

Markets and operations

This article reviews developments in sterling financial markets since the 2007 Q4 *Quarterly Bulletin* up to the end of February 2008. The article also reviews the Bank's official operations during this period.

Sterling financial markets⁽¹⁾

Overview

There were some signs of improvement in sterling money markets in December and early January, including a more orderly year-end period than many market participants had feared. But during February, conditions deteriorated again. While banks were reportedly able to raise very short-term funds — up to around one month — longer-maturity funding markets remained impaired.

Information from market prices and comments by market participants suggested that difficult conditions in bank term funding markets would continue for some time, which would be likely to lead to a reduction in the supply of credit to the economy generally. This could act as a drag on economic activity, and in turn could prompt further deterioration in the quality of banks' assets and limit their ability and willingness to lend. Perhaps consistent with perceptions of possible adverse feedback effects between banks' balance sheets and the macroeconomy, UK equity markets fell quite sharply in January (and became more volatile).

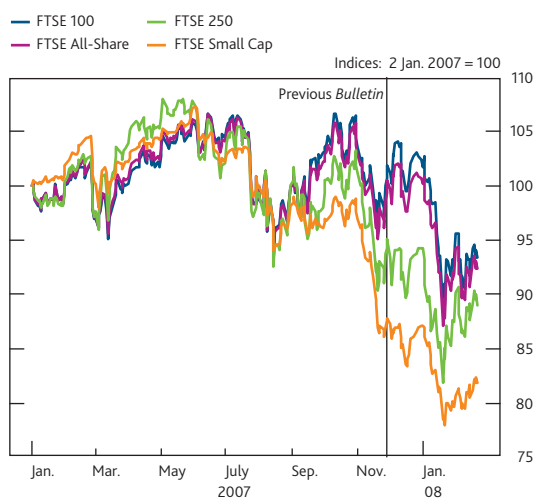
Against that background, uncertainty about the future path of short-term interest rates increased. Expectations for the future path of Bank Rate fell further.

Recent developments in sterling capital markets Equities

Through most of the second half of 2007, the ongoing stress in financial markets had been largely concentrated in credit and bank funding markets. However, in recent months, UK equity markets weakened quite sharply, in line with a global fall in equity prices. This continued the falls of November reported in the previous *Bulletin*. The share price declines were experienced by smaller and larger firms alike, suggesting a common influence (**Chart 1**).

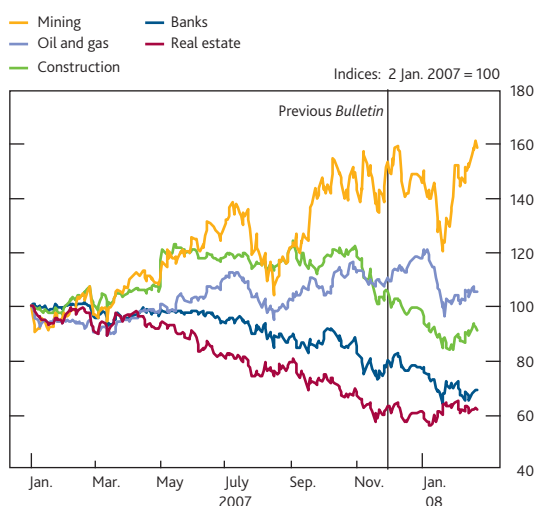
The share prices of banks and construction companies experienced particularly marked falls since the previous *Bulletin* (**Chart 2**). Contacts suggested that banks' share prices

Chart 1 Changes in UK equity indices since 2 January 2007



Sources: Bloomberg and Bank calculations.

Chart 2 Selected sectoral UK equity indices^(a)



Sources: Bloomberg and Bank calculations.

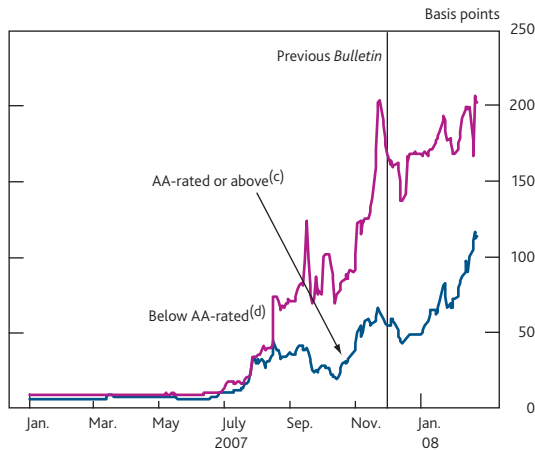
(a) Selected sectoral components of FTSE All-Share index.

fell sharply as worries about their profits and capital adequacy intensified on the back of further write-downs on structured

(1) This article focuses on sterling capital market developments. The data cut-off for this section is 22 February.

credit investments, and the ongoing process of bringing assets back onto their balance sheets. These concerns were also reflected in higher premia on credit default swaps (CDS), referencing UK banks (**Chart 3**).

Chart 3 Spreads on five-year credit default swaps referencing UK banks^{(a)(b)}



Sources: Fitch Ratings, Markit, Thomson Datastream, UK banks' published accounts and Bank calculations.

- (a) Asset-weighted average five-year premia using latest published asset values (typically 2007 Q4).
 (b) Using Fitch Ratings long-term issuer ratings.
 (c) Banco Santander, Barclays, HBOS, HSBC, Lloyds TSB and RBS.
 (d) Alliance & Leicester, Bradford & Bingley, Nationwide and Northern Rock.

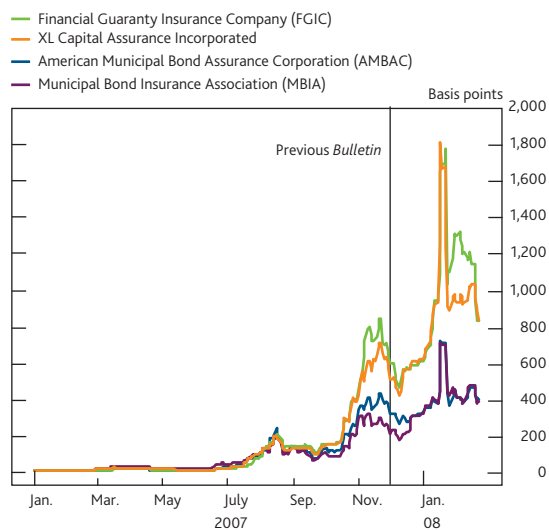
A number of financial institutions reported details of their write-downs associated with exposures to US sub-prime mortgage-backed securities. By late February, in aggregate, the major UK banks had reported write-downs of around \$17 billion, part of global estimated write-downs by financial institutions of around \$110 billion. Contacts also reported signs that the credit problems in US mortgage markets may have spread beyond sub-prime assets to include securities related to prime residential and commercial real estate mortgages. But considerable uncertainty remained about the ultimate scale and location of the losses across the global financial system, not least because of further increases in delinquency rates on the underlying mortgages in the United States.

A particular source of uncertainty was banks' exposures — both direct and indirect — to financial guarantors, and the potential losses associated with further credit rating downgrades to these institutions. Banks have various contractual exposures to financial guarantors (also known as monoline insurers). These include direct exposures via credit derivative contracts where financial guarantors guaranteed payments on structured finance securities held by banks; and indirect exposures arising from banks' investment in municipal bonds and asset-backed securities that include a credit enhancement provided by the guarantors (sometimes called monoline 'wraps').

Continuing a theme discussed in the previous *Bulletin*, worries persisted about the adequacy of some of the major financial

guarantors' capital cushions in light of further downgrades to the underlying securities they insured and resulting marked-to-market losses. As a result, spreads on their CDS remained elevated (**Chart 4**), although they have narrowed sharply since early January, reflecting some successful efforts to raise capital; reports of a possible restructuring of some firms in the industry; and ratings affirmations of some of the largest guarantors.

Chart 4 Spreads on five-year credit default swaps of financial guarantors^(a)



Source: Markit.

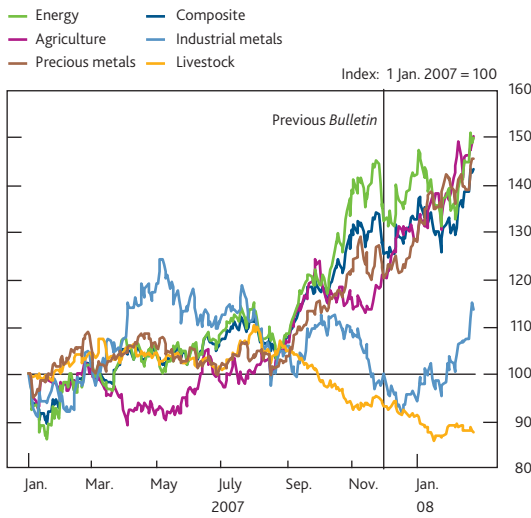
- (a) Spreads refer to credit default swap contracts written on the financial guarantee affiliates of the named companies.

However, some of the major financial guarantors remained on review for downgrade by the rating agencies. In the event of further downgrades, the value of the guarantees provided against the underlying assets would fall. This could lead to additional marked-to-market losses on banks' asset portfolios and in turn to further write-downs. Contacts noted that downgrades to a major financial guarantor would increase the cost of borrowing for relatively low-rated issuers that raise finance through monoline-wrapped debt securities, and also that the type of securities affected could include bonds issued to finance UK private finance initiative (PFI) projects.

Among the other business sectors, the decline in the equity prices of UK construction companies was perhaps linked to wider concerns about the outlook for UK residential and commercial property markets. In particular, UK commercial property prices fell further over recent months prompting investor redemptions from commercial property funds. Some property funds halted redemptions, in part reflecting the time it takes to liquidate property assets in order to return funds to investors.

In contrast to banks and construction, sectoral equity indices for the mining and the oil and gas sectors ended the period little changed (**Chart 2**). It is likely that the equity prices of

Chart 5 Selected commodity price indices^(a)



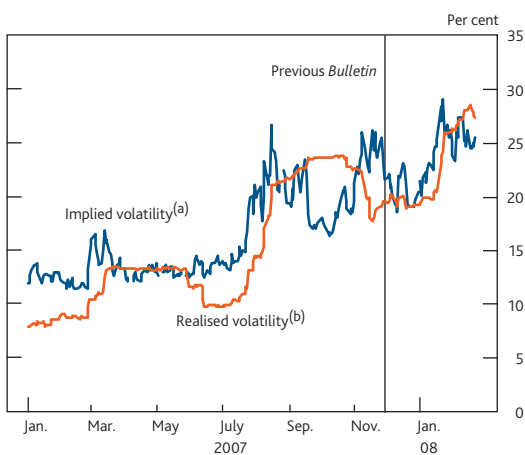
Source: Bloomberg.

(a) Indices refer to S&P GSCI total return index.

these firms were supported by the rise in many commodity prices during the period (Chart 5).

Accompanying the overall fall in UK equity indices, share prices became more volatile over recent months. Realised volatility of daily movements in the FTSE 100 index picked up further from around 20% to close to 27% (Chart 6). And implied uncertainty about future equity prices, inferred from options, indicated that market participants expected volatility to remain at these elevated levels.

Chart 6 FTSE 100 implied and realised volatility



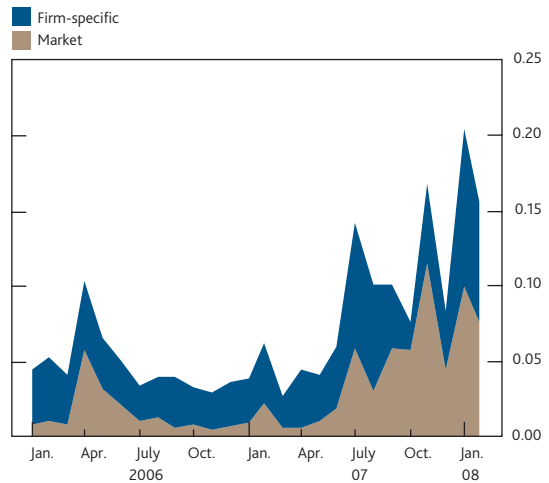
Sources: Bloomberg, Euronext.Liffe and Bank calculations.

(a) Three-month (constant maturity) implied volatility derived from options.
 (b) Annualised rolling standard deviation of log returns estimated over a three-month window.

Lower and more volatile share prices might suggest that investors feared that ongoing stress in money and credit markets would spill over to the broader economy. In particular, contacts reported that worries intensified about the possible impact of a weaker macroeconomic outlook on the

prospects for corporate profits. Perhaps consistent with that, by late February around 50% of the increased volatility of the FTSE 100 index reflected common drivers of the market; firm-specific factors accounted for the other half (Chart 7).

Chart 7 Decomposition of average variance of returns of FTSE 100 firms^(a)

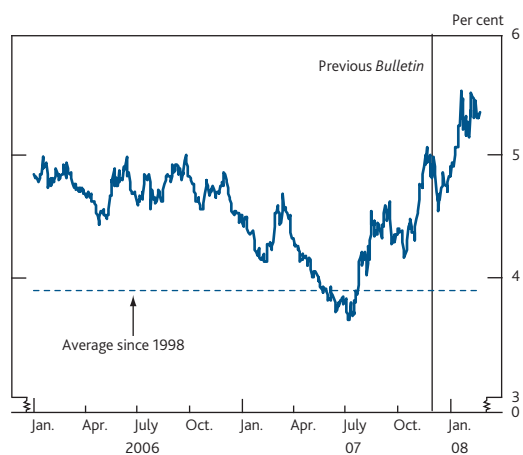


Sources: Thomson Datastream and Bank calculations.

(a) Decomposition of the average return volatility in a market index into a systematic component that is common to all the assets in the index and an idiosyncratic component that reflects the average level of asset-specific volatility. For more information on the analytics behind the decomposition see Campbell *et al* (2001), 'Have individual stocks become more volatile? An empirical exploration of idiosyncratic risk', *Journal of Finance*, Vol. 56, pages 1–43.

Increased uncertainty about the macroeconomic environment could have prompted a rise in the risk compensation required by equity investors. According to a simple dividend discount model, recent price moves indicated a significant rise in the implied equity risk premium (Chart 8).

Chart 8 Implied equity risk premium for the FTSE 100^(a)



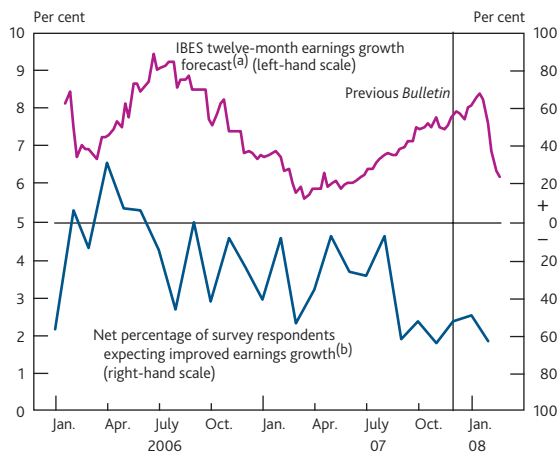
Sources: Bank of England and Thomson Datastream.

(a) Estimated using a one-stage dividend discount model, with an exogenous long-term dividend growth rate equal to 3%. For more details of dividend discount models see Vila Wetherill, A and Weeken, O (2002), 'Equity valuation measures: what can they tell us?', *Bank of England Quarterly Bulletin*, Winter, pages 391–403.

A weaker perceived macroeconomic outlook might also have led investors to lower their estimates of UK companies' future earnings. And indeed, equity analysts revised down their

forecasts for near-term earnings growth for UK companies having previously revised them higher through much of 2007. Likewise, in a recent survey, investment fund managers became more pessimistic about the outlook for UK corporate earnings (**Chart 9**).

Chart 9 Forward-looking indicators of UK company earnings



Sources: Merrill Lynch and Thomson Datastream.

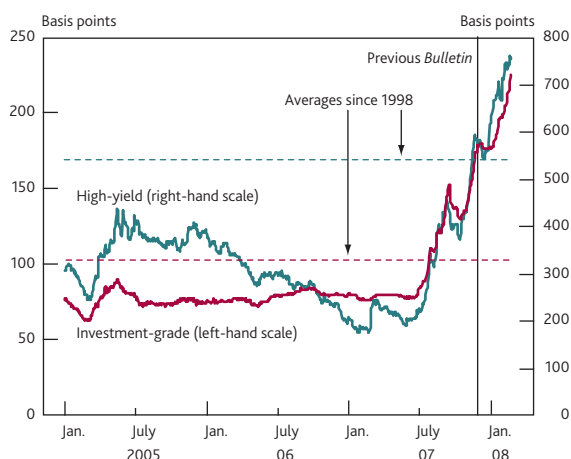
- (a) Institutional Brokers' Estimate System (IBES) uses Consensus forecasts of earnings per share growth over the next twelve months by sell-side analysts.
 (b) The net percentage of fund managers in the Merrill Lynch Fund Managers Survey that expected improved earnings growth over the next twelve months.

Corporate credit

The falls in UK equity market indices were accompanied by a further widening in sterling-denominated corporate bond spreads (**Chart 10**). Spreads on investment-grade sterling-denominated corporate bonds were well above the peaks seen between 1998 and 2002, while non-investment grade spreads approached their peaks during the same period.

As a result of these moves on credit spreads (together with changes in long-term risk-free interest rates), yields on sterling

Chart 10 Sterling-denominated corporate bond spreads^(a)

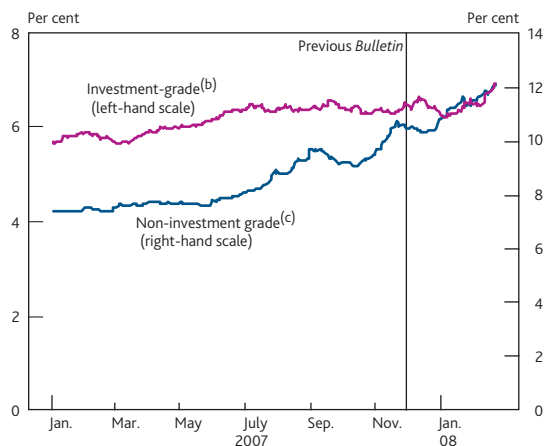


Source: Merrill Lynch.

- (a) Option-adjusted spreads over government bond yields.

corporate bonds increased over recent months, suggesting an increase in firms' cost of debt capital. Specifically, yields on non-investment grade corporate bonds rose above 12%, compared with around 7% at the start of 2007 while yields on investment-grade bonds, which account for the majority of corporate bond issuance, increased to around 7% (**Chart 11**).

Chart 11 Sterling-denominated corporate bond yields^(a)



Source: Merrill Lynch.

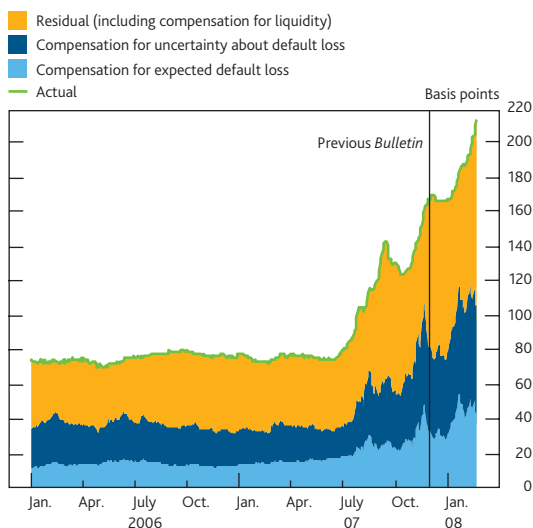
- (a) Yields to maturity.
 (b) Aggregate indices of bonds rated BBB3 or higher.
 (c) Aggregate indices of bonds rated lower than BBB3.

Contacts noted that perceptions of corporate credit risk increased as projected defaults were revised higher. For example, Moody's forecast that the twelve-month global speculative-grade default rate would rise from 0.9% in 2007 to 5.3% in 2008. This remains some way below the levels observed in 1990–91 and 2000–02.

Consistent with increased worries about possible company defaults, a model-based decomposition suggested that the recent widening in spreads on corporate bonds in large part reflected increased compensation for expected defaults and the credit risk premium (**Chart 12**). Taken together, the model suggested these two components accounted for almost two thirds of the widening in spreads on investment-grade bonds since the previous *Bulletin*. The remainder reflected an increase in the residual term, which could be consistent with contacts' reports that illiquidity in secondary corporate bond markets persisted.

In fact, many firms may not have been able to raise new capital even at wider credit spreads. Some contacts reported that sterling corporate bond primary markets remained largely closed. And while some firms may have drawn down previously arranged credit lines from financial institutions, the Bank's Q4 *Credit Conditions Survey* reported that lenders had significantly reduced the availability of credit to firms. Moreover, lenders indicated that they expected further reductions would take place in Q1 (**Chart 13**).

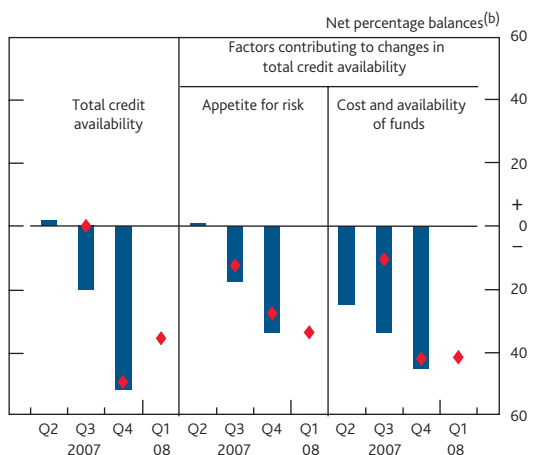
Chart 12 Decomposition of sterling-denominated investment-grade corporate bond spreads^(a)



Sources: Bloomberg, Merrill Lynch, Thomson Datastream and Bank calculations.

(a) For details of the method underlying the decomposition, see Webber, L and Churm, R, 'Decomposing corporate bond spreads', *Bank of England Quarterly Bulletin*, Vol. 47, No. 4, pages 533–41.

Chart 13 Credit Conditions Survey: credit availability to corporates^(a)



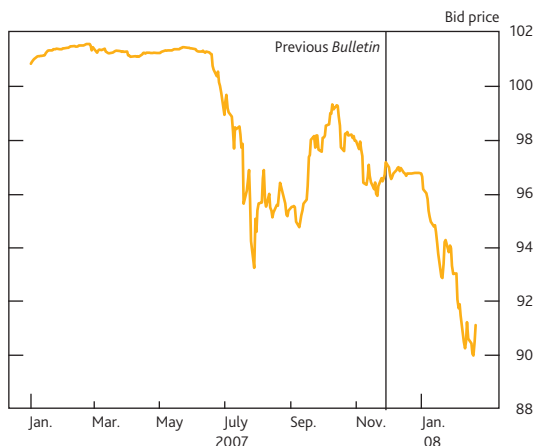
Source: Bank of England Credit Conditions Survey.

(a) Net percentage balances are calculated by weighting together the responses of those lenders who answered the question. The blue bars show the responses over the previous three months. The red diamonds show the expectations over the next three months. Expectations balances have been moved forward one quarter so that they can be compared with the actual outturns in the following quarter.

(b) A positive balance indicates more corporate credit is available or that the change in the factors described have served to increase credit availability.

In leveraged loan markets, the prices of European leveraged loans fell sharply, reportedly to their lowest levels since the mid-1990s (Chart 14). Contacts attributed this in part to low primary issuance of collateral loan obligations (CLOs) which have typically accounted for the bulk of demand for leveraged loans and some reduction in risk-taking by banks with a large volume of leveraged loan exposures stuck on their balance sheets. In addition, although only a handful of existing CLOs had been unwound, the potential for further unwinds might have added to the downward pressure on prices. Such fears may have been particularly acute in credit markets relative to, say, equity markets given the greater proportion of investors that are highly leveraged in complex ways.

Chart 14 Price of European senior leveraged loans^(a)



Source: Reuters Loan Pricing Corporation.

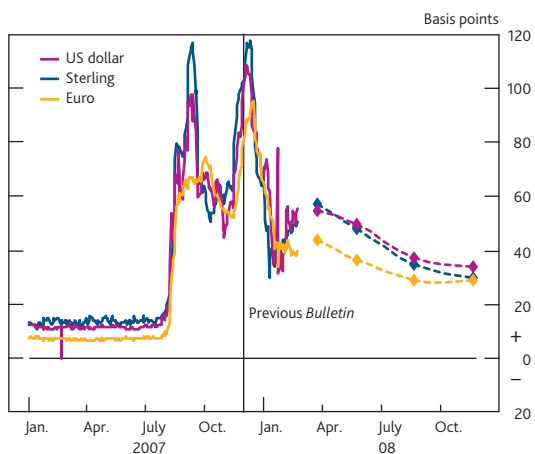
(a) The iTraxx LevX five-year senior index. The index comprises 35 equally weighted first-lien credit agreements traded in the European Leveraged Loan CDS (LCDS) market. The index trades on a price rather than spread basis.

Bank funding markets

Funding markets for financial institutions also remained under pressure, partly reflecting the difficulty of securitising loans and mortgages. The cost of longer-term bank funding and capital increased and spreads on covered bonds — securities issued by banks backed by assets on their balance sheets — widened further.

At shorter maturities, contacts reported that interbank money market conditions improved during December and early January. But spreads between Libor and rates on overnight index swaps (OIS) remained wide and indeed widened further during February (Chart 15). And contacts noted that liquidity in term money markets generally deteriorated through February and remained very thin at maturities beyond one month. The renewed difficulties in sterling money markets were broadly paralleled in other major currencies — euro and US dollar Libor-OIS spreads remained fairly similar to those in

Chart 15 Three-month Libor rates relative to expected policy rates^(a)



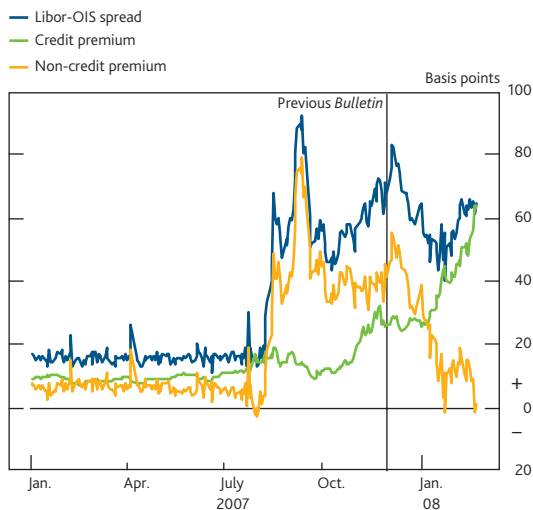
Sources: Bloomberg, British Bankers' Association and Bank calculations.

(a) Spread of three-month Libor to three-month overnight interest swap rates. Dashed lines show implied forward spreads derived from forward rate agreements as at 22 February.

sterling (Chart 15). And forward Libor-OIS spreads remained elevated, indicating that market participants expected difficult conditions in bank funding markets would continue for some time.

According to an indicative decomposition, credit premia (derived from CDS prices) increased over recent months and by the end of the period seemed to account for the sterling Libor-OIS spread (Chart 16). However, the inability of banks to obtain funding in the interbank market might have affected the perceived likelihood of bank default. This interrelation between perceptions of liquidity and default risk is not captured by the simple decomposition.

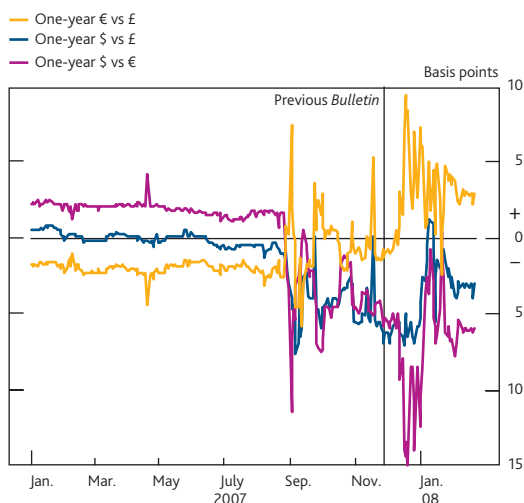
Chart 16 Indicative decomposition of the sterling twelve-month Libor-OIS spread^(a)



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

(a) Estimates of credit premium are derived from credit default swaps on banks in the Libor panel. Estimates of non-credit premium are derived by residual. The method for decomposing interbank spreads is described in the box on pages 498–99 of the 2007 Q4 Bank of England Quarterly Bulletin.

Chart 17 One-year basis swap spreads



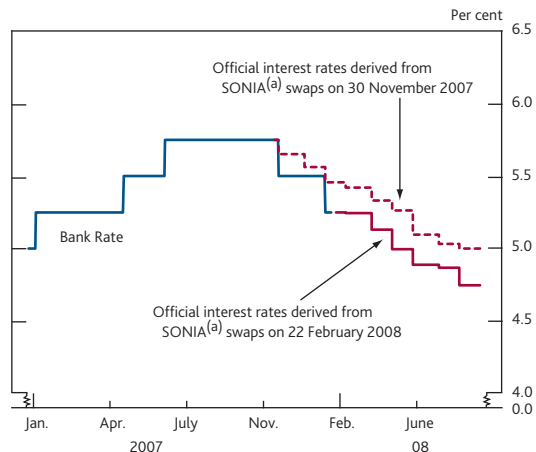
Source: Bloomberg.

Moreover, contacts suggested that worries about banks' credit risk continued to impair the functioning of the foreign exchange swap market. In particular, basis swap spreads, which measure the relative cost of obtaining funding in one currency in exchange for another currency, reached wide levels just before the year end due to heightened demand to receive dollars upfront (Chart 17).⁽¹⁾

Short-term interest rates

Given the ongoing stress in money and credit markets, and taking into account other macroeconomic factors likely to affect inflation, the UK Monetary Policy Committee reduced Bank Rate in two 25 basis point moves, from 5.75% to 5.25%, over the period. Looking ahead, short-term sterling implied interest rates declined since the previous *Bulletin* as market participants revised down the expected path for future UK policy rates. On 22 February, market expectations derived from rates on sterling OIS suggested that market participants had fully priced in two further 25 basis point cuts in Bank Rate by August 2008 (Chart 18).

Chart 18 Bank Rate and forward market interest rates



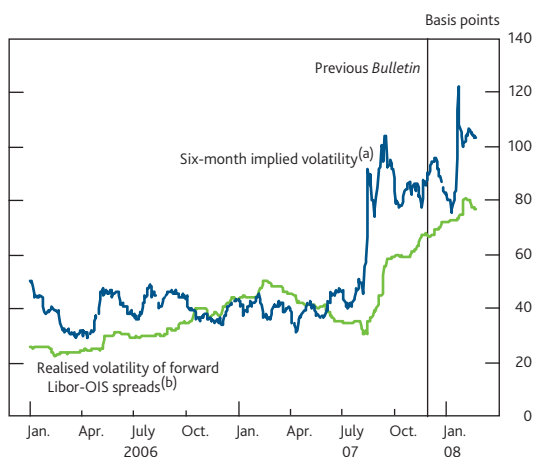
Sources: Bank of England and Reuters.

(a) Sterling overnight index average.

This was also broadly consistent with surveys of market economists. According to a survey conducted by Reuters in February, the mean expectation was for a 25 basis point reduction in Bank Rate by June and a further 25 basis point cut by December to 4.75%. In contrast, the equivalent November survey had suggested that short-term rates were expected to remain above 5% throughout 2008.

Uncertainty about the future path of short-term sterling interest rates remained high and indeed increased over the period (Chart 19). However, the implied volatility measures are derived from options that reference Libor rates. This means that some of the rise may have reflected uncertainty about

(1) For more details of basis swaps see the box 'Basis swaps', page 120 of the Summer 2004 Quarterly Bulletin.

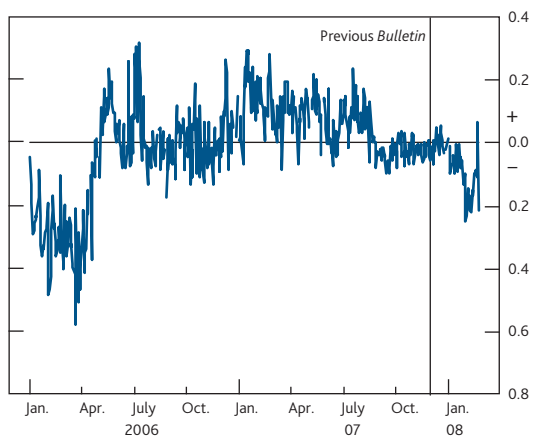
Chart 19 Short-term sterling interest rate volatility

Sources: Bank of England, Bloomberg, British Bankers' Association and Euronext.Liffe.

(a) Inferred from options on Libor futures.

(b) Annualised rolling standard deviation of the spread between three-month, three-month forward Libor and overnight indexed swaps over a six-month window.

credit and liquidity premia in Libor rates rather than uncertainty about the future path of Bank Rate. Indeed, the pickup in implied volatility on sterling Libor rates broadly coincided with an increase in the realised volatility of forward Libor-OIS spreads (Chart 19).

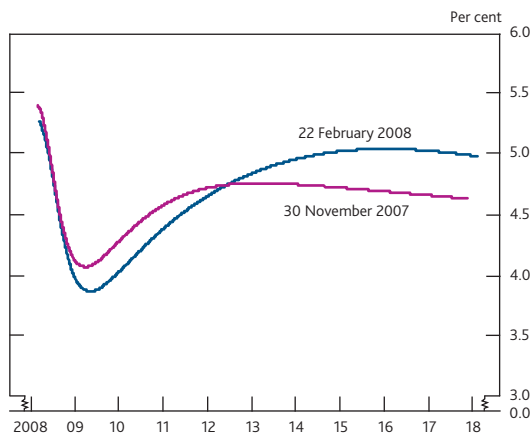
Chart 20 Six-month skew from sterling interest rate options

Sources: Bank of England and Euronext.Liffe.

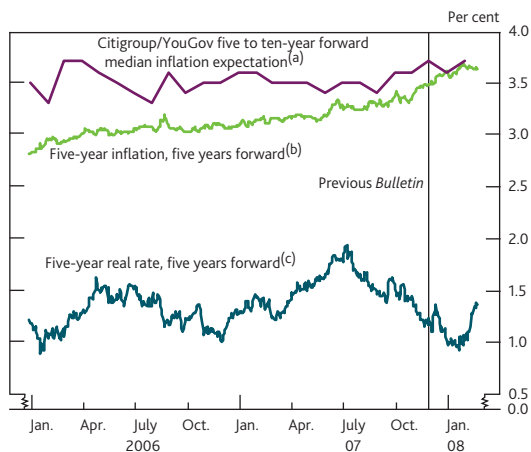
The skew of the implied distribution of future sterling interest rates became more negative, despite a shift down in the mean expected path for near-term rates (Chart 20). This indicated that market participants placed more weight on further large reductions in near-term interest rates relative to large rises. But again, this measure relates to future Libor rates and will also be affected by perceptions of future moves in the Libor-OIS spread.

Long-term interest rates

At longer horizons, sterling nominal forward rates rose since the previous *Bulletin* (Chart 21). Decomposing nominal forward rates into their real and inflation compensation components shows that both long-horizon sterling real and

Chart 21 Sterling nominal forward rates^(a)

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

Chart 22 Sterling long-term real and inflation forward rates and inflation expectations

Sources: Citigroup, YouGov and Bank calculations.

(a) This survey indicator of inflation expectations relates to general goods and services inflation and does not correspond to a recognised inflation measure.

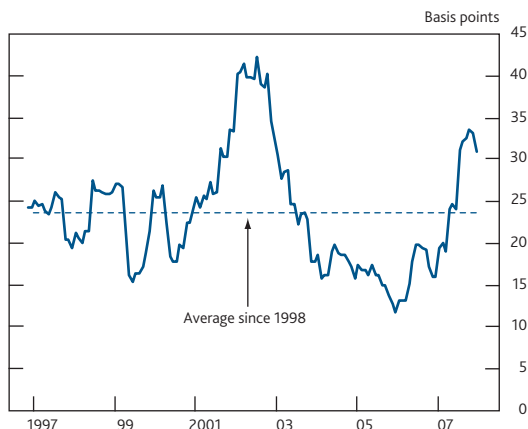
(b) RPI inflation forward rates derived from the Bank's government liability curve.

(c) Derived from the Bank's government liability curve.

inflation forward rates increased compared with three months ago (Chart 22). During the period, long-term implied real rates initially fell quite sharply, coming close to the recent lows of January 2006, before rebounding. In contrast, long-horizon inflation forward rates rose fairly steadily, continuing their gradual drift higher since the beginning of 2006.

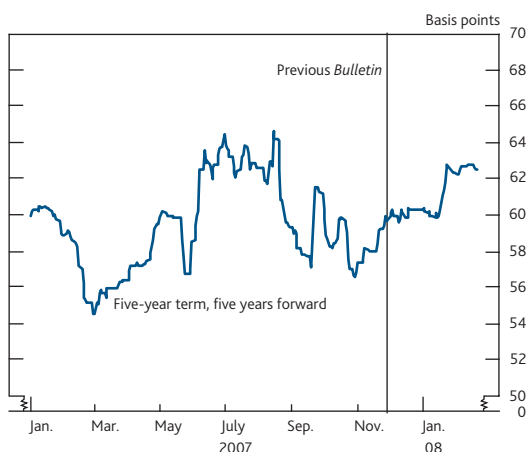
It is possible that market participants revised up further their long-run expectations of RPI inflation. However, a survey of the general public's inflation expectations at long horizons remained relatively steady (Chart 22). An alternative explanation is that investors required increased compensation for inflation risk, perhaps in response to the pickup in the realised volatility of RPI inflation outturns (Chart 23).

If that were the case, one would expect this premium for inflation uncertainty to have shown up in other market indicators. There has been an increase in implied uncertainty inferred from nominal swaptions over the past three months (Chart 24), though implied volatility is currently slightly lower

Chart 23 Realised volatility of RPI inflation^(a)

Sources: National Statistics and Bank calculations.

(a) Rolling standard deviation of changes over twelve-month window.

Chart 24 Implied volatility for sterling long-term nominal forward interest rates^(a)

Source: JPMorgan Chase & Co.

(a) Based on swaptions settling on five-year swap rates, five years ahead.

than it was in the middle of 2007 and little changed from levels at the beginning of 2007. However, market contacts cautioned that long-horizon sterling swaptions are not traded very heavily, which limits the extent to which these data can be relied upon as an accurate forward-looking measure of market uncertainty.

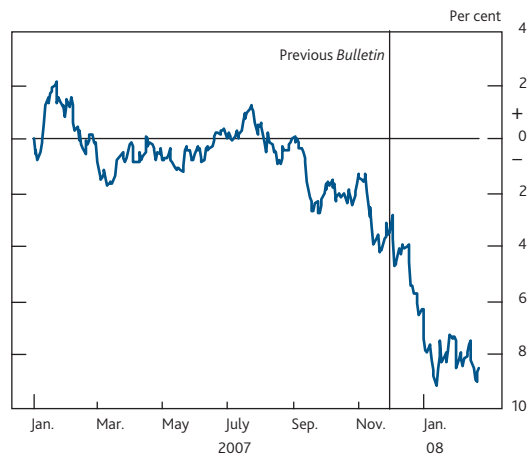
Among other explanations for the rise in long-term inflation forward rates, contacts continued to cite the influence of strong demand for index-linked gilts from institutional investors, in particular pension funds, seeking to match better their assets with their liabilities. Given relatively inelastic supply — reportedly worsened recently by the difficulties experienced by monoline insurers, which typically insure inflation-linked bonds issued by corporates — this continued strong institutional demand may have helped push the price of index-linked bonds higher and their yields lower. To the extent that nominal gilt yields have been less affected by the increased institutional demand, this will have tended to

increase measured breakeven inflation rates (measured by the difference between the yields on nominal and index-linked government bonds).

This explanation might also be consistent with a model-based decomposition of the sterling real and inflation forward rates outlined in the box on pages 14–15. This shows that most of the rise in inflation long-horizon forward rates since early 2006 was unlikely to be explained by inflation expectations or indeed inflation risk premia. Instead, the model suggests that the rise was due to an unexplained residual term, which may capture the recent effects of particularly strong institutional demand.

Foreign exchange

Developments in relative interest rates seemed to account for some of the depreciation in the value of sterling during the first half of the review period. The sterling effective exchange rate index (ERI) fell by approximately 5% over this period, reflecting falls against most of the major currencies (**Chart 25**). However, since mid-January news about relative interest rates might have been expected to have supported an appreciation in the currency, other things being equal, when in fact the sterling ERI remained broadly unchanged from its level in early January (**Chart 26**).

Chart 25 Cumulative changes in the sterling effective exchange rate index since 2 January 2007

One possible explanation for changes in sterling exchange rates could be that investors altered their required risk compensation to hold sterling assets. However, implied volatilities inferred from exchange rate options were little changed from their levels at the time of the previous *Bulletin* (**Chart 27**).

Nonetheless, an implied risk reversal for the sterling ERI inferred from option prices remained negative, indicating that market participants were more concerned about a possible depreciation in the sterling ERI over the next two years than an appreciation (**Chart 28**).

A model-based decomposition of sterling government yield curves

Yield curves can provide policymakers with information about expected future interest rates, attitudes to risk and the underlying shocks hitting the economy. But extracting and interpreting this information is not straightforward. This box uses a so-called 'affine' model to decompose sterling yield curves into expectations of future interest rates and inflation, as well as risk premia.

Factors driving movements in yield curves

If investors are risk-averse and face uncertain future real returns, they will either require extra compensation to hold bonds with long maturities (if long-term bonds are perceived to be risky) or be prepared to hold them at a discount (if long-term bonds act as insurance). So forward interest rates will embody term premia, which will be positive (negative) if returns on long-term bonds, compared to short-term bonds, are low (high) when the returns are most needed — ie when times are bad.

Term premia and investors' expectations are unobservable. Hence some form of model is needed to measure these influences on yield curves. And to the extent that such a model can be estimated for both the nominal and real yield curves, it may be possible to decompose nominal forward interest rates into expectations about real rates and inflation, real term premia and inflation risk premia.

An empirical model of the yield curve

A common empirical approach to modelling yield curves is to identify factors that are statistically important in explaining movements in yield curves. Early models used changes in a single factor — for example, the current short-term interest rate — to explain the term structure of interest rates. But limitations in the ability of single-factor models to capture fully the empirical regularities in yield curves prompted the development of so-called multi-factor affine (linear) models.

This type of model can be applied in different ways, but is based on three common assumptions: (1) bond prices are arbitrage free, so that risk-free profits cannot be made by trading bonds of different maturities; (2) bond prices are driven by a small set of factors; and (3) the 'stochastic discount factor' in the model, which embodies attitudes towards risk, has a flexible form that allows for time-varying term premia.

Attempts to model yield curves solely as a function of observable macroeconomic indicators have tended to have problems fitting the data, particularly at longer maturities. So the model described here incorporates a number of latent

(unobservable) factors, in addition to data on inflation and inflation expectations.⁽¹⁾ The methodology employed is consistent with the literature on so-called essentially affine term structure models.⁽²⁾

Imposing no-arbitrage across yields of different maturities enables the derivation of a recursive relationship between nominal and real yields and the underlying factors.⁽³⁾ The model assumes that two latent factors drive the real yield curve, and a third latent factor and inflation (the fourth factor) affect real term premia, inflation risk premia and inflation expectations. Given the relatively short sample period used to estimate the model, it may be difficult to attribute the dynamics of long-term inflation forward rates correctly into inflation expectations and risk premia. To alleviate this problem, the model also incorporates survey information from Consensus forecasts on long-horizon inflation expectations.⁽⁴⁾ However, these forecasts may differ from the expectations of bond investors, so the model also includes a measurement error term to allow long-term inflation expectations to differ from those of the surveys, although on average they must be the same.

Consistent with the literature on these models, it is assumed that yields are measured with error because they are derived from a limited number of bonds. This allows the model to be estimated using standard econometric methods.⁽⁵⁾ From the estimated relationships, it is possible to back out estimates of expected risk-free real interest rates, inflation expectations, real term premia and inflation risk premia.

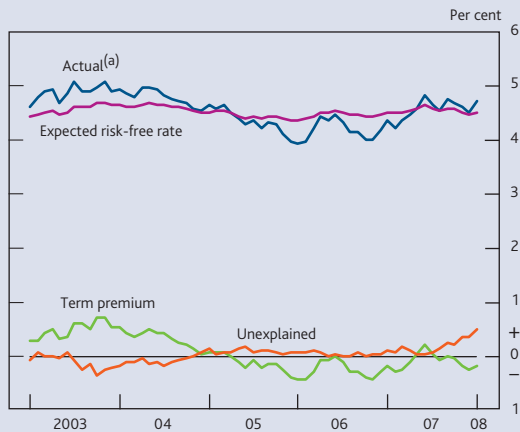
Results

The main finding is that term premia seem to have played an important role in explaining movements in long-term UK forward interest rates in recent years. In contrast, derived expected risk-free real and nominal interest rates appear to have changed less over time.

Over the period since 2005, the model suggests that term premia on nominal forward rates have typically been negative, mainly reflecting negative real term premia (**Charts A and B**). This might imply that investors in index-linked gilts were prepared to pay a premium for insurance-like characteristics of these bonds and/or were constrained in their investment decisions; possibly consistent with views of market contacts that new pension fund regulations and changes in accounting rules increased institutions' demand for these bonds in order to match better their assets with their liabilities.

The model also suggests that little of the increase in ten-year forward inflation rates over the past couple of years can be accounted for by a rise in expected inflation (**Chart C**). Furthermore, the model indicates that there has been only a very modest pickup in the inflation risk premium.⁽⁶⁾

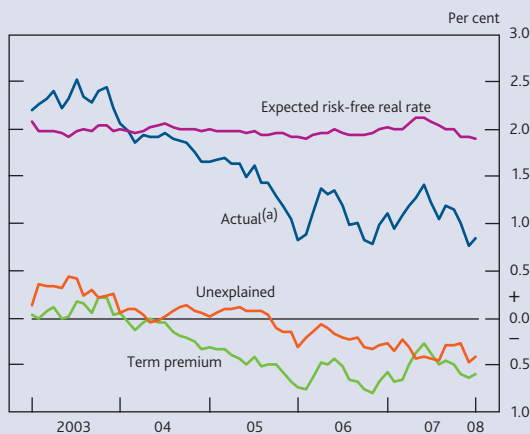
Chart A Decomposition of sterling ten-year nominal forward rates



Source: Bank calculations.

(a) Instantaneous sterling ten-year nominal forward rates derived from the Bank's government liability curve.

Chart B Decomposition of sterling ten-year real forward rates



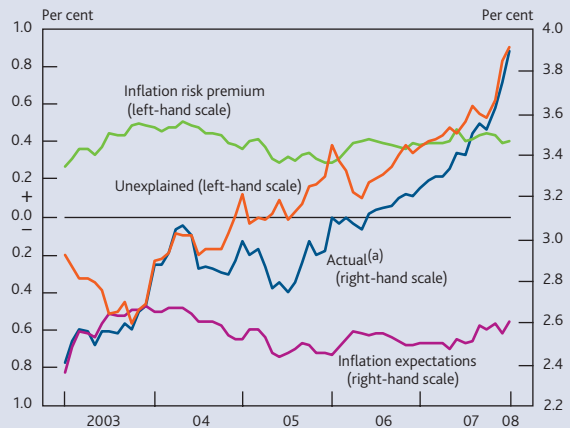
Source: Bank calculations.

(a) Instantaneous sterling ten-year real forward rates derived from the Bank's government liability curve.

Most of the rise in long-horizon inflation forward rates is therefore not explained by the model. But the fact that the model fits nominal forward rates well (until the recent market turbulence) means that the residual in inflation forwards is almost the mirror image of the residual for real forwards. Hence the unexplained component of inflation forwards largely reflects the model's inability to fit long-term real forward rates. Put another way, the real rates priced into nominal bonds may be higher than the real rates implied by index-linked bonds.

One possible explanation for this might be that recent moves in long-term real rates have been affected by particularly strong demand for index-linked gilts in the face of limited supply. In part linked to regulatory factors, market contacts suggest that institutional demand for index-linked bonds has become very price inelastic over the past few years. If this unusually strong recent demand was not well captured by the

Chart C Decomposition of sterling ten-year inflation forward rates



Source: Bank calculations.

(a) Instantaneous sterling ten-year inflation forward rates derived from the Bank's government liability curve.

model, it might help explain the pickup in the model's residual term.

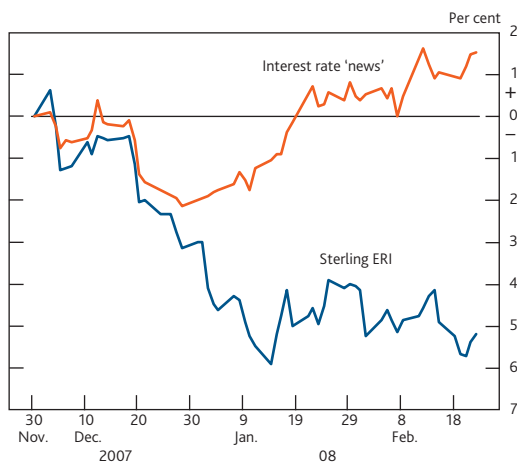
Conclusions

Using a model to decompose movements in UK yield curves suggests that term premia have played a major role in explaining movements in UK long-horizon forward interest rates. In particular, a large part of the fall in real forward rates since 2005 can be attributed to negative real term premia, suggesting that investors paid a premium for these bonds. The model also suggests that much of the recent pickup in ten-year breakeven inflation rates did not reflect a rise in expected inflation, and only a modest pickup in the inflation risk premium. Instead, much of the rise could be consistent with particularly strong recent institutional demand for long-term index-linked bonds, perhaps in response to accounting and regulatory changes.

These results are, however, subject to the normal caveats with any empirical modelling approach. Furthermore, while this model allows some economic interpretation, a full understanding of the fundamental drivers of yield curves requires a general equilibrium model that incorporates the behaviour of different investors. But, such heterogeneous agent models are extremely complicated and not yet well developed.

- (1) This model is described more fully in a forthcoming *Bank of England Working Paper*, entitled 'Extracting inflation expectations and inflation risk premia from the term structure: a joint model of the UK nominal and real yield curves'.
- (2) See Duffee (2002), 'Term premia and interest rate forecasts in affine models', *Journal of Finance*, Vol. 57, No. 1, pages 405–43.
- (3) See 'An affine macro-factor model of the UK yield curve', *Bank of England Working Paper no. 322*.
- (4) It is not uncommon to include surveys in latent factor models. For example, see Orphanides and Kim (2005), 'Term structure estimation with survey data on interest rate forecasts', *Finance and Economics Discussion Series*, 2005–48.
- (5) The model is estimated using end-month Bank of England data on UK zero-coupon nominal and real yields at a range of maturities.
- (6) This conclusion is not significantly altered if inflation survey information is excluded from the model.

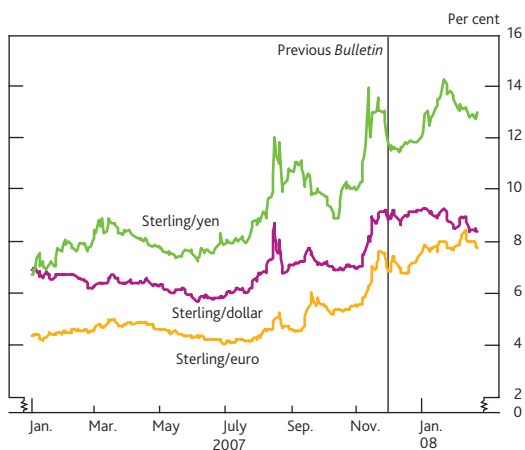
Chart 26 Implied contribution of interest rate 'news' to cumulative change in the sterling ERI since previous *Bulletin*^(a)



Source: Bank calculations.

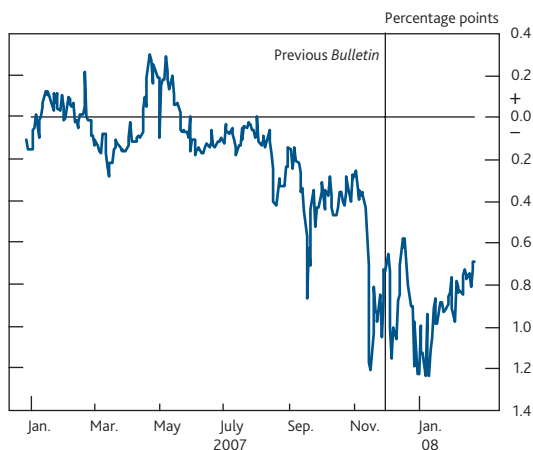
(a) For more information on the analytics required to isolate the impact of interest rate 'news' on exchange rates, see Brigden, A, Martin, B and Salmon, C (1997), 'Decomposing exchange rate movements according to the uncovered interest parity condition', *Bank of England Quarterly Bulletin*, November,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

Chart 27 Twelve-month implied sterling exchange rate volatility



Sources: Bank of England and Bloomberg.

Chart 28 Three-month 'synthetic' risk reversal for the sterling ERI^(a)



Sources: Bank of England and British Bankers' Association.

(a) For more information on the construction of this measure see the box 'Using option prices to derive a probability distribution for the sterling exchange rate index', on pages 130–31 of the Summer 2006 *Quarterly Bulletin*.

It is also possible that market participants revised down their estimates of the long-run equilibrium sterling exchange rate. This could have been because of a renewed focus on the sustainability of the UK current account deficit. In particular, figures on foreign income receipts released in December showed net earnings on foreign assets by UK investors were revised down. Furthermore, the increased spreads on bank debt, and debt backed by credit-related assets, would be likely to imply an increase in future net payments abroad, given that the UK banking sector has been a net borrower from overseas.

Bank of England official operations

The Bank's balance sheet is managed in accordance with its policy purposes. These relate to the implementation of monetary policy; management of the Bank's foreign exchange reserves; provision of payment services for the UK financial system and the wider economy; provision of banking services to other central banks; and management of the Bank's free capital and cash ratio deposits from financial institutions.

Sterling monetary framework

This section reviews three full maintenance periods between 8 November and 6 February and summarises key developments during the February–March maintenance period.

Reserves targets

The Bank's operations in the sterling money markets have been aiming to keep secured market overnight interest rates in line with Bank Rate. They do so by ensuring a net supply of reserves sufficient for the banking system, in aggregate, to meet chosen targets for average balances held at the Bank of England over a maintenance period running from one MPC decision date until the next.

Each month, ahead of the start of a reserves maintenance period, reserves banks in the United Kingdom have the opportunity to set new reserves targets, and the Bank undertakes to supply the reserves that banks in aggregate need to meet those targets. Thus the monthly resetting of reserves targets provides an opportunity for banks individually, and the banking system as a whole, to obtain extra liquidity from the Bank in the light, *inter alia*, of their evaluation of the likelihood of payment shocks.

Following the emergence of strains in money markets in August 2007, reserves banks in aggregate increased their targets ahead of each subsequent maintenance period during the remainder of 2007. Ahead of the maintenance period beginning on 8 November, members of the Bank's reserves scheme increased their aggregate targets by 6%, to £21,200 million. For the maintenance period starting on 6 December, aggregate reserves targets increased by a further £1.5 billion, bringing the cumulative increase in reserves since the August maintenance period to £6.1 billion, or 37%. For the

maintenance period beginning on 9 January aggregate reserves targets were set 8% lower than in the December maintenance period, but remained substantially higher than in August. For the maintenance period starting on 7 February they increased by 1% to £21.1 billion (Charts 29 and 30).

Chart 29 Aggregate reserves targets

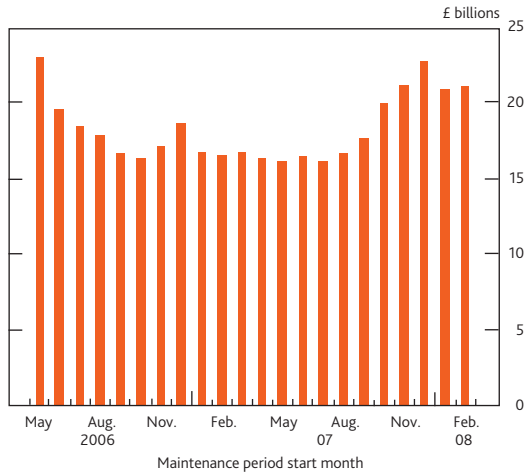
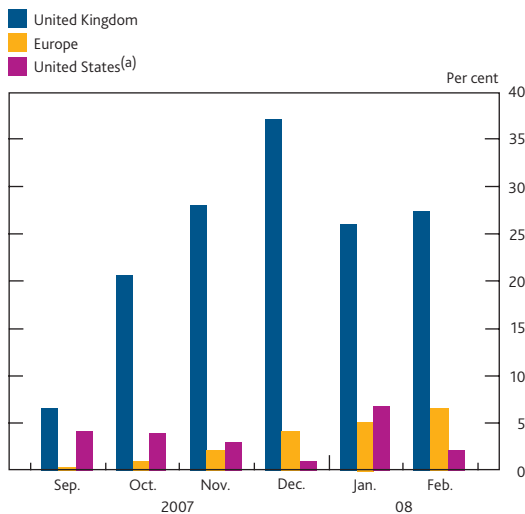


Chart 30 Cumulative increase in aggregate reserves targets since August 2007



Sources: Bank of England, Board of Governors of the Federal Reserve System and European Central Bank.

(a) Required reserves less vault cash used to satisfy reserves plus required clearing balances.

Reserves target ranges

Between the introduction of the Bank's reformed framework for its money market operations, in May 2006, and September 2007, the range around reserves targets within which reserves are remunerated was set at $\pm 1\%$. The range is designed to reduce the probability of banks needing to use standing facilities by mitigating the effect of any errors in the Bank's forecast of sterling flows between the banking system and the Bank's balance sheet (so-called autonomous factors). This in turn helps to stabilise market interest rates. Following the Bank's provision of additional reserves above the level

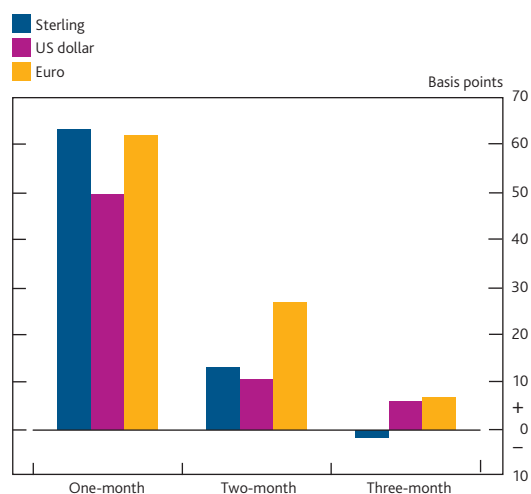
necessary to allow reserves banks in aggregate to meet their targets in the September maintenance period, the ranges were widened, ultimately to $\pm 60\%$, in order to ensure that reserves banks could, in aggregate, hold the additional reserves without penalty, consistent with the Bank's rate-setting objective.

Throughout the period covered by this *Quarterly Bulletin*, the Bank maintained the range around reserves targets within which reserves are remunerated at $\pm 30\%$, even though there was no additional provision of reserves by the Bank above that necessary to allow reserves banks in aggregate to meet their targets. This was done in response to feedback from counterparties that the wider range provided useful additional flexibility in prevailing market conditions. The Bank announced in January that it would keep under review, in the light of market conditions, whether some reduction in the target range was warranted.

November–January maintenance periods

As reported in the previous *Bulletin*, a key influence on market interest rates over the November and December maintenance periods was market participants' approach to funding in the run-up to the new year. Short-term money market rates often rise over the year end because banks try to 'window-dress' their balance sheets over what is an important reporting date.⁽¹⁾ In particular, banks tend to reduce interbank lending and hoard liquidity, which both put upward pressure on money market rates. At the end of 2007, against a backdrop of the protracted period of stressed money market conditions, uncertainty about the year end was unusually high. As the year end approached, short-term market rates in sterling and other currencies increased significantly when the relevant maturity began to span the year end (Chart 31).

Chart 31 Change in Libor spread to OIS rates as they spanned year end^(a)

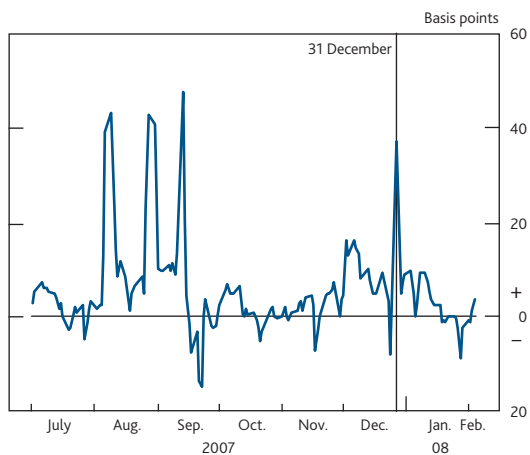


Sources: Bloomberg and Bank calculations.

(a) Sterling Libor first crossed the year end on different dates from dollar and euro rates, as determined by BBA Libor settlement conventions. See www.bba.org.uk/bba/jsp/polopoly.jsp?d=225&a=1413&artpage=4.

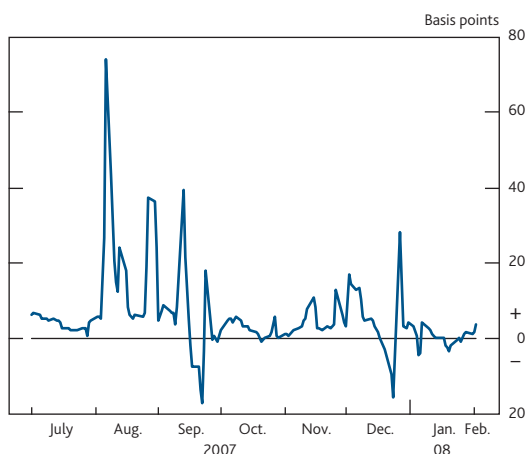
(1) See 2007 Q1 *Quarterly Bulletin*.

Chart 32 Spread to Bank Rate of secured sterling overnight interest rate



Sources: BrokerTec and Bank calculations.

Chart 33 Spread to Bank Rate of unsecured sterling overnight interest rate



Sources: Wholesale Market Brokers' Association and Bank calculations.

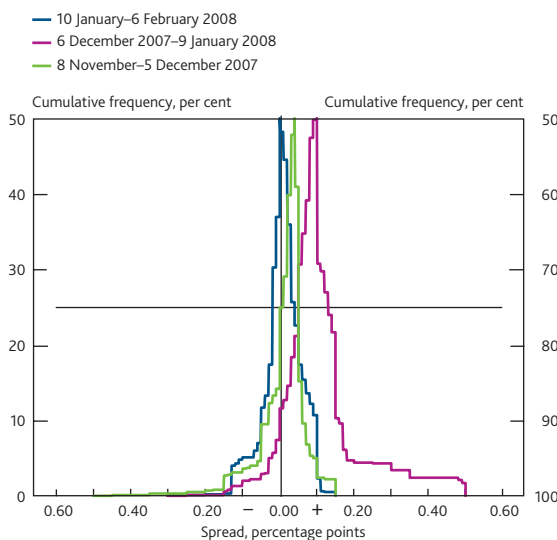
Overnight secured and unsecured sterling money market rates also rose somewhat relative to Bank Rate in late November and early December, although not to the extent seen in August and September (Charts 32 and 33).

On 29 November, the Bank announced its intention to offer £10 billion in the form of a five-week repo open market operation (OMO). This constituted a significant proportion of its scheduled supply of reserves for the whole maintenance period beginning on 6 December. It was done in order to help to alleviate concerns that money market conditions would be particularly tight by providing, at the very start of the maintenance period, financing that would remain outstanding over the year end. The decision to conduct a five-week repo OMO followed discussions with reserves scheme banks and with the Money Market Liaison Group. The operation was oversubscribed, with a cover ratio of 6.2.

The Bank also stated on 29 November that it stood ready to take further measures to keep overnight rates in line with Bank Rate. In the event, counterparties reported that market conditions remained orderly.

Secured overnight market rates in the January maintenance period were generally stable and close to Bank Rate (Chart 34).

Chart 34 Folded cumulative distribution^(a) of spread of sterling secured overnight interest rate (trade weighted) to Bank Rate



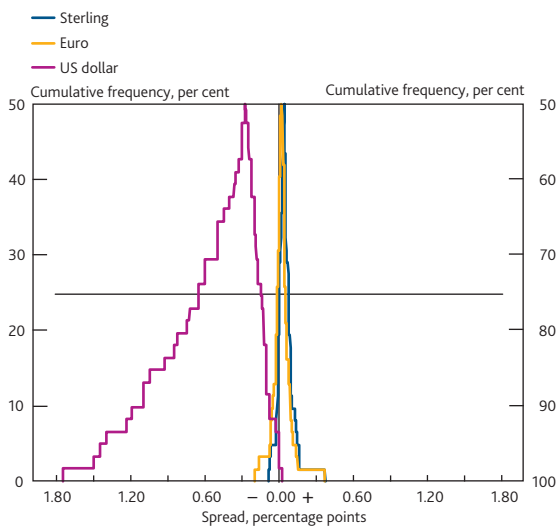
Sources: BrokerTec and Bank calculations.

(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.

For the November, December and January maintenance periods combined, sterling secured and unsecured overnight market interest rates tended to be at least as close to policy rates as comparable euro and dollar overnight rates (Charts 35 and 36). In dollars the appropriate comparator for sterling secured rates is the unsecured overnight rate, since this is the rate targeted by the FOMC.

The amounts supplied in the Bank's weekly OMOs continued to decline over the review period. As explained in the previous *Bulletin* and in the box on page 20, this does not mean that the net amount of reserves supplied to the banking system fell — until end-December this rose in line with the increase in reserves targets, and in January and February remained substantially higher than it had been in August. Rather it reflected central bank money being injected into the system via drawings by Northern Rock on the liquidity facility available to it; via the five-week repo; and via the larger three-month long-term repos that the Bank offered in December and January (see the section below on 'Co-ordinated central bank action and the Bank's longer-term repo OMOs') (Chart 37).

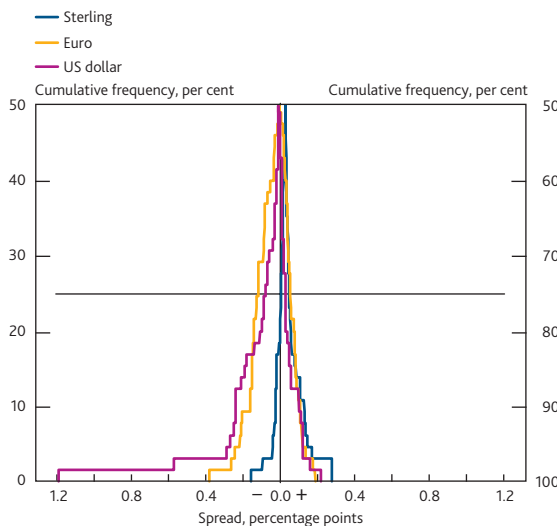
Chart 35 Folded cumulative distribution^(a) of spread of international secured overnight interest rates to official interest rates^(b)



Sources: ICAP 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.
 (b) Chart shows the distribution for period 8 November 2007–6 February 2008. Differences in the median level of the spread of secured rates to official rates are due to differences in the way official operations are conducted.

Chart 36 Folded cumulative distribution^(a) of spread of international unsecured overnight interest rates to official interest rates^(b)



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.
 (b) Chart shows the distribution for period 8 November 2007–6 February 2008.

In announcing the larger long-term repos on 12 December, the Bank stated that, consistent with its objective of keeping overnight market interest rates in line with Bank Rate, it would offset in its other market operations the additional reserves taken up (Chart 37). The partial repayment in January of the balance of the UK central government's overdraft facility with the Bank, known as the 'Ways and Means' facility, had the effect of draining reserves from the banking system,

Chart 37 Liquidity provided in OMOs and short-term OMO cover ratio

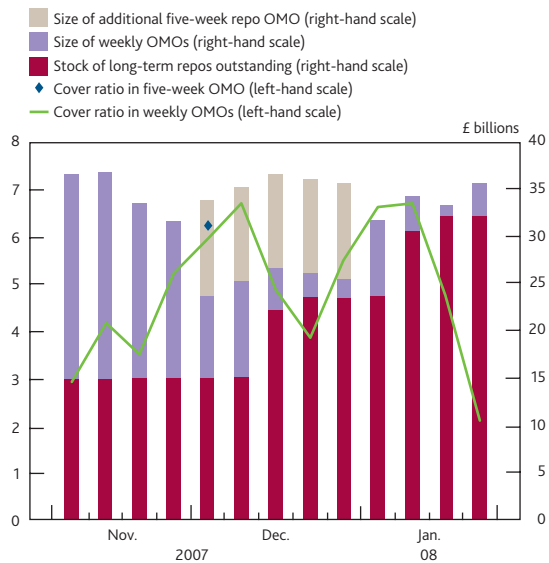
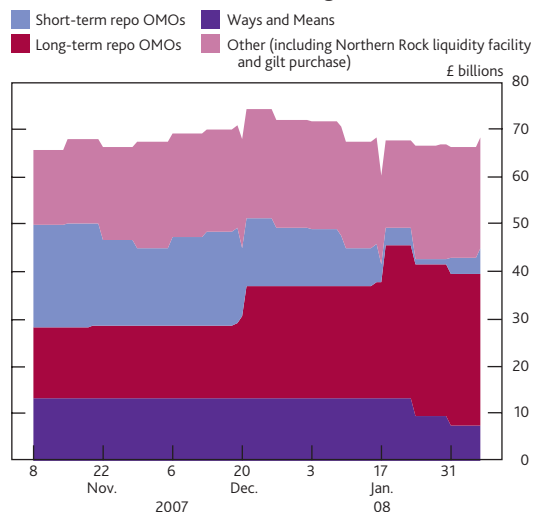


Chart 38 Breakdown of sterling market transactions



contributing to the Bank's offsetting of the reserves supplied via lending to Northern Rock and via the larger long-term repos (Chart 38). The box on page 20 explains the background to, and the effect of, the Ways and Means repayment.

February maintenance period

The spread between overnight market rates and Bank Rate generally remained low and stable during February. The maintenance period ending on 5 March will be reviewed in the 2008 Q2 *Bulletin*.

Co-ordinated central bank action and the Bank's longer-term repo OMOs

Along with other central banks, the Bank announced on 12 December further measures designed to address pressures in short-term funding markets.⁽¹⁾ These measures were

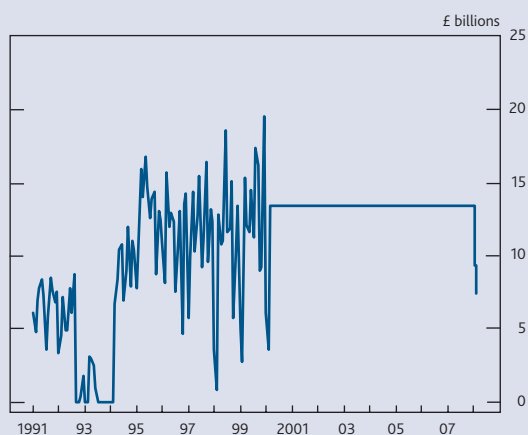
(1) www.bankofengland.co.uk/publications/news/2007/158.htm.

Repayment of part of the 'Ways and Means' facility

'Ways and Means' is the name given to the UK central government's overdraft facility at the Bank.

Prior to the transfer of the government's day-to-day sterling cash management from the Bank to the Debt Management Office (DMO) in March 2000, the outstanding daily balance varied significantly, reflecting net cash flows into and out of government accounts. The average level had risen significantly in the mid-1990s.⁽¹⁾ Between March 2000 and the beginning of 2008, borrowing from the Bank was not used to facilitate day-to-day management of the government's cash flows and the balance was stable, at £13.4 billion (Chart A).

Chart A Ways and Means facility: outstanding balance



In implementing monetary policy the Bank generally aims to supply reserves banks, in aggregate, with the reserves they have chosen to target. This enables the Bank to ensure that overnight market interest rates are in line with Bank Rate.⁽²⁾ Ordinarily the Bank ensures that the correct level of reserves is supplied to the market, at the margin, by varying the size of its one-week repo OMOs and, on the final day of the maintenance period, by holding an overnight fine-tuning OMO. As explained on page 506 of the previous edition of the *Bulletin*, the size of the weekly OMO has fallen in recent months to offset the injection of central bank money to the banking system via the Bank's lending to Northern Rock under the liquidity support facility.

In addition, the increase in the size of the Bank's long-term repo operations in December and January meant that more reserves than normal were supplied to the market via long-term repo OMOs. In announcing the changes to the December and January long-term repo OMOs on 12 December, the Bank announced that, consistent with its objective of keeping overnight market interest rates in line with Bank Rate, it would offset in its other operations the additional reserves taken up.

The size of the Bank's weekly short-term OMO is however bounded at zero. Beyond that point the Bank must 'drain' reserves from the system by other means in order to ensure that the correct level of reserves is supplied in aggregate.

As with any other sterling flow across the Bank's balance sheet, the Bank's lending to the government under the Ways and Means facility constitutes a supply of reserves to the banking system. On 24 January HM Treasury instructed the DMO to make an initial part repayment to the Bank of £4 billion of the Ways and Means facility; and on 31 January instructed a further repayment of £2 billion, taking the outstanding balance down to £7.4 billion.

The repayment of part of the balance therefore had the effect of draining reserves from the banking system, and thus contributed to the Bank's objective of offsetting the additional reserves taken up in the December and January long-term repo OMOs. The repayments also improved the longer-term flexibility of the Bank's balance sheet. The Bank will replace the claim on the government with other assets that may be routinely utilised to adjust the net supply of reserves to the banking system, for example by reposing out for cash, or selling, bonds.

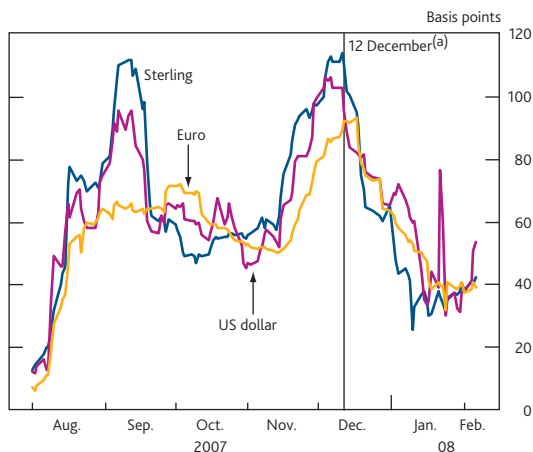
In making the repayments HM Treasury reiterated its intention to continue to reduce the size of the balance of the Ways and Means facility over time.

Other central banks from time to time also need to drain 'excess' reserves from the banking system. For example, the Federal Reserve Bank of New York has in recent months redeemed or sold part of the Federal Reserve system's holdings of Treasury bills, in order to offset factors that added reserves to the banking system.

(1) At that time the government aimed to 'fully fund' the Public Sector Borrowing Requirement (PSBR) and any increase in the foreign exchange reserves by selling central government debt with a maturity of three years or more. But as local authorities and public corporations were repaying debt to the private sector the PSBR was smaller than the central government's cash needs, and the central government had recourse to short-term borrowing, including from the Bank under the Ways and Means facility.

(2) The Bank's regime for the implementation of monetary policy is explained in *The Framework for the Bank of England's Operations in the Sterling Money Markets*, available at www.bankofengland.co.uk/markets/money/publications/redbookjan08.pdf.

Chart 39 Three-month Libor spread to three-month OIS rate



(a) Date of co-ordinated central bank announcement.

motivated by the re-emergence of strains in term money markets towards the end of 2007. The spread between three-month interbank rates and market expectations of central bank policy rates increased during November and December in sterling, dollars and euro, to peaks above the highs reached earlier in the year (Chart 39).

Specifically, the Bank announced changes to its long-term repo OMOs scheduled for 18 December and 15 January. In those operations, it announced that the total amount of funds offered at the three-month maturity would be expanded and the range of high-quality collateral accepted at this maturity would be widened, including to AAA RMBS and covered bonds.

The total size of reserves offered in each of the operations was raised from £2.85 billion to £11.35 billion, of which £10 billion was offered at the three-month maturity. The range of securities eligible as collateral in the three-month operations was wider than in the Bank's normal OMOs but narrower than those eligible for the special term tenders, with a minimum penalty rate, that the Bank held in September and October, described on pages 509–10 of the previous *Bulletin*.⁽¹⁾

Following the joint central bank announcement, spreads between Libor rates and expected policy rates declined considerably, although remaining above the levels prevailing prior to August, and contacts reported some improvement in interbank money market conditions during the second half of December, that persisted during the first part of January. However, later in January, and during February, conditions deteriorated, with spreads between Libor rates and expected policy rates increasing.

Possibly reflecting the wider range of eligible collateral, the range of successful bid rates in the three-month operations in December and January was wider than normal. The cover ratios in those operations were relatively low (Table A).

Table A Long-term repo operations

	Three-month	Six-month	Nine-month	Twelve-month
20 November 2007				
On offer (£ millions)	1,600	750	400	200
Cover	1.15	3.07	3.55	4.10
Weighted average rate ^(a)	5.643	5.526	5.416	5.327
Highest accepted rate ^(a)	5.700	5.550	5.430	5.340
Lowest accepted rate ^(a)	5.560	5.490	5.415	5.325
Tail ^(b)	8.30	3.60	0.10	0.20
18 December 2007				
On offer (£ millions)	10,000 ^(c)	750	400	200
Cover	1.09	2.07	2.46	3.68
Weighted average rate ^(a)	5.949	5.410	5.351	5.303
Highest accepted rate ^(a)	6.600	5.430	5.370	5.320
Lowest accepted rate ^(a)	5.360	5.381	5.345	5.285
Tail ^(b)	58.92	2.85	0.63	1.75
15 January 2008				
On offer (£ millions)	10,000 ^(c)	750	400	200
Cover	1.31	0.93	1.34	3.00
Weighted average rate ^(a)	5.278	4.988	4.940	4.850
Highest accepted rate ^(a)	5.630	5.020	4.950	4.850
Lowest accepted rate ^(a)	5.140	4.800	4.870	4.850
Tail ^(b)	13.85	18.79	6.95	0.00

(a) Per cent.

