

Markets and operations

This article reviews developments since the Q3 *Quarterly Bulletin* in sterling financial markets. It summarises asset price movements in conjunction with market intelligence gathered from market contacts, and evaluates them in the context of the Bank's core purposes. The article also outlines changes in market structure and reviews the Bank's official operations.⁽¹⁾

Sterling financial markets

Overview

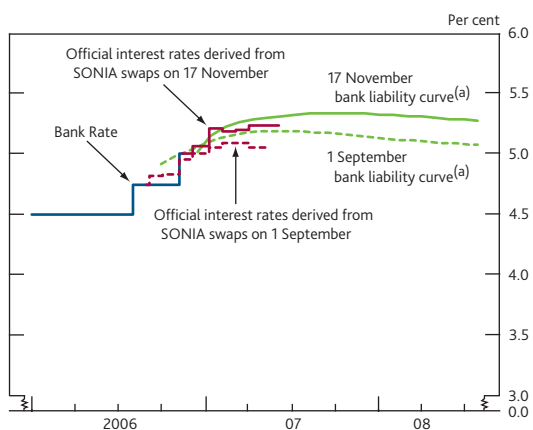
Short-term sterling interest rates rose and equity prices increased strongly over the past few months, perhaps consistent with market participants perceiving that the near-term downside risks to UK growth have lessened. In contrast, long-term sterling forward rates fell and approached the lows recorded in January 2006. To some extent this was part of an international fall in long-term real forward rates. But it may also have reflected further strong demand from institutional investors for UK government long-dated bonds.

Uncertainty surrounding future sterling asset prices generally fell further. In part, this also seemed to reflect market perceptions that the outlook for the UK economy remained robust.

Recent developments in sterling markets

Since the previous *Bulletin*, the UK Monetary Policy Committee (MPC) increased Bank Rate by 25 basis points to

Chart 1 Sterling official and forward market interest rates



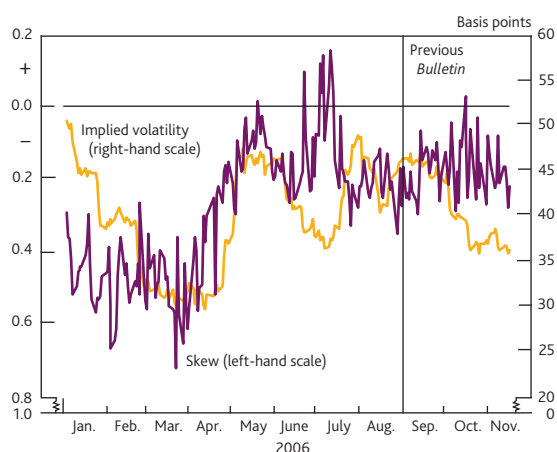
Sources: Bank of England and Bloomberg.

(a) One-day nominal forward rates implied by a curve fitted to a combination of instruments that settle on Libor.

5%. And looking ahead, the implied path of sterling money market interest rates shifted higher, with short-term forward rates increasing by up to 25 basis points. On 17 November, forward market interest rates derived from swaps on future sterling overnight interest rates (SONIA) implied some expectation of a further 25 basis point increase in Bank Rate during the first half of 2007 (**Chart 1**). Thereafter, the implied profile for market interest rates was broadly flat.

Implied uncertainty surrounding the expected near-term path of sterling rates decreased. But the skew of the implied distribution of future rates remained negative, suggesting that market participants perceived the balance of risks around the future path of interest rates to be slightly to the downside (**Chart 2**).

Chart 2 Six-month implied volatility and skew from interest rate options



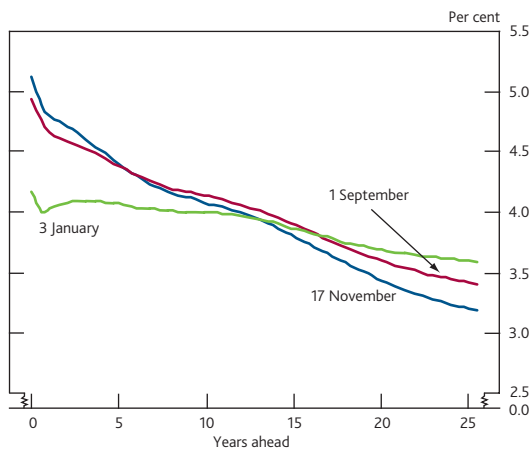
Sources: Bank of England and Euronext.Liffe.

At longer horizons, nominal sterling forward rates fell, with the largest declines occurring at very long maturities. Taken together with the rise in short rates, this meant that the

(1) This article focuses on developments in sterling capital markets since 1 September (the data cut-off for the previous *Quarterly Bulletin*). The data cut-off for this article is 17 November.

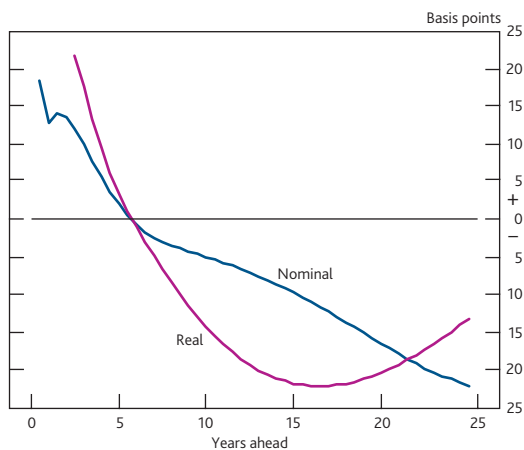
sterling forward rate curve became more inverted (ie downward sloping) (Chart 3). The fall in long-term nominal rates apparently reflected a decline in real interest rates, as the yields on index-linked gