary policy from the United Kingdom. Charles Bean noted that, during the crisis, the Bank provided enhanced liquidity support and undertook transactions in corporate assets to improve the operation of temporarily dysfunctional markets. He went on to describe the MPC's outright purchases of longer-dated assets financed by the issuance of reserves. Charles Bean explained that the objective of this policy was to raise the prices of the purchased assets and of substitute assets in order to boost nominal spending through wealth and cost of capital channels. He noted that event studies, and the return of nominal GDP growth to pre-crisis levels, provided supportive evidence of this policy having been successful. However, Charles Bean concluded that central banks should continue to rely on short-term interest rates as their main policy instrument in normal times.

Discussion of Lord Turner's lecture, 'Reforming finance: are we being radical enough?'

Paul Tucker, Deputy Governor, February 2011.

www.bankofengland.co.uk/publications/speeches/2011/speech477.pdf

In this speech, Paul Tucker commented on the Clare Distinguished Lecture in Economics by Lord Turner, 'Reforming finance: are we being radical enough?'. Mr Tucker reviewed some recent interactions between policy and economic theory, arguing that there needed to be fundamental change in the 'rules of the game' for the financial system. A recent theoretical paper by Shleifer *et al* (2010) shows that moving away from the traditional rational expectations world and introducing myopia about certain low probability, high impact risks can generate the sort of outcomes seen in the recent financial crisis. For example, they show that this sort of myopia can lead to overinvestment in securities that carry those characteristics — in the recent crisis, that could be seen in the ballooning of ABS issuance and the mispricing of those instruments as a result of the search for yield. Such theoretical papers serve as a bridge to policymaking, as they have important macroprudential policy implications.

One policy implication of myopia is that we need to attend to risks beyond the banking sector — in shadow banking, such as money market funds. A second policy implication is that it is vital that (regulatory) capital requirements for banks more or less truly capture their risks. The current Basel work to review fundamentally the capital requirements for banks' trading books will be a key plank of the capital reforms. As will the work on how much greater loss-absorbing capacity — whether in the form of pure equity or contingent capital bonds — should be held by Global Systemically Important Financial Institutions. But higher capital requirements are not sufficient if the incentives that created the Too Big To Fail problem are not addressed. A key element of that is the international work on effective resolution regimes. That means building institutions that underpin the commitment to resolve firms in a way that ensures financial stability, rather than bailing them out.

Ten good reasons to tighten

Andrew Sentance, Monetary Policy Committee member, February 2011.

www.bankofengland.co.uk/publications/speeches/2011/speech476.pdf

In a speech to the Ashridge Alumni business briefing in London, Dr Andrew Sentance summarised ten arguments for tightening

monetary policy at the current economic conjuncture. He began by arguing that monetary policy should lean against the persistently high UK inflation, which is partly caused by global inflationary pressures. Policymakers should also be alert to the risk that strong global and domestic demand is fuelling such pressures, which tighter monetary policy can counterweigh by affecting the value of sterling on foreign exchanges. Turning to the supply side, Dr Sentance pointed out that the perceived margin of spare capacity had yet to put downward pressure on inflation, while companies appear to be more willing and able to pass through cost increases. In light of this evidence, in his view the MPC should take early action to protect its credibility, by gradually raising interest rates from current record low levels.

Monetary policy in extraordinary times

David Miles, Monetary Policy Committee member, February 2011.

www.bankofengland.co.uk/publications/speeches/2011/speech475.pdf

In this speech, David Miles argued that the recent recession was unprecedented in peacetime. Rebalancing of the economy would require tighter fiscal policy, exports rising by more than imports, and a higher saving rate. This would need to happen while confidence is fragile, unemployment significantly higher than before the recession, and inflation substantially above the 2% target level.

Monetary policy could be set to reduce inflation back to target more rapidly than implied by the central profile in the February *Inflation Report* fan charts. However, that might not be desirable: for example, a substantial appreciation of the exchange rate might add to volatility of output in the short term and be unhelpful for rebalancing; and more slack in the economy could erode productive potential and increase structural unemployment.

Reforms to prudential regulation and the structure of the banking system, in particular increases in banks' capital, would help lower the risk of encountering similar crises in the future.

The soft tyranny of inflation expectations

Adam Posen, Monetary Policy Committee member, February 2011.

www.bankofengland.co.uk/publications/speeches/2011/speech474.pdf

In this speech, Dr Posen discussed different measures of UK inflation expectations and how monetary policy makers should respond to them. He argued that there is no sign of medium or long-term inflation expectations becoming de-anchored in the data. Surveys of households' and professional forecasters' long-term inflation expectations remain close to their historical averages. Financial market indicators suggest that uncertainty about future inflation has increased, consistent with greater economic uncertainty, but this has not been accompanied by a rise in the level of long-term inflation expectations. Together, this evidence suggests continued confidence in the MPC's commitment to the inflation target. Although some short-run survey measures of household inflation expectations have picked up recently, Dr Posen presented evidence showing that movements in these and related indicators have not tended to feed through to higher wage growth over the past 25 years. He warned that tightening policy pre-emptively, in response to worries about sudden swings in sentiment, would increase the risk of overshooting the inflation target on the downside.

The United Kingdom's inflation problem: selling England by the pound?

Andrew Sentance, Monetary Policy Committee member, February 2011.

www.bankofengland.co.uk/publications/speeches/2011/speech472.pdf

In a speech to the 'State of the Economy' Conference in London, Dr Andrew Sentance explained why he thought inflationary pressure was greater than suggested by the latest *Inflation Report* forecast and why higher interest rates are now needed. He argued that too much faith was being put on the impact of a large 'output gap' pushing down on inflation, which might not materialise given uncertainty about the degree of spare capacity in the economy, strong domestic demand and a shift in businesses' perception of the pricing climate. He also thought there was not enough weight being placed on the inflationary pressures from the global environment and the past depreciation of sterling. He concluded that while the exchange rate should not become the centrepiece of UK monetary policy, a modest appreciation of sterling would mitigate the impact of global inflationary pressures and help to steer inflation back to the target.

Speech by the Governor

Mervyn King, Governor, January 2011.

www.bankofengland.co.uk/publications/speeches/2011/speech471.pdf

In this speech, the Governor explained that three factors could account for recent high inflation. Rises in import prices and world energy prices combined with recent increases in VAT have added 12% to the price level over the past four years. The contribution of domestically generated inflation over that period was close to zero, and well below the target.

The Governor noted that the three factors above have led to sharp falls in real wages. But, being a real adjustment there was nothing the MPC could have done to prevent this squeeze in living standards; that is a legacy of the banking crisis and the need to rebalance the economy. Had the MPC raised Bank Rate significantly, the current recession would have been even deeper and this would not have met the MPC's remit to avoid undesirable volatility in output in attempting to meet the inflation target.

Setting UK monetary policy in a global context

Andrew Sentance, Monetary Policy Committee member, January 2011.

www.bankofengland.co.uk/publications/speeches/2011/speech470.pdf

In a speech to the European Policy Forum in London, Dr Andrew Sentance discussed the global forces that affect UK inflation. He highlighted three channels through which global economic developments affect UK inflation: import prices; demand; and the global pricing climate. He pointed to the trends in emerging and developing economies that appear to have shaped global price developments and capacity pressures recently and their impact on UK inflation. Dr Sentance also stressed that recovery in UK domestic demand was helping to lift the UK economy out of recession. But coupled with a resurgence of global inflationary pressures and the additional inflationary impact from the exchange rate depreciation, this was likely to lead to upward pressure to the business pricing climate and expectations. This provided a strong case for a gradual monetary tightening, as further delay could lead to a much larger tightening in the future, jeopardising the recovery.

The outlook for financial regulation in the United Kingdom

Andrew Bailey, Executive Director for Banking Services and Chief Cashier, January 2011.

www.bankofengland.co.uk/publications/speeches/2011/speech469.pdf

In this speech on a regional visit to Edinburgh, Andrew Bailey reviewed initiatives to shape the future of financial regulation. Andrew spoke about the difficulties faced by Scottish banks during the financial crisis, and the potential impact of developments in the euro area on UK banks.

Andrew reviewed the changes in the financial system since 2007 and how the Bank and regulators around the world will continue to ensure that financial institutions are taking the necessary steps to move them towards having more robust capital and liquidity buffers.

Andrew used the analogy of the failures of monetary policy in the 1970s to illustrate why it was important that there is a strong understanding in public policy of the need for financial stability. This highlights the need for a clear consensus that financial stability is a goal which will result in a clear improvement to the welfare of the public.

Global imbalances in retrospect and prospect

Andrew Haldane, Executive Director for Financial Stability, December 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech468.pdf

Andrew Haldane assembled stylised facts from the past on global imbalances, in terms of both the size and direction of these global flows. He then went on to consider potential drivers of these imbalances, focusing on the gross saving and investment behaviour of surplus and deficit countries. Andrew focused on two archetypical surplus and deficit countries — China and the United States — highlighting differences in saving behaviour across sectors, distributions to shareholders and social factors between the two countries. Finally, Andrew considered the likely evolution of global financial integration and differential savings behaviour in order to assess the potential course of imbalances in the future. This implies a potentially dramatic shift in the pattern of global capital flows going forward, with potential pressure for further widening global imbalances and further pressure on international monetary, financial and trading systems.