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

(c) December and January long-term repos were held against an expanded range of high-quality collateral.

Electronic tendering system for OMOs

As reported in the previous *Quarterly Bulletin*, the Bank has introduced a new electronic tendering system for its OMOs, called Btender. The first weekly repo OMO using Btender was conducted on 22 November; the first long-term repo OMO using Btender on 18 December; and the first gilt-purchase OMO on 28 January.

Bond-purchase OMOs

The Bank announced in May 2006 that it intended to conduct OMOs to inject reserves to the banking system via the outright purchase of bonds. The box on pages 22–23 explains the policy motivation for the Bank's bond purchases; and how the operations are structured.

On 2 January the Bank announced the dates and sizes of the first three OMOs for the outright purchase of gilts. The first such OMO was conducted on 28 January, and was well covered at all maturities (Table B).

Foreign currency reserves

The Bank's foreign currency reserves currently comprise around £1 billion equivalent of assets. These are funded by a \$2 billion three-year issue, the first liability under the Bank's programme

(1) Details of the additional eligible collateral securities, including the margins applied by the Bank, and of the operational arrangements for the three-month long-term OMOs in December and January, were contained in a Market Notice issued on 14 December. It is available at www.bankofengland.co.uk/markets/money/documentation/statement071214.pdf.

The injection of reserves via bond-purchase OMOs

This box explains the rationale for the Bank's new open market operations (OMOs) for the outright purchase of bonds; and sets out the operational framework for the purchases.

As part of the reforms to its money market framework introduced in May 2006, the Bank introduced voluntary reserves — balances which a wide range of banks and building societies may choose to hold at the Bank. Members of the reserves scheme each set their own target for average holding of reserves in a maintenance period running from the date of one MPC interest rate decision to the eve of the next. These reserves are remunerated, at Bank Rate, provided that average holdings are within a range around the target. Between £15 billion–£25 billion has been held in these new reserves accounts.

Because the Bank's liabilities have expanded in this way, so too have its assets. In particular the Bank uses its OMOs to ensure that members of the reserves scheme can hold the reserves they demand. The money that the Bank pays out in its OMOs finds its way, directly or indirectly, into the reserves accounts of reserves holders at the Bank.

In recent years the Bank has conducted its OMOs in the form of loans by way of reverse repo, lending money for a fixed term against high-quality collateral securities. Usually, most of the Bank's reverse repos are for just one week (or for just one day on the final day of a maintenance period). Since 2006 these OMOs have included repos of three, six, nine and twelve months. The Bank announced on 15 May 2006, in a joint statement with the Debt Management Office, that it planned also to conduct open market operations to make outright purchases of bonds, including gilts and high-quality foreign currency bonds.⁽¹⁾

The Bank's repo OMOs inject reserves into the banking system for the term of the loan. If the Bank makes a one-week loan via reverse repo, the money that it puts out in the loan will add to the total of reserves balances until the loan has to be repaid. With outright purchases the same basic mechanism will apply as with repos. When the Bank buys a bond it will plan to hold it to maturity. The money that the Bank pays for the bond will therefore be added to commercial banks' reserves accounts until the bond is redeemed. Purchasing a five-year bond, for example, provides central bank money to the banking system for five years; injected on the day of purchase and withdrawn on the day of maturity. By buying longer-term assets the Bank will be reducing the size of its refinancing of the banking system that has to be rolled over frequently.

The bonds will be marketable instruments, so the Bank will be able readily, if necessary, to adjust the net supply of reserves to the banking system by selling bonds or by repoing bonds for cash.

For these reasons, bond purchases are a flexible means of injecting reserves into the banking system. A number of central banks, including the Federal Reserve Bank of New York and the Bank of Japan, provide financing for the banking system's purchase of banknotes and reserves holdings via outright purchases of government bonds.

The Bank's bond portfolio will in general, appear on the balance sheet of its Issue Department, backing banknotes.⁽²⁾ The reason for this is that the underlying growth of the banknote issue has been steady for many years and so the majority of the necessary financing for banknotes can in most circumstances, be provided via the purchase of longer-maturity assets. The overall net supply of reserves supplied by the Bank will not change, but reserves supplied in the form of bond purchases will over time replace reserves supplied in the form of short-term repo OMOs.

Five principles guide the Bank's provision of central bank money via the acquisition and management of this bond portfolio:

- i. The process for purchasing the bonds and the structure of the resulting portfolio is designed to be simple and transparent.
- ii. The purchases are, and can be seen to be, non-discretionary, given that the Bank is acquiring assets whose yields reflect, among other things, expectations of the path of Bank Rate set by the MPC.
- iii. The portfolio is designed to expose the Bank to minimal credit risk.
- iv. The portfolio is structured broadly to match the expected behavioural maturity of Issue Department's banknote liabilities, while allowing for the possibility of persistent reductions in demand for banknotes.
- v. The purchases and structure of the portfolio are designed to avoid disruption to HMG debt management. In particular, the Bank seeks to avoid actions or arrangements that would undermine the efficient functioning of the gilt market, or conflict with the Government's debt management policy and the operational requirements of the UK Debt Management Office (DMO) in implementing that policy.

Given those principles, the following framework governs the Bank's bond-purchase OMOs:⁽³⁾

- Over each calendar year as a whole, the maturity profile of the bonds purchased by the Bank is determined by the maturity distribution of UK government sterling fixed-rate debt in issue.
- Bonds purchased have a maximum residual maturity of 21 years and, initially, a minimum residual maturity of three years. In each operation the Bank purchases bonds from each of three different maturity segments in that part of the curve.
- Bonds are purchased via open market operations with the Bank's OMO counterparties, conducted on a regular, published timetable; and, as far as possible, of broadly even sizes.

The Bank held its first bond-purchase OMO, to purchase £400 million of gilts, on 28 January. The results are shown on page 24. The Bank plans that gilt-purchase OMOs will be held each calendar month in 2008 with the exception of December (due to the Christmas holiday).

The Bank intends, later in 2008, to begin purchasing high-quality foreign-currency denominated bonds, with the cash flows swapped into fixed-rate sterling. The reasons for buying swapped foreign currency bonds, in addition to gilts, are to ensure that the Bank's purchases do not put undue pressure on the gilt market; and to allow the overall size of the portfolio to be built up more quickly in the coming years.

When the portfolio is mature the same principles will apply to the Bank's purchases but their scale will then be driven by the growth of the note issue and redemptions of bonds in the Bank's portfolio, and not by the initial need to build up the portfolio.

The Bank intends to lend from its gilt portfolio in due course. This will help to avoid the risk that its purchases of gilts exacerbate any undesirable volatility in secured money market rates due to collateral shortages, or contribute to particular stocks trading at a significant premium in the cash gilt market. After consultation with the DMO, the Bank published a statement on 28 January setting out its plans for bond lending in more detail.⁽⁴⁾

Further details of these planned changes to the Bank's operations will be provided in subsequent *Quarterly Bulletins*.

(1) The Bank subsequently issued a consultative paper on its planned bond purchases in July 2006; and in November 2006 a Market Notice setting out the framework that it was minded to adopt. All these papers, and other material, are available at www.bankofengland.co.uk/markets/money/omo/outright_purchases.htm.

(2) Under the Bank Charter Act of 1844, banknotes and the assets backing those notes are separated from the rest of the Bank's business and appear on the balance sheet of the Issue Department of the Bank.

(3) Further details of the Bank's approach may be found in *The Framework for the Bank of England's Operations in the Sterling Money Markets*, available at www.bankofengland.co.uk/markets/money/publications/redbookjan08.pdf; in particular on pages 9–10 and 23–24.

(4) Available at www.bankofengland.co.uk/markets/money/omo/statement080128.pdf.

Table B Issue Department gilt-purchase OMO

	Amount purchased (£ millions)	Sector cover ratio	Weighted average accepted price	Highest accepted price	Lowest accepted price	Tail ^(a)
28 January 2008						
Short		3.12				
UKT 4.25% 07/03/2011	81.10		99.695	99.700	99.686	0.005
UKT 9% 12/07/2011	102.80		114.693	114.700	114.680	0.007
Medium		4.91				
UKT 4.75% 07/03/2020	52.03		102.184	102.190	102.183	0.006
UKT 8% 07/06/2021	71.87		133.930	133.950	133.923	0.020
Long		4.75				
UKT 5% 07/03/2025	45.79		106.264	106.290	106.250	0.026
UKT 6% 07/12/2028	45.83		120.372	120.400	120.290	0.028
Total purchased ^(b) 399.41						

(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.

of annual bond issuance which commenced in March 2007. Planning is under way for the second issue in this programme; on 29 February, the Bank announced that it had mandated Barclays Capital, Deutsche Bank, HSBC and JPMorgan to bring a three-year US dollar transaction of size \$2 billion, expected to take place in the week beginning 10 March. The intention is that by mid-2009 the Bank's reserves will have reached a steady-state level of around £3 billion equivalent.

On 28 January 2008 one of the Bank's remaining two Euro Notes, for €2 billion nominal, matured. This has led to a temporary drop in the Bank's holdings of foreign currency bonds.

Facilitating the provision of payment services

The final Euro Note, for €3 billion nominal, matures on 27 January 2009. Assets funded by this issue are currently lent out each day to generate intraday liquidity to facilitate the Bank's participation in TARGET, the euro area's wholesale payments system. As detailed in previous *Quarterly Bulletins*, during 2008 the Bank will cease to be a direct member of TARGET; going forward, its intraday liquidity requirements will be somewhat lower.

Capital portfolio

The Bank holds an investment portfolio that is approximately the same size as the Bank's capital and reserves (net of equity holdings, eg in the BIS and ECB, and the Bank's physical assets) together with aggregate cash ratio deposits. The Bank's 'free' capital and cash ratio deposits 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 £2 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 announcement on 3 December: £20 million each in November and January.

Table C Simplified version of Bank of England consolidated balance sheet^{(a)(b)}

£ billions					
Liabilities	6 Feb.	7 Nov.	Assets	6 Feb.	7 Nov.
Banknote issue	41	41	Short-term sterling reverse repo	6	21
Reserves account balances	23	22	Long-term sterling reverse repo	32	15
Standing facility deposits	0	0	Ways and Means advance	7	13
Other sterling deposits, cash ratio deposits and the Bank of England's capital and reserves	14	14	Standing facility assets	0	0
Foreign currency denominated liabilities	18	17	Other sterling-denominated assets	30	24
			Foreign currency denominated assets	21	21
Total^(c)	96	94	Total^(c)	96	94

(a) The Bank Charter Act 1844 requires the Bank of England to separate the note issue function from its other activities. Accordingly, the Bank has two balance sheets: for Issue Department and Banking Department. See 'Components of the Bank of England's balance sheet' (2003), *Bank of England Quarterly Bulletin*, Spring, page 18.

(b) Based on published weekly Bank Returns. The Bank also uses currency, foreign exchange and interest rate swaps to hedge and manage currency and non-sterling interest rate exposures — see the Bank's 2006 *Annual Report*, pages 36–37.

(c) Figures may not sum to totals due to rounding.