Quarterly Bulletin

2008 Q4 | Volume 48 No. 4

BANK OF ENGLAND

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Foreword

This edition of the *Quarterly Bulletin* begins with the regular *Markets and operations* report, reviewing recent developments in capital markets and the Bank's official operations. The report covers a period of exceptional instability in the global financial system which was accompanied by a significant deterioration in the global economic outlook. These developments prompted the introduction of various measures by the authorities in many countries to maintain financial stability. These initiatives helped to restore some level of stability to the financial system from late October. But conditions remained far from normal.

A key issue facing the Monetary Policy Committee (MPC) is how the financial situation of households has changed over the past year. The impact of tighter credit conditions is likely to vary significantly across households and so it is important to examine disaggregated data when assessing the impact. Each year a survey of households' financial situation is carried out for the Bank by NMG Research, and the results of the latest survey are examined by Tomas Hellebrandt, Matt Waldron and Garry Young. The survey finds that households experienced a decline in the income they had available after meeting household bills and had saved less than they had previously expected. Many households thought that credit had become harder to access over the course of the year, which had caused some to lower their spending. And more households were finding their debt to be a burden to them than was the case in previous NMG Research surveys. This survey informed the MPC's assessment of the prospects for household consumption and saving in the November *Inflation Report* and the MPC will continue to monitor closely indicators of household distress.

An important contribution to the slowdown in investment in the United Kingdom over the past year has come from lower investment in dwellings. Matthew Corder and Nyssa Roberts analyse developments in dwellings investment in the context of an economic framework that considers the incentives to invest relative to the costs. Investment in dwellings responded sluggishly to rising house prices in the earlier part of this decade, reflecting lags in the construction cycle and increasing costs arising from the planning process. But such factors have not prevented an abrupt decline in construction activity more recently, as house prices have fallen and uncertainty about their future path has increased.

To assess the prospects for inflation it is important that the Monetary Policy Committee understands how companies set prices. Earlier this year the Bank of England conducted a survey of companies' price-setting behaviour by sampling companies who are contacts of the Bank's Agents. Jennifer Greenslade and Miles Parker report the results of the survey which updates our understanding of price-setting behaviour. The survey indicates that the frequency with which companies change their prices varies considerably across sectors but that over the past decade a significant number of companies have increased the frequency of price changes. Different

factors influence price rises and falls but nearly half of companies surveyed change their prices within three months of an increase in costs or a fall in demand.

On 30 September, the Bank of England and the Centre for Economic Policy Research jointly hosted a Monetary Policy Roundtable. This was the first in what is expected to become a regular series intended to provide a forum for economists to discuss key issues affecting the design and operation of monetary policy in the United Kingdom. There were four discussion topics: the prospects for the housing market and consumer spending; oil and other global price pressures; monetary policy considerations at the current juncture; and lessons from the financial turmoil for monetary policy. A report in this *Quarterly Bulletin* summarises the main points made by participants at the 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.

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

Recent economic and financial developments

Markets and operations

This article reviews developments in global financial markets since the 2008 Q3 *Quarterly Bulletin* up to late November 2008. The article also reviews the Bank's official operations during this period.

Global financial markets(1)

Overview

This article covers a period of exceptional instability in the global financial system. The financial market turmoil intensified in September and October, especially following the failure of Lehman Brothers. Subsequently, a number of other financial firms failed, were rescued by government intervention or merged with other financial institutions.

As a result, trading conditions in many markets became very strained. Market liquidity deteriorated as market makers widened spreads between prices at which they were prepared to buy and sell. This contributed to numerous apparent anomalies in market pricing.

The instability of the global financial system was accompanied by a significant deterioration in the global economic outlook and increased investor risk aversion. Consensus forecasts for economic growth were revised sharply lower in both major and emerging economies. The majority of asset prices fell and there were large increases in realised volatilities and also implied volatilities derived from option prices across markets (**Chart 1**). This asset price volatility also increased the pressure on many financial institutions to reduce the size of their trading positions in order to conserve capital.

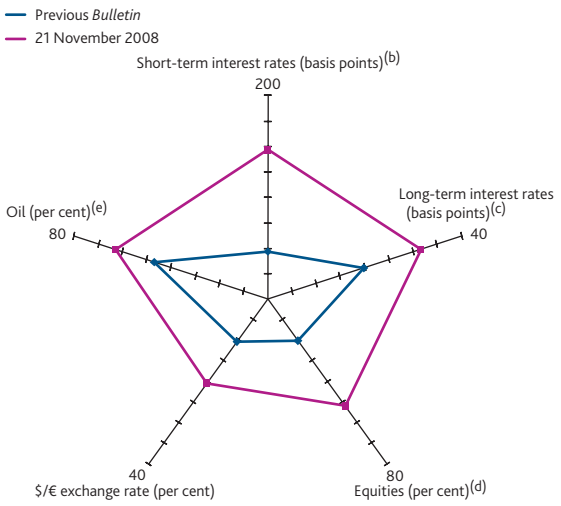
These financial market developments prompted the introduction of various measures by the authorities in many countries to maintain financial system stability. The initiatives helped to bring some level of stability to financial markets from late October. But conditions remained far from normal.

Recent developments in international capital markets

Bank funding markets

Following more than a year of stress in interbank money markets, conditions worsened markedly in September 2008. The cost of interbank borrowing, particularly in US dollars, rose markedly following the failure of Lehman Brothers. The spread of three-month US dollar Libor over expected future short-term interest rates reached a record high of around 370 basis points in October (**Chart 2**). There was also a sharp

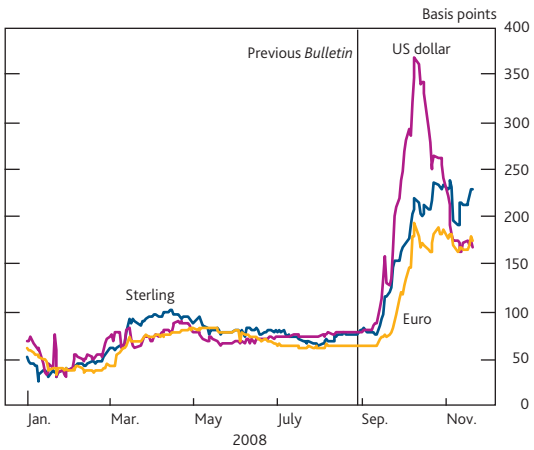
Chart 1 Selected implied volatilities(a)



Sources: Bloomberg, Chicago Mercantile Exchange, Euronext.liffe and Bank calculations.

(a) Implied by option prices on selected instruments. Equal weighting where more than one instrument used.
(b) Options on US dollar, euro and sterling Libor interest rate futures contracts.
(c) US dollar swaptions settling on five-year swap rates, five years forward.
(d) Options on FTSE 100, S&P 500 and Euro Stoxx 50.
(e) Options on West Texas Intermediate crude oil futures.

Chart 2 Three-month Libor relative to expected short-term interest rates(a)



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

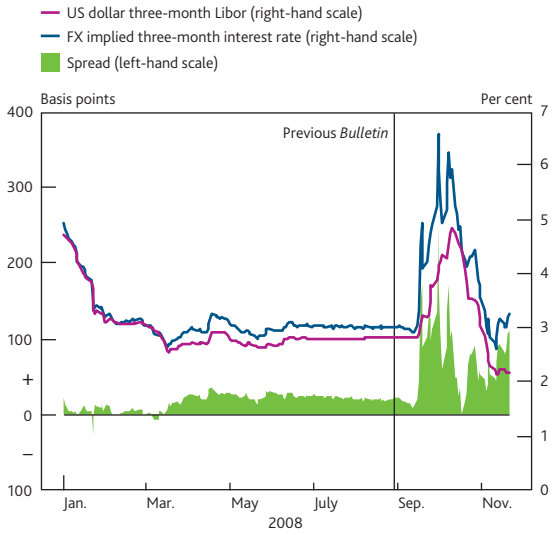
(a) Spread of three-month London interbank offered rate (Libor) to three-month overnight index swap (OIS) rates.

(1) This article focuses on global capital market developments. The data cut-off for this section is 21 November.

decrease in the volumes of money market loans, particularly at maturities beyond a few days. At the same time, contacts reported increased differentiation between rates paid by individual banks to borrow funds.

The strains on bank funding were particularly acute in cross-currency swap markets where the implied rates for US dollars spiked up sharply (**Chart 3**).

Chart 3 Three-month US dollar Libor rates and implied three-month rates from foreign exchange forwards(a)



Sources: Bloomberg, Reuters and Bank calculations.

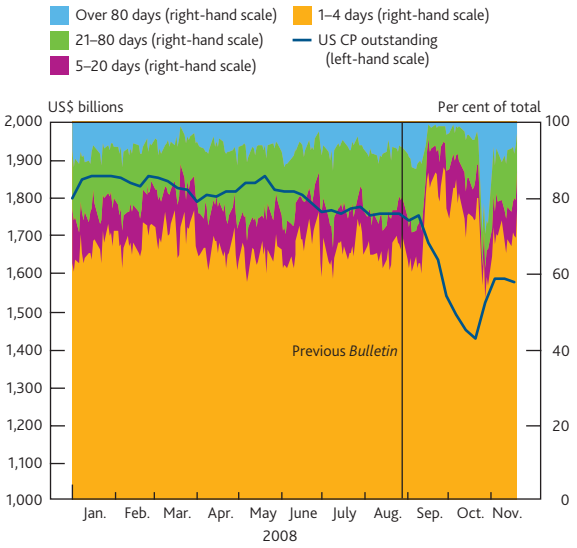
(a) For more details, see 2008 Q2 *Quarterly Bulletin*, page 134, Chart 26 and *BIS Quarterly Review* March 2008, pages 73–86.

In addition, markets for other short-term bank debt remained stressed. In the United States, financial institutions issued commercial paper (CP) at shorter maturities (**Chart 4**), and contacts reported that issuance of certificates of deposit (CDs) decreased markedly in September as secondary markets for these securities became very illiquid. Certain lenders to banks, such as money market funds (MMFs), corporates and asset managers, reportedly ceased to repurchase maturing longer-term paper in favour of overnight paper and deposits (**Chart 4**).

US MMFs experienced a sharp downturn in total assets under management after the value of Reserve Primary Fund's assets fell below the notional value of shares in the fund (ie it 'broke the buck').(1) And there were widespread redemptions from 'Prime' funds, which invest in bank securities, with the proceeds reinvested in government paper-only funds. MMFs themselves shortened the term of their remaining lending to banks (**Chart 5**).

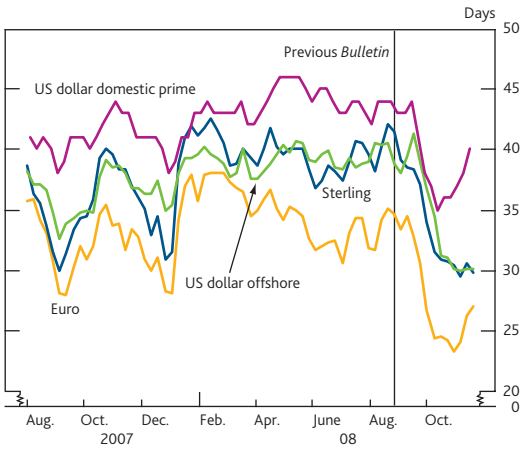
In response to these funding pressures, the US authorities introduced a number of new measures to restore liquidity to short-term funding markets and maintain investor confidence in the MMF industry. The Commercial Paper Funding Facility

Chart 4 US commercial paper outstanding and maturity of daily issuance



Source: US Federal Reserve.

Chart 5 Money market fund assets' weighted-average maturity



Source: iMoneyNet.

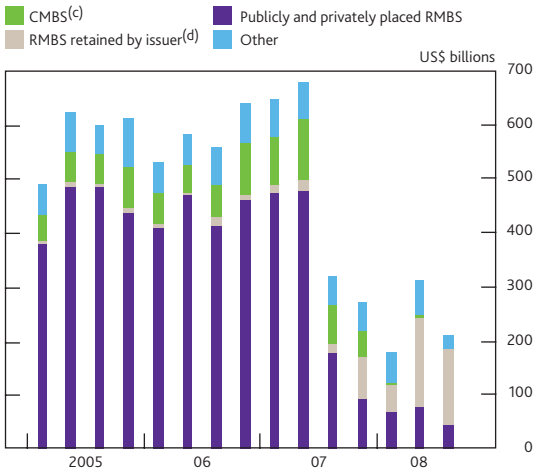
(CPFF) in particular was reported to have supported US dollar CP issuance. In the first few weeks following its introduction on 27 October, the CPFF purchased around $270 billion of CP, which contacts suggested helped the US domestic MMF industry through the turbulence.

The market for asset-backed securities (ABS) — another source of funding for banks and corporates — remained largely closed. Very few ABS were publicly issued, with the majority of issuance retained by the issuer for use as collateral in central bank operations (**Chart 6**). And the inability of banks to access wholesale funding markets via issuance of ABS reportedly affected their ability to provide new lending. On 25 November, the Federal Reserve announced the Term

(1) The value of its assets fell such that it could no longer price its shares at par. 'Breaking the buck' has previously led to suspension of redemptions and the eventual closure of the fund.

Asset-Backed Loan Facility (TALF), which will lend up to $200 billion to holders of highly rated US dollar ABS backed by consumer and small business loans in order to facilitate lending to these sectors.

Chart 6 Global issuance of asset-backed securities(a)(b)



Sources: Dealogic and Bank calculations.

(a) Non-retained residential mortgage-backed security (RMBS) issuance has been proxied by issuance that is eligible for inclusion in underwriting league tables, while retained issuance has been proxied by issuance that is not eligible for inclusion.
(b) Quarterly issuance. 'Other' includes auto, credit card and student loan ABS.
(c) Commercial mortgaged-backed securities.
(d) This includes RMBS used as collateral in central bank operations.

More widely, during October and November the governments of the world's largest economies announced a series of measures to stabilise the international banking system. According to contacts, these measures prompted some modest improvement in market sentiment and helped ease the acute instability across the global banking system.

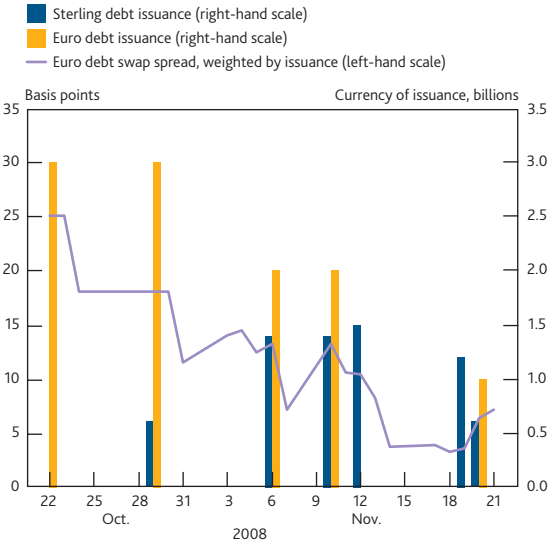
On 8 October, the UK Government announced a set of measures to address perceived weaknesses in banks' capital and funding. Specifically, the UK Government offered to underwrite new equity capital issuance by UK banks. And the Credit Guarantee Scheme allowed UK banks to issue up to £250 billion (in aggregate) of government-guaranteed CDs, CP and senior unsecured paper of up to three years in maturity.(1) In the period up to 21 November, €11 billion and £6.7 billion of two to three-year guaranteed debt was issued publicly (**Chart 7**), in addition to shorter-maturity guaranteed debt by private placement.

Elsewhere, similar measures were adopted, including the Temporary Liquidity Guarantee Programme (TLGP) in the United States and other government-guarantee schemes throughout Western Europe and Australia.

Short-term interest rates

Alongside these government measures, on 8 October central banks in the United States, euro area, United Kingdom, Canada, Switzerland and Sweden took co-ordinated action to ease policy rates by 50 basis points. In all cases this was

Chart 7 UK banks' debt issuance of two to three years' maturity under the Credit Guarantee Scheme



Sources: Bloomberg and Bank calculations.

followed by further reductions to policy rates. The changes in central bank policy rates in different economies are summarised in **Table A**.

Table A Selected changes to official policy rates to 21 November

Country/region	Policy rate 29 Aug.	Date	Move	Policy rate 21 Nov.
United States	2.00%	8 Oct.(a)	-50 basis points	
		29 Oct.	-50 basis points	1.00%
Euro area	4.25%	8 Oct.(a)	-50 basis points	
		7 Nov.	-50 basis points	3.25%
Japan	0.50%	31 Oct.	-20 basis points	0.30%
China	7.47%	15 Sep.	-27 basis points	
		8 Oct.(a)	-27 basis points	
		29 Oct.	-27 basis points	6.66%
United Kingdom	5.00%	8 Oct.(a)	-50 basis points	
		7 Nov.	-150 basis points	3.00%
Canada	3.00%	8 Oct.(a)	-50 basis points	
		21 Oct.	-25 basis points	2.25%
Australia	7.25%	3 Sep.	-25 basis points	
		8 Oct.	-100 basis points	
		5 Nov.	-75 basis points	5.25%
Sweden	4.50%	3 Sep.	+25 basis points	
		8 Oct.(a)	-50 basis points	
		22 Oct.	-50 basis points	3.75%
Switzerland	3.00%(b)	8 Oct.(a)	-50 basis points	
		6 Nov.	-50 basis points	
		20 Nov.	-100 basis points	1.00%

Source: Bloomberg.

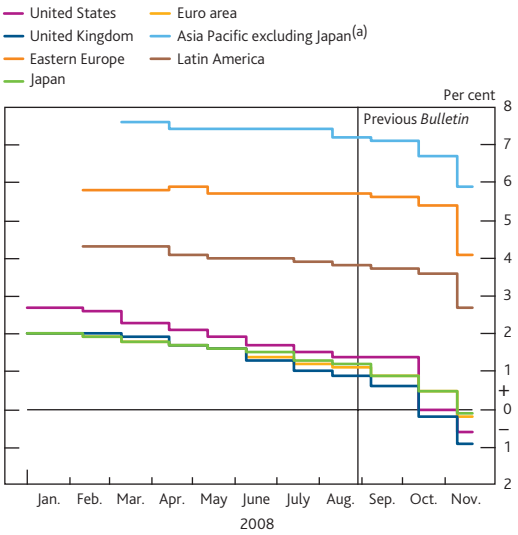
(a) Part of co-ordinated central bank action.
(b) Although the Swiss National Bank's target range for Swiss franc three-month Libor was 2.25%–3.25% at the beginning of the period, the target rate was above 3% immediately prior to the 8 October decision.

Consensus forecasts for economic growth in 2009 were revised down further compared with projections earlier in the year with most major industrial economies expected to

(1) Banks issuing under the Credit Guarantee Scheme will incur a fee equivalent to 50 basis points plus the bank's median five-year CDS spread over the twelve-month period proceeding 7 October 2008.

contract in 2009 (**Chart 8**). Growth projections for emerging economies also fell, suggesting reduced perceptions of emerging markets being 'decoupled' from developed markets.

Chart 8 Expected real GDP growth for 2009

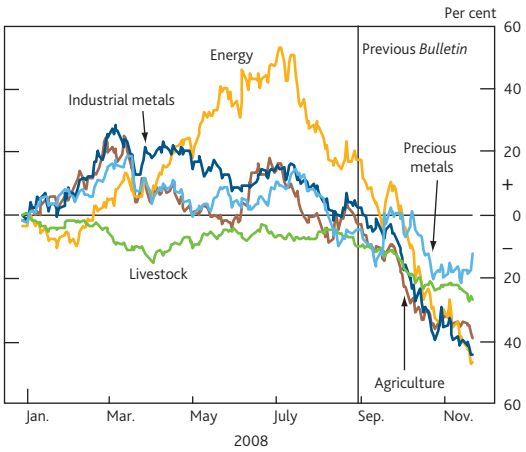


Source: Consensus Economics.

(a) Comprises fifteen countries.

Falls in global growth expectations led to further broad-based falls in commodity prices (**Chart 9**). In particular, the price of Brent crude oil fell below $54 compared with its high of around $147 in July. This helped to ease near-term pressures on retail price inflation.

Chart 9 Cumulative changes in selected commodity price indices(a) since January 2008

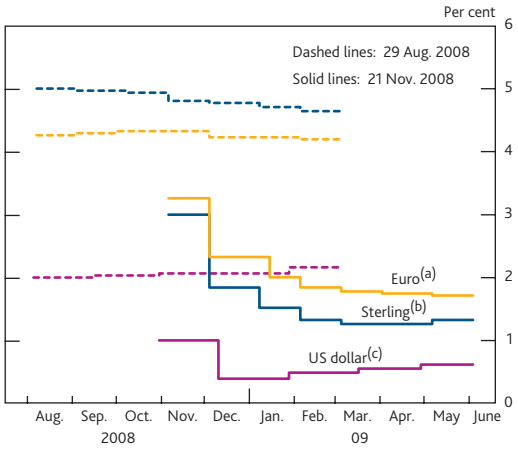


Source: Standard & Poor's.

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

Looking ahead, implied future paths for short-term interest rates in sterling, US dollar and euro shifted down sharply (**Chart 10**). Economists' expectations of future policy rates implied by surveys also fell.

Chart 10 International forward short-term interest rates

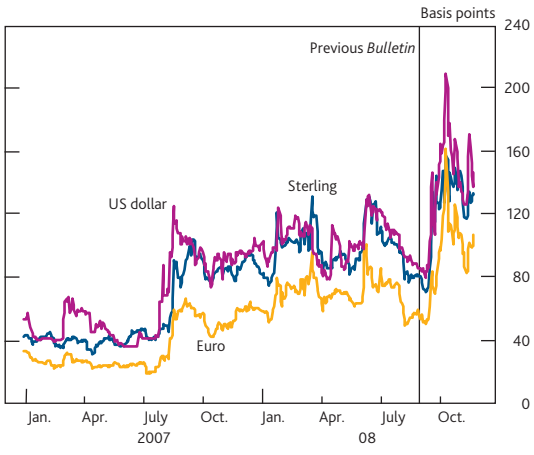


Sources: Bloomberg and Bank calculations.

(a) Derived from euro overnight index average (EONIA) swaps.
(b) Derived from sterling overnight index average (SONIA) swaps.
(c) Derived from overnight swaps that settle on the Fed funds effective rate.

Increased uncertainty about the outlook for short-term interest rates was reflected in measures of implied volatility derived from option prices on Libor futures (**Chart 11**). Implied volatility increased sharply during September, declined a little during October following the co-ordinated monetary easing, but ended the period significantly higher than at the time of the previous *Bulletin*. This could have reflected both increased uncertainty about risk premia in Libor rates as well as uncertainty about the future path of policy rates.

Chart 11 International six-month implied volatility derived from interest rate options

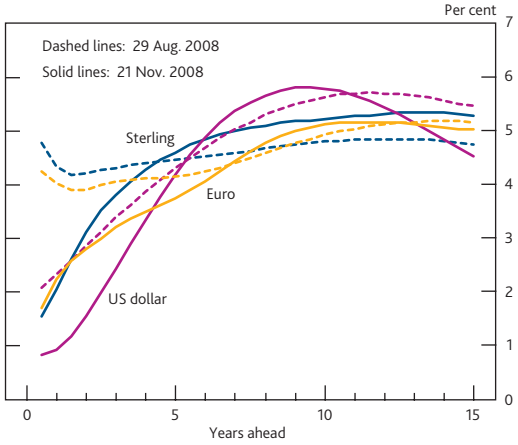


Sources: Bank of England, Chicago Mercantile Exchange and Euronext.liffe.

Long-term interest rates

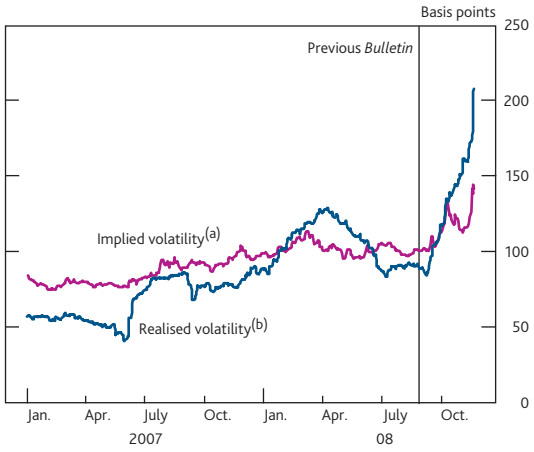
At longer horizons, volatility also picked up in international government bond markets against a general trend of steepening yield curves (as short forward rates fell and long rates increased — see **Chart 12**). In particular, realised and implied long-term US dollar interest rate volatility rose sharply (**Chart 13**).

Chart 12 International nominal forward interest rates(a)



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

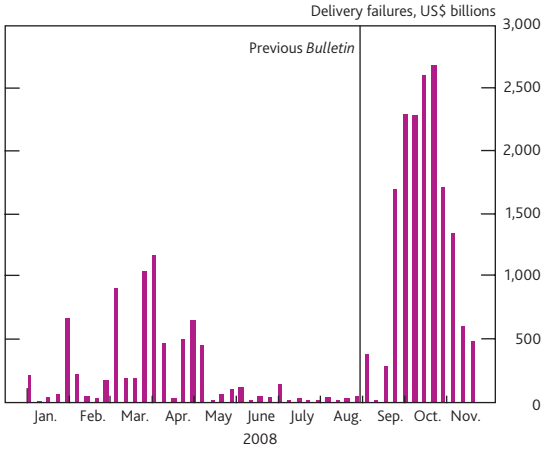
Chart 13 US dollar nominal forward interest rate volatility



Sources: JPMorgan Chase and Co. and Bank calculations.

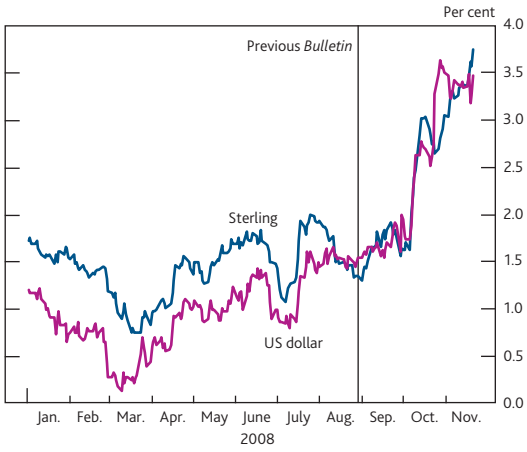
(a) Five-year volatility, five years ahead implied by swaptions.
(b) Annualised volatility over the preceding three-month period of five-year nominal rates five years ahead, derived from the Bank's government liability curve.

Chart 14 Notional value of US government bond repo delivery failures



Sources: Federal Reserve Bank of New York and Bank calculations.

Chart 15 International five-year spot real interest rates(a)



Source: Bank calculations.

(a) Sterling and US dollar spot rates derived from the Bank's government liability curves. Sterling rates referenced to RPI and US dollar rates referenced to CPI.

This rise in volatility was associated with very illiquid conditions and contacts noted that at times the functioning of government bond markets became severely impaired. Associated with that, the number of failed trades on US Treasury repo transactions increased to record levels in October and remained elevated in November (**Chart 14**). As a result, holders of US Treasuries became reluctant to lend in the repo market.

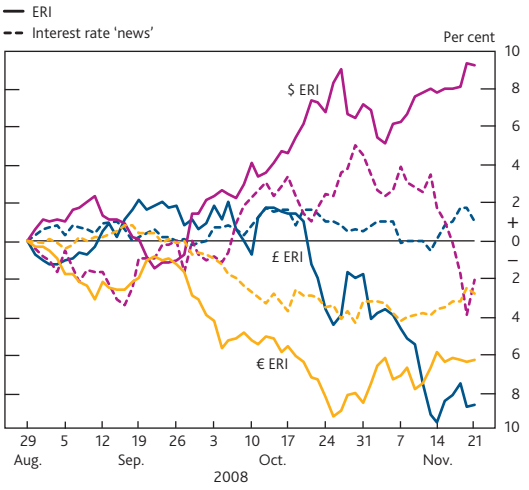
US dollar and sterling real interest rates rose at short to medium-term maturities (**Chart 15**). Contacts suggested that this may, in part, relate to higher prospective government borrowing, which could have prompted higher expected future interest rates and/or a rise in the uncertainty surrounding those expectations (ie term premia).

Foreign exchange

Interest rate developments might account for some of the variations in exchange rates. For example, unexpected falls in euro interest rates (relative to those overseas) coincided with a sharp depreciation in the euro. And at short horizons, relative interest rate developments were consistent with a fall in the value of sterling. However in general, the major currencies seem to have moved by more than would be suggested by interest rate news, especially since late October (**Chart 16**).

Market participants tended to place weight on other explanations for the recent swings in exchange rates. In particular, three interrelated factors were widely cited: a general retrenchment from risky assets as part of the ongoing deleveraging process in financial markets; unwinding of so-called carry trades (which typically involve borrowing in low-yielding currencies to invest in overseas assets with higher

Chart 16 Implied contribution of interest rate 'news' to cumulative changes in selected ERIs since previous *Bulletin*[a]



Source: Bank calculations.

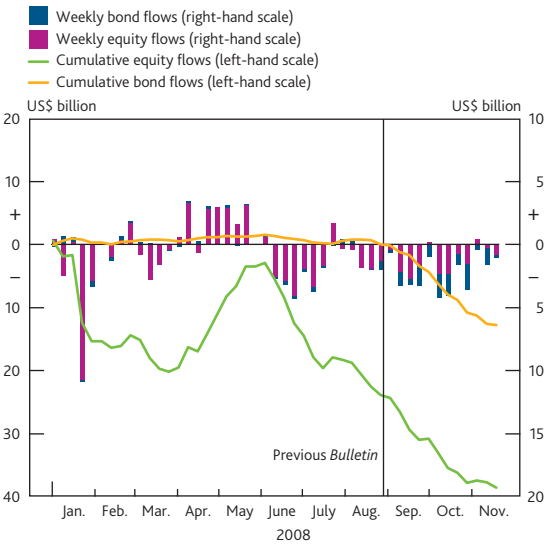
(a) For more information on the analytics required to isolate the impact of interest rate 'news' on exchange rates, see Brigden, A, Martin, B and Salmon, C (1997), 'Decomposing exchange rate movements according to the uncovered interest rate parity condition', *Bank of England Quarterly Bulletin*, November,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

nominal returns); and repatriation of investments (especially to the United States and Japan).

Emerging markets

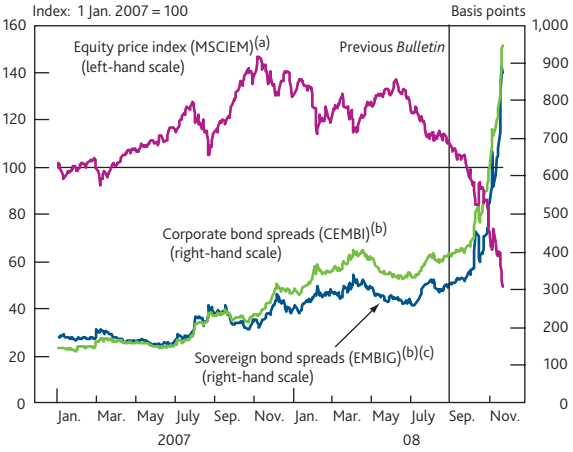
Emerging market economies (EMEs) were particularly affected by this changing pattern of capital flows. There were significant outflows from emerging market debt and equity mutual funds over the review period (**Chart 17**). EME sovereign and corporate bond spreads widened and EME equity markets weakened sharply (**Chart 18**). In contrast to earlier in the year when emerging market currencies were on divergent trends, there were also sharp and broad-based depreciations in the value of emerging market currencies against the US dollar (**Chart 19**).

Chart 17 Net flows into emerging market bond and equity mutual funds



Source: EPFR Global.

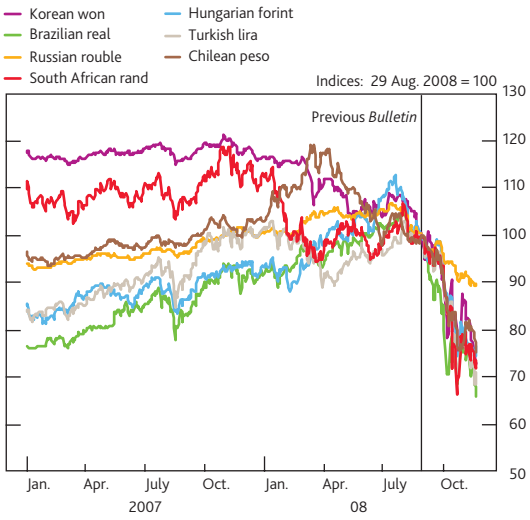
Chart 18 Emerging market bond spreads and equity prices



Sources: JPMorgan Chase & Co., Morgan Stanley and Bank calculations.

(a) In US dollar terms.
(b) US dollar-denominated debt index.
(c) Excludes defaulted bonds.

Chart 19 Emerging market exchange rates[a]



Sources: Reuters and Bank calculations.

(a) Against the US dollar.

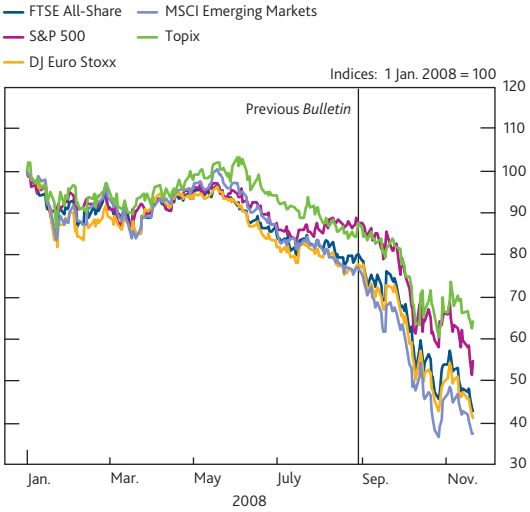
To some extent, these falls in emerging market asset prices reflected the weaker macroeconomic outlook for these economies which would have tended to lower expected returns on EME assets. In addition, against the background of heightened risk aversion and further deleveraging, investors may have demanded greater risk compensation on investments in EMEs.

The decline in commodity prices, especially those for energy and industrial metals, also put further pressure on EME commodity exporters. For example, share prices of Russian energy companies declined by around 60%.

Equity markets

Alongside the falls in EME share prices, equity indices in the major economies also fell, continuing the decline that took hold in the summer (**Chart 20**). The falls in equity prices were broad-based, affecting nearly all the major industrial sectors.

Chart 20 International equity indices (in US dollars)(a)



Sources: Bank of England and Bloomberg.

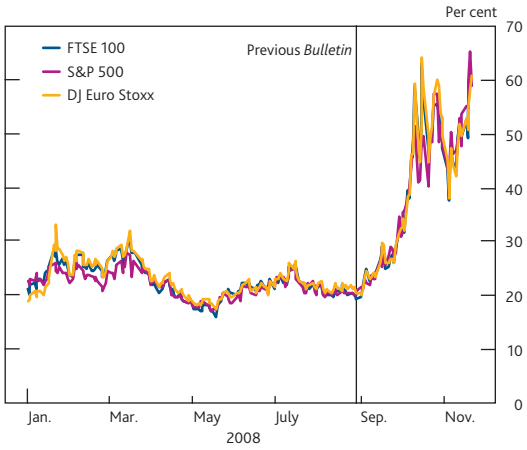
(a) The MSCI Emerging Markets index is a capitalisation-weighted index that monitors the performance of stocks in emerging markets.

The share price declines were particularly sharp in early October, coinciding with the intensification of pressures on the global banking system. Contacts linked some of the price falls to hedge funds liquidating positions to meet increased margin calls on collateral posted with their prime brokers. In addition, actual (and fears of future) redemption requests at hedge funds — including via so-called funds of funds — might also have triggered further equity sales. Data available to the end of September showed a quarterly outflow from equity hedge funds, and according to contacts the outflow accelerated through October.

Forward-looking measures of equity price volatility rose, indicating that investors perceived that the outlook for equity markets remained highly uncertain (**Chart 21**). This heightened uncertainty was reflected in a widening in the implied probability distribution of future equity prices derived from option prices (**Chart 22**). The implied distribution also showed a significant increase in the perceived downside risks to the future levels of the FTSE 100 index.

The continued falls in equity prices and increased volatility occurred at the same time as expectations for company earnings growth were revised down further. Specifically, investment analysts lowered their forecasts for earnings growth in 2008 and 2009 as the macroeconomic outlook worsened (**Chart 23**).

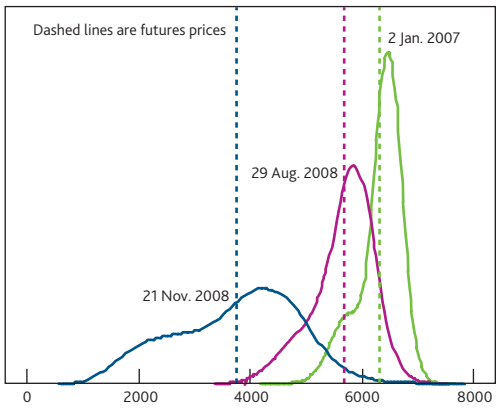
Chart 21 Implied volatilities for international equity indices(a)



Sources: Bloomberg, Euronext.liffe and Bank calculations.

(a) Three-month (constant maturity) implied volatility derived from options.

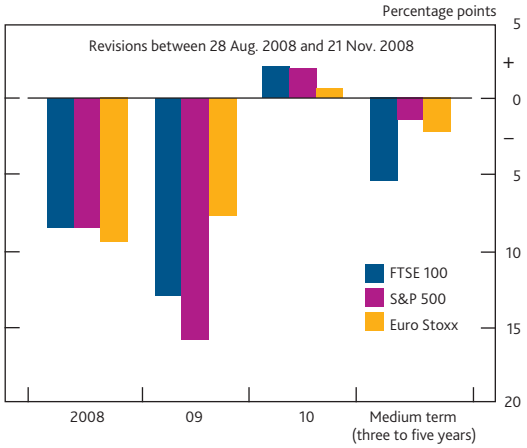
Chart 22 Three-month option-implied FTSE 100 probability density functions(a)



Sources: Euronext.liffe and Bank calculations.

(a) For more details, see Clews, R, Panigirtzoglou, N and Proudman, J (2000), 'Recent developments in extracting information from options markets', *Bank of England Quarterly Bulletin*, February, pages 50–60.

Chart 23 Revisions to company earnings growth forecasts(a)(b)

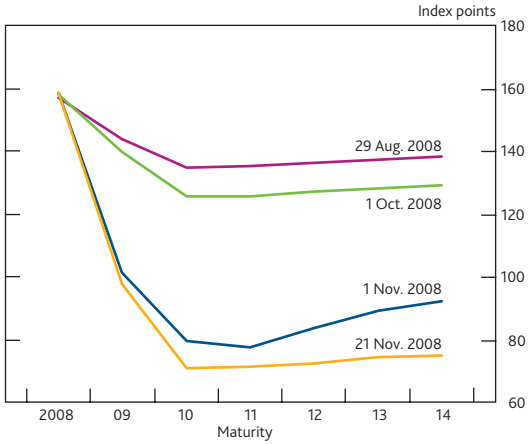


Source: Thomson Datastream.

(a) Based on data from the Institutional Brokers' Estimate System which uses Consensus forecasts of earnings per share growth by sell-side analysts.
(b) 2009 figures capture analysts' forecasts relating to annual results of companies that have a year end between 1 June 2008 and 30 May 2009. Similarly, forecasts for 2009 (2010) relate to those firms whose financial years end between June 2009 (2010) and May 2010 (2011).

An alternative market-based indicator of future company earnings also suggested that corporate prospects deteriorated. The price of dividend swaps — instruments that allow investors to trade future dividend payments in return for fixed cash flows (see the box opposite for more details) — fell sharply since the summer, across all maturities. Most of the falls occurred in October. In principle, the decline in the value of dividend swaps could have reflected a shift down in expectations of future dividend payouts (**Chart 24**). However, the falls could also be consistent with heightened risk premia on these instruments. In particular, contacts reported reduced liquidity in equity derivative markets in recent months, which may have affected the liquidity premium factored into dividend swap pricing.

Chart 24 DJ Euro Stoxx dividend swap prices(a)(b)



Sources: Bloomberg and Bank calculations.

(a) For more details on dividend swaps see the box opposite.
(b) From exchange-traded futures contracts.

Corporate credit

Accompanying the falls in equity prices, corporate credit spreads also widened further. Indeed, some commentators noted that equity and corporate credit market indicators became more consistent over recent months. Previously, over the year to Summer 2008 equity prices had generally remained resilient compared with corporate credit spreads which had widened sharply from July 2007 (**Chart 25**).

Liquidity premia remained a persistent feature in corporate bond markets. The prices of corporate bonds were low compared with premia on credit default swap (CDS) contracts for the same firm. This metric — the so-called CDS/cash bond basis — became considerably more negative. According to contacts, this was predominantly due to a deterioration in funding conditions for corporate bonds, with counterparties demanding more onerous terms when parting with cash in exchange for bonds (**Chart 26**).

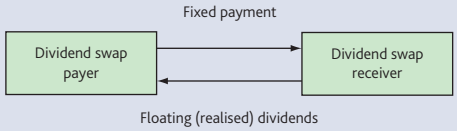
Dividend swaps

Dividend swaps are derivative contracts which are directly linked to the dividends paid by a specific stock or basket of stocks. The final payment between parties to the swap is determined by the actual level of dividends paid over the time period specified by the contract, usually a calendar year.

Trading in the dividend swap market takes place predominantly over-the-counter as private contracts between counterparties. However in June 2008, Eurex introduced exchange-traded dividend swaps that reference the aggregate level of dividends paid by the group of companies included in the Dow Jones Euro Stoxx 50 index.

The mechanics of dividend swaps are similar to fixed-for-floating interest rate swaps. The payer in a swap agrees to make a fixed payment at expiry, which embodies expectations of future dividends. The receiver in the swap agrees to pay the realised dividends accrued over the period (**Figure 1**). Hence, the payer in a dividend swap is 'long' realised dividends (ie the payer makes a profit if the realised dividend is greater than the agreed fixed payment). The swaps that reference dividends paid by a basket of companies (ie indices) are quoted in index point terms.(1)

Figure 1 Indicative structure of a dividend swap

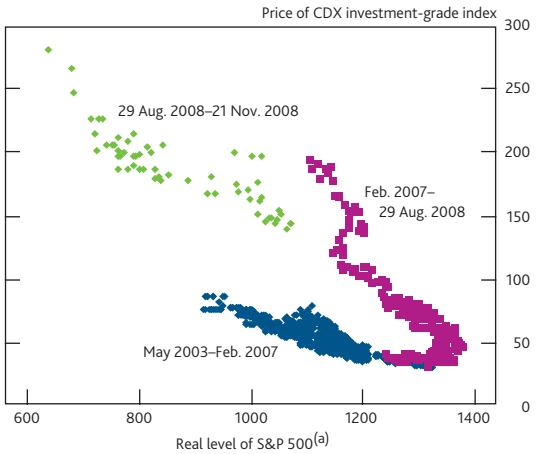


Prior to the swap maturing its price will fluctuate as the present value of cash flows on the contract changes. Since the final payment is uncertain, the appropriate discount rate for future cash flows will include an adjustment for risk. This means that the market price of the swap not only reflects expected dividends but also compensation for the perceived uncertainty around those expectations.

In addition, since this is a relatively new market and the number of active participants is still developing, contacts report that swap prices may also be affected by demand and supply conditions at particular times. That is, liquidity premia can sometimes be a particularly important in the pricing of dividend swaps.

(1) For example, if the dividend swap trades at 120 index points and the index level is at 3500, the swap implies a dividend yield of 120/3500 = 3.4%.

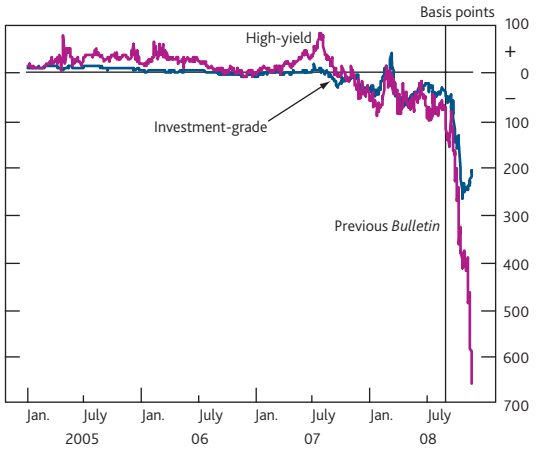
Chart 25 US corporate credit default swap premia and real equity prices



Sources: JPMorgan Chase and Co. and Standard & Poor's.

(a) S&P 500 deflated by US CPI (not seasonally adjusted).

Chart 26 Indicative 'basis' between bond spreads and corresponding credit default swap spreads for US corporates(a)



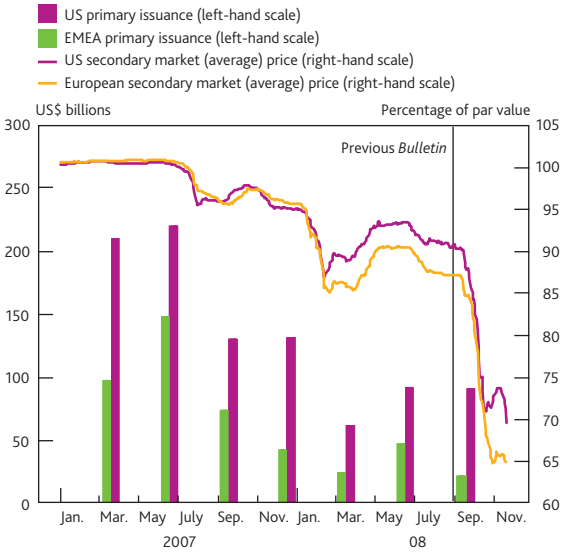
Source: JPMorgan Chase and Co.

(a) Calculated as equally weighted averages of the differences between bond spreads and spreads on the corresponding credit default swaps for US corporates.

Conditions in tradable loan markets also remained subdued. Prices in secondary markets for European and North American leveraged loans fell further, to record lows (**Chart 27**). And primary loan issuance remained low with limited demand for new leveraged buyout deals.

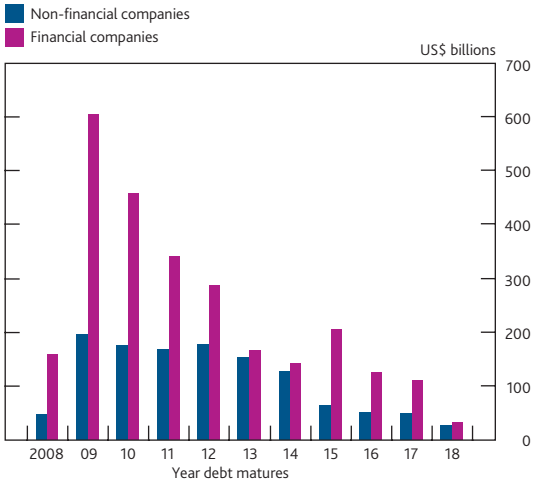
As well as lower prospective turnover and profits, corporates faced significant near-term funding pressures. A large volume of corporate debt matures towards the end of 2008 and over 2009 (**Chart 28**) which presents significant refinancing risks for firms. Similarly, the availability of trade finance reportedly fell over recent months, while demand from firms for such facilities increased, which further strained corporate cash flows.

Chart 27 Primary issuance and secondary market prices of leveraged loans



Sources: Loan Syndications and Trading Association Inc. and Reuters LPC Loan Connector.

Chart 28 Maturity profile of outstanding European corporate debt(a)



Source: Standard & Poor's Global Fixed Income Research.

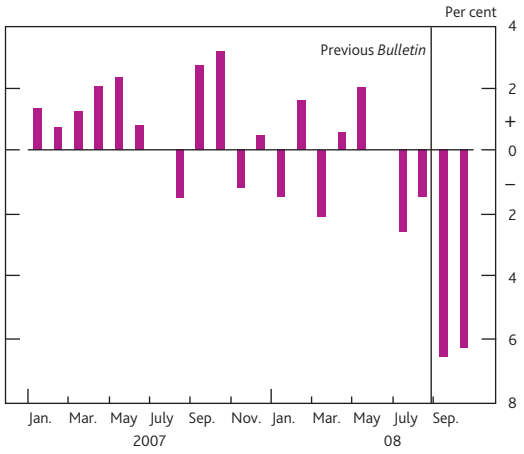
(a) Secured and unsecured instruments including bank loans, notes and bonds (including convertibles). Preferred stock and structured finance securities are not included.

Hedge funds and insurance companies

Against the background of falling asset prices and heightened market volatility, trading losses extended beyond banking sectors. In particular, in aggregate the value of assets under management with hedge funds fell in excess of 6% in both September and October, the biggest monthly losses on record for the sector (**Chart 29**).

Some hedge funds were caught out by the process of rehypothecation of assets whereby prime brokers on-lend collateral posted by hedge fund clients. Specifically, following the failure of Lehman Brothers some funds found they could not realise their assets held with that firm and this added to the liquidity pressures they faced.

Chart 29 Monthly hedge fund performance[a]



Sources: Bloomberg, CSFB/Tremont and Bank calculations.

(a) Monthly percentage change in CSFB/Tremont aggregate hedge fund performance index.

In an effort to stem forced assets sales and halt redemptions, a number of hedge funds reportedly looked to freeze investable funds (via so-called 'gates' which limit the amount of redemptions), or charge fees for early redemptions.

Outside of the speculative community, falling asset prices also affected the asset portfolios of long-term investors such as pension funds and insurance companies. In particular, weaker bond and equity prices reportedly reduced the value of assets held by such investors who typically hold positions on a 'buy and hold' basis.

Bank of England official operations

The Bank undertook a number of exceptional operations during the period of extraordinary tensions in money and funding markets.

In order to address pressures on banks' financing, the Bank:

- increased the size, frequency and collateral eligible in its long-term repo operations;
- extended the drawdown period for the Special Liquidity Scheme until 30 January 2009; and
- introduced a Discount Window Facility to provide liquidity insurance.

To help stabilise market interest rates out to the next MPC date, the Bank:

- held a number of *ad hoc* fine-tuning repo operations to inject extra reserves;
- expanded the range within which reserves were remunerated in order to accommodate the extra reserves;
- held *ad hoc* fine-tuning and scheduled operations to drain the reserves injected through larger extended collateral long-term repo operations; and
- introduced Operational Standing Facilities to absorb frictions in the overnight money markets.

Beyond sterling markets, the Bank joined other central banks in offering to lend US dollars at a range of maturities.

Sterling monetary framework

The Bank's market operations have two objectives, as set out in the Bank's recent consultative document, *The Development of the Bank of England's Market Operations*, released on 8 October (see the box on page 380):[1]

(i) To implement monetary policy by maintaining overnight market interest rates in line with Bank Rate, so that there is a flat risk-free money market yield curve to the next MPC decision date, and there is very little day-to-day or intraday volatility in market interest rates at maturities out to that horizon.

(ii) To reduce the cost of disruptions to the liquidity and payments services supplied by commercial banks. The Bank does this by balancing the provision of liquidity insurance against the costs of creating incentives for banks to take greater risks, and subject to the need to avoid taking risk onto its balance sheet.

The Bank seeks to meet these objectives under normal and stressed conditions.

Maintaining short-dated interest rates in line with Bank Rate

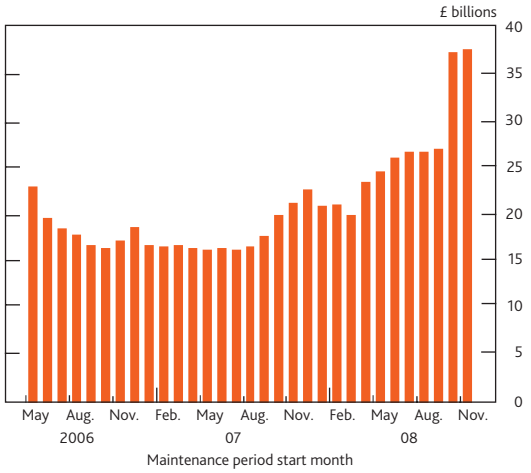
Volatility in short-dated market interest rates rose sharply. The Bank used a number of the contingency measures laid out in its 'Red Book'.[2]

Reserves targets

The Bank seeks to achieve its rate-setting objective by ensuring a net supply of reserves in line with the banking system's demand, as reflected in targets chosen by the banks themselves. Between August and October, reserves banks in aggregate increased their chosen targets from £26.7 billion to £37.4 billion. Ahead of the November–December maintenance period, the aggregate target rose further to £37.7 billion (**Chart 30**).

(1) www.bankofengland.co.uk/markets/money/publications/condococt08.pdf.
(2) See *The Framework for the Bank of England's Operations in the Sterling Money Markets* (the 'Red Book') available at www.bankofengland.co.uk/markets/money/publications/redbookjan08.pdf.

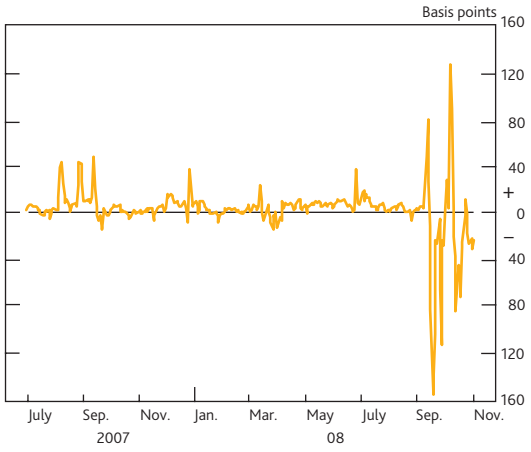
Chart 30 Aggregate reserves targets



Fine-tuning operations

The first shock to money markets in the period occurred following the failure of Lehman Brothers on 15 September. Reserves banks' demand for reserves increased significantly and overnight market interest rates rose relative to Bank Rate (**Chart 31**).

Chart 31 Spread to Bank Rate of secured sterling overnight interest rate since July 2007



Sources: BrokerTec and Bank calculations.

The Bank offered to supply, in two fine-tuning repo open market operations (OMOs) held on 15 and 16 September, additional reserves of £5 billion and £20 billion respectively. The OMOs were oversubscribed and the additional reserves were fully allotted. These reserves were reoffered in the scheduled short-term repo OMO on 18 September. Overnight market rates fell significantly below Bank Rate the following week and the Bank offered to drain reserves through fine-tuning OMOs. Three fine-tuning liquidity draining repo operations were held. Each was offered for £10 billion, with maturity dates set to match the date of the next scheduled weekly OMO (**Table B**). Each was fully covered. The decisions to conduct these operations followed discussions with reserves scheme banks and at the Money Market Liaison Group (see the box on page 381 for a discussion of the work of the Money Market Liaison Group during 2008). Market interest rates remained volatile for the remainder of the maintenance period.

Table B Results of fine-tuning operations[a]

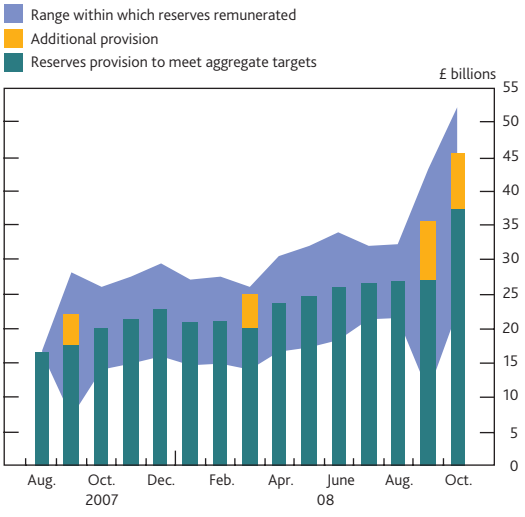
	Term	Offered (£ millions)	Allocated (£ millions)	Type of operation	Impact on reserves
3 Sep. 2008	1 day	4,680	4,422	Scheduled	Add
15 Sep. 2008	3 days	5,000	5,000	Exceptional	Add
16 Sep. 2008	2 days	20,000	19,999	Exceptional	Add
23 Sep. 2008	2 days	10,000	9,999	Exceptional	Drain
24 Sep. 2008	1 day	10,000	10,000	Exceptional	Drain
1 Oct. 2008	1 day	10,000	10,000	Exceptional	Drain
8 Oct. 2008[b]	1 day	43,480	24,950	Scheduled	Drain
13 Oct. 2008	2 days	10,000	10,000	Exceptional	Add
15 Oct. 2008	1 day	5,000	3,700	Exceptional	Drain
17 Oct. 2008	6 days	10,010	10,010	Exceptional	Drain
22 Oct. 2008	1 day	20,000	17,000	Exceptional	Drain
29 Oct. 2008	1 day	9,000	3,600	Exceptional	Drain
5 Nov. 2008	1 day	15,000	850	Scheduled	Drain

(a) Horizontal lines indicate start of new maintenance period.
(b) Fine-tune draining operations held on and after 8 October were conducted by selling Bank of England bills. Prior to that, draining operations were conducted by repo of gilts.

In order to accommodate the extra reserves, the Bank widened the ranges around reserves targets.

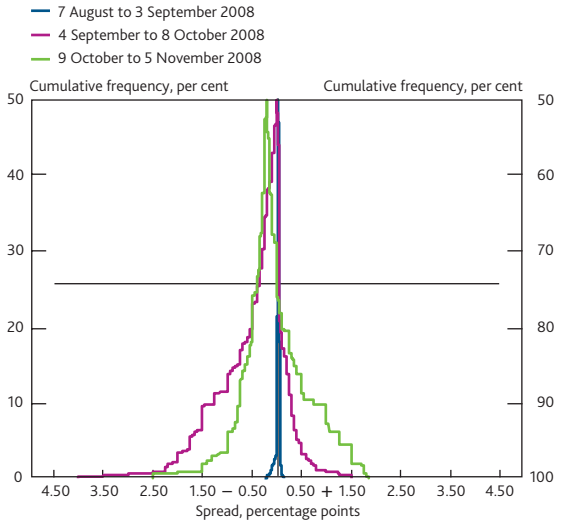
The start of the October–November maintenance period coincided with a period of intensified uncertainty about banks internationally, including those active in the sterling money market. Sterling overnight rates increased sharply once more and the Bank held an exceptional fine-tuning OMO to provide reserves, some of which were drained later in the maintenance period (**Chart 32**).

Chart 32 Aggregate reserves targets and reserves provision



The distribution of sterling overnight interest rates was wider, and more negatively skewed in September and October than observed in August–September (**Chart 33**). Overnight unsecured market interest rates were, on occasions, relatively low compared to Bank Rate. But, judged by the rates on overnight index swaps, market interest rates at one and two-week maturities tended to be closer to Bank Rate (**Chart 34**). Such volatility in short-dated money market interest rates was a global phenomenon (**Chart 35** and **Chart 36**).

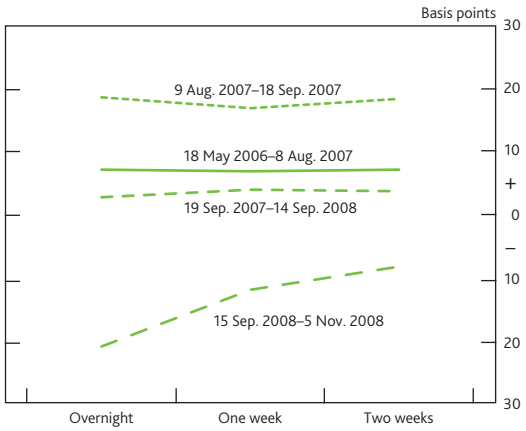
Chart 33 Folded cumulative distribution[(a)] of spread of sterling secured overnight interest rate (trade weighted) to Bank Rate



Sources: BrokerTec and Bank calculations.

(a) Distribution of the spread between overnight interest rate at end-of-day and the official interest rate. The distributions are folded at the median so that cumulative probabilities for values above (below) the median are indicated by the right-hand (left-hand) scale.

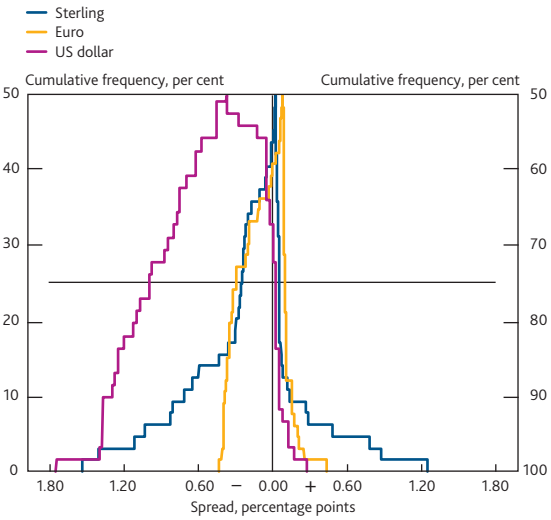
Chart 34 Spread to Bank Rate of overnight index swap rates[(a)]



Sources: Bloomberg and Bank calculations.

(a) One-week and two-week calculations exclude transactions maturing after the next MPC meeting.

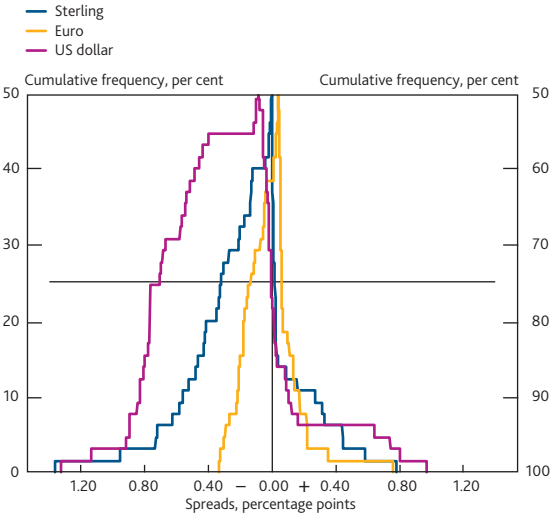
Chart 35 Folded cumulative distribution[(a)] of spread of international secured overnight interest rates to official interest rates for period 7 August–5 November 2008



Sources: BrokerTec and Bank calculations.

(a) Distribution of the spread between overnight interest rate at end-of-day and the official interest rate. The distributions are folded at the median so that cumulative probabilities for values above (below) the median are indicated by the right-hand (left-hand) scale.

Chart 36 Folded cumulative distribution[(a)] of spread of international unsecured overnight interest rates to official interest rates for period 7 Aug.–5 Nov. 2008



Sources: Wholesale Market Brokers' Association and Bank calculations.

(a) Distribution of the spread between overnight interest rate at end-of-day and the official interest rate. The distributions are folded at the median so that cumulative probabilities for values above (below) the median are indicated by the right-hand (left-hand) scale.

Provision of liquidity insurance through extended long-term repo OMOs

In December 2007, the Bank widened the collateral eligible in its regular monthly three-month repo OMOs. In the latest period, the Bank increased the size and frequency of these OMOs and further widened the collateral.

On 9 September, the Bank announced that the three-month maturity of the scheduled long-term repo OMOs in September

and October 2008 would be offered against extended collateral.

From 29 September, long-term repo OMOs were held with weekly frequency; and, from 3 October, the eligible collateral was further expanded to cover securities backed by commercial mortgage assets and corporate debt. At the same time, the bidding arrangements for the operations were amended to introduce separate minimum bid rates for bids against collateral routinely eligible in the Bank's short-term repo OMOs and bids against collateral from the wider collateral pool. For bids against collateral routinely eligible in the Bank's short-term repo OMOs, the minimum bid rate would be the equivalent-maturity overnight index swap (OIS) rate. For bids against the wider collateral pool, the minimum bid rate would be 50 basis points higher than the equivalent-maturity OIS rate.

On 8 October, the Bank announced that it would accept as collateral, in all its extended collateral operations, bank debt that is guaranteed under the HM Government bank debt guarantee scheme that was announced by the Government that day.

The results of these operations are shown in **Table C**. Over the review period, the stock of long-term repo OMOs offered against extended collateral rose from £10 billion to £109 billion.

These extended-collateral long-term repo operations provide reserves both for the maintenance period in which they are settled and all subsequent maintenance periods until maturity. This served to reduce the amount of reserves that needed to be supplied in other OMOs, as described in the following section.

Table C Extended-collateral three-month long-term repo operations

16 September 2008	
On offer (£ millions)	5,000
Cover	1.77
Weighted average rate[a]	5.646
Lowest accepted rate[a]	5.340
Tail[b]	30.60
29 September 2008	
On offer (£ millions)	40,000
Cover	1.3
Weighted average rate[a]	5.517
Lowest accepted rate[a]	4.765
Tail[b]	75.20
7 October 2008	
On offer (£ millions)	40,000
Cover	0.77
Weighted average rate[a]	4.557
Lowest accepted rate[a]	4.340
Tail[b]	21.70
14 October 2008	
On offer (£ millions)	40,000
Cover	0.41
Weighted average rate[a]	4.525
Lowest accepted rate[a]	4.179
Tail[b]	34.60
21 October 2008	
On offer (£ millions)	30,000
Cover	0.26
Weighted average rate[a]	4.241
Lowest accepted rate[a]	3.970
Tail[b]	27.10
28 October 2008	
On offer (£ millions)	20,000
Cover	0.45
Weighted average rate[a]	3.683
Lowest accepted rate[a]	3.570
Tail[b]	11.30
4 November 2008	
On offer (£ millions)	20,000
Cover	0.39
Weighted average rate[a]	3.560
Lowest accepted rate[a]	3.400
Tail[b]	16.00

(a) Per cent.
(b) The yield tail measures, in basis points, the difference between the weighted average accepted rate and the lowest accepted rate.

Factors affecting the supply of reserves

The provision of additional reserves was initially offset by reduced provision of funds in the Bank's weekly OMOs, the size of which had fallen to £15 billion by 2 October. Subsequently, it became necessary for the Bank to drain reserves, which it did by selling Bank of England sterling bills (see the box on page 377). The first of these was sold in an overnight fine-tuning OMO to drain reserves on 8 October.

The four weekly OMOs in the October–November maintenance period were conducted to drain reserves; a separate weekly Bank bill was sold for each operation. The sizes offered ranged between £28.5 billion and £47.4 billion, each reflecting the level of reserves balances the Bank sought to maintain following each operation.

Counterparties also made active use of the ability to place funds with the Bank via the standing deposit facilities. During the September–October maintenance period, average deposits of £1.37 billion were placed, draining reserves from the system. During the October–November maintenance period, average deposits were £1.06 billion. Use of Standing Facilities naturally tended to coincide with periods when market interest rates were below Bank Rate (**Chart 37**).

The draining of reserves through operational Standing Facilities, fine-tuning OMOs to drain reserves and sales of Bank of England bills all served to offset the impact of a much larger stock of extended-collateral long-term repo OMOs on the Bank's balance sheet (**Chart 38**).

In October, the Bank reformed its Standing Facilities, as part of a package of wider reforms (see the box on page 380).

The use of central bank bills in the implementation of monetary policy

From October, the Bank has drained substantial quantities of surplus reserves through the sale of Bank of England bills. This box reports on similar initiatives implemented by other central banks, and explains the rationale for the Bank's own bill-sale draining open market operations (OMOs).

Central banks are the monopoly suppliers of central bank money (banknotes and reserves). In most cases, central banks undertake OMOs to supply the amount of reserves necessary to meet demand. However, in response to the extraordinary market conditions and pressure on banking systems, many central banks have conducted operations designed to provide longer-term financing to the banking system. These operations were not designed specifically to supply extra reserves but have that incidental effect. Initially, this could be accommodated by central banks shrinking the size of other short-term repo OMOs. But the provision of financing became so large that they have had to be accompanied by draining operations.

The operational procedures of a number of central banks contain provisions for undertaking such draining operations. For example, the ECB's general documentation provides for the issuance of debt securities as an additional tool outside of the routine framework. The Bank of Japan has also utilised bill issuance as a means of implementing monetary policy.

Recently, the Swiss National Bank and the Swedish Riksbank have introduced OMOs to sell central bank securities to offset the provision of reserves via additional term liquidity. **Table 1** summarises the use of central bank securities as a policy tool across a number of central banks.

Table 1 Central banks with the provision to sell their own securities

Central bank	Instrument	Percentage of balance sheet (October 2008)	Range of maturities
Bank of England	Bank of England bills	19	1–7 days
Danmarks Nationalbank	Certificates of deposit	31	7–14 days
ECB	ECB debt certificates	0	12 months or less
Bank of Japan	Financing bills	1	6 months or less
Riksbank	Riksbank certificates	13	7 days
Swiss National Bank	Swiss National Bank bills	10	7, 14 and 28 days

In a similar vein, the Reserve Bank of Australia (RBA) introduced a term deposit facility under which fixed-term deposits are auctioned via a competitive tender to allow counterparties to bid to place additional reserves on account at the RBA.

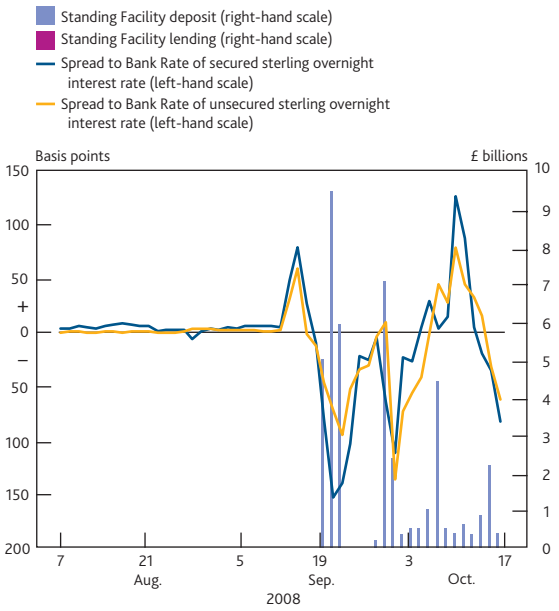
Bank of England OMOs to sell bills

For modest amounts, the Bank conducts fine-tuning operations to drain reserves using repo transactions in which the Bank receives cash in exchange for gilts held on its balance sheet. However, the scale of such operations was limited by the existing size and composition of the Bank's balance sheet. To drain large quantities of reserves, the Bank needed to expand its balance sheet by issuing a non-monetary liability. Bank of England bills perform that role.

Bank of England bills are marketable, short-term securities issued by the Bank and provide a means to conduct large-scale short-term operations to drain reserves. The bills are discount instruments, sold at Bank Rate and usually have a maturity of one week matching that of the Bank's short-term repo operations. They are separate from the UK Treasury bills issued by the Debt Management Office as part of the Government's debt and cash management portfolio.

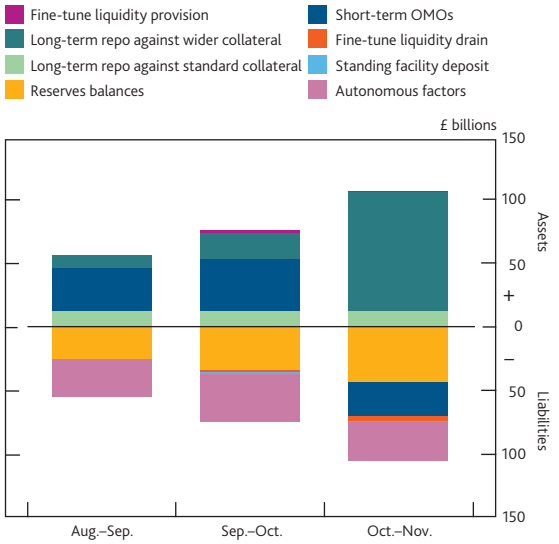
Sales of Bank of England bills are conducted via OMOs using the same format and with the same group of counterparties as the Bank's more usual OMOs to supply reserves. Counterparties receiving the bills may use them as collateral in the repo market, including within certain categories of delivery by value as well as in the Bank's other reserves providing operations. The bills are eligible for the Financial Services Authority sterling stock liquidity regime, and have a zero regulatory capital weighting.

Chart 37 Standing Facility usage and spread to Bank Rate of secured and unsecured rates



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

Chart 38 Factors affecting the supply of reserves (maintenance period averages)



Other market operations

Special Liquidity Scheme

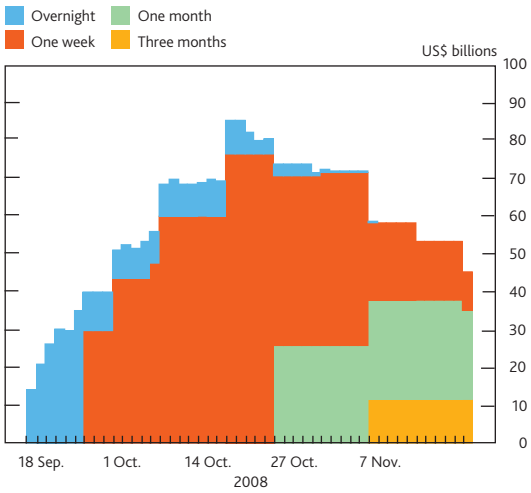
Another financing facility available to eligible institutions since April 2008 has been the Special Liquidity Scheme (SLS). The SLS allows participating institutions to exchange mortgage assets for UK Treasury bills.

On 17 September, in view of the disorderly market conditions prevailing at that time, the Bank announced an extension of the drawdown period for the SLS from 21 October to 30 January 2009. The Bank will publish the total outstanding value of bills lent under the Scheme after the end of the drawdown period.

US dollar repo operations

In co-operation with other central banks, since 18 September, the Bank has offered dollar financing to the UK banking system funded by a swap with the Federal Reserve. Maturities have included overnight, one week, one month and three months. The profile of the stock of dollar financing is shown in **Chart 39**.

Chart 39 US dollar repo operations: stock outstanding by maturity(a)



(a) Stock outstanding is shown from settlement date.

Bond-purchase OMOs

The Bank maintained its regular OMOs to provide reserves for long periods by buying bonds. Over the review period the Bank conducted three such OMOs, in accordance with screen announcements made on 1 July and 1 October. All three operations were fully covered (**Table D**).

The Bank intends, in due course, to begin providing reserves by holding OMOs to purchase high-quality foreign-currency denominated bonds, with the cash flows swapped into fixed-rate sterling.

The Bank's foreign currency reserves

There have been no significant developments in the Bank's holdings of foreign exchange reserves over the review period. Because of exchange rate movements, the reserves now comprise around £2.5 billion of assets. These are funded by two $2 billion three-year issues, under the Bank's programme of annual bond issuance, which commenced in March 2007. The Bank's reserves are scheduled to reach the currently planned steady-state level of around £3 billion in early 2009.

Facilitating the provision of payment services

In May, as previously reported, the Bank ceased to be a direct member of TARGET, the euro-area wholesale payments system. Prior to this, to facilitate UK participation in TARGET, the Bank held euro-denominated assets that were lent out

Table D Issue Department gilt-purchase OMOs

	Amount purchased (£ millions)	Sector cover ratio	Weighted average accepted price	Highest accepted price	Lowest accepted price	Tail[a]
1 September 2008						
Short		4.76				
UKT 4.75% 07/09/15	132.43		101.936	101.970	101.889	0.034
UKT 8% 07/12/15	86.53		121.357	121.390	121.327	0.033
Medium		3.21				
UKT 4% 07/09/16	129.00		97.338	97.432	97.250	0.094
Long		5.79				
UKT 5% 07/03/25	45.97		104.066	104.098	104.040	0.032
UKT 6% 07/12/28	45.89		117.776	117.779	117.769	0.003
Total purchased[b]	439.82					
22 September 2008						
Short		2.47				
UKT 9% 12/07/11	183.94		111.757	111.849	111.660	0.092
Medium		6.60				
UKT 4.75% 07/03/20	76.83		99.435	99.440	99.400	0.005
UKT 8% 07/06/21	47.14		129.690	129.698	129.688	0.008
Long		6.04				
UKT 4.25% 07/12/27	56.94		93.167	93.200	93.150	0.033
UKT 6% 07/12/28	34.96		115.541	115.590	115.430	0.049
Total purchased[b]	399.81					
27 October 2008						
Short		2.40				
UKT 5% 07/09/14	90.22		105.431	105.460	105.410	0.029
UKT 8% 07/12/15	128.70		122.440	122.500	122.370	0.060
Medium		2.84				
UKT 8.75% 25/08/17	128.92		131.386	131.420	131.320	0.034
Long		2.31				
UKT 5% 07/03/25	45.90		103.136	103.150	103.120	0.014
UKT 6% 07/12/28	45.92		116.916	116.948	116.890	0.032
Total purchased[b]	439.66					

(a) The tail measures the difference between the highest accepted price and the weighted average accepted price.
(b) Figures may not sum to total due to rounding.

each day by the Bank to generate intraday liquidity. These assets were funded by a series of Euro Notes of which the final one, for €3 billion nominal, will mature on 27 January 2009.

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 BIS and ECB and the Bank's physical assets) together with aggregate cash ratio deposits. The size of the Bank's 'free' capital and cash ratio deposits did not change much over the period. These funds are invested in a portfolio 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 bond portfolio currently includes around £3 billion of gilts and £1 billion of other debt securities. Purchases are generally made each month, with purchase details announced in advance on the Bank's wire service pages. Over the current review period, gilt purchases were made in accordance with the announcements on 1 July and 1 October: £20 million each in August, September and October.

The remainder of the Bank's capital and reserves are normally invested in short-term repos, which are conducted as part of the Bank's OMOs.

Consultative document on the Development of the Bank of England's Market Operations

On 16 October 2008, the Bank published a consultation document, *The Development of the Bank of England's Market Operations*. This set out plans for three major reforms.

1. Operational Standing Facilities

The Bank's existing Standing Facilities were replaced on 20 October by Operational Standing Facilities (OSFs). OSFs have the clear purpose of absorbing technical problems and imbalances in the operation of money markets and payments, and so help to stabilise the overnight rate. For that reason, the rate applied to OSFs is ±25 basis points relative to Bank Rate. Overnight market rates approaching the plus and minus 25 basis points range to Bank Rate would reflect a market friction and so would obviously be a legitimate rationale for using OSFs.

To avoid stigma, the Bank reduced disclosure so that the average use of OSF would be disclosed after the end of the relevant maintenance period; previously disclosure of aggregate usage had occurred on the following working day. For the lending facility, the eligible collateral will remain those instruments that are eligible in the Bank's short-term repo OMOs.

2. Discount Window Facility

The Bank also launched a Discount Window Facility (DWF), which enables banks to borrow UK government securities against a wide range of collateral, at any time, at fees reflecting the type of collateral and the size of drawing.

The facility is intended to provide liquidity insurance to banks in the event of stress. Drawings will not be permitted for banks with fundamental solvency or viability problems.

The Bank retains discretion to extend the maturity of Discount Window borrowing beyond 30 days; and to lend cash rather than gilts, which might prove necessary in rare circumstances where, as recently, the government bond repo markets failed to function properly during a period of acute stress.

Collateral is classified into four groups (or levels), broadly defined as follows:

- Level A: high-quality sovereign and supranational bonds.
- Level B: other quality debt that is tradable in liquid markets.
- Level C: debt, and other transferable instruments, that are not tradable in liquid markets.
- Level D: 'own name' instruments, ie where a bank borrowing from the DWF itself originated (or has some close financial link to) the assets comprising the collateral.

The list of eligible collateral will be developed over time.

Average use of the DWF over a quarter is to be disclosed at the end of the subsequent quarter.

3. Long-term repos against wide collateral

Finally, the Bank intends to maintain permanently long-term repo operations against broader classes of high-quality private sector securities.

The Bank is consulting on a proposed auction structure that would involve counterparties bidding separately against different types of collateral. The proportion of each auction allocated to borrowing against different types of collateral would depend on the spread between the relevant bids.

Consultation process

The Bank is consulting on these and other more technical measures.

The work of the Money Market Liaison Group in 2008

The Money Market Liaison Group (MMLG), chaired by the Bank of England, was established in Summer 1999. It provides a high-level forum to discuss and, where appropriate, respond to developments affecting UK money markets and related infrastructure. It comprises senior representatives from key money market participants, infrastructure providers and the UK authorities.

The Group typically meets quarterly, but during the period of stressed money market conditions it communicated more frequently (daily over some periods of acute stress) through teleconferences to facilitate information sharing between money market participants on both market developments and the actions of authorities.

On 16 October, the Bank published a consultation document on the development of its framework for operations in the sterling money markets (see the box on page 380). MMLG discussed the consultation document collectively in its quarterly meeting on 20 October, and members of MMLG have submitted and discussed individual responses with the Bank.

MMLG operations subgroup

The MMLG operations subgroup provides a forum to discuss and facilitate important structural developments affecting trading, clearing, payments and settlement infrastructure in money markets.

A major element of the subgroup's agenda over 2008 has been to assist in designing a series of sterling market tests sponsored by MMLG to test banks' ability to trade and settle from disaster recovery sites (DRSs), the first conducted in May 2007.

A second, desktop, exercise was undertaken on 13 March, which included banks, infrastructure providers and the official sector. The objectives of the exercise were to give MMLG a more informed understanding of how a major operational disruption could impact maintenance of market operations, give participants an opportunity to test their own planning assumptions collaboratively, explore contingency measures and identify and understand any practical issues that may not have been highlighted in the first, 'live', test.

MMLG members agreed that a third, more challenging, exercise should be considered by the operations subgroup for 2009 Q1. It will test the ability of participants to transact from DRSs using the Bank of England's electronic tendering system for open market operations, BTender.

Other initiatives of MMLG and the subgroup

CREST has used MMLG as a forum to develop potential contingency measures to ensure outstanding trades could be unwound in an orderly manner in the event that a major disruption late in the trading day meant that CREST was unable to close 'normally'.

Together with the Securities Lending and Repo Committee, the Group jointly drew up an updated version of the Gilt Repo Code. The Code sets out, for guidance, a summary of the basic procedures which UK-based participants in the gilt repo market observe as good practice. The Code was published on the Bank's website in May.(1)

The Group also continued to monitor progress and contribute views on LCH.Clearnet's initiative to act as central counterparty clearer for gilt repo transactions to deliveries of gilts through CREST's delivery-by-value service, which was launched in March 2007. The launch occurred with no technical or procedural problems and trading volumes have continued to grow.

The British Bankers' Association has used the Group as an arena to keep the market informed on its annual review of the governance and definition of Libor and the consultative paper on strengthening Libor for the future.

(1) www.bankofengland.co.uk/markets/gilts/giltcode.pdf.

Research and analysis

The financial position of British households: evidence from the 2008 NMG Research survey

By Tomas Hellebrandt and Garry Young of the Bank's Monetary Assessment and Strategy Division and Matt Waldron of the Bank's Structural Economic Analysis Division.

The financial position of British households has been affected by a number of developments over the past year, including sharp fluctuations in food and energy bills, falling house prices and tighter credit conditions. Evidence from the latest survey of households, carried out for the Bank by NMG Research in late September and early October, shows how these and other changes have impacted on household budgets and spending decisions. The typical household reported that the income it had available after meeting household bills had fallen over the past year and that it had saved less than it had expected. Some households had been put off spending by tighter credit conditions, and more households were finding their debts to be a burden than in similar surveys carried out since the mid-1990s. But despite the greater pressures on household finances, only 3% of the households surveyed had so far fallen behind on bill or debt payments. Lower house prices had reduced the housing equity of homeowners.

Introduction

After a number of years of steady economic growth and low inflation, the past year has seen an abrupt change in the circumstances facing British households. For most of the year household real incomes have been squeezed by higher food and energy prices. That has been compounded by the effects of higher borrowing costs for a minority of mortgagors who reached the end of fixed-rate or discounted mortgage deals that had been taken out when mortgage interest rates were lower. Alongside these changes, house prices have fallen and credit has become more costly or difficult to obtain. The impact of these developments differs across households and the implication for overall household spending is likely to depend on whether those who are most adversely affected can shield their spending by running down their savings or borrowing more. Unlike aggregate data, disaggregated data can illuminate these differences between households and so contribute to an assessment of the impact of changes in household finances on consumer spending.

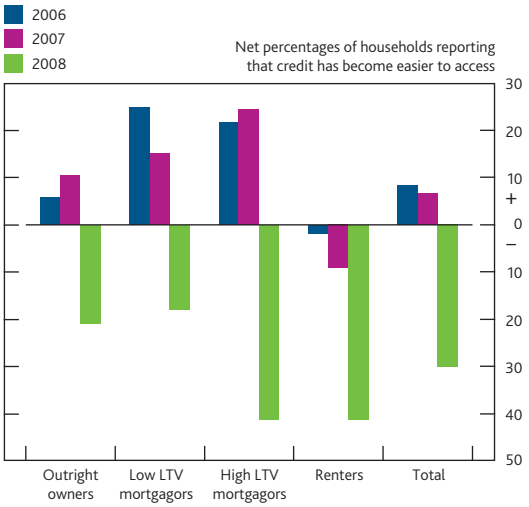
In late September and early October 2008 NMG Research carried out a survey of nearly 2,500 households on behalf of the Bank. The survey was carried out in the midst of the recent financial crisis with interviews taking place shortly after the failure of Lehman Brothers on 15 September, but before the UK bank support package was announced on 8 October.(1) Households were asked a range of questions about their finances. These included questions about how much they owed, whether their borrowing was secured or unsecured, whether they found it to be a burden and whether they had difficulty accessing further credit.(2) The survey is the sixth that the Bank has commissioned NMG Research to conduct on household finances.(3) Results from this year's survey have been used in the November 2008 *Inflation Report* (page 21) to assess the extent of household difficulties in servicing their debt and in the October 2008 *Financial Stability Report* to estimate the prospective scale of negative equity for a range of possible falls in house prices (pages 10–11). This article describes further results from the survey and provides more detail.(4)

(1) The 2007 survey was carried out shortly after the Bank announced on 14 September that it had provided a liquidity support facility to Northern Rock.
(2) Some more detailed information about the survey is included in the box on pages 391–92. The NMG Research survey is carefully designed and weighted to be representative of British households. But, as in any small sample of a population, care must be taken in interpreting small changes in results from year to year because they may not be a reliable guide to changes in the population.
(3) The results of each year's survey have been reported in the *Quarterly Bulletin*. See Waldron and Young (2007) for details of the 2007 survey.
(4) The raw survey data are available at www.bankofengland.co.uk/publications/quarterlybulletin/nmgsurvey2008.xls.

Access to credit

More households reported that credit had become harder rather than easier to access over the course of the year; a sharp change from the previous two surveys when more had found it easier to borrow (**Chart 1**).(1) Credit conditions had tightened by more for borrowers with least collateral such as mortgagors with loan to value (LTV) ratios of over 75% (high LTV mortgagors) and renters.(2)

Chart 1 Change in credit conditions(a)



Sources: NMG Research survey and Bank calculations.

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

The survey suggests that tighter credit conditions had restrained household spending. The proportion of respondents who said they had been put off spending because they were concerned that they might not be able to get further credit when they needed it had risen from 12% in 2007 to 16% in 2008. This proportion had risen among all groups and was highest among renters, where a quarter of respondents were in this position (**Chart 2**).

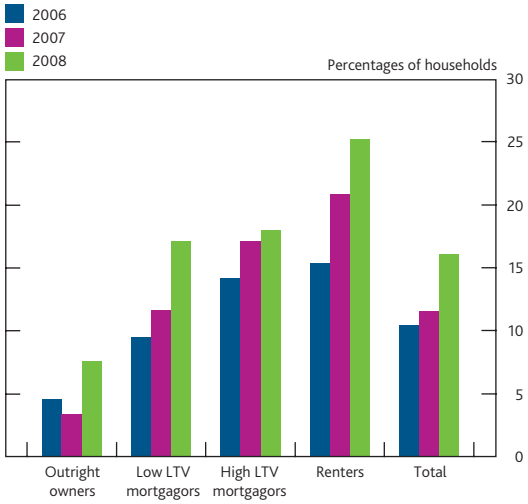
Developments in household indebtedness

After a number of years of rapid growth, the total amount of debt owed by UK households reached a little under £1.6 trillion by 2008 Q2, an average of around £60,000 per household.(3) That debt is not evenly spread across the population. About three quarters of it is secured on dwellings and so is owed by mortgagors, who comprise just 40% of households. The rest is borrowed using credit cards, overdrafts, personal loans, hire purchase and other types of unsecured credit. This section describes how debt is distributed across households, focusing on how developments over the past year have affected households' financial positions.

Unsecured debt

The proportion of households with some outstanding unsecured debt has increased and reached more than 50% in 2008. As a group, mortgagors accounted for around 60% of the total amount of unsecured debt reported in the survey. Compared to the 2007 survey, there was little overall change in the distribution of unsecured debt reported.

Chart 2 Proportion put off spending by concerns about credit availability(a)



Sources: NMG Research survey and Bank calculations.

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

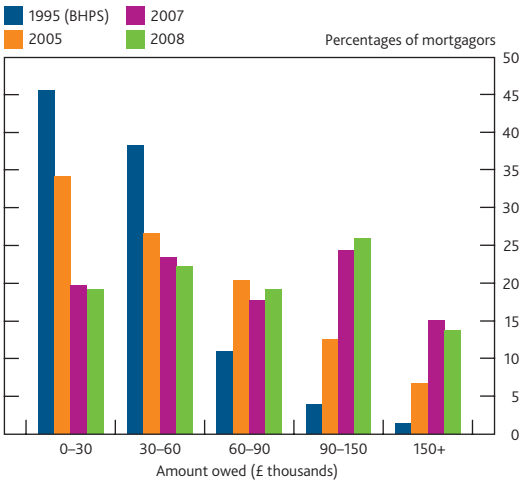
Secured debt and housing equity

There are wide differences in the amount of secured debt owed by different households. Around 40% of mortgagors reported that they owed more than £90,000 and almost 15% said they owed more than £150,000. This position is sharply different to that in the mid-1990s when the distribution was more concentrated and only 5% of mortgagors owed more than £90,000 (**Chart 3**).(4)

Almost 80% of mortgagors thought that their home had declined in value over the past year, while one third thought that their home had declined in value by more than 10%. Compared to the 2007 survey, the average house value reported by mortgagors was 10% lower.(5) Reflecting that, the amount of equity in mortgagors' homes had fallen and the size of their loans relative to the value of their houses had increased (**Chart 4**). Compared to the 2007 survey, more mortgagors had high LTV ratios (in excess of 75%). Nevertheless, previous rises in house prices had left most homeowners with a substantial buffer of housing equity. So, although loan to value ratios had increased on average in the

(1) This is consistent with evidence that lenders had tightened the supply of credit to households (see the Bank's *Credit Conditions Survey*, 2008 Q3).
(2) Similar to the 2007 survey, around 40% of the respondents were mortgagors, 28% were renters and 32% were outright owners.
(3) As published by the Office for National Statistics.
(4) The first NMG Research survey was carried out in 2003. Comparisons with the 1990s are made using the British Household Panel Survey (BHPS) which contains similar questions but is less timely. For more information on the BHPS please see www.iser.essex.ac.uk/ulsc/bhps/.
(5) House prices had fallen by 13% in the year to September 2008 according to the average of the Nationwide and Halifax house price indices.

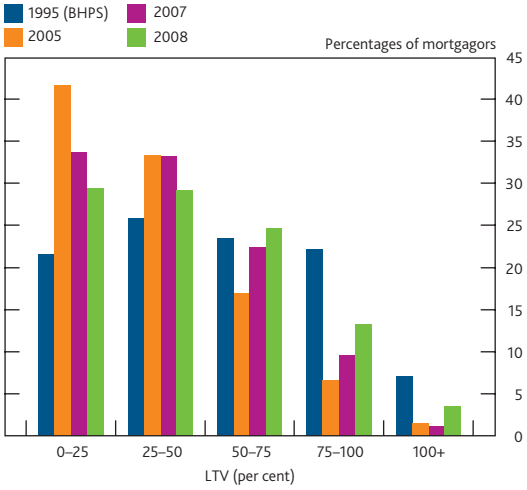
Chart 3 Distribution of secured debt among mortgagors[a]



Sources: British Household Panel Survey, NMG Research survey and Bank calculations.

(a) Mortgage debt from the BHPS captures mortgage debt owed by households on all properties they own. Mortgage debt from the NMG Research survey captures only mortgage debt owed on households' primary residences.

Chart 4 Distribution of loan to value ratios on mortgagors' outstanding secured debt[a]



Sources: British Household Panel Survey, NMG Research survey and Bank calculations.

(a) Mortgage debt from the BHPS captures mortgage debt owed by households on all properties they own. Mortgage debt from the NMG Research survey captures only mortgage debt owed on households' primary residences.

2008 survey, they remained below the levels recorded in 1995, after the trough of the previous housing downturn when estimates of negative equity peaked.

According to the NMG Research survey, around 4% of mortgages are estimated to have been in negative equity in late September 2008 (LTV greater than 100% in **Chart 4**). This is less than was the case in 1995 (see Cutler (1995)). But further falls in house prices would increase the incidence of negative equity. The prospective scale of negative equity under different assumptions about the prospects for future house prices can be estimated from the LTV distribution shown in **Chart 4** (see pages 10–11 of the October 2008 *Financial Stability Report*). Of course, the accuracy of these estimates depends on the reliability of the overall survey responses and it is possible that the survey understates the potential scale of the problem (see the box on pages 391–92). Ongoing internal work by Bank staff using alternative methods and sources has yielded broadly similar, but slightly higher, estimates of negative equity.

The reduction in housing equity over the past year may have affected some mortgagors' spending. In particular, mortgagors with high LTVs and relatively little collateral typically have to pay more for additional credit and credit conditions appear to have tightened most for this group (**Chart 1**). That may have discouraged some mortgagors from withdrawing and spending equity from their homes.(1) Consistent with that, there was a sharp reduction in the proportion of mortgagors in the 2008 survey who said that they had withdrawn equity. Just 6% of mortgagors said that they had taken out an additional secured loan in the year preceding the survey, compared to 10% in 2007 and 14% in 2006.(2) As in previous years, the main reason cited for taking an additional secured loan was to fund home improvements. But 39% of those taking out an additional loan said that they had done so to pay off other debts. Evidence on the effect of falling house prices on mortgagors' spending was not clear cut. Of the mortgagors identified as having LTV ratios of 75% or more, 50% said that their spending would be unaffected if house prices were to fall another 10%, while 3% said that they would increase their spending.

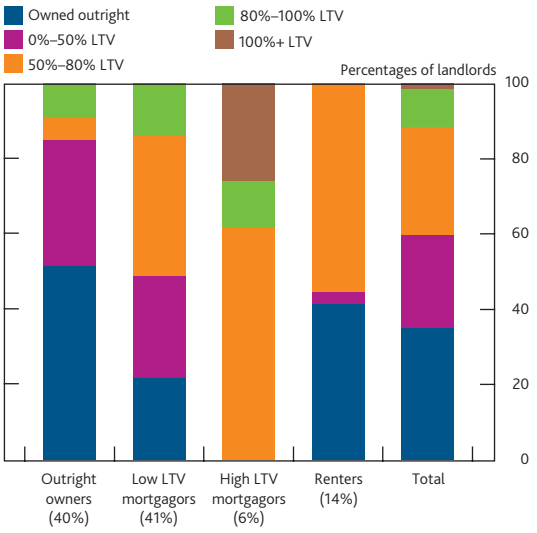
Buy-to-let mortgages

According to the Council of Mortgage Lenders, the proportion of the total stock of secured debt accounted for by buy-to-let mortgages grew from under 2% in 2000 to over 10% in 2008. This year's survey included for the first time some additional questions, aimed at finding out which households had buy-to-let mortgages and whether households with large mortgages secured on their primary residence also had large buy-to-let mortgages.

About 5% of respondents (around 100 households) reported owning at least one property for investment purposes which they let out. Most of these properties were financed by buy-to-let mortgages; around a third owned their investment properties outright. The majority of landlords had substantial housing equity either because they owned at least one property outright, or because they had a relatively low LTV on their property portfolio (**Chart 5**). About 40% of landlords owned their primary residence outright. These landlords were also the most likely to own their investment properties outright and of those with buy-to-let mortgages, the majority had LTV ratios of less than 50% on their buy-to-let portfolio.

(1) See Benito, Thompson, Waldron and Wood (2006) for a discussion of the link between house prices and spending.
(2) 6% was the lowest proportion taking out an additional secured loan since the NMG survey began and was as low as in the BHPS in the late 1990s.

Chart 5 Distribution of LTVs on investment properties by housing tenure of landlord[a]



Sources: NMG Research survey and Bank calculations.

(a) Tenure status of households (on the x-axis) refers to their main residence and does not include their buy-to-let portfolio. Proportion of landlords in each category shown in parentheses.

The most exposed landlords were the 6% of landlords with high LTV ratios on their main residence. All of these landlords had buy-to-let mortgages and 40% of them also had LTV ratios in excess of 80% on their buy-to-let portfolios.

Affordability

Although the distribution of household debt had not changed by much over the year, the average household had found it more difficult to service its existing debt. This was largely because higher household bills meant that after paying tax, national insurance, housing costs (rent, mortgage payments), loan payments and utility bills many households had experienced a decline in the amount of income available to spend in the shops (their 'available' incomes). Moreover, the real purchasing power of their 'available' income was further squeezed by higher prices of many essential items, including food.

More than half of the households surveyed reported that their monthly 'available' income had fallen in the year preceding the survey (**Table A**). The extent of this decline varied significantly across households and around 30% of households had experienced a decline in 'available' income of more than £100 per month. Around 40% of mortgagors were in this position. And consistent with the impact of higher bills, almost half of the respondents said that they had spent more over the year than they had expected to at the start of the year, compared to just under 8% who said that they had spent less.(1)

A possible reason for the reported decline in 'available' income among mortgagors was that some had experienced an increase in their regular mortgage repayments. Aggregate measures

Table A Changes in 'available' income over the past year by housing tenure[a]

	Outright owners	Low LTV mortgagors	High LTV mortgagors	Renters
Percentage of households	**32**	**33**	**7**	**28**
Characteristics				
Mean pre-tax monthly income (£s)	2,050	3,790	3,580	1,620
Mean 'available' monthly income (£s)	710	820	630	340
Distribution of changes in monthly 'available' income (percentage of households)				
Down by more than £100	23	39	39	24
Down by £51 to £100	21	19	19	21
Down by £1 to £50	13	9	9	16
Not changed	34	19	19	27
Up by £1 to £50	4	3	0	5
Up by £51 to £100	2	5	2	3
Up by more than £100	2	6	13	6
Mean change in 'available' income (£s)	-48	-64	-56	-45
Mean percentage change	-12	-12	-11	-14

Sources: NMG Research survey and Bank calculations.

(a) Questions: 'How much of your monthly income would you say your household has left after paying tax, national insurance, housing costs (eg rent, mortgage repayments, council tax), loan repayments (eg personal loans, credit cards) and bills (eg electricity)?'.
'And how much would you say your monthly leftover income has changed over the past year?'

suggest that the share of income mortgagors were devoting to service their debts was little changed in the year to October 2008. But some mortgagors faced more substantial changes as they came to the end of fixed or discounted-rate mortgage deals. The survey helps to quantify the significance of this by splitting mortgagors into three distinct groups (**Table B**). Those who had continuing variable-rate mortgage deals (column 1); those who had fixed or discounted-rate mortgage deals which expired in the year preceding the survey (column 2); and those who had continuing fixed or discounted-rate deals which did not expire in the year preceding the survey (column 3).

Around half of the mortgagors surveyed reported that they had been on a continuing variable-rate mortgage. Most of these households reported that their repayments were either unchanged or had increased only slightly compared to the previous year.

By contrast, the 17% of mortgagors who had been on a fixed or discounted-rate mortgage deal that had expired some time during the twelve months preceding the survey reported an increase in repayments. On average, this group reported that their repayments had increased by £68 a month, equivalent to around 10% of their previous monthly repayments and 2% of their monthly pre-tax income. But there was substantial variation around this, reflecting the timing of when individual

(1) When asked: 'Thinking about the last twelve months and taking all of your household's spending into account, did you end up spending more or less than you had expected?'. This is the first time this question has appeared in the survey and so it is not possible to know whether these responses are unusual.

Table B Characteristics of mortgagors and changes in repayments by types of mortgage

	Mortgagors on continuing variable-rate deals	Mortgagors who had a fixed or discounted-rate deal that expired during the preceding twelve months	Mortgagors on continuing fixed or discounted-rate deals
Percentage of mortgagors	**53**	**17**	**30**
Characteristics			
Mean pre-tax income (£s)	42,160	45,530	45,120
Mean outstanding mortgage balance (£s)	73,280	108,340	99,860
Mean mortgage loan to house value (per cent)	35	53	52
Mean age of respondent (years)	47	41	41
Distribution of actual or expected changes in monthly mortgage repayments (per cent)			
Down by more than £100	4	5	2
Down by £1 to £100	6	7	3
Not changed or not expected to change	37	20	25
Up by £1 to £50	37	19	13
Up by £51 to £100	10	24	31
Up by £101 to £200	4	17	21
Up by more than £200	1	8	5
Mean change in monthly repayments (£s)	18	68	69
Mean percentage increase	4	10	15

Sources: NMG Research survey and Bank calculations.

households took out their original mortgage deals and when they refinanced. In addition, households deemed riskier by lenders, perhaps because they had large loans relative to the value of their houses, may have experienced larger increases in repayments as lenders tightened the terms on which they were prepared to offer credit to higher-risk borrowers during 2008. As evidence that some households may have had difficulties, of the 160 mortgagors in the survey who refinanced, 15% either had some applications turned down before they got a new deal or moved on to their existing lenders' standard variable rate.

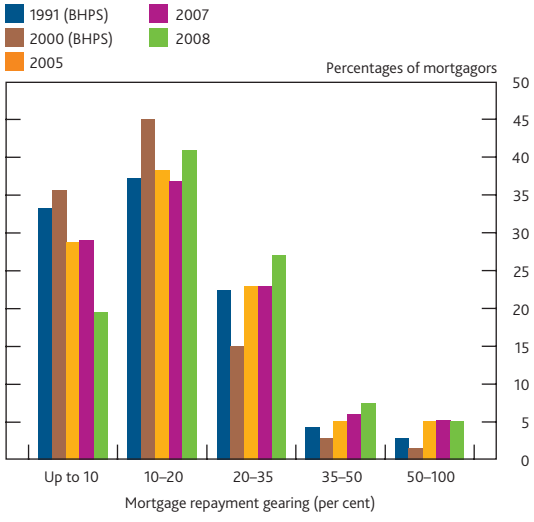
For those mortgagors who did experience an increase in their repayments, the effect of that on their ability to continue servicing their debts and on their consumer spending would have depended in part on whether or not the increase in repayments had been anticipated. In the 2007 NMG Research survey, most of the mortgagors with continuing fixed-rate deals reported that they were expecting their repayments to increase when their deals came to an end. In fact, the mean expected monthly increase was £65, very similar to the mean reported change in this year's survey. Although there would have been variation in households' expectations relative to what eventually happened, that does suggest that the increase in the repayments of fixed and discounted-rate mortgagors reported in this year's survey may have been at least in part anticipated. As a result, these households may have had more time to adjust their budgets to pay for any increase, mitigating the impact on consumer spending and the ability of these mortgagors to continue servicing their debts.

The remaining 30% of mortgagors were mainly on fixed-rate deals that had not yet expired and so had not experienced any change in their repayments in the year preceding the survey. On average, this group were expecting their payments to increase by £69 per month when their current deals expire, equivalent to 15% of their current monthly mortgage repayments. The amount by which these mortgagors' repayments will actually change depends on their current deals' expiry date (which was not identified in the survey) and the evolution of mortgage interest rates in the intervening period.

Overall (aggregating the three mortgagor groups in **Table B**), around two out of every three mortgagors surveyed reported that their repayments had not changed or had fallen compared to the previous year. And only 16% reported that their repayments had increased by more than £50 a month.

One measure of the overall affordability of households' mortgages is the share of their income that is devoted to servicing those mortgages. The distribution has shifted a little to the right in recent years and more mortgagors devoted a relatively large share of their incomes to meeting mortgage repayments in 2008 than in previous surveys, including the 1991 wave of the BHPS, at which time nominal interest rates were over 10% (**Chart 6**). That reflects rapid growth in secured debt over that period, as rising house prices meant that first-time buyers and those trading up the housing ladder had to take on more debt to fund their house purchases than had been necessary in the past (**Chart 3**).

Chart 6 Mortgage repayment gearing[a][b][c]



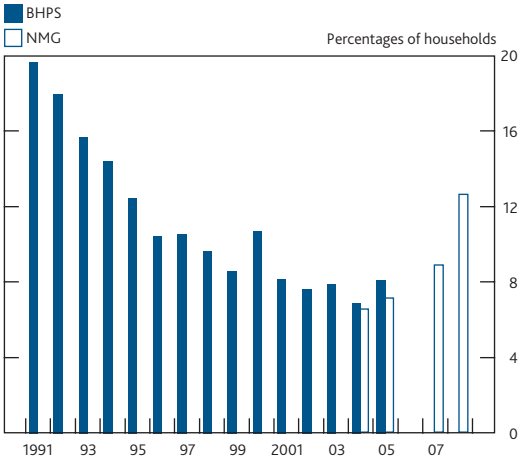
Sources: British Household Panel Survey, NMG Research survey and Bank calculations.

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

Repayment difficulties and how households respond to them

The NMG Research survey shows an increase in the number of households experiencing difficulty in keeping up with payments on their debts and other commitments. **Chart 7** plots the proportion of households who said that they were having difficulty keeping up with their housing payments (ie rental payments for renters and mortgage payments for mortgagors). This increased over the year for all types of households and has increased steadily since the trough recorded in 2004. But it remains well below the peak levels recorded in the early 1990s.(1)

Chart 7 Housing payment problems(a)(b)



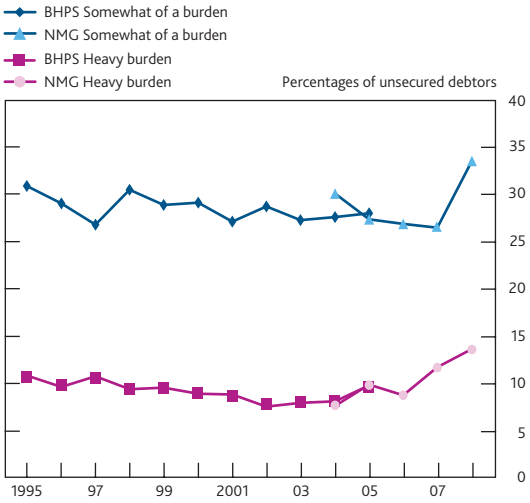
Sources: British Household Panel Survey, NMG Research survey and Bank calculations.

(a) Question: 'Many people these days are finding it difficult to keep up with their housing payments. In the past twelve months would you say you have had any difficulties paying for your accommodation?'
(b) In the 2006 NMG Research survey, renters and outright owners were not asked this question, so data for 2006 have been excluded from the chart because they are not comparable.

Chart 8 plots the proportion of households with unsecured debt who said that it is somewhat of a burden and the proportion that said it is a heavy burden to them. This is at its highest level since the question was first asked in the BHPS in 1995.

Although an increasing proportion of households reported experiencing some degree of financial difficulty, the number of households actually falling behind on their repayments was relatively small. The majority of households reported that they could keep up with bills and credit commitments without much difficulty (**Table C**). Around a third of households said that they struggled from time to time. Only around 3% of households admitted to falling behind with some bills or credit commitments. This is broadly consistent with other evidence such as that on mortgage arrears where about 1.5% of mortgages are in arrears of over three months.(2) Renters and mortgagors with high LTV ratios were more likely to be in this position than outright owners or low LTV mortgagors, with around 8% of renters and 4% of high LTV mortgagors reporting that they had fallen behind on payments.

Chart 8 Burden of unsecured debt(a)



Sources: British Household Panel Survey, NMG Research survey and Bank calculations.

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

Table C Keeping up with bills and credit commitments(a)

	Outright owners	Low LTV mortgagors	High LTV mortgagors	Renters	Total
Percentage that mentioned:					
Keeping up without much difficulty	71	56	49	46	58
Keeping up, but struggle from time to time	22	32	37	33	29
Keeping up, but a constant struggle	6	10	10	14	10
Have fallen behind on some or many payments	0	2	4	8	3

Sources: NMG Research survey and Bank calculations.

(a) Question: 'Which one of these statements best describes how well your household is keeping up with your bills and/or credit commitments at the moment?'

Table D shows that the main reason that some households had been experiencing difficulty in keeping up with their bills and credit commitments was that household bills had been higher than expected. Other reasons frequently cited by both renters and mortgagors were 'lack of cash flow that has been or will be resolved in the future' and 'overspending'. There was relatively little difference in the responses given by different types of households.(3)

Households who said that they had problems meeting their commitments were also asked what action they would consider taking to resolve them. As in previous surveys, the most frequently cited response was to cut back on spending. **Table E** shows that over half of all those experiencing some financial difficulty would cut back on spending to resolve it. That dominated all other suggested responses with only a

(1) The box on page 21 of the November 2008 *Inflation Report* discusses potential explanations for the apparent discrepancy between measures of affordability, like repayment gearing, and measures of distress.
(2) Source: Council of Mortgage Lenders.
(3) Note that this table is not directly comparable with that shown last year as that focused on difficulties with credit commitments only.

Table D Reasons for difficulty in keeping up with bills and credit commitments

Percentage that mentioned:[a][b]	
Higher-than-expected household bills	35
Lack of cash that has been or will be resolved in future	28
Overspending	13
Unemployment	9
Higher-than-expected interest rates	8
Loss of income through reduction or cessation of overtime	7
Illness	4
Divorce or separation	3
Redundancy	2
Credit card and other loan offers were too tempting	2
Children's school or university fees	2
You or your partner leaving work to have a child	1
Debt legacy from being a student	1
Other	7
Don't know	5

Sources: NMG Research survey and Bank calculations.

(a) Ordered by frequency of response, rather than by the order in which households were shown alternative responses.
(b) Households were permitted to make multiple responses, so figures do not add up to 100.

Table E Action to resolve difficulty in keeping up with bills and credit commitments

Percentage that mentioned:[a]	
Cut back on spending	54
Sell your house	3
Take out another loan	3
Take out another mortgage on your house	1
Declare yourself insolvent (ie bankruptcy or IVA)	1
Other/none of these	32
Don't know	6

Sources: NMG Research survey and Bank calculations.

(a) Ordered by frequency of response, rather than by the order in which households were shown alternative responses.

small proportion saying they would borrow more, remortgage or sell their house or declare themselves insolvent (either by bankruptcy or an Individual Voluntary Arrangement (IVA)).[1] A third of respondents said they would not take any of the suggested actions with many of those saying that they would try to get a first or second job to meet debt repayments.

Summary and conclusions

The latest NMG Research survey highlighted the financial pressures that British households have faced over the past year or more. One of the key pressures was the widespread squeeze on the remaining income households had available after paying for higher household bills and, for a minority of mortgagors, higher mortgage repayments. Most households felt that their 'available' income had gone down. Consistent with that, and aggregate data on household saving, more households reported that they had saved less rather than more over the course of the year than they had expected to. And an unexpected increase in household bills was the most frequently cited factor in causing households difficulty in keeping up with their bills and debt repayments. These pressures were compounded by the effects that higher prices for food and other essential items had on the real purchasing power of 'available' income.

There was little evidence of households having increased their borrowing to help cope with these pressures. That may in part have reflected the impact of tighter credit conditions. Many households thought that credit had become harder to access over the course of the year. And almost one in six said that they had been put off spending because they were concerned they would not be able to get further credit when they needed it. So the survey was consistent with tighter credit conditions and higher household bills being key factors behind the slowdown in consumer spending over the past year.

Falling house prices had reduced the amount of equity homeowners had in their homes. There was some evidence that had affected household spending, with fewer households reporting that they had taken out an additional secured loan to fund spending on household goods or home improvements than in previous years.

There was evidence that more households were finding their debts to be a burden to them than was the case in previous NMG surveys. But despite that, only 3% of the households surveyed reported having fallen behind on bills or debt payments. Those that did report having fallen behind were mainly mortgagors with high LTV ratios or renters. As in previous surveys, very few households saw bankruptcy as a solution to their problems, with most households saying that they would try to resolve their debt problems by cutting back on household spending.

(1) An IVA is an agreement whereby the borrower agrees a repayment plan with the lender as an alternative to bankruptcy.

Survey method

The survey was undertaken by adding 34 questions to the monthly omnibus survey, MarketMinder, carried out by NMG Research. Interviews were conducted in the respondents' homes using Computer Assisted Personal Interviewing (CAPI) in two separate waves. The first wave of 505 households was carried out between 19 September and 25 September 2008. The second wave of 1,906 households was carried out between 26 September and 2 October 2008. Only mortgagors were interviewed in the first wave. This wave was carried out to increase the reliability of analysis of loan to value ratios, particularly at the extreme of the distribution. The results from each wave were weighted to help correct for any bias in the sample using nationally defined profiles for age, social grade, region and working status. In addition, the combined sample of the two waves was weighted so that the proportion of mortgagors matched the proportion found in the second wave of 40%.

A limitation of all surveys about sensitive issues such as household finances is that some people are reluctant to discuss them in face-to-face interviews. Because of embarrassment, those who face the most financial stress might be more likely than others to refuse to answer certain questions or to understate their difficulties. As in previous years, the survey was designed to reduce these possibilities. In order to encourage respondents to divulge sensitive information, they were told that the survey was being carried out on behalf of the Bank of England and would be useful in assessing how spending might be affected by its interest rate decisions and in judging the risks to financial stability. They were assured that their replies would be treated in the strictest confidence, would not be passed to any third party at any stage in the future and would not under any circumstances be used for sales or marketing purposes. Also, to avoid embarrassment in revealing sensitive information to the interviewer, replies to questions were coded on show cards and recorded on a computer in such a way that the interviewer would not know the content of respondents' answers.

Response rates were similar to those obtained in previous years. Only those respondents who were the chief income earner or main shopper were asked for their income. On a weighted basis, this meant that 10% of respondents were not asked about their income. A further 32% of households refused to provide (11%) or did not know (21%) their household income. Just over 30% of respondents refused to say or did not know how much unsecured debt they owed. A similar percentage of households did not provide information about their secured debts. 9% of those asked did not know how much they owed and 19% refused to say how much.

Several possible approaches can be used to adjust for missing values arising from non-response to particular survey questions. Effectively, these all involve imputing a value for missing observations. All calculations reported in this article have been carried out using all available responses, implicitly assuming that non-response is distributed in the same way as recorded responses: that is, regardless of the characteristics of non-respondents. But in practice non-response for individual survey questions is not distributed uniformly across groups in the survey population. For example, older people were more likely to refuse to say what their household income was. Nevertheless, internal analysis shows that the overall conclusions from the survey were not very sensitive to which of the available imputation methods is used.

But the extent to which the sample of households surveyed can be considered representative of the population as a whole also depends on other factors. For example, collectively, survey respondents may systematically misreport information about their finances. Redwood and Tudela (2004) perform an aggregation exercise using the British Household Panel Survey and conclude that mortgage debt is underrecorded, the value of households' housing assets is overrecorded and unsecured debt is substantially underrecorded. Internal analysis shows that those broad conclusions also apply to the NMG Research survey. But there was less evidence that these biases vary over time. So, changes in the distribution of balance sheets between different survey years may be representative of changes in the population as a whole.

Finally, in an attempt to encourage as many households as possible to provide information about their finances, the respondents were offered a list of categories from which they could select their responses. For example, mortgagors were asked roughly how much they had left to pay on their mortgage and other secured debts. Those who were prepared or able to provide a response were offered a list of 25 buckets from which to choose: 'Less than £10,000', '£10,000–£19,999', '£20,000–£29,999', … , '£1,000,000 or more'. And similar response lists were associated with other questions (eg household income, house values etc). In each case, the buckets were chosen so that there were smaller increments in parts of the distribution that tend to draw more of the responses. But regardless of how the buckets were chosen, it is not possible to determine the distribution of responses within each bucket in the absence of additional information. For example, a mortgagor who reported having an outstanding mortgage balance of '£10,000–£19,999' could owe £10,000, £19,999 or anything between the two. There are two alternative assumptions that can be made. First, assume that each mortgagor had a mortgage debt equal to the mid-point of the bucket chosen. In the example above that

would be equivalent to assuming that the mortgagor had an outstanding mortgage balance of £15,000. This was the approach taken in all previous *Quarterly Bulletin* articles discussing NMG Research surveys (eg Waldron and Young (2007)). Second, assume that all of the responses within each bucket are equally likely. In the above example, that is equivalent to assuming that there is a continuum of households, which have the same overall weight as the identified mortgagor, with mortgage debts of between £10,000 and £19,999. This was the approach taken in this article. Theoretically, this approach is a more accurate representation of the raw information provided by the respondents. Practically, the conclusions of the article are unaffected by whichever method is used. In particular, the two approaches yield an identical mean. For example, both approaches would imply a mean mortgage debt among responding mortgagors of £86,593. But the two approaches yield slightly different results in other parts of the distribution with the second approach resulting in smoother distributions, particularly near the tails.

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Understanding dwellings investment

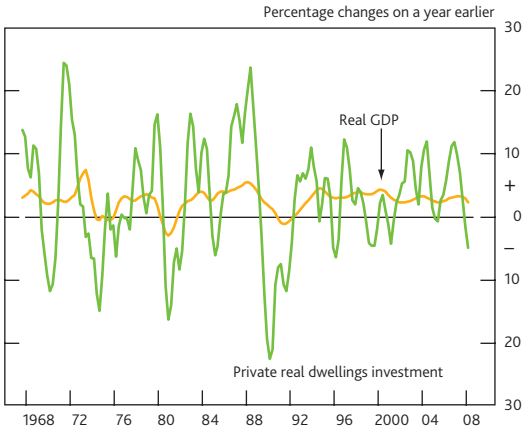
By Matthew Corder of the Bank's Structural Economic Analysis Division and Nyssa Roberts of the Bank's Conjunctural Assessment and Projections Division.

Dwellings investment (house building and home improvements) can have a large impact on GDP growth. This article presents an economic framework that helps explain movements in UK dwellings investment. House building responded sluggishly to rising house prices in the earlier part of this decade. This partly reflected lags in the construction cycle, but also increasing costs arising from the planning process. Such factors are less likely to restrain a downward adjustment in house building, and since late 2007 house builders have cut production sharply in response to lower house prices and housing market activity.

Introduction

Dwellings investment (house building and home improvements) makes up a relatively small fraction (by international standards) of UK economic activity: on average around 4½% of real GDP since 1970. But it is volatile, and has contributed significantly to UK economic cycles. Since 1970, growth in private sector dwellings investment has been more than five times as volatile as GDP growth (**Chart 1**). This volatility largely arises because small changes in the desired housing stock require large changes in housing investment.

Chart 1 Private dwellings investment and GDP(a)

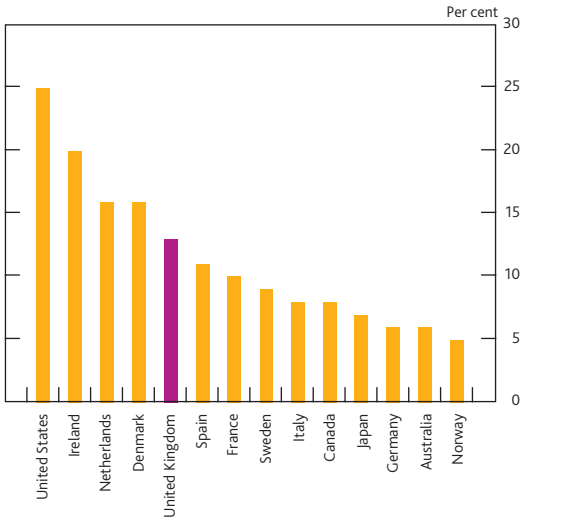


Sources: Office for National Statistics (ONS) and Bank calculations.

(a) Both series have been smoothed using a centred moving average.

Chart 2 shows that dwellings investment added significantly to weakness in the UK economy ahead of previous recessions. And the November 2008 *Inflation Report* noted that one of the biggest drags on UK growth in the first half of 2008 came from the marked decline in dwellings investment. This contraction reflected tighter credit supply and the deteriorating macroeconomic outlook, which have contributed to the sharp fall in house prices, housing market activity and house builders' profits over the past year. Further falls in investment are expected in coming quarters. But in judging the medium-term outlook, it is important to assess the incentives for residential investment in a well-founded economic framework. This article sets out such a framework.

Chart 2 Contribution of residential investment to weakness in GDP growth one year before recessions(a)

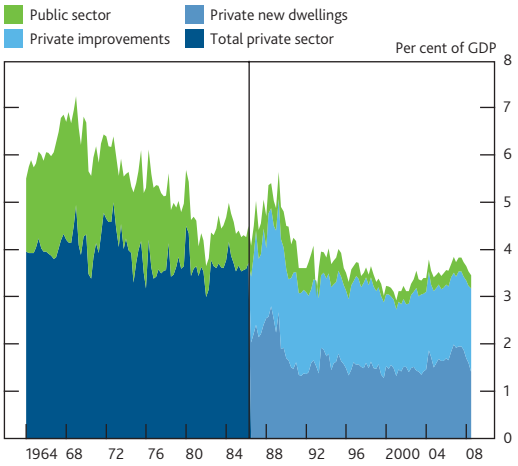


Source: International Monetary Fund (2008), Table 3.2.

(a) The chart shows the proportion of the abnormal cumulative decline in GDP that is accounted for by residential investment. The 'abnormal' contribution of a component to GDP growth is the difference between the actual and 'normal' contributions. The 'normal' contribution is calculated by smoothing the actual contributions over the whole period using the methodology in Leamer (2007).

The next section presents the general economics of investment. The article then separately applies this theory to private sector house building and improvements, which together account for over 90% of dwellings investment (**Chart 3**), and discusses how far it can explain recorded investment. Public sector investment accounts for the remainder. But, as the public sector's decision to invest in dwellings is a function of public policy as much as housing market conditions, this article focuses on private sector investment.(1)

Chart 3 Components of real dwellings investment(a)



Sources: ONS and Bank calculations.

(a) Disaggregated dwellings investment data are provided by the ONS, but are not published. They have therefore not been subject to the same level of scrutiny as published National Accounts variables. Separate data for improvements and new dwellings are not available prior to 1986 Q2.

Economics of investment

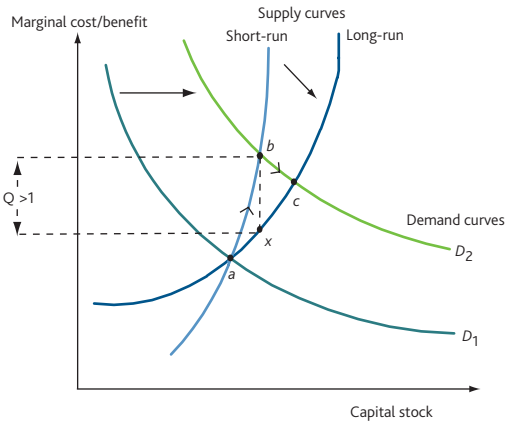
Housing is a durable good: it is not consumed once and disposed of, but yields housing services for many years. Hence, the decision to invest in housing can be analysed in a similar way to a company's decision to invest in machinery or other capital.

In theory, companies should invest in new capital until the benefit of acquiring an extra unit (the marginal benefit) equals the marginal cost. The benefit is captured by the expected return on the extra unit. The cost reflects the price of the investment good, depreciation, taxes and the interest rate on finance for investment. If the expected return rises or the cost falls, companies should invest more until marginal returns once again equal the marginal cost. When doing so, companies are adjusting their capital stock. Small changes in the desired stock can lead to large changes in the flow of investment.

In practice, there are 'adjustment costs' associated with changing the capital stock. For example, large increases in investment might push up labour costs if capacity constraints start to bind. Investment projects can also take some time to complete, so companies have to make investment decisions based on uncertain *expected* returns. This uncertainty introduces risk, especially since most investment projects cannot easily be reversed. Waiting for more information can reduce the uncertainty about returns, so companies will delay investing until the expected returns are sufficient to compensate them for the risk of investing.

Adjustment costs prevent the capital stock moving immediately to a new equilibrium. So the short-run supply response of the stock to a change in returns is less than the long-run response. This is illustrated in **Figure 1** where the short-run supply curve is steeper than the long-run curve. If there were no adjustment costs, the two curves would be equal and higher returns to investing (represented by a shift out in the demand curve from D_1 to D_2) would result in an immediate jump of the capital stock from point *a* to *c*. In the presence of adjustment costs, there is a slower adjustment from point *a* to *b*, and then to *c*.

Figure 1 Demand and supply for capital in the presence of adjustment costs



During this adjustment, the marginal returns to new investment (represented by point *b* on the demand curve) are greater than the marginal cost (represented by point *x* on the long-run supply curve). A common way to summarise this disequilibrium, and hence the incentive to invest, is known as 'Tobin's Q'.(2) Q expresses the market value of capital relative to its replacement cost, so it measures the profitability of investing. In the long run, when demand is equal to supply, Q should equal one: the return from an additional unit of capital equals the cost (points *a* or *c* in **Figure 1**). Investment should therefore just be sufficient to offset the depreciation of the capital stock.

As with other types of investment, empirical estimates suggest dwellings investment is subject to adjustment costs.(3) The

(1) Housing association investment, which in recent years accounted for around 9% of private sector new dwellings investment, is also driven to a large extent by public policy. But it is not considered separately from activity by private developers.
(2) See Tobin (1969).
(3) Topel and Rosen (1988) were the first to formalise the house builder's decision to construct new homes in the presence of adjustment costs. Using US data, they found that adjustment costs are a crucial factor underlying the house builder's decision.

responsiveness of UK dwelling investment to demand changes (signalled by price movements) in the short run is lower than in the long run.(1) And it is also low relative to other developed economies.(2)

The framework above implies companies produce and utilise the capital themselves. In practice, and housing is a good example, some companies produce capital goods for others to use. This can introduce additional frictions into the process. But the incentives to invest can still be modelled in the same way, even if those involved are slightly different. The next section applies this framework to house building and the following section considers improvements.

House building and Q

When applied to investment in new housing, Q is the *expected* market price of a new home, divided by the cost of production (see box on page 396). Because it takes time to build a home, builders must base their decision to start construction on their expectations of the price they will achieve when the property is completed and sold.

Other researchers have applied Tobin's Q to UK housing. For example, Barot and Yang (2002) use the ratio of house prices to building costs. Tsoukis and Westaway (1994) implicitly estimate Q, modelling house building as a function of house prices, residential land prices, building costs, the cost of capital and credit availability. But relative to previous analysis, this article includes more detail on the costs of house building, including costs arising from the planning process.

To highlight the importance of taking the planning process into account, this article first presents an initial simple Q measure that implicitly assumes planning costs have remained constant in real terms. The following sections outline how the components of this simple Q measure have developed over time, before combining them. More detailed estimates of the costs of the planning process are then introduced to give a more comprehensive measure of the incentive to invest in house building.

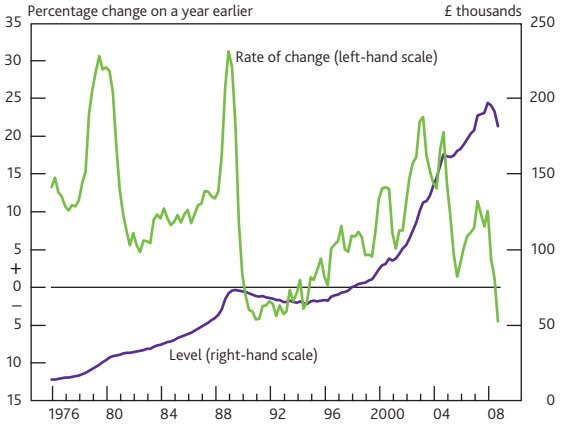
The market value of houses

The house-building Q's numerator, and the initial signal to invest, is the price of new houses. House prices should depend on the discounted cost of the future stream of housing services (what the household would hypothetically pay to rent the property). That will depend on the balance of demand and supply. The housing stock (like any form of capital) is likely to be fixed in the very short run, so changes in demand are likely to drive house price movements initially.

Housing demand depends on a range of factors, such as economic prosperity and demographics. Higher household income boosts housing demand; empirical analysis suggests that a 1% rise in real disposable income is associated with a similar increase in real housing demand.(3) Since 1972, real post-tax labour income per head has grown by almost 2% per year on average, implying a significant rise in housing demand over that period. This, together with demographic changes, may explain why the number of households has risen much faster than the population: Britain's population rose by around 4% between 1991 and 2004, while the number of households rose almost 10%. Lower average household size adds to housing demand.

The rate at which future benefits from a property are discounted will depend on interest rates and the expected capital gains on housing. Previous analysis indicates that the decline in long-term real risk-free interest rates over the past fifteen years can account for part of the rise in house prices between 1995 and 2007.(4) The fall in the spread between mortgage rates and risk-free rates in the earlier part of this decade would have further improved the affordability of housing and boosted house prices. And sustained house price increases may have led households to expect continued increases, which would have raised the price people were willing to pay for housing. These factors help explain the large house price increases over the past decade (**Chart 4**).

Chart 4 Price of new houses(a)



Sources: Halifax, Nationwide and Bank calculations.

(a) The average of the quarterly Halifax and Nationwide new house price indices.

Since mid-2007, at least some of these factors have unwound: mortgage lending spreads have risen, and measures of households' house price expectations have fallen as prices have fallen sharply. By 2008 Q3, new house prices were almost 8% off their peak, and surveys suggest builders expect

(1) For example, Barker (2003) reported estimates of the elasticity of supply of UK housing of 0.3 in the short run and twice that in the long run. A price elasticity of 0.3 indicates that a 1% increase in house prices is associated with a 0.3% increase in housing supply.
(2) Barker (2003) reported an international comparison study that showed the price elasticity of supply in the United Kingdom was about 0.5, versus 1.4 in the United States and 2.1 in Germany.
(3) Barker (2003), page 39.
(4) See, for example, Weeken (2004).

Tobin's Q for dwellings investment

New housing

Tobin's Q measures the incentive to invest by comparing the market price of capital to the replacement cost. In the case of housing, the relevant comparison is the market price of a new home to the cost of producing a new home.

This article's measure of Q for new housing is shown below:

$$Q_t^N = \frac{H_{t+3}^N}{L_t / D_{t+3} + C_t + P_t + F_t + O_t}$$

Where: H^N is the price of a new house;
L is the average price of non-residential land (per hectare);
D is the density of new developments (dwellings per hectare);
C is the cost of construction;
P is the cost of planning obligations;
F is the cost of professional fees associated with the development; and
O represents other costs, including the cost of finance.

There is a lag between the decision to start construction work and the sale of a completed dwelling, so house builders must form an expectation about what house prices will be when the property is sold. For simplicity, this article uses the actual value of house prices three quarters in the future as a proxy for builders' expectations. This lead on house prices is based on data from the National House Builders Council (NHBC) that show the average time between the date builders notify the NHBC of an intention to start work and the date of completion is about ten months.(1) Given that measures of density are not recorded until properties are built, Q also uses a three-quarter lead on the density of new developments to ensure that planned densities are included at the time construction starts.

It is the availability of land to build on that provides the main constraint on new supply. So the incentive for landowners to release new land for residential use must be captured in a measure of Q. While there will always be a premium on the price of residential land relative to non-residential uses, landowners should be willing to sell more land to house builders when the premium becomes unusually high. To capture this premium, the Q measure compares house prices in the numerator to the price of *non-residential* land (the opportunity cost of releasing land for residential development) in the denominator.

Details of the data sources used to construct Q are in the annex. But it should be stressed that there is considerable uncertainty about many of the components of this measure. In particular 'other costs', which includes the average premium on residential land, cannot be precisely quantified. For simplicity such costs are estimated so that the average real value of the premium on residential land and other costs over the period 1986 to 2007 is consistent with a Q equal to one. As a result, the Q measures can give an indication of the changes in the incentive to invest, but not the absolute level of returns to investment.

It should be noted that investment strictly depends on the unobservable *marginal* Q: the ratio of the market value of an *additional* unit of capital to its replacement cost. The Q shown in **Charts 8** and **9** is an *average* Q based on the flow of investment: the ratio of the market value of new housing to its replacement cost. Hayashi (1982) derives conditions under which average and marginal Q are equal. These conditions are unlikely to all be met in the case of house building. But a measure based on average costs and benefits to new investment is closer to the marginal Q than a measure based on the overall stock of housing.

Improvements

In theory, households' incentive to invest in improvements can be summarised in a Q measure in the same way as for house building. Q for a given improvement (say extending a two-bedroom house to three bedrooms) is defined as:

$$Q^I = \frac{H^I}{H^U + C}$$

where H^I is the market value of a property that has been improved (a three-bedroom house). C is the cost of the improvement (including raw materials, any labour costs and, where applicable, costs associated with obtaining planning permission). H^U is the market value of a property that cannot be altered via this particular improvement (a two-bedroom house that does not have space for an extension).

Comparing H^I to H^U captures the full gains from improving. The difference in value between H^U and that of a similar property that does have the potential to be improved is already incorporated in H^I. H^U is equivalent to the value of non-residential land in the house-building Q. If demand for a particular type of improvement increases, H^I will rise relative to H^U. This raises Q, assuming construction costs do not change, and increases the incentive to undertake the improvement.(2)

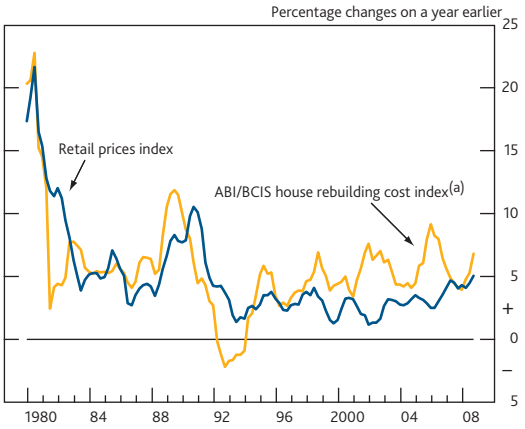
(1) In practice, there is considerable variation around the time to build for any particular site, but the profile of Q is invariant to small changes in this lead.
(2) Households owning improvable properties have the choice of undertaking improvements themselves or releasing them to those who want the improvements by selling them at their now higher prices.

further price falls over the next year. Nevertheless, prices remain considerably higher than a decade ago. However, construction costs and land prices, two key components of Q's denominator, are also higher, reducing any incentive to build.

Construction costs

House builders face costs for inputs such as raw materials and labour. Complying with building regulations, which impose minimum standards for new properties, also imposes a cost.(1) A combined measure of these costs has increased more sharply than retail price inflation since around 1994 (**Chart 5**). One explanation is that changes to building regulations have increased compliance costs. Another is that cutbacks in construction employment in the 1990s' recession subsequently resulted in prolonged labour shortages and rising wage costs relative to other sectors once output picked up. House builders have noted that much of the labour shed from the industry did not return even as wages rose sharply in real terms.(2) These effects only eased substantially in 2004 (**Chart 6**), as migrant labour was attracted to the United Kingdom.

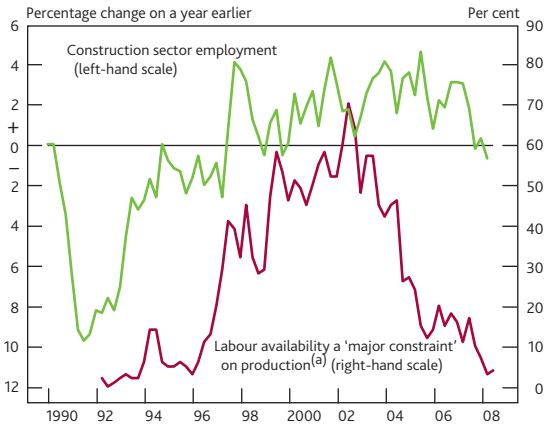
Chart 5 Retail price and construction cost inflation



Sources: Building Cost Information Service and ONS.

(a) See annex for details.

Chart 6 Employment and labour availability



Sources: Home Builders Federation and ONS.

(a) Percentage of builders citing labour availability as a major constraint on production.

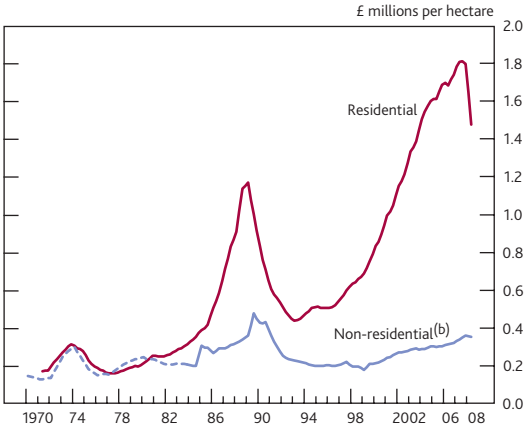
Increasing construction costs may have limited the incentive to invest to some degree. However, construction costs accounted for less than half of new house prices in recent years.(3) Another important element is land prices.

Land prices

House prices more than doubled in the decade to end-2007. House builders, attempting to increase output in response to the rise in housing demand, bid up the price of the limited supply of residential land. While production can be increased by raising building densities, supply can only increase substantially if landowners release further land for residential use (subject to receiving planning consent, which is discussed below). The availability of land is likely to be the key constraint on house building and so must be captured in any measure of Q. The amount of new land released will depend on the price of residential land relative to the returns from alternative land uses.

Chart 7 shows residential land prices against an estimate of the alternative non-residential value, based on agricultural and industrial land prices. The rise in the ratio of residential to non-residential land prices indicates that incentives to convert land to residential use have increased substantially in recent years. The exact size of the premium is uncertain, because the variety of sites makes it difficult to assess average land values. Furthermore, as Barker (2006) notes, **Chart 7** overstates the incentive to some extent, because the comparison is based on average land values whereas new developments involve land which can be converted relatively easily. Different land types are often not close substitutes. For example, agricultural land usually does not have access to roads and utilities. So residential land should always be worth more on average, but

Chart 7 Real UK land prices(a)



Sources: Department for Communities and Local Government, Department for Environment, Food and Rural Affairs, ONS, Valuation Office Agency and Bank calculations.

(a) 1987 prices, deflated by RPI.
(b) Data prior to October 1983 are estimated based on agricultural land price inflation.

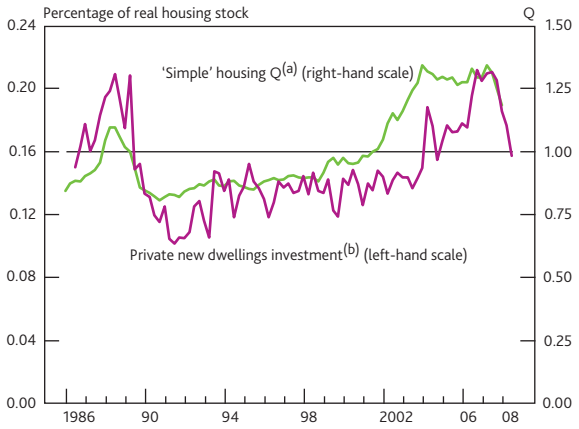
(1) Other regulatory costs, such as costs arising from the planning system are discussed later in the article.
(2) Office of Fair Trading (2008), page 176.
(3) Note this only includes the cost of the dwelling itself, not related infrastructure or decontamination/preparation of the site.

landowners should be willing to sell more land to house builders when the premium is unusually high. The estimated Q captures changes in this premium by comparing house prices in the numerator to the price of *non-residential* land (the opportunity cost of releasing land for residential development) in the denominator.

A simple Q estimate for new dwellings

Putting the above elements together (house prices divided by the sum of construction, land and other costs, such as the cost of finance), gives a simple initial estimate of Q (**Chart 8**). There is significant uncertainty about the components of this measure. As a result, while the measure gives an indication of the profile of returns, it does not provide a meaningful estimate of the absolute level of the return to house building.

Chart 8 'Simple' housing Q and real private new dwellings investment



Source: See annex for source data.

(a) Average of Q set equal to one over the period 1986–2007.
(b) Private new dwellings investment data are provided by the ONS, but are not published. They have therefore not been subject to the same level of scrutiny as published National Accounts variables.

Q rose in the late 1980s as house prices rose faster than costs, prompting a house-building boom. Then, as housing market prospects deteriorated, so did the expected return and, with it, house building. Q quickly dropped and remained low until 2001, when rising house prices relative to costs again boosted the returns to house building. It is perhaps puzzling why house building did not rise more quickly given the increased returns. However, this simple Q measure includes only a basic implicit estimate of a variety of 'other' costs; assuming such costs remain constant in real terms. In practice, these costs are likely to have varied over time. One particular example is the costs arising from the planning system.

The effect of planning on Q

As in all advanced economies, UK house building is subject to planning legislation. There are good reasons for not allowing unregulated land use, such as the value society places on open space or the potential to reduce commuting distances and carbon emissions by keeping housing closer together.(1) Planners balance the costs and benefits of regulating land use. But such restrictions inevitably reduce the land available for house building and raise the costs associated with new developments.

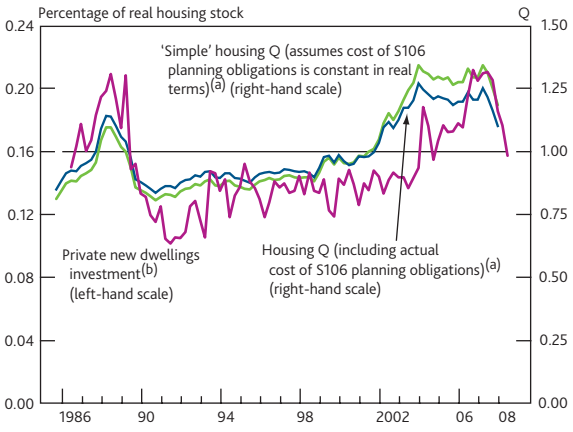
An example of planning legislation is Section 106 (S106) agreements. S106 of the 1990 Town and Country Planning Act allows local authorities to seek cash or contributions-in-kind from developers to mitigate a development's impact. These payments contribute towards affordable housing, transport infrastructure and other public benefits. 'S106 agreements offer a useful mechanism for infrastructure delivery and, in some cases, can act as an incentive for development by allowing local authorities to extract development contributions for the benefit of the wider community' (Barker (2004), page 53). Aside from affecting planning authorities' incentives, such contributions can also boost private sector new dwellings investment, as payments towards affordable housing may allow additional investment by housing associations (which the ONS classifies within the private sector).

Information on the costs of S106 agreements is limited, but research for the Department for Communities and Local Government (CLG) and other data indicate that the value of S106 agreements has risen considerably over the past decade.(2) For example, CLG estimates that the value of S106 planning obligations agreed in England rose by around 57% between 2003/04 and 2005/06, to £4 billion (around 15% of the total value of house building).(3) By contrast, the value of house building rose by less than 40% over the same period. While there is much uncertainty around these estimates, **Chart 9** suggests such costs dampened the rise in returns to house building from 2001. The Q measure that includes these costs picks up less sharply than the simple measure, which may help explain part of the subdued pickup in new dwellings investment over the past decade.

Q in **Chart 9** does not include other costs that may also have changed in recent years, such as the cost of obtaining planning permission. For example, not all applications receive permission. In recent years the rejection rate for major housing applications has increased significantly, from around 15% in the mid-1990s, to over 35% in 2008.(4) As applicants must bear the cost of unsuccessful applications, this suggests the cost per successful application has risen in recent years. The rejection rate understates the effect of the planning system on the availability of developable land, as many sites are in areas, such as the greenbelts surrounding various cities, where development is forbidden. While the cost of such restrictions is not easily quantified, recent studies have noted

(1) For other examples see Barker (2006), pages 154–59.
(2) See annex for more details.
(3) Crook *et al* (2008).
(4) Major residential developments are those with ten or more dwellings.

Chart 9 Housing Q (including the costs of S106 agreements) and real private new dwellings investment



Source: See annex for source data.

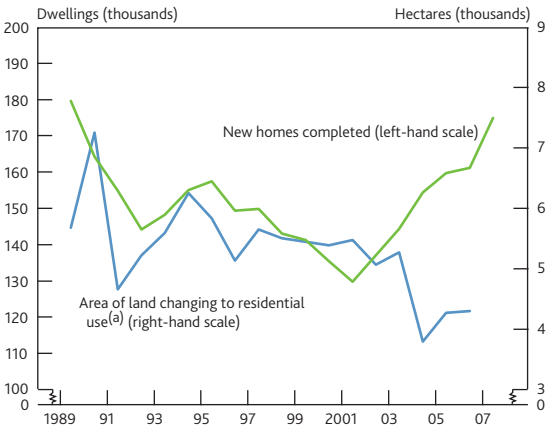
(a) Average of both measures of Q set equal to one over the period 1986–2007.
(b) Private new dwellings investment data are provided by the ONS, but are not published. They have therefore not been subject to the same level of scrutiny as published National Accounts variables.

that the planning process has constrained house builders' ability to increase supply rapidly when demand increases.(1) Indeed, the amount of land used for new house building has fallen since 2003 (**Chart 10**), despite an increased number of major housing applications.

Restrictions on land supply do not necessarily prevent a rise in house-building activity (**Chart 10**). Builders can shift production from low-density houses to high-density flats. Densities in England have increased from 25 dwellings per hectare in 2001 to around 45 in 2007. But as the supply of flats rises relative to the supply of houses, the relative price of flats will fall, reducing the incentive to invest (assuming the relative demand for flats does not also increase).

The time taken to get planning permission may also explain the sluggish response of house building to rising returns up to

Chart 10 New dwellings investment and land use, England



Source: Department for Communities and Local Government.

(a) 1999 land area statistics are not published by CLG. The figure shown is the mid-point between the 1998 and 2000 figures.

2007. Research by the Home Builders Federation (HBF (2006)) and Ball (2008) found that the average time spent in planning was about fifteen months, but is highly variable, with some developments spending more than three years in planning.

The estimated Q also takes no account of uncertainty and the benefit of waiting for more information. In the context of housing, house builders may not have believed that the rise in house prices from around 2000 was a persistent phenomenon, so may have wanted to see several years of consistent price increases relative to costs before expanding output. Similarly, now property prices and housing market transactions are falling, builders may be unwilling to invest while they are unsure what price they will receive, or even if they can sell their properties, once the development is complete. The unobservable cost of uncertainty should enter the denominator of Q. At present this cost is likely to be unusually high, so the current estimated level of Q may overstate the incentive to build homes.

Asymmetric supply response

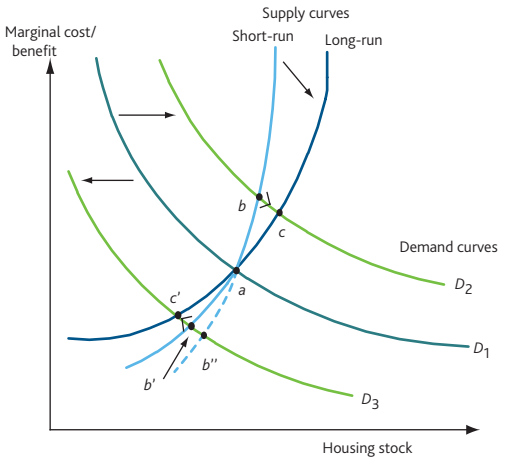
This article has discussed why investment in new dwellings in the United Kingdom responded only slowly to increased returns from 2001 to mid-2007. But since then house prices and activity have fallen sharply. The sharp fall in house building in response highlights asymmetric adjustment costs, which reduce the responsiveness of investment to *increases* in demand, but have less impact when demand *falls*. For example, planning permission grants a permission rather than an obligation to build, so builders can cut production in response to a fall in demand more easily than they can increase production. It is also easier to cut the labour force than to find new workers with appropriate skills.

Figure 2 illustrates the effect of asymmetric adjustment costs with a 'kink' in the short-run supply curve. (The dotted line shows the 'unkinked' curve from **Figure 1**.) As before, an increase in demand from D_1 to D_2 initially causes a jump from the starting point *a* to point *b*. This corresponds to a large move upwards in house prices and a limited increase in the housing stock. If adjustment costs were symmetric, a fall in demand from D_1 to D_3 would similarly result in a large fall in prices and a limited fall in the stock (a move from *a* to *b''*). But with asymmetric costs, a fall in demand has a smaller initial effect on prices, because the slope of the short-run supply curve is closer to the long-run response (a move from *a* to *b'*).

Pryce (1999) finds evidence of asymmetric responses to house prices in the United Kingdom, with a lower supply response in the boom of the late 1980s than in the bust of the early 1990s. Some evidence for this asymmetry can also be seen in the sluggish response of investment to increases in Q earlier in this decade, compared with the period since the start of 2007,

(1) For example Barker (2004), Callcutt (2007) and Office of Fair Trading (2008).

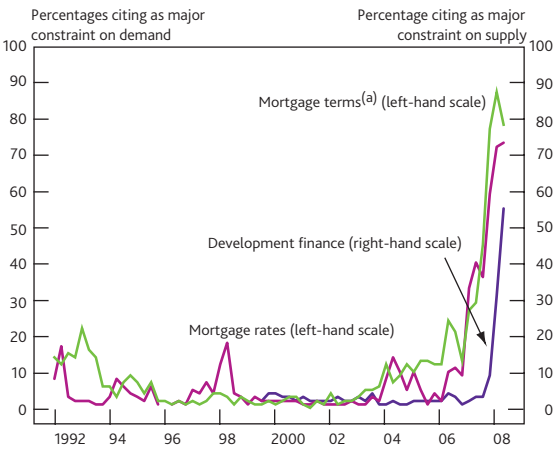
Figure 2 Demand and supply for housing in the presence of asymmetric adjustment costs



during which new dwellings investment has fallen by around a quarter as Q has fallen.

To the extent that credit availability is procyclical, credit might compound the effects of asymmetric adjustment costs. Survey evidence from the HBF suggests that between 1992 and 2007 house builders did not feel constrained by credit availability (**Chart 11**). However, since mid-2007, survey data and reports from Bank contacts indicate that the availability of credit to house builders has tightened significantly and is acting as a major constraint on supply. Furthermore, house builders report that credit availability is acting as a constraint on household housing demand. The Q measure does not take account of credit market frictions, because the underlying theory assumes companies can always obtain finance to exploit a profitable investment opportunity.

Chart 11 House builders' view of major constraints on demand for and supply of new dwellings



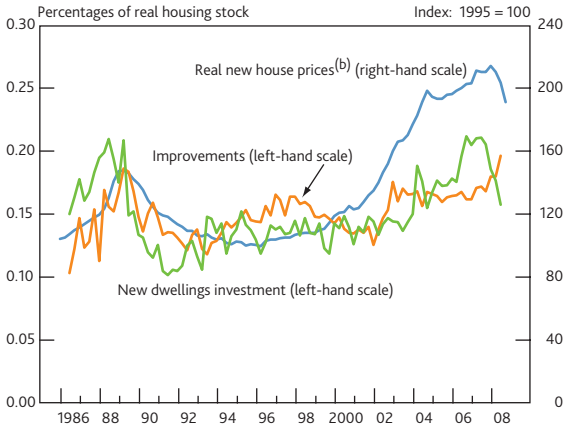
Source: Home Builders Federation.

(a) Mortgage income multiples and loan to value ratios.

Improvements

Between 2002 and 2007, improvements to existing dwellings (defined as major renovations or modifications) increased as a percentage of the housing stock, but by less than the rise in new dwellings (**Chart 12**). Given the potential substitutability of improvements and new dwellings, and the strong increase in housing demand implied by rapid house price increases, the level of improvements over the recent past is perhaps surprisingly low. This is especially true given that the increase in planning costs in recent years might have encouraged a substitution from house building, because planning affects new house building more than improvements. However, new dwellings and improvements are not perfect substitutes: an existing house cannot be improved indefinitely. And over the past 20 years the number of households has risen substantially while the average household size has fallen, so improvements may be less appropriate to meet the demand for additional housing.

Chart 12 Components of dwellings investment and real house prices(a)



Sources: Halifax, Nationwide, ONS and Bank calculations.

(a) Disaggregated dwellings investment data are provided by the ONS, but are not published. They have therefore not been subject to the same level of scrutiny as published National Accounts variables.
(b) The average of the Halifax and Nationwide new house price indices, deflated by RPI.

In theory, households' incentive to invest in improvements can be summarised in a Q measure in the same way as for house building (see the box on page 396). In practice, it is difficult to construct such a Q measure. The cost of improvements can be estimated, but given the wide variety of possible improvements, the value of an average improvement is unobservable. Furthermore, even if Q could be measured, it may not adequately explain recorded changes in improvements, because measuring improvements is very difficult. 'The borderline between… improvements, on the one hand, and repairs (which are part of intermediate consumption) on the other, is not easy to draw.' (ONS (1998), paragraph 15.36). For this reason, improvements data are more uncertain than new dwellings data.

Nevertheless, some general conclusions can be drawn. The value of improvements is determined by demand for the housing services they provide, and so is likely to be correlated with the general level of house prices (which is driven by aggregate housing demand). This is supported by **Chart 12**. It is therefore plausible that the fall in house prices over the past year implies a fall in improvements, as the incentive to improve properties diminishes.

Conclusion

This article used an economic framework — in particular 'Q' theory — to interpret movements in dwellings investment. The rise in house building between 2003 and 2007 can be explained to some extent with a Q measure based on estimates for house prices, land prices, construction costs and planning costs. However, house building initially rose more slowly than might have been expected, possibly reflecting factors, such as time spent in planning, which limit the speed at which house builders can react to rising returns. Such factors have not restrained the response of house building to the fall in estimated returns over the past year and to the tightening in credit supply. In 2008 Q3, starts by private developers and housing associations were 48% lower than a year ago. Given the lags in the construction process, this is likely to translate into weak investment for some time.

The scale and pace of the eventual recovery in house building will depend on the expected future path of house prices and on credit supply. The Bank will use the framework described in this article to help in its assessment of the medium-term outlook for new dwellings investment.

For improvements to existing dwellings, data limitations preclude the construction of an appropriate Q measure. In addition, investment in improvements is subject to greater measurement error than house building, because it is difficult to distinguish between improvements and repairs. But, as the return from improving a property is likely to be correlated with the general level of house prices, the recent fall in prices suggests that improvements might fall in the near term.

Annex
Data underlying the components of Q for new housing

This annex details the data sources used to estimate Q, as defined in the box on page 396.

Price of new homes (H^N)

New house prices are a simple average of the quarterly Halifax and Nationwide price indices for new homes.(1)

Price of land per dwelling (L/D)

Data on non-residential land prices are based on agricultural and industrial land price data from the Department for Environment, Food and Rural Affairs and the Valuation Office Agency. In each region of the United Kingdom, a weighted average land price is calculated based on the split between greenfield and brownfield development in that region. Information on this split is sourced from the Department for Communities and Local Government (CLG). A UK index is created by weighting together each region using population weights as a proxy for the number of dwellings in each area.

To calculate the cost of land used per dwelling, CLG data on building densities for new developments are used.

Construction costs (C)

The construction cost of a dwelling is based on a CLG report (CLG (2008)), which estimated that the cost of building an average dwelling in 2007 Q4 was about £72,500. The report notes that this estimate relates to the construction of the dwelling only. It makes no allowance for site-specific costs, such as infrastructure or drainage, or non-construction costs such as planning or legal fees. This cost is projected backwards using the house rebuilding cost index from the Association of British Insurers (ABI) and Building Cost Information Service (BCIS).

Fees (F)

House builders incur significant other costs in the process of building a dwelling in the form of professional fees to solicitors, architects and planning advisers. The ONS estimate these costs are equal to about 5% of construction output, so the measure of Q uses the same estimate.(2)

Planning obligations (P)

Section 106 (S106) of the 1990 Town and Country Planning Act allows local authorities to seek cash or contributions-in-kind from developers to mitigate a development's impact. Rough estimates of the cost of such planning obligations are based on research from the CLG for 2003/04 and 2005/06 (**Table 1**). In practice, not all agreed contributions will be delivered as some developments may not go ahead or may be renegotiated. So estimates of S106 costs are based on the assumption that only a proportion of agreed contributions are delivered.

Table 1 Value of Section 106 planning agreements agreed and delivered (England)

£ billions	Agreed		Estimate of actual delivered	
	2003/04	2005/06	2003/04	2005/06
Total value of non-affordable housing obligations (excluding land)	0.7	1.0	0.5	0.4[a]
Affordable housing	1.2	2.0	0.6	0.9
Subtotal	1.9	3.0	1.1	1.3
Land contributions (other than for affordable housing)	Unknown	1.0	Unknown	Unknown
Total delivered	Unknown	4.0	Unknown	Unknown

Source: Crook *et al* (2008).

(a) Crook *et al* caution that the small sample size used to estimate this number means 'this analysis cannot be regarded as accurate, but it is the one estimate of the value of obligations actually delivered in 2005–06'.

Projections beyond the available data are based on estimates from Barlow *et al* (1994) of the number of affordable homes built in the early 1990s and the assumption that the number of Section 106 agreements has risen over time in line with available data (**Table 2**). The cost per Section 106 agreement is assumed to move in line with residential land prices (either because some payments are given in the form of open space or land for affordable housing that will be linked directly to land prices, or because the viability of a scheme, and hence the amount a builder can afford to pay in planning obligations, will be a function of land values).

Table 2 Proportion of planning permissions with planning agreements attached (England)

Per cent

	1987–90	1993	1997/98	2003/04	2005/06
All developments	0.5[a]	1.1	1.5	6.9	6.4
All dwellings developments			7	14	14
Major dwellings developments[b]			26	40	48

Source: Crook *et al* (2008).

(a) A small number of planning permissions had planning agreements attached prior to 1990, reflecting agreements signed under earlier planning legislation.
(b) Major dwellings developments are those for ten or more dwellings.

Other costs (O)

In the absence of detailed data on, for example, the cost of capital for landowners and builders, the estimate of 'other' costs are estimated as a constant percentage of construction costs so that the average values of both measures of Q presented in this article are equal to one over the period 1986 to 2007.

(1) The Halifax index for new house prices is only available back to 1983. Prior to that, the series is projected back using only the Nationwide new house price index.
(2) Further details are provided in the UK Gross National Income (ESA95) Inventory, Chapter 5: The Expenditure Approach, paragraph 4.2.1.4.

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Price-setting behaviour in the United Kingdom

By Jennifer Greenslade and Miles Parker of the Bank's Structural Economic Analysis Division.[1]

It is important for central banks to understand how companies set prices, since price-setting behaviour plays a key role in the monetary policy transmission mechanism. Surveys of companies have been conducted in a variety of countries to shed light on this issue. Earlier this year the Bank of England asked companies who are contacts of the Bank's Agents about how they set prices. The survey adds to and updates our understanding. It indicates that the frequency with which companies change their prices varies considerably across sectors but that over the past decade a significant number have increased the frequency of price changes. Different factors influence price rises and falls but nearly half of companies change their prices within three months of an increase in costs or a fall in demand.

Introduction

It is important for central banks to understand how companies set prices, since price-setting behaviour influences the way in which monetary policy affects the economy. There are many reasons why monetary policy may affect the real economy, at least in the short run. At least part of the reason is that some prices are slow to adjust, that is, they are *sticky*. Many of the economic models that are frequently used for monetary policy analysis assume that there are some constraints on price adjustment, often called 'nominal rigidities'. If prices are sticky, then changes in nominal interest rates affect the real interest rate and so monetary policy influences real economic activity. Understanding the extent of these nominal rigidities, their causes, and the degree to which they react asymmetrically to changes in demand or supply is therefore crucial.

The Bank of England has recently conducted a survey of companies' price-setting behaviour to try to improve its understanding of the extent of price rigidity by asking companies who are contacts of the Bank's Agents directly about these issues. This article analyses the responses of these companies, surveyed over the period December 2007 to February 2008. The Agents speak to these contacts on a regular basis to help build a picture of current conditions in the UK economy to help inform the Bank of England's Monetary Policy Committee.[2] Asking firms directly about how they set prices is not a new exercise. Previous examples include surveys for the United States (see Blinder (1991)), Canada (see Amirault *et al* (2005)), the euro area (see Fabiani *et al* (2005)), as well as an earlier survey that the Bank of England conducted for the United Kingdom in 1995 (see Hall *et al* (1996, 2000)).

The aim of this new survey was to obtain a comprehensive view of price-setting across the whole economy and to shed light on how price-setting behaviour had changed in the light of significant changes such as inflation targeting in the United Kingdom,[3] the growing emergence of China in the world economy and the advent of the internet. These macroeconomic changes may have influenced the frequency of price changes by companies. The survey took place against a backdrop of large external commodity price rises and after the initial deterioration in credit conditions. It is possible that respondents were influenced by such circumstances.

The article is organised as follows. First it provides some background details on the survey and describes the main characteristics of the companies that responded. It then discusses the price reviewing process carried out by companies and the frequency of actual price changes. The following sections examine the factors influencing price changes and how prices react to significant changes in demand and costs.

The survey

The survey was sent to a selection of the business contacts of the Bank's Agents in two waves over the period December 2007 to February 2008. The earlier survey conducted in 1995 was to a large degree composed of

(1) Miles Parker is currently on secondment at the Reserve Bank of New Zealand.
(2) The latest *Agents' Summary of Business Conditions* is available at www.bankofengland.co.uk/publications/agentssummary/index.htm.
(3) The introduction of inflation targeting in 1992 preceded the earlier survey in 1995. However it was still relatively new at that time and the Bank of England did not have operational independence until 1997 (after the earlier survey).

manufacturing companies. Given the further expansion of the service sector since then, the aim of this new survey was to obtain a more comprehensive view of the economy by using a broader sample of companies. The sample included all companies that had responded to the 1995 Bank of England survey and remained contacts of the Bank of England's Agents. Additional companies were then chosen at random from the Agents' contacts, so that the share of each industry in the full sample matched that industry's share in aggregate GDP. Within each industry the sample was designed to be broadly representative of the economy by size of firm, as measured by the number of employees.

The final sample consisted of 2,331 companies, out of which there were 693 respondents (a response rate of around 30%). The industrial breakdown was broadly consistent with shares in UK GDP (**Table A**). There was a large spread of firm size by turnover, with around 9% of the sample having a turnover of less than £1 million a year and around a third of the sample with a turnover of more than £50 million (**Chart 1**). In terms of market share, the majority of companies perceived themselves to have a market share of less than 5%, whereas a fifth of the respondents stated they had a market share above 20% (**Chart 2**). The annex lists the questions.(1)

Table A Survey respondents by industry(a)

Industry	Number of responses	Percentages	Memo: Share of GVA(b) (percentage)
Manufacturing	154	22.2	18.1
Electricity and gas supply	9	1.3	2.1
Construction	70	10.1	7.4
Wholesale, vehicle repairs and fuel	44	6.3	7.9
Retail	62	8.9	7.2
Hotels and restaurants	30	4.3	3.8
Transport, storage and communication	87	12.6	9.6
Financial intermediation	46	6.6	9.0
Real estate, renting and business services	150	21.6	29.1
Recreational, cultural and other personal services	41	5.9	5.9
Total	**693**	**100**	**100**

(a) Columns may not sum to 100 due to rounding.
(b) Share of gross value added (GVA) is calculated based only on the sectors listed. These sectors account for over 75% of total GVA.

Chart 1 Company size by turnover

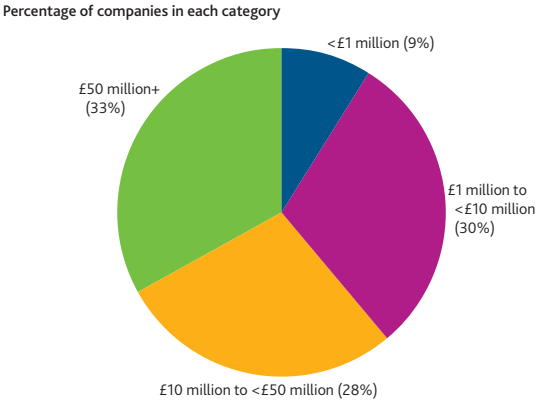
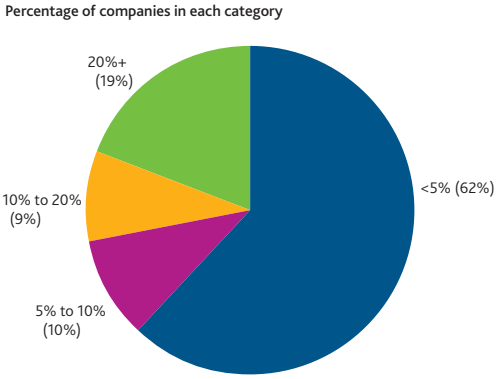


Chart 2 Market share of companies in survey

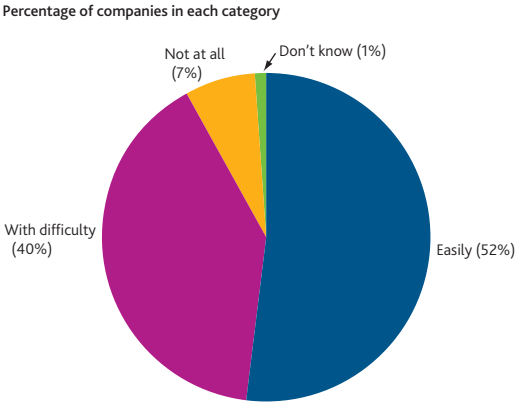


Price reviews

Individual companies are unlikely to adjust prices continuously because price reviews and changes are costly to conduct and implement. The first stage of the process of price adjustment is for a firm to evaluate whether its current price is optimal since it may be costly to charge the 'wrong' price. This section investigates how companies review their prices, as well as looking at the frequency of such reviews.

One factor affecting the cost of gathering information is the ease with which companies can find out their competitors' prices. Around half the respondents said they could discover their competitors' prices easily, with only 7% saying they could not find it out at all (**Chart 3**). However, there was a marked divergence between industries, with nearly 90% of companies in the retail and hotels and restaurants sectors being able to find competitors' prices easily. This is unsurprising as hotel rates are widely publicised. But a fifth of construction companies could not discover their competitors' prices at all, probably because unpublished bilateral contracts are common in that sector.

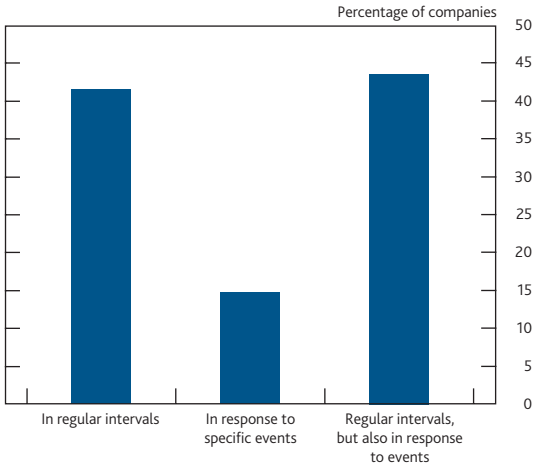
Chart 3 Ease of finding out competitors' prices



(1) Many of the questions in the survey were similar to those used in the euro-area surveys (see Fabiani *et al* (2005)).

Companies were asked whether they reviewed their prices in regular intervals or in response to specific events. This allows a distinction to be drawn between the two forms of pricing behaviour that underlie most modern macroeconomic models: 'time-dependent' rules (where companies change their prices only at specific intervals) and 'state-dependent' ones (where companies change their prices whenever they like, depending on the state of the economy).[1] The results suggest that more companies review their prices at regular intervals than in response to specific events (**Chart 4**). But it is not unusual for companies to review prices both at regular intervals and in response to specific events, for example following a substantial change to costs. Even if companies review their prices at regular intervals in the short run, ultimately price-setting will depend on the state of the economy as profits and therefore economic survival depend on economic conditions.

Chart 4 How companies review their price



Companies were asked about the information they use when reviewing their prices. About a fifth of companies use rules of thumb or primarily backward-looking information (**Table B**). Over a third of companies review prices mainly looking forward, whereas nearly half of companies set the price primarily for current conditions. There are differences across firm size (measured by the number of employees) — larger companies appear to be more forward looking than smaller companies — and across industry — for example, retail and wholesale companies are more likely to set prices based on current rather than expected future developments. These results, together with the limited international survey evidence to date, are broadly consistent with empirical work that suggests that pricing decisions today depend on expected future inflation, past inflation and real marginal cost (the cost of producing an extra unit of output divided by the price).

Table B Information used when reviewing prices

Percentage of companies in each category	
Rule of thumb	12
Set price primarily given conditions that have applied in the recent past	8
Set price primarily for current conditions	45
Set price primarily looking forward over the near future	35

The survey then asked companies how often they reviewed their main price. This is designed to shed light on the informational costs of changing price, that is, the cost of gathering information necessary to determine if the current price is appropriate. These costs are different from those involved in *implementing* a new price. If reviewing prices were costless, companies would be continuously doing so.

A small proportion of respondents review their prices daily, which may suggest that they find it is relatively costless to review prices or that the costs of not reviewing prices are high (**Table C**). Around one third of companies review prices at least monthly, whereas around one quarter only do so on an annual basis. Companies that perceive that they face intensive competition often appear to review prices frequently. This may suggest that they have more incentive to check that their price is not out of line with their competitors as the demand for their product is more sensitive to price. Overall, based on all companies in the sample, the median firm reviewed its price twice per year.

Table C Frequency of price review[a]

Percentage of companies	
Daily	6.8
Weekly	11.0
Monthly	13.9
Quarterly	12.0
Half-yearly	15.6
Annually	25.5
Irregularly	8.2
Other	7.1

(a) Column does not sum to 100 due to rounding.

Price changes

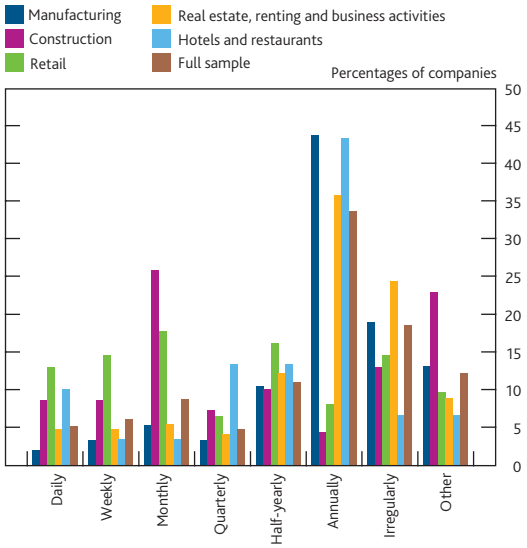
The second part of the price adjustment process is the implementation stage. Surveys can shed light on how sticky prices are by asking companies directly how often they change prices in a given period.

How often do companies change prices?

The survey suggests that the median number of times that prices are changed is once per year. But there are some important differences between sectors, which can be seen by looking at the frequency of price changes for selected sectors (**Chart 5**). Many UK construction and retail companies

(1) The latter approach, where prices are not reviewed routinely, but in response to a sufficiently large change in market conditions is appealing, but has been less commonly used in macroeconomic modelling as it is more complicated to use.

Chart 5 Frequency of price changes in selected sectors



reported that they changed their prices at least monthly whereas manufacturing, real estate/business activities and hotels and restaurants generally did so less frequently. Firm size (measured by the number of employees) also has an impact on how often companies reset prices. Larger companies are more likely to set prices at high frequencies, with a quarter of large companies resetting prices at least monthly, but only 15% of small companies doing so. Like other strands of micro pricing work, the Bank's survey reveals that heterogeneities are present and capturing these in models used for macroeconomic analysis is very difficult. This is an area for further research.

An interesting question is whether companies that change prices less frequently are more forward looking in their price-setting. **Table D** shows the proportion of companies that use each type of information by frequency of price change. For example, the top row shows that 11% of companies that change prices daily use the 'rule of thumb' approach and 9% use primarily information on past conditions, with 63% focusing on current conditions and 17% on future conditions.

Table D Relationship between the frequency of price change and information used reviewing prices[a]

Percentages of companies in each category

	Rule of thumb	Primarily past conditions	Primarily current conditions	Primarily future conditions	Total at each frequency
Daily	11	9	63	17	100
Weekly	5	10	48	38	100
Monthly	5	2	55	38	100
Quarterly	12	3	55	30	100
Half-yearly	11	12	41	36	100
Annually	17	9	38	36	100
Irregularly	12	10	48	30	100
Other	5	5	47	43	100
Total of each information type	**12**	**8**	**45**	**35**	**100**

(a) Rows may not sum to 100 due to rounding.

Perhaps surprisingly, there is no significant evidence that companies that set prices half-yearly or annually rely more than average on forward-looking information. But, as expected, those companies setting prices daily look mainly at current conditions and less at future conditions.

Do companies change prices more frequently than a decade ago?

There are many reasons why pricing behaviour may have changed over the past decade, such as a move to a lower inflation environment, technological advances or an increase in competition. By itself, a move to a lower and more stable inflation environment may reduce the frequency at which companies need to adjust their prices. However, technological advances may enable companies to change their prices more often, by making it easier and less costly to implement price reviews and changes. Or increased competition may lead to companies changing their prices more often if the cost of charging the wrong price is greater in a more competitive environment.

The survey asked companies whether the frequency of price adjustment has changed in the past decade. The findings suggest that the frequency of pricing changes is the same as a decade ago for around half of companies, but for many companies (39%), pricing has become more flexible over the past decade. Companies were asked to give reasons why the frequency of resetting their prices had changed. For those firms that had increased the frequency of price changes, the most commonly cited explanations were increased competition and increased variability of input costs.(1) A small proportion of companies changed prices less often (6%), with a common response being that this was because of a more stable macroeconomic environment with lower inflation. So, for the United Kingdom, over the past decade, an increase in competition and higher variability of input prices may have increased the frequency of price changes, yet the more stable macroeconomic environment may have resulted in a small number of companies amending their prices less often.

How are prices determined?

The survey also asked companies which factors influenced their pricing decisions for their main product or activity. Many of the economic models used for monetary policy analysis assume that companies choose to set their price as a mark-up over marginal costs. The Bank survey finds widespread use of the mark-up over costs form of pricing, with 25% of respondents describing constant mark-up pricing as 'very important' and 33% doing so for variable mark-up pricing (which could be related to the economic cycle). Around a third of companies reported that setting prices largely based on competitors' prices was 'very important'.

(1) A recent survey carried out by the Bank of Canada (Amirault *et al* (2005)) reached a similar conclusion.

Do factors such as firm size or competitive environment have an impact on how prices are determined? The results suggest that large companies are more likely to use variable mark-up pricing than small companies. In terms of competition, companies that perceive that they face strong competition are more likely to set prices based on their competitors' prices than other approaches.

Why do prices not adjust?

The survey suggests that the median firm reviews its price more often than it changes prices. As Hall *et al* (1996, 2000) point out, there could be many reasons why this might occur, such as costly price adjustment or the type of demand or cost conditions that the company faces. For example, there may be costs to reprinting price lists (physical 'menu costs'), or companies may be concerned about initiating a price war (often referred to in the economic literature as 'co-ordination failure') or of breaching implicit or explicit contracts with their customers. It is possible that some of these factors may be more important for price rises (or price falls), that is, the effects might not be symmetric. For example, concerns about antagonising customers are likely to be less relevant for price reductions than increases. To allow for this, the survey allowed respondents to differentiate between factors which might influence why they do not raise prices or cut prices separately.

The main factors that tended to be cited by survey respondents as explaining price stickiness were explicit and implicit contracts, a desire not to antagonise customers and co-ordination failure. Companies citing the importance of contracts may wish to avoid damaging long-term relationships with their customers, whereas companies citing co-ordination failure may be concerned about initiating a price war. About a third of companies reported that they do not raise prices because their input costs do not change much. So-called 'menu costs' (costs such as time, effort or reprinting) did not seem to provide a major reason for why prices may be sticky. This confirms findings from other surveys.

Factors influencing prices

The previous section investigated how often companies change their prices and discussed reasons why prices might be sticky. This section examines which factors cause prices to change and whether these effects are asymmetric. Companies were asked about the importance of a range of cost factors (such as labour costs, raw material prices and financial costs) and market conditions (demand and competitors' prices) for price adjustment. Unlike other surveys, this survey asked companies about the importance of expected changes in key variables as well as actual changes, and it also distinguished between domestic and overseas competition.

Table E shows the importance of various factors perceived to drive prices upward.(1) Increases in labour and raw material prices emerge as the most important determinant in driving prices upward. A variety of other factors were also considered to be important, such as actual or expected rises in demand and price increases by competitors, particularly domestic rivals.

Table E Most important factors leading to a rise or fall in price (based on share of companies responding 'very important' or 'important')(a)

Rise	Rank	Fall	Rank
Increase in cost of labour	1	Actual decline in demand	1
Increase in the prices of fuel, raw materials or input/components	2	Actual price reduction by one or more of your domestic rivals	2
Actual rise in demand	3	Expected decline in demand	3
Increase in costs arising out of regulation	4	Significant reduction in market share	4
Actual price increase by one or more of your domestic rivals	5	Expected price reduction by one or more of your domestic rivals	5
Expected rise in demand	6	Decrease in the prices of fuel, raw materials or input/components	6

(a) Companies were asked to rank the importance of eleven factors. The table lists the top six factors only (based on companies responding 'very important' or 'important', with equal weight given to each).

In terms of driving prices downward, demand conditions and competitors' prices were the most important factors.(2) Given the weak outlook for economic activity in the United Kingdom, the results from the price survey suggest that this is likely to be a key factor restraining price rises in the current conjuncture.

How do prices adjust following a demand or cost shock?

The survey asked companies how they would adjust prices in response to demand and cost shocks. Starting with the effect of changes in the value of sterling, importers were asked: *How much does the exchange rate change before you would adjust your price of goods sold in the United Kingdom?* The responses shown in **Table F** suggest that around two thirds of importing companies would change prices if the exchange rate changed by up to 10%. Companies appear to respond symmetrically to depreciations and appreciations.

Table F Exchange rate change needed before importers adjusted their UK prices(a)(b)

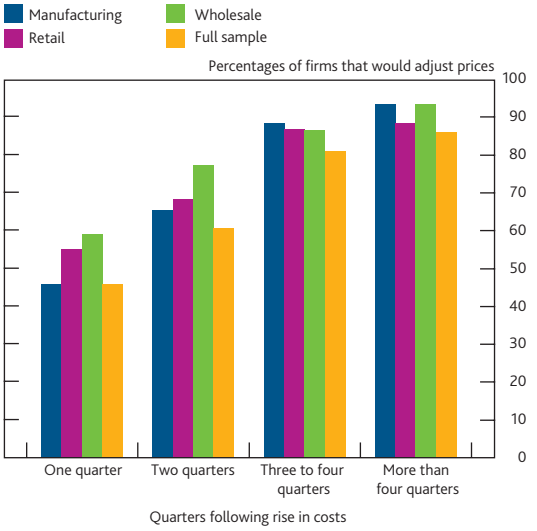
Sterling appreciation	Percentage of companies	Sterling depreciation	Percentage of companies
<2%	14	<2%	13
2% to <10%	49	2% to <10%	53
10% to <20%	26	10% to <20%	24
20%+	12	20%+	11

(a) Based on 143 responses from companies that operate in international markets as importers.
(b) Columns may not sum to 100 due to rounding.

(1) 6% of companies reported that they never adjust prices upward, so are excluded from the table.
(2) 26% of companies reported that they never adjust prices downward so are excluded from the table.

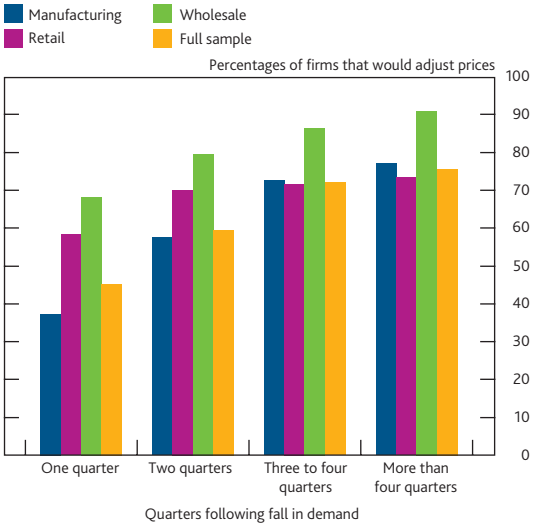
All companies were then asked how long it takes them to reset prices following shocks. Focusing first on costs: *After a significant increase in production costs, how much time on average elapses before you raise your prices?* **Chart 6** shows the cumulative response. In response to a significant increase in production costs, nearly half of companies raise their prices within a quarter (and half of those react within one month). Over 80% of companies respond to such an increase in costs within one year, whereas 12% of companies said they do not change their price in response to an increase in production costs.

Chart 6 Percentage of companies changing price in reaction to significant increase in costs



Turning to demand, companies were asked: *After a significant fall in demand, how much time on average lapses before you reduce your prices?* The survey suggests that just under half of companies cut their prices within a quarter and over 70% of companies respond to such a fall in demand within a year (**Chart 7**). However, nearly a quarter of companies said they would not change their price in response to a fall in demand. The survey also points to differences in the speed of reaction between industries — retailers and wholesalers said they were far more likely than manufacturers to react to falling demand within the first quarter.

Chart 7 Percentage of companies changing price in reaction to significant fall in demand



Conclusions

It is important to understand how companies set prices, since price-setting behaviour plays a key role in the monetary policy transmission mechanism. The latest Bank of England survey improves our understanding of price-setting by asking companies directly about these issues.

Many companies review their prices at regular intervals, rather than responding to specific events. However, it is also common for companies to use a combination of the two. Overall, the median firm reviews its price twice per year and changes its price once a year. However, there are important differences between sectors — for example, UK construction and retail companies change their prices more often than companies in the manufacturing and other services sectors. And firm size has an impact on how often companies reset prices, with larger companies changing prices more often than smaller companies. So, there are important heterogeneities at work. Further work may be needed to investigate this.

Over the past decade, a substantial number of companies have increased the frequency at which they change prices. Companies mainly attributed that to an increase in competition over the period, which increases the cost to the firm from deviating from the optimal price, and higher variability of input prices.

The survey revealed that different factors influence price rises and price falls. Higher costs — in particular, labour costs and raw materials — are the most important driver behind price rises, whereas lower demand and competitors' prices are the main factor resulting in price falls. It also provides some insights about the speed of response to changes in cost and demand conditions. Nearly half of companies change their prices within a quarter following an increase in costs or a fall in demand.

Annex
Price-setting questionnaire

General information

1. What is your main product or activity, by domestic turnover? _____

2. What is the 'market share' of your main product or activity in the United Kingdom?
   - ❑ <5%
   - ❑ 5% to <10%
   - ❑ 10% to <20%
   - ❑ 20%+

3. Roughly how many products do you currently sell in the United Kingdom? _____

4. On average, approximately how many full-time equivalents does your company employ in the United Kingdom?
   - ❑ 0–49
   - ❑ 50–249
   - ❑ 250+

5. Approximately what size was your UK turnover in the last financial year?
   - ❑ <£1m
   - ❑ £1m to <£10m
   - ❑ £10m to <£50m
   - ❑ £50m+

6. What do you regard as the principal market for your main product or activity?
   - ❑ The United Kingdom
   - ❑ European Union
   - ❑ North America
   - ❑ The whole international economy

   (If one country or other group of countries please specify) _____

7. What proportion of the sales of your main UK product or activity is sold to overseas markets?
   - ❑ 0%
   - ❑ >0% to <10%
   - ❑ 10% to <30%
   - ❑ 30%+

8. a) What is the main destination of your sales (choose only one option)?
   - ❑ Retailers/wholesalers
   - ❑ Public sector
   - ❑ Other private sector companies
   - ❑ Directly to consumers

   b) If you sell to retailers, wholesalers or other private sector companies, are they within your own group?
   - ❑ Yes
   - ❑ No

9. How intensive is the competition you experience for your main UK product or activity?
   - ❑ Strong
   - ❑ Weak
   - ❑ None
   - ❑ Don't know/No answer

10. How easily can you find out the prices set by your competitors for your main product or activity?
    - ❑ Easily
    - ❑ With difficulty/effort
    - ❑ Not at all
    - ❑ Don't know/No answer

11. Do you face more competition for your main UK product or activity compared with a decade ago?
    - ❑ Yes
    - ❑ No
    - ❑ The same
    - ❑ Not applicable

12. Do you generate the largest share of your UK turnover with long-term or short-term customers?
    - ❑ Long-term (more than one year)
    - ❑ Short-term (less than one year)

Pricing in the United Kingdom

13. The UK price of your main product or activity is (choose only one option)

- ❑ The same for all customers/quantities
- ❑ Depends on the quantity sold (but according to a standard price list)
- ❑ Decided case by case

14. Companies often *review* their prices without necessarily changing them. Do you generally *review* the UK sales price of your main product or activity (choose only one option)

- ❑ In regular intervals
- ❑ Generally in regular intervals, but also in response to specific events (eg as reaction to a substantial change in costs)
- ❑ In response to specific events (eg as reaction to a substantial change in costs)

15. a) How frequently do you actively *review* your UK pricing decisions?

- ❑ Daily
- ❑ Weekly
- ❑ Monthly
- ❑ Quarterly
- ❑ Half-yearly
- ❑ Annually
- ❑ Irregularly
- ❑ Other (please specify) _____

If you answered IRREGULARLY or OTHER to question 15 please answer the following question.

b) In the past twelve months how many times have UK pricing decisions been actively *reviewed*? _____

16. a) At which interval do you *change* the UK price of your main product or activity?

- ❑ Daily
- ❑ Weekly
- ❑ Monthly
- ❑ Quarterly
- ❑ Half-yearly
- ❑ Annually
- ❑ Irregularly
- ❑ Other (please specify) _____

If you answered IRREGULARLY or OTHER to question 16 please answer the following question.

b) In the past twelve months how many times have you actually *changed* your UK prices? _____

17. Which of the following methods best describes how you set the UK price of your main product or activity (choose only one option)?

- ❑ Rule of thumb (eg change by a fixed amount or percentage; change in accordance with the economy-wide inflation)
- ❑ We set the price primarily given conditions that have applied in the recent past
- ❑ We set the price primarily for current conditions
- ❑ We set the price primarily based on our view of the near future

18. Has the frequency of price adjustments changed for your main UK product or activity in the past decade?

- ❑ Yes, increased
- ❑ Yes, reduced
- ❑ No, unchanged
- ❑ Not applicable

If yes, why? _____

19. How are UK prices for your main product or activity primarily determined?

Please rank each of the following options by circling the numbers to the right of each statement. Use the following options: 1 = not important; 2 = slightly important; 3 = important; 4 = very important; 0 = not applicable, I can't evaluate.

Price is made up of direct (ie prime or variable) cost per unit plus a fixed percentage mark-up	1	2	3	4	0
Price is based on direct (ie prime or variable) cost per unit, as above, but the percentage mark-up is not fixed	1	2	3	4	0
Price is primarily specified by your principal customer	1	2	3	4	0
Price is primarily determined by your competitors' price	1	2	3	4	0
Price is primarily determined by a regulatory agency	1	2	3	4	0
Price is set at a statutory level	1	2	3	4	0
Price is primarily determined in other ways (please specify)	1	2	3	4	0

_____

20. How important are the following factors listed below in terms of causing an *increase* in UK prices?

Use the following options: 1 = not important; 2 = slightly important; 3 = important; 4 = very important; 0 = not applicable, I can't evaluate.

Not applicable — upward adjustment never takes place (go to Q.21)					0
Increase in cost of labour	1	2	3	4	0
Increase in the prices of fuel, raw materials or inputs/components	1	2	3	4	0
Increase in financing costs	1	2	3	4	0
Actual rise in demand	1	2	3	4	0
Expected rise in demand	1	2	3	4	0
Actual price increase by one or more of your domestic rivals	1	2	3	4	0
Expected price increase by one or more of your domestic rivals	1	2	3	4	0
Actual price increase by one or more of your overseas rivals	1	2	3	4	0
Expected price increase by one or more of your overseas rivals	1	2	3	4	0
Significant increase in market share	1	2	3	4	0
Increase in costs arising out of regulation	1	2	3	4	0

21. How important are the following factors in causing a *fall* in UK prices?

Use the following options: 1 = not important; 2 = slightly important; 3 = important; 4 = very important; 0 = not applicable, I can't evaluate.

Not applicable — downward adjustment never takes place (go to Q.22)					0
Decrease in cost of labour	1	2	3	4	0
Decrease in the prices of fuel, raw materials or inputs/components	1	2	3	4	0
Decrease in financing costs	1	2	3	4	0
Actual decline in demand	1	2	3	4	0
Expected decline in demand	1	2	3	4	0
Actual price reduction by one or more of your domestic rivals	1	2	3	4	0
Expected price reduction by one or more of your domestic rivals	1	2	3	4	0
Actual price reduction by one or more of your overseas rivals	1	2	3	4	0
Expected price reduction by one or more of your overseas rivals	1	2	3	4	0
Significant reduction in market share	1	2	3	4	0
Decrease in costs arising out of regulation	1	2	3	4	0

22. What effect will the following changes in market conditions have on your ability to change gross profit margins?

	No effect	Upward effect	Downward effect
A rise in market demand for your product	❑	❑	❑
A rise in domestic competitors' prices	❑	❑	❑
A rise in overseas competitors' prices	❑	❑	❑

23. Companies often differ in how quickly they adjust prices in response to changes in demand and costs. How does your firm respond?

Use the following options: 1 = less than one week; 2 = from one week to one month; 3 = from one to three months; 4 = from three to six months; 5 = from six months to one year; 6 = more than one year; 7 = the price remains unchanged.

After a significant increase in demand, how much time on average lapses before you raise your prices?	1	2	3	4	5	6	7
After a significant increase in production costs, how much time on average elapses before you raise your prices?	1	2	3	4	5	6	7
After a significant fall in demand, how much time on average lapses before you reduce your prices?	1	2	3	4	5	6	7
After a significant fall in production costs, how much time on average lapses before you reduce your prices?	1	2	3	4	5	6	7

24. Companies sometimes decide to postpone price changes or to change their price only slightly. This is generally due to various factors, some of which are listed below. Some of these factors may be more relevant for price rises, whereas others may be more important for price falls. Please indicate how important each of these factors are in your company.

Use the following options: 1 = not important; 2 = slightly important; 3 = important; 4 = very important; 0 = not applicable, I can't evaluate.

	Reasons to decide not to raise the price					Reasons to decide not to lower the price				
The risk that our competitors do not change their prices	1	2	3	4	0	1	2	3	4	0
The risk that we subsequently have to readjust our prices in the opposite direction	1	2	3	4	0	1	2	3	4	0
The existence of written contracts specifying that prices can only be changed when the contract is renegotiated	1	2	3	4	0	1	2	3	4	0
The existence of an implicit contract (regular contact with a customer without any written contract)	1	2	3	4	0	1	2	3	4	0
The preference for maintaining prices at a certain threshold (eg you would rather charge £4.99 than £5.00)	1	2	3	4	0	1	2	3	4	0
The costs implied by price changes (eg printing of price lists or information gathering costs)	1	2	3	4	0	1	2	3	4	0
The variable costs in our company do not change by much with market conditions, making our price quite stable	1	2	3	4	0	1	2	3	4	0
It would antagonise our customers	1	2	3	4	0	1	2	3	4	0
Other (please specify) _____	1	2	3	4	0	1	2	3	4	0

For companies that trade in international markets (as importers or exporters), please proceed to Q.25.

If you only operate in the United Kingdom, thank you again for your co-operation in completing this survey.

Information regarding price behaviour in international markets

Only to be filled out by companies operating in international markets, as importers and/or exporters.

Importers (if you are not an importer but an exporter, please go straight to Q.27)

25. How much does the exchange rate change before you would adjust your price of goods and services sold in the United Kingdom?

Sterling appreciation
- ❑ <2%
- ❑ 2% to <10%
- ❑ 10% to <20%
- ❑ 20%+

Sterling depreciation
- ❑ <2%
- ❑ 2% to <10%
- ❑ 10% to <20%
- ❑ 20%+

26. Are foreign exchange costs more difficult to pass on to UK consumers now than a decade ago?

- ❑ Yes
- ❑ No

If yes, why?
- ❑ Competition from domestic sources
- ❑ Low inflation makes price increases more visible and more difficult to justify
- ❑ Competition from foreign sources
- ❑ Other factors (please specify) _____

Exporters (if you are not an exporter, thank you for your co-operation in completing this survey).

27. Companies may charge different prices on different markets. Which of the following statements is true for your company (please tick one answer only)?

The price — expressed in sterling — varies across countries (proceed to Q.28)
The price — expressed in sterling — is identical in all countries (proceed to Q.29)

28. How important are the following factors in discriminating your price between markets?

Use the following options: 1 = not important; 2 = slightly important; 3 = important; 4 = very important; 0 = not applicable, I can't evaluate.

Exchange rate changes	1	2	3	4	0
The destination country tax system	1	2	3	4	0
Structural market conditions (tastes, standard of living)	1	2	3	4	0
Cyclical fluctuations in country demand	1	2	3	4	0
Regulation	1	2	3	4	0
Transportation costs	1	2	3	4	0
Other factors, please specify _____	1	2	3	4	0

29. If a significant share of your sales (at least 20%) goes to a single country and, if sterling were to permanently appreciate by 5% *vis-à-vis* that country, how would you change the price in that market of your main product or activity (choose only one option)?

In the near term (first six months)
- ❑ The price would increase by more than 5%
- ❑ The price would increase by less than 5%
- ❑ The price would increase by 5%
- ❑ The price would remain basically unchanged

In the longer term
- ❑ The price would increase by more than 5%
- ❑ The price would increase by less than 5%
- ❑ The price would increase by 5%
- ❑ The price would remain unchanged

Thank you again for your co-operation.

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Estimating the determinants of capital flows to emerging market economies: a maximum likelihood disequilibrium approach

Summary of Working Paper no. 354 Guillermo Felices and Bjorn-Erik Orskaug

This paper studies the determinants of capital flows (defined as gross external bond and syndicated loan issuance) to a group of emerging market economies (EMEs) since 1992. Capital flows to EMEs are of particular interest, because their rapid reversals have been responsible for various financial crises in large economies such as Brazil, Russia, Mexico and several East Asian countries in the past few decades. Understanding the determinants of capital flows is therefore important in order to avoid future financial crises and their potential spillover effects on other financial markets, including developed ones.

For emerging market economies, the cost of financing debt via international markets has traditionally been higher than for developed ones, as investors attach risks to their ability to repay their debt, either in the form of bonds or bank loans. As a result, investors require interest rates that incorporate a premium over 'safe' interest rates in order to compensate them for taking such risk. The combined observation of capital flows and the associated interest rates reflects the interaction of the supply of capital from the rest of the world to EMEs and the demand for capital from EMEs. But this interaction might not reflect an efficient competitive equilibrium resulting from conventional supply and demand analysis. The supply of flows could, for instance, be rationed if creditors are unwilling to lend to a country at a cost of capital that is acceptable for the borrower. This could occur, for example, if creditors have imperfect information about the borrowers' ability or willingness to repay their obligations. Similarly, at times and at a given cost of capital, the demand for flows by debtor countries could be dwarfed by excess supply from the rest of the world. This could occur, for example, if the supply of capital by international investors — perhaps driven by their search for higher returns — outpaces the capital that EMEs require to cover their financing needs.

In order to account for the possibility of disequilibrium in capital flows to EMEs we follow earlier work by Ashoka Mody and Mark Taylor by estimating an explicit disequilibrium demand and supply model of capital flows, where the quantity transacted is the minimum of either demand or supply. We use the estimated supply and demand determinants to calculate time-varying probabilities of international supply-side rationing. Unlike Mody and Taylor's paper, which estimates the model on four countries individually, we estimate it for the asset class as a whole over the period 1994 to 2004. We then explore applications of the model to a few individual EMEs including Brazil, Chile, China, Colombia, Korea, Mexico, Poland and Thailand using a longer time period than Mody and Taylor (1992 to 2004 instead of 1990 to mid-2000).

For our selection of EMEs taken together, our results suggest that the supply of flows to EMEs is positively related to EME spreads (the difference between borrowing and lending rates — a measure of expected returns), sovereign credit ratings, and estimates of world GDP growth; and negatively related with US high-yield spreads. This is in line with what theory suggests. On the demand side, domestic equity indices have a positive effect on capital flows, while the ratio of reserves over imports and EME spreads (a measure of the cost of capital to borrowers) have a negative one. Again, this is in line with theoretical priors. We find similar results for most countries when using individual country data. Finally, we present the probability of a 'capital crunch' (when the supply of capital is less than demand) for EMEs taken as a whole, and for a specific application to Brazil.

The network topology of CHAPS Sterling

Summary of Working Paper no. 355 Christopher Becher, Stephen Millard and Kimmo Soramäki

One of the core purposes of modern central banks is to contribute to financial stability. This entails assessing risks across the financial system as a whole — systemic risk — that would otherwise undermine the system in general, and seeking to make the system stronger by reducing such risks. Payment systems, which facilitate transactions between individuals, businesses and financial institutions, form a crucial part of the financial system and play a vital role in ensuring the smooth implementation of monetary policy. So, it is important for central banks to understand how shocks in one institution can be propagated across payment systems if they are to seek to reduce the systemic risk in such systems.

One way of trying to do this is to characterise the structure of a payment system — its 'network topology' — using tools recently developed by physicists. Once we understand the structure of the network of banks and the payments they make to/receive from each other, we can assess the stability of this network to particular shocks. In this paper, we seek to understand the network topology of large-value interbank payment flows in the United Kingdom so as to understand better the risks associated with the system.

The UK large-value payment system — the Clearing House Automated Payment System (CHAPS) — consists of only fifteen banks. Banks that are not direct members of the system (so-called 'second-tier' banks) have to make their payments via a correspondent bank that is a member of the system. We first examine the ramifications of this tiered structure, and illustrate the broad network topology of interbank payments in the United Kingdom, using data from the 2003 CHAPS Traffic Survey. We find that, despite the fact that there are far fewer banks in the United Kingdom than in the United States, the structure of UK interbank payments is similar in certain respects to that of Fedwire (the US large-value payment system). But while the two networks are in some respects similar, the tiered structure of the UK system implies rather different risk characteristics.

We then look at the CHAPS system as a network containing only the settlement banks. We find that payment flows in CHAPS form a well-connected network — every bank is connected to every other bank by some set of payment flows — and that its properties change little day to day. A consequence of this network structure is that liquidity is able to flow efficiently around the network. We also find that the network develops only gradually in the early hours of opening. The explanation for this pattern lies in the purposes of payments being made at this time, and in particular the tendency to withhold payments until time-critical payments have been settled. We also saw slight peaks in the number of pairs of banks involved in payments before noon and late afternoon, indicating that the network is particularly busy at these times. This variation indicates that the impact of an operational disruption may vary according to the time of day at which it strikes.

Finally, we examine the effects of a particular incident — where one of the banks was unable to make payments for a large proportion of the day — on the properties of the CHAPS network. The network appears to be highly resilient to this type of shock. In the particular instance of an operational outage examined here, the effective removal of a node for much of the day had little impact on the ability of other banks to make payments between one another. The fact that the network is 'well-connected' will have contributed to this resilience. However, we cannot discount the possibility that operational disruptions at one or more large banks, especially if they are net suppliers of liquidity to the system, would have a more severe impact on the payment network than was evident from this case study.

Measuring monetary policy expectations from financial market instruments

Summary of Working Paper no. 356 Michael Joyce, Jonathan Relleen and Steffen Sorensen

The Bank of England's Monetary Policy Committee (MPC) is interested in financial market participants' expectations of future monetary policy rates for a variety of reasons. Most obviously, the market's interest rate expectations affect the lending and borrowing rates facing firms and consumers and so play an important role in the transmission mechanism of monetary policy to the real economy. Monetary policy makers therefore want to know how their decisions and communications are affecting these expectations. In addition, these expectations may themselves contain useful information about the market's perceptions of current and future economic developments, which policymakers might also want to incorporate into their own view of the outlook.

There are a variety of possible financial market instruments that can be examined for the purpose of measuring the market's policy rate expectations. But none are self-evidently suited for the task, in that none are directly linked to the UK policy rate, Bank Rate. Moreover, different instruments vary in terms of their credit quality (default risk) and liquidity (the extent to which there is an active market for the particular instrument), which may be reflected in their associated interest rates, driving them away from genuine Bank Rate expectations. In addition, interest rates, particularly those relating to more distant future periods, may also reflect term premia (the compensation investors require for the risk of future interest rate changes), which will complicate their relationship with policy rate expectations.

Market expectations cannot, of course, be directly observed, making it difficult to assess which financial market instruments measure them best. In order to evaluate different financial market instruments, the paper makes the underlying assumption that more reliance should be placed on those instruments that have more accurately predicted Bank Rate in the past since, other things being equal, instruments that have predicted relatively well are less likely to have been affected by other factors.

The first part of the paper attempts to evaluate the interest rates derived from various financial instruments in terms of their ability to forecast UK policy rates over the period from October 1992 to March 2007. The sample therefore covers a period during which the United Kingdom followed an explicit inflation target, but excludes the period of turbulence in international money and credit markets that began in Summer 2007.

The main finding is that interest rates derived from instruments or yield curves that are less likely to embody material credit or liquidity risk premia have done better in forecasting Bank Rate. But beyond this finding, it proves difficult to discriminate. This may not be that surprising if financial markets work efficiently, so that expectations are consistently reflected in different instruments. We do, however, find some evidence that is consistent with term premia being important at horizons of a year and beyond, which potentially obscures the information in market interest rates about future policy rate expectations.

The paper then examines several ways of estimating term premia, in order to calculate term premia-adjusted market interest rates. One method of doing this suggested by other work is to regress the difference between Bank Rate outturns and implied interest rates onto macroeconomic and financial information. Under certain conditions, the fitted values from these sorts of regression provide a measure of term premia. We construct such measures but in general find them to be sensitive to the precise specification, forward horizon and sample period being examined. We also compare these regression-based term premia estimates with other common ways of measuring term premia using survey expectations and interest rate models. Different approaches are sometimes found to provide quite different term premia estimates.

Finally, we examine how important it is to adjust for term premia in inferring interest rate expectations from market rates. When we compare various methods of forecasting Bank Rate out of sample (that is, using no information that would not have been available to forecasters in real time), we find no consistent pattern. Sometimes, using a regression-based method to adjust market rates for term premia produces Bank Rate forecasts inferior to those generated by unadjusted market interest rates, or by simply assuming that Bank Rate will remain constant.

The main message of this paper is that it does not seem prudent to rely on any one particular method for measuring monetary policy rate expectations from financial market instruments. The best approach seems to be to take an inclusive approach, using a variety of methods and information. This provides some support for the convention of conditioning the Bank of England *Inflation Report* forecast projections on a profile of market interest rates that has not been explicitly adjusted for term premia. But this remains an active area of research at the Bank and elsewhere and it is conceivable that further research may change this conclusion.

Report

Monetary Policy Roundtable

Introduction

On 30 September, the Bank of England and the Centre for Economic Policy Research jointly hosted a Monetary Policy Roundtable. This was the first in what is expected to become a regular series intended to provide a forum for economists to discuss key issues affecting the design and operation of monetary policy in the United Kingdom. Participants included a range of economists from private sector financial institutions, academia and public sector bodies. There were four discussion topics:

- the prospects for the housing market and consumer spending;
- oil and other global price pressures;
- monetary policy considerations at the current juncture; and
- lessons from the financial turmoil for monetary policy.

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

The prospects for the housing market and consumer spending

House prices had fallen sharply in recent months, but further declines were likely. The relative importance of restrictions in credit supply and falling demand in driving the housing market slowdown was discussed. Gross mortgage lending had slowed less sharply than net lending, suggesting that remortgaging activity had been more resilient. If restricted credit supply was the main driver, then all forms of lending might be expected to fall in a similar way. So weak demand could also be playing a role. Prospects of further price falls might lead buyers to put in very low offers. If sellers were not yet willing to accept such a drop in price, transactions would fall sharply and observed house prices would adjust sluggishly. Some estimates suggested an overall fall in house prices of 20%–30% was plausible.

On average, mortgage interest rates on the outstanding stock of mortgages had not changed much over the past year or so. For new mortgages, rising spreads had been partly offset by the decline in Bank Rate, but there was significant differentiation between different types of borrowers. Most of the key drivers in empirical models of house prices were now pointing to further falls; real income growth was weak, credit conditions were tightening and unemployment was increasing (although supply constraints for new homes remained an upside factor for house prices). Rising loan to value ratios could delay any recovery in the housing market if buyers had to save more for their deposit.

A range of channels were identified through which falling house prices might affect aggregate demand. Lower house prices would lead to a slowdown in house building and less housing collateral available for households to borrow against, potentially reducing consumption. Lower housing market activity might also lead to fewer purchases of key household items which were often bought when people moved house. In addition, falling house prices might feed back into tighter credit conditions if banks saw collateral values fall or experienced losses through defaults. A further possible channel was if increases in house prices constituted a 'bubble'. In this case, it was argued that changes in house prices might lead to conventional wealth effects.

Changes in house prices caused some households to gain and others to lose. Those 'long' of housing (households who planned to sell or trade down) would be worse off, while those 'short' of housing (households who were yet to buy or planned to trade up) would be better off. Whether or not these effects netted out in the short run depended on the different marginal propensities to spend out of wealth of the two groups.

Identifying the importance of the various channels through which house prices might affect consumption was difficult. The often strong correlation between house prices and consumption could reflect both variables responding to a common factor, such as income expectations. Nevertheless, incorporating house prices in consumption equations did seem to improve forecasting performance.

Oil and other global price pressures

Rapid increases in commodity prices have been associated with the pickup in inflation over the past year in the

United Kingdom and elsewhere. The discussion in this session focused on the factors behind these commodity price developments, the outlook for commodity prices, their macroeconomic impact, and the response of monetary policy.

The two key factors contributing to increasing commodity prices since 2003 were the rapid growth in the demand for commodities from fast-growing developing countries and the relatively inelastic supply response, especially in the oil market. The muted oil supply response reflected a number of factors. In non-OPEC countries, production yields had been declining in mature oil fields, the marginal cost of extraction in many new fields was relatively high, and there were significant barriers to entry in a number of countries. As a result, the increase in oil production in non-OPEC countries had not kept pace with the increase in global oil demand, leaving OPEC to fill the gap. OPEC had also not increased oil production significantly in response to the pickup in oil demand. In part, this reflected a low margin of spare capacity due to underinvestment in exploration and development since the mid-1980s. And in part, it reflected a change in pricing behaviour by OPEC countries.

Views differed as to the eventual level at which oil prices might settle. The sharp increase in volatility of long-dated oil futures prices was highlighted as evidence of increased uncertainty among market participants about medium-term prospects for the oil market. Much depended on the outlook for global growth — especially growth in emerging markets, but also in the United States, which continued to be the largest energy consumer in the world — and on the long-run price elasticity of demand for commodities. It was noted that US demand for oil had been falling but that demand from emerging market economies remained strong.