The UK inflation outlook if this time isn't different

Adam Posen, Monetary Policy Committee member, December 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech467.pdf

In this speech, Dr Posen discussed the prospects for UK inflation based on past experiences of the United Kingdom and other economies in similar episodes. He argued that this approach to inflation forecasting is superior to one based on extrapolation of recent data which may tempt one to conclude that 'this time is different'. He discussed four empirical regularities based on past experience that are relevant to the current inflation forecast. He argued that the Phillips curve relationship between short-run output/employment and inflation continues to hold and that the output gap that opened up in the wake of the financial crisis is likely to persist for some time, pulling down on inflation. He showed evidence that consumption and inflation tend to fall following episodes of fiscal consolidation and that the declining unit labour costs in the United Kingdom are also likely to be disinflationary.

The economic outlook for 2011 and beyond

Charles Bean, Deputy Governor, December 2010.

www.bankofengland.co.uk/publications/speeches/2010/speech466.pdf

In a speech to the Market News International Annual Seminar, Deputy Governor Charles Bean discussed economic developments over the past year and the challenges ahead. Charles Bean opened by describing activity indicators as having given some comfort that a recovery was under way. Looking forward, however, he noted that economic prospects would depend on private final demand and net exports increasing. The impact of the prospective fiscal consolidation on consumption remained an open question. Also, given the depreciation of sterling since 2007, the contribution of net exports to the recovery had thus far been somewhat disappointing. Charles Bean noted that inflation had been considerably higher than the MPC had expected. He also noted that strong global growth generated upside risks to inflation through commodities and tradable goods prices. He concluded by saying that it would, at some point, become appropriate to begin withdrawing the current monetary stimulus in a measured fashion.

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 Q2

– Public attitudes to inflation and interest rates
– National saving
– Understanding investment better: insights from recent research
– Financial globalisation, external balance sheets and economic adjustment
– A review of the work of the London Foreign Exchange Joint Standing Committee in 2006
– The MPC ten years on (S)
– The City's growth: the crest of a wave or swimming with the stream? (S)
– The changing pattern of savings: implications for growth and inflation (S)
– Interest rate changes — too many or too few? (S)
– A perspective on recent monetary and financial system developments (S)
– Recent developments in the UK economy: the economics of walking about (S)

2007 Q3

– Extracting a better signal from uncertain data
– Interpreting movements in broad money
– The Bank of England Credit Conditions Survey
– Proposals to modify the measurement of broad money in the United Kingdom: a user consultation
– The Governor's speech to CBI Wales/CBI Cymru, Cardiff (S)
– The Governor's speech at the Mansion House (S)
– London, money and the UK economy (S)
– Uncertainty, policy and financial markets (S)
– Central banking and political economy: the example of the United Kingdom's Monetary Policy Committee (S)
– Promoting financial system resilience in modern global capital markets: some issues (S)
– UK monetary policy: good for business? (S)
– Consumption and interest rates (S)

2007 Q4

– Household debt and spending: results from the 2007 NMG Research survey
– The macroeconomic impact of higher energy prices on the UK economy
– Decomposing corporate bond spreads
– The foreign exchange and over-the-counter derivatives markets in the United Kingdom
– The Governor's speech in Northern Ireland (S)
– Current monetary policy issues (S)
– The global economy and UK inflation (S)
– Trends in European labour markets and preferences over unemployment and inflation (S)
– Fear, unemployment and migration (S)
– Risk, uncertainty and monetary policy (S)
– New markets and new demands: challenges for central banks in the wholesale market infrastructure (S)
– A tale of two shocks: global challenges for UK monetary policy (S)

2008 Q1

– Capital inflows into EMEs since the millennium: risks and the potential impact of a reversal
– Recent developments in portfolio insurance
– The Agents' scores: a review
– The impact of low-cost economies on UK import prices
– The Society of Business Economists' survey on MPC communications
– The Governor's speech in Bristol (S)
– The impact of the financial market disruption on the UK economy (S)
– The return of the credit cycle: old lessons in new markets (S)
– Money and credit: banking and the macroeconomy (S)
– Financial markets and household consumption (S)

2008 Q2

– Public attitudes to inflation and interest rates
– Recent advances in extracting policy-relevant information from market interest rates
– How do mark-ups vary with demand?
– On the sources of macroeconomic stability
– A review of the work of the London Foreign Exchange Joint Standing Committee in 2007
– Sovereign wealth funds and global imbalances (S)
– Monetary policy and the financial system (S)
– Inflation and the global economy (S)
– Does sterling still matter for monetary policy? (S)
– Strengthening regimes for controlling liquidity risk: some lessons from the recent turmoil (S)
– Inflation, expectations and monetary policy (S)

2008 Q3

– Market expectations of future Bank Rate

- Globalisation, import prices and inflation: how reliable are the 'tailwinds'?
- How has globalisation affected inflation dynamics in the United Kingdom?
- The economics of global output gap measures
- Banking and the Bank of England (S)
- The Governor's speech at the Mansion House (S)
- A tale of two cycles (S)
- The financial cycle and the UK economy (S)
- The credit crisis: lessons from a protracted 'peacetime' (S)
- Financial innovation: what have we learnt? (S)
- Global inflation: how big a threat? (S)
- Remarks on 'Making monetary policy by committee' (S)

2008 Q4

- The financial position of British households: evidence from the 2008 NMG Research survey
- Understanding dwellings investment
- Price-setting behaviour in the United Kingdom
- Monetary Policy Roundtable

2009 Q1

- Price-setting behaviour in the United Kingdom: a microdata approach
- Deflation

2009 Q2

- Quantitative easing
- Public attitudes to inflation and monetary policy
- The economics and estimation of negative equity
- A review of the work of the London Foreign Exchange Joint Standing Committee in 2008

2009 Q3

- Global imbalances and the financial crisis
- Household saving
- Interpreting recent movements in sterling
- What can be said about the rise and fall in oil prices?
- Bank of England *Systemic Risk Survey*
- Monetary Policy Roundtable

2009 Q4

- The financial position of British households: evidence from the 2009 NMG survey
- Accounting for the stability of the UK terms of trade
- Recent developments in pay settlements

2010 Q1

- Interpreting equity price movements since the start of the financial crisis
- The Bank's balance sheet during the crisis
- Changes in output, employment and wages during recessions in the United Kingdom
- Monetary Policy Roundtable

2010 Q2

- Collateral risk management at the Bank of England
- The impact of the financial crisis on supply
- Public attitudes to inflation and monetary policy
- A review of the work of the London Foreign Exchange Joint Standing Committee in 2009

2010 Q3

- Understanding the price of new lending to households
- Interpreting the world trade collapse
- What can we learn from surveys of business expectations?
- Residential property auction prices
- Chief Economists' Workshop: state-of-the-art modelling for central banks
- Monetary Policy Roundtable

2010 Q4

- The history of the *Quarterly Bulletin*
- Index of articles 1960–2010
- The UK recession in context — what do three centuries of data tell us?
- The Bank's money market framework
- Managing the circulation of banknotes
- Understanding the weakness of bank lending
- Evolution of the UK banking system
- The financial position of British households: evidence from the 2010 NMG Consulting survey
- The foreign exchange and over-the-counter interest rate derivatives markets in the United Kingdom
- Global finance after the crisis

2011 Q1

- Understanding the recent weakness in broad money growth
- Understanding labour force participation in the United Kingdom
- Global imbalances: the perspective of the Bank of England
- China's changing growth pattern
- Monetary Policy Roundtable

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. 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

No. 408 Wage rigidities in an estimated DSGE model of the UK labour market (February 2011)
Renato Faccini, Stephen Millard and Francesco Zanetti

No. 409 The contractual approach to sovereign debt restructuring (February 2011)
Sergi Lanau

No. 410 Are EME indicators of vulnerability to financial crises decoupling from global factors? (February 2011)
Guillermo Felices and Tomasz Wieladek

No. 411 Low interest rates and housing booms: the role of capital inflows, monetary policy and financial innovation (February 2011)
Filipa Sá, Pascal Towbin and Tomasz Wieladek

No. 413 Mapping systemic risk in the international banking network (March 2011)
Rodney J Garratt, Lavan Mahadeva and Katsiaryna Svirydzenka

No. 414 A Bayesian approach to optimal monetary policy with parameter and model uncertainty (March 2011)
Timothy Cogley, Bianca de Paoli, Christian Matthes, Kalin Nikolov and Tony Yates

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

No. 31 Optimal bank capital (January 2011)
David Miles, Jing Yang and Gilberto Marcheggiano

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.

General enquiries about the Bank of England should be made to +44 (0)20 7601 4878.
The Bank of England's website is at www.bankofengland.co.uk.

Issued by the Bank of England Publications Group.

ISSN 0005-5166
Printed by Park Communications Limited