In the United Kingdom, rising energy and food prices have pushed up CPI inflation, which had led to a squeeze in real incomes and a slowdown in consumer spending. In the view of some participants, the impact of higher consumer prices had up to now been a more important factor in explaining the economic slowdown in the United Kingdom than the impact of tighter credit conditions. Higher energy prices can put pressure on growth through affecting potential supply, especially in developing countries that specialise in the production of energy-intensive goods.

In principle, increases in relative prices should wash out of the headline measure of inflation after a while. But there was a risk that persistently higher headline inflation could dislodge inflation expectations away from target, leading to a wage-price spiral. Some participants noted that there was not much evidence of such a spiral having occurred so far in the United Kingdom.

Monetary policy considerations at the current juncture

Discussion in this session centred on: just how difficult the current economic situation was and whether this necessitated a change to the MPC's remit; whether the MPC should adopt 'core' inflation as an intermediate target; and what information could be gleaned from macroeconomic models at the current juncture.

Much of the discussion on the current state of the economy was rather gloomy. A number of speakers argued that the United Kingdom was in the midst of an unprecedented combination of adverse external demand and supply shocks, with the result that the economy was probably already in recession. At the same time, however, CPI inflation was well above the 2% target. Several speakers thought that the rapid deterioration in financial market conditions might well lead to a sharper downturn and in due course an undershoot of the inflation target. These speakers recommended an early (and possibly large) cut in interest rates.

Discussion of whether or not there should be any change to the MPC's remit focused largely on the advantages and disadvantages of adopting 'core' inflation as an intermediate target and performance indicator. There was a general consensus that it would not be sensible to alter the remit to put more emphasis on growth, as in the US Federal Reserve's 'dual mandate'. There were two arguments put forward for adopting 'core' inflation as an intermediate target variable. First, headline inflation was subject to shocks that were not readily controllable with Bank Rate, such as movements in oil prices. Second, the current remit was vague about the speed with which headline inflation should be brought back to target. This reduced the effectiveness of the framework in anchoring inflation expectations and made it harder to hold the MPC to account for its actions. With 'core' inflation as an intermediate target, it was argued that: the MPC would gain greater clarity; their performance could be measured more easily since changes in Bank Rate more directly influence 'core' inflation; and they would still ultimately achieve the inflation target since 'core' and actual inflation rates moved together in the long run. However, for a number of reasons, other speakers were less supportive. First, households and businesses care about actual, not 'core', inflation — if actual inflation diverged from 'core' inflation for an appreciable length of time, as had been the case recently, the credibility of the monetary policy framework would be strained. Second, the MPC's inflation projections played a similar role to that suggested for 'core' inflation. And third, the current framework had worked well; it was not obvious that this proposal would have affected the MPC's decisions and any change risked damaging the credibility of the framework.

Finally, there was a discussion about the weight one should attach to model estimates of the likely size of the economic downturn given that most models do not explicitly incorporate credit intermediation channels. Opinion here was divided. Some speakers noted that general equilibrium models that did attempt to capture credit market effects pointed to the likelihood of significant depressing effects on growth. But other speakers argued that such models did not fit the data well enough to be usable for policy analysis.

Lessons from the financial turmoil for monetary policy

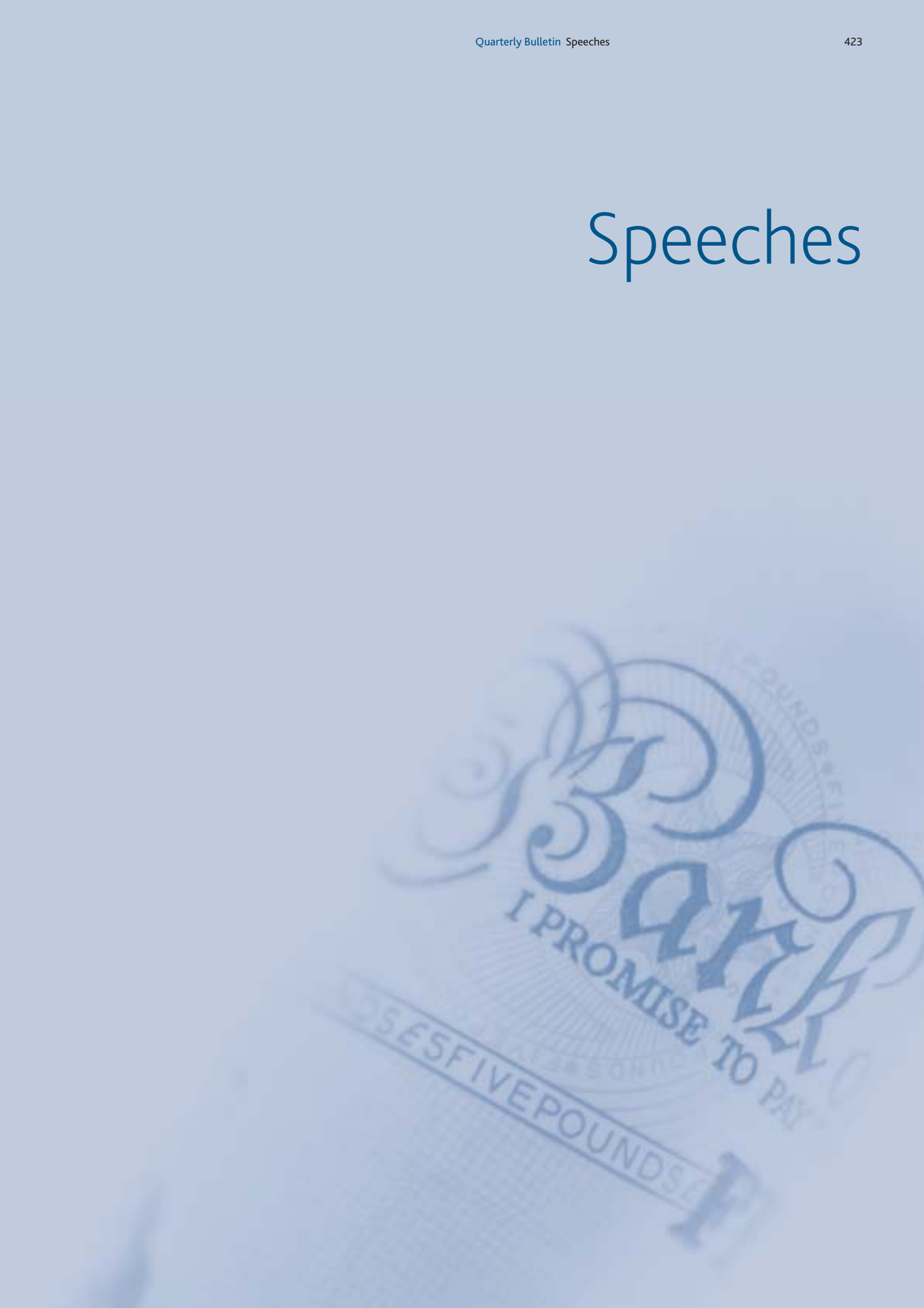
Much of the discussion in this session centred on how monetary policy should react to what some saw as the procyclicality of liberalised financial systems. Some speakers argued that the current financial turmoil was a product of developments during the 'Great Moderation' period that preceded it. In particular, excessively low policy interest rates, especially in the United States, and inadequate macroprudential regulation had contributed to: rapid growth in money and credit, falling credit standards, elevated asset prices, low rates of saving and increased global imbalances. If monetary and regulatory policies had leaned against these trends, it would have reduced the extent of the current financial turmoil. This was contrasted with the view, associated by some participants with the US Federal Reserve, that monetary policy should not try to lean against asset price booms, but should instead be prepared to clean up the fall-out from any subsequent unwinding.

Some speakers noted that leaning against asset price booms was entirely consistent with an inflation-targeting framework, as the 'bust' phase would be associated with significant downward pressure on inflation. But it was not clear that monetary policy was the most appropriate instrument for dealing with asset price booms, especially as modest increases in interest rates would do little to restrain an asset price boom and it was not straightforward to identify unsustainable increases in asset prices. A number of speakers suggested that macroprudential regulation was better suited to leaning against asset price booms, including maximum leverage ratios for lenders and loan to value ratios for borrowers. In addition, it was also suggested that regulatory policy should pay attention to the perverse risk-taking incentives that were inherent in some tax and remuneration schemes.

A few speakers felt central banks should more clearly separate their monetary policy operations from their liquidity support operations. It was also suggested that the Swiss National Bank's approach of targeting three-month market interest rates, rather than overnight rates, might usefully be reviewed by other central banks. Among the other lessons were the need for better co-operation between central banks, and between central banks and regulators.

As in the preceding session, there was discussion of whether existing economic models used by central banks were adequate for the analysis of monetary policy in the face of a financial shock. There were calls for macroeconomic models to be developed so as to capture better the role of financial intermediaries in the monetary transmission mechanism.

Speeches



Bank of England speeches

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

The structure of regulation: lessons from the crisis of 2007[1]

Paul Tucker, Executive Director for Markets and Monetary Policy Committee member, November 2008.

www.bankofengland.co.uk/publications/speeches/2008/speech369.pdf

In this paper, contributing to a London School of Economics debate in the spring, Paul Tucker discussed five issues relating to lessons learned from the financial crisis thus far. These included: (1) the 'collective action' problem, whereby bankers and others have an incentive to herd together in an upswing; (2) how central bank collateral policies can be affected by a 'time-consistency' problem, and how important it is to protect liquidity insurance facilities from stigma; (3) the importance of clarifying the objectives of different central bank operations, and ensuring that market participants/commentators understand the difference between them; (4) the need for a debate on how the authorities can in future tame the credit cycle; and (5) the macroeconomic backdrop and the preconditions for financial system stabilisation. A connecting theme between these issues is that regimes matter, for the way they affect the behaviour of the financial system (and the authorities).

(1) These comments were given at the LSE's Financial Markets Group Conference on 3 March 2008. The paper is also available in the *Journal of Financial Stability* (2008), Vol. 4, Issue 4, pages 359–63.

Some lessons for monetary policy from the recent financial turmoil

Charles Bean, Deputy Governor, November 2008.

www.bankofengland.co.uk/publications/speeches/2008/speech368.pdf

In a speech delivered to a conference on Globalisation, Monetary Policy and Inflation in Istanbul on 21 November, Charles Bean explained that while there have been a number of microeconomic misalignments in the financial system that caused the financial crisis, the preconditions were created by macroeconomic policies. Large and unsustainable global imbalances grew out of individually rational but collectively inconsistent policies. Reform of the international financial architecture is necessary to prevent these building up again, in particular the IMF should be more focused on the interaction of policy choices and ought to have the authority to prevent the adoption of frameworks which lead to unsustainable capital flows. Mr Bean also discussed the role of monetary policy during asset price booms and busts. The current framework is flexible enough to deal with this. But leaning against the wind is a difficult policy to implement. It is far better to use countercyclical capital requirements. The recent recapitalisation of banks was intended to build up a buffer of excess capital which can be run down as losses rise.

Learning from the financial crisis

Sir John Gieve, Deputy Governor, November 2008.

www.bankofengland.co.uk/publications/speeches/2008/speech367.pdf

In this speech, John Gieve highlighted the fact that the crisis is a truly global event because its roots lie in unbalanced global growth and its consequence is a severe downturn worldwide. The crisis has changed in nature over fifteen months so the policy response has had to evolve too, in terms of monetary policy, emergency liquidity measures, bank recapitalisation, and lending guarantees. He then outlined lessons from the crisis which policymakers should draw for the medium term. These include closer international co-ordination of monetary policy, better ground rules for cross-border financial crises, and the development of macroprudential tools, aimed at dampening the financial cycle. He described three possible macroprudential tools: dynamic provisioning, where banks build up provisions which can be drawn upon in a downturn; growth-related capital requirements; and tougher liquidity standards that will discourage banks from using less stable sources of funding to grow rapidly.

Concluding remarks on the Royal Economic Society Public Lecture 2008

Timothy Besley, Monetary Policy Committee member, November 2008.

www.bankofengland.co.uk/publications/speeches/2008/speech366.pdf

In a speech at the Royal Institution, London, Professor Timothy Besley discussed the challenges that the Monetary Policy Committee (MPC) face and the institutional setting for monetary policy in the United Kingdom. He noted that institutional change is a slow process and it is impossible to appreciate fully how institutions will work until they have been tested under all conditions. The current monetary policy arrangements were fashioned in response to previous periods of economic turmoil and the challenges that these posed to economic management. The strength of the current framework remains the fact that the MPC makes independent monthly decisions based on economic judgements in light of the data and economic analysis to achieve a clearly defined target. Professor Besley argued that

this remains the best hope to make monetary policy work now and in the future.

Where next for the UK economy?

David Blanchflower, Monetary Policy Committee member, October 2008.

www.bankofengland.co.uk/publications/speeches/2008/speech365.pdf

In this speech, Professor David Blanchflower explained that CPI inflation was likely to decline sharply in the near term. Oil and commodity prices had fallen, wage growth remained muted and measures of inflation expectations had turned down. Hence, the risks of a wage-price inflation spiral had now past. In contrast, the deterioration in financial market conditions was clearly having an adverse effect on the broader UK economy. Output had contracted in the third quarter and unemployment had increased at the fastest pace in 17 years. Furthermore, credit availability was likely to be tightened further in the final quarter of the year. The United Kingdom was likely to enter recession and the widening margin of spare capacity, together with dissipating inflationary pressure implied that monetary policy could be loosened to help stabilise the economy.

Some current issues in UK monetary policy

Timothy Besley, Monetary Policy Committee member, October 2008.

www.bankofengland.co.uk/publications/speeches/2008/speech364.pdf

In a speech at the UBS Conference Centre, London, Professor Timothy Besley discussed some current issues in the UK economy. He noted that since last summer, the sharp fall in commodity prices and the consequently more benign prospects for food and services inflation, as well as the substantial weakening in demand, implied that the upside risks to inflation had diminished significantly. A cut in Bank Rate, on its own, would not be a magic bullet. No single instrument could work to achieve all goals. Monetary policy should remain focused on achieving the 2% inflation target in the medium term. Monetary policy could play a role in conjunction with other policy responses to meet the current challenges. Professor Besley discussed the extent to which the conventional channels for the effectiveness of cuts in Bank Rate on to the real economy were impaired.

Rebuilding confidence in the financial system

Sir John Gieve, Deputy Governor, October 2008.

www.bankofengland.co.uk/publications/speeches/2008/speech363.pdf

In this speech, John Gieve set out a blueprint for the reforms that would have to be put in place to restore confidence in the financial system. He began by detailing the case for the co-ordinated policy intervention. Structural vulnerabilities in the banking system had become apparent: access to cheap funds in wholesale markets had enabled a spectacular expansion of banks balance sheets, leaving banks with insufficient capital and liquidity buffers. The package of recapitalisation, guaranteed funding and enhanced liquidity had been necessary to demonstrate that banks were capable of surviving the downturn. Looking ahead, John Gieve outlined three key lessons that needed to be learned by policymakers around the globe. First, macroprudential policies, perhaps along the lines of the Spanish system of 'dynamic provisioning', need to be developed. Second, a more effective regime for managing failing banks needs to be introduced. Third, cross-border crisis management has to be improved.

The Governor's speech to the CBI, Institute of Directors, Leeds Chamber of Commerce and Yorkshire Forward at the Royal Armouries, Leeds

Mervyn King, Governor, October 2008.

www.bankofengland.co.uk/publications/speeches/2008/speech362.pdf

In this speech, the Governor explained how the industrialised world had been engulfed by financial turmoil and why the radical action taken by the UK authorities to recapitalise the banking system had been needed to ensure its survival. He noted that the scale of central bank liquidity support had been unprecedented but was not, and never could be, the solution to the banking crisis which reflected deeper structural problems in the banking sector. Risks built up during benign times, from securitised mortgage lending, particularly US sub-prime mortgages, from banks' own mortgage exposures and from their funding through short-term wholesale borrowing had been exposed by rising defaults and falling house prices, with the effects amplified by very high levels of borrowing relative to capital. The value of banks' assets had fallen with liabilities unchanged. And as uncertainty about the value of banks' assets had risen, markets had sent a clear message to banks around the world that they did not have enough capital. As that view spread, confidence in the system had been eroded. The recapitalisation plan was having a major impact in the restoration of market confidence in banks. But it would take time before the recapitalisation led to a resumption of more normal levels of lending and there might still be problems in other parts of the financial system and the emerging market economies. Attention had moved to the outlook for the UK and world economies, which had deteriorated quickly. It seemed likely that the UK economy was entering a recession. There were implications for fiscal policy, as well as monetary policy, from the crisis, though it should be possible for the Government to reduce its stake in the banking system, for example by selling units in a Bank Reconstruction Fund, and repay the additional debt issued.

But a fall in capital inflows to the United Kingdom would, unless replaced by other forms of external finance, lead to adjustments in the trade deficit and exchange rate that would be larger and faster in the short term than otherwise, implying weaker domestic spending in the short run.

Prospects for the UK economy and challenges for monetary policy

Andrew Sentance, Monetary Policy Committee member, October 2008.

www.bankofengland.co.uk/publications/speeches/2008/speech361.pdf

In this speech, Andrew Sentance explained how monetary policy had moved into a new phase following the collapse of Lehman Brothers and the ensuing financial turmoil. The significance of this development had been aggravated and reinforced by an accumulation of downbeat news about the health of the real economy. Domestic demand had been hit over the summer by rising food and energy prices and the uncertainty created by the 'credit crunch'. But there was also now evidence that firms' export order books had softened and their stock levels had increased. This, Dr Sentance argued, pointed to increased risks of a bigger and more sustained downturn. He then went on to highlight that two key signals of inflationary pressure — rising wage and money spending growth — that preceded earlier recessions in the 1970s, 1980s and 1990s were absent today. Consequently, faced with much weaker demand prospects, monetary policy was in a better position than in earlier recessions to help stabilise the economic situation.

Global influences on UK interest rates

Kate Barker, Monetary Policy Committee member, September 2008.

www.bankofengland.co.uk/publications/speeches/2008/speech360.pdf

In this speech, Kate Barker discussed how global influences (both the impact on UK credit supply of a financial crisis, and the rise in commodity prices) were dominating the UK outlook. These turbulent economic times were also leading to criticisms of the UK monetary framework. One criticism was whether a 2% target would remain valid in a period of high commodity price inflation. But Kate Barker argued that commodity price inflation was unlikely to remain high permanently. And while imported inflation might be a little stronger in the future than during the period when the share of UK imports from low-cost producers was rising, this was unlikely to prevent the achievement of the present inflation target. Another criticism was whether CPI, rather than some measure of core inflation, would still be the right target if commodity price inflation became more volatile. In practice there is not so much difference between the two approaches. The MPC takes less account of the first-round effects on CPI, but is concerned about the risk of high (or low) commodity price inflation becoming embedded in domestic inflation, due to a change in inflation expectations. A core inflation targeter would also have to be concerned about this risk. Finally, in commenting on the immediate economic outlook, the uncertain nature of credit conditions was identified as a major problem, and it was acknowledged that there were unusually large risks to the economy, and therefore to credibility, from policy mistakes in either direction.

Monetary policy: sticking to the basics

Andrew Sentance, Monetary Policy Committee member, September 2008.

www.bankofengland.co.uk/publications/speeches/2008/speech359.pdf

In this speech, Andrew Sentance discussed how the twin shocks of rising energy and food prices and financial market turbulence were affecting the outlook for the UK economy and the MPC's task of keeping the economy on a low inflation course. He noted that sticking to the basic fundamentals which have underpinned the successful operation of monetary policy in the United Kingdom over the past eleven years would give the best chance of navigating the economy through a difficult period. Four key elements of policy were highlighted: keeping a focus on the objective of price stability; continuing the MPC's tradition of independence, openness and accountability; basing decisions on an understanding of how the real economy of business and households operates; and maintaining a forward-looking perspective. He emphasised that prospects for the UK economy were different to past recessions, but risks were finely balanced. Recent financial market turbulence highlighted the possibility of further shocks and the MPC remained prepared to respond to these.

The credit crunch and the UK economy

Sir John Gieve, Deputy Governor, September 2008.

www.bankofengland.co.uk/publications/speeches/2008/speech358.pdf

In this speech, John Gieve discussed how the credit crunch was affecting the wider UK economy. He noted that like other central banks, the Bank of England had adapted its money market operations to provide the liquidity the banking system as a whole should require. First, the Bank of England had allowed banks to increase their reserve balances held at the Bank, increasing the size of overall provision of central bank money. Second, within that larger total, the Bank had shifted the balance towards longer-term lending as the terms of market finance had shortened. Third, the Bank had widened the collateral accepted for longer-term repos. And in April, the Bank had introduced a special scheme to provide banks with up to three years' finance for legacy assets which had become

illiquid. He explained why the risk of inflation expectations drifting upwards had been such a central concern of the MPC over the past year. He highlighted the importance of not underestimating the deflationary consequences of the credit crisis and that the news on that front remained worrying. He noted that although the Bank would continue to work for the return of calmer financial markets, this work should not be relied upon to deliver a quick reversal of the macroeconomic slowdown. On the contrary, the risk at the moment was that the slowdown in the real economy could be amplified through a contraction in banks' balance sheets. He concluded by noting the need for longer-term measures to prevent such financial imbalances from building up again in the next upswing and commended the countercyclical 'dynamic provisioning' approach to capital that has been developed in Spain.

All along the watchtower

Spencer Dale, Executive Director and Chief Economist, September 2008.

www.bankofengland.co.uk/publications/speeches/2008/speech357.pdf

In this speech, Spencer Dale described the two key uncertainties that were affecting the economic landscape. First, he considered the risk that deteriorating housing market conditions were posing to the outlook for consumer spending. He noted that the deterioration in the housing market was likely to amplify the impact of tighter credit conditions on consumer spending. Second, he emphasised the risk that the period of elevated inflation could lead to an increase in generalised wage and price pressures. Near-term expectations for inflation had increased. And there was conflicting evidence on the likely persistence of the rise in inflation expectations. Overall, the risks were finely balanced. As the economic environment changed, however, so too could the balance of risks.

Money and credit, twelve months on

Paul Tucker, Executive Director for Markets and Monetary Policy Committee member, September 2008.

www.bankofengland.co.uk/publications/speeches/2008/speech356.pdf

In this wide-ranging speech on the connections between the macroeconomy and finance, Paul Tucker set out what the current conjuncture suggested, from the policymaker's perspective, should feature in the research agenda of monetary economics. First, it was difficult to calibrate monetary conditions, currently, given that both credit market and cost shocks had affected any estimates of the 'equilibrium' interest rate. Greater interest in monetary and credit quantities, and indeed more generally in nominal quantities, would be needed, especially in a world in which quantity rationing had become more prevalent. Second, the cost and credit shocks had developed in tandem with global imbalances. More insight would be needed to identify how 'deficit' countries could in future shield themselves without succumbing to 'beggar thy neighbour' policies. Finally, the crisis had shown that further progress in integrating macroeconomics and finance, both on the theoretical and applied fronts, would be important. Most notably, thus far, the literature had given little indication on how to interpret risk premia from a macroeconomic and macroprudential perspective. And models which explored the macroeconomic effects of the crystallisation of nasty risks (such as default) were still in their infancy.

Appendices

Contents of recent Quarterly Bulletins

The articles and speeches that have been published recently in the *Quarterly Bulletin* are listed below. Articles from November 1998 onwards are available on the Bank's website at:

www.bankofengland/publications/quarterlybulletin/index.htm.

Articles and speeches

Speeches are indicated by (S)

Spring 2006

- New information from inflation swaps and index-linked bonds
- The distribution of assets, income and liabilities across UK households: results from the 2005 NMG Research survey
- Understanding the term structure of swap spreads
- The information content of aggregate data on financial futures positions
- The forward market for oil
- The Governor's speech in Ashford, Kent (S)
- Reform of the International Monetary Fund (S)
- Global financial imbalances (S)
- Monetary policy, demand and inflation (S)
- Has oil lost the capacity to shock? (S)

Summer 2006

- House prices and consumer spending
- Investing in inventories
- Cost-benefit analysis of monetary and financial statistics
- Public attitudes to inflation
- The Centre for Central Banking Studies
- A review of the work of the London Foreign Exchange Joint Standing Committee in 2005
- Uncertainty, the implementation of monetary policy, and the management of risk (S)
- Reflections on operating inflation targeting (S)
- Cost pressures and the UK inflation outlook (S)
- The UK current account deficit and all that (S)
- A shift in the balance of risks (S)
- What do we now know about currency unions? (S)

2006 Q3

- The UK international investment position
- Costs of sovereign default
- UK export performance by industry
- The Governor's speech in Edinburgh, Scotland (S)
- The Governor's speech at the Mansion House (S)
- Stability and change (S)
- Financial system risks in the United Kingdom (S)

2006 Q4

- The economic characteristics of immigrants and their impact on supply
- Recent developments in sterling inflation-linked markets
- The state of British household finances: results from the 2006 NMG Research survey
- Measuring market sector activity in the United Kingdom
- The Governor's speech at the Great Hall, Winchester (S)
- Trusting in money: from Kirkcaldy to the MPC (S)
- The Governor's speech to the Black Country business awards dinner (S)
- International monetary stability — can the IMF make a difference? (S)
- The puzzle of UK business investment (S)
- Hedge funds and financial stability (S)
- Practical issues in preparing for cross-border financial crises (S)
- Reflections on my first four votes on the MPC (S)
- Prudential regulation, risk management and systemic stability (S)
- Globalisation and inflation (S)

2007 Q1

- The Monetary Policy Committee of the Bank of England: ten years on
- The macroeconomic impact of globalisation: theory and evidence
- The macroeconomic impact of international migration
- Potential employment in the UK economy
- The role of household debt and balance sheets in the monetary transmission mechanism
- Gauging capacity pressures within businesses
- Through the looking glass: reform of the international institutions (S)
- The Governor's speech to the Birmingham Chamber of Commerce Annual Banquet (S)
- Perspectives on current monetary policy (S)
- The MPC comes of age (S)
- Pricing for perfection (S)
- Risks to the commercial property market and financial stability (S)
- Macro, asset price, and financial system uncertainties (S)
- The impact of the recent migration from Eastern Europe on the UK economy (S)
- Inflation and the supply side of the UK economy (S)
- Inflation and the service sector (S)
- Recent developments in the UK labour market (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

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. 343 Efficient frameworks for sovereign borrowing (March 2008)
Gregor Irwin and Gregory Thwaites

No. 344 International monetary co-operation in a world of imperfect information (March 2008)
Kang Yong Tan and Misa Tanaka

No. 345 Summary statistics of option-implied probability density functions and their properties (March 2008)
Damien Lynch and Nikolaos Panigirtzoglou

No. 346 Network models and financial stability (April 2008)
Erlend Nier, Jing Yang, Tanju Yorulmazer and Amadeo Alentorn

No. 347 Non-linear adjustment of import prices in the European Union (April 2008)
José Manuel Campa, José M González Mínguez and María Sebastiá Barriel

No. 348 The elasticity of substitution: evidence from a UK firm-level data set (April 2008)
Sebastian Barnes, Simon Price and María Sebastiá Barriel

No. 349 Dealing with country diversity: challenges for the IMF credit union model (May 2008)
Gregor Irwin, Adrian Penalver, Chris Salmon and Ashley Taylor

No. 350 Investigating the structural stability of the Phillips curve relationship (May 2008)
Jan J J Groen and Haroon Mumtaz

No. 351 The cyclicality of mark-ups and profit margins for the United Kingdom: some new evidence (August 2008)
Clare Macallan, Stephen Millard and Miles Parker

No. 352 An agent-based model of payment systems (August 2008)
Marco Galbiati and Kimmo Soramäki

No. 353 The conduct of global monetary policy and domestic stability (August 2008)
Andrew P Blake and Bojan Markovic

No. 354 Estimating the determinants of capital flows to emerging market economies: a maximum likelihood disequilibrium approach (November 2008)
Guillermo Felices and Bjorn-Erik Orskaug

No. 355 The network topology of CHAPS Sterling (November 2008)
Christopher Becher, Stephen Millard and Kimmo Soramäki

No. 356 Measuring monetary policy expectations from financial market instruments (November 2008)
Michael Joyce, Jonathan Relleen and Steffen Sorensen

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. 24 The causal relationship between inflation and inflation expectations in the United Kingdom (July 2008)
Roger Kelly

No. 25 Household external finance and consumption (October 2008)
Timothy Besley, Neil Meads and Paolo Surico

No. 26 Monetary policies and low-frequency manifestations of the quantity theory (December 2008)
Thomas J Sargent and Paolo Surico

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/ms/current/index.htm.

Following user consultation, printed editions of *Bankstats*, which were previously published twice a year in January and July, have been discontinued since July 2006.

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 in April and October. 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 series also includes lecture and research publications, which are aimed at the more specialist reader. 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 (MPC) 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/redbookjan08.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.

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.

Summary pages of the *Bulletin* from February 1994, giving a brief description of each of the articles, are available on the Bank's website at:

www.bankofengland.co.uk/publications/quarterlybulletin/index.htm.

Individual articles from May 1994 are also available at the same address.

Bound volumes of the *Quarterly Bulletin* (in reprint form for the period 1960–2004) can be obtained from Schmidt Periodicals GmbH, Ortsteil Dettendorf, D-83075 Bad Feilnbach, Germany, at a price of €4,100 per complete set.

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 over the following two years. 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 2009 are as follows:

Quarterly Bulletin

Q1	16 March
Q2	15 June
Q3	21 September
Q4	14 December

Inflation Report

February	11 February
May	13 May
August	12 August
November	11 November

Financial Stability Report

April
October

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	2009					
	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.

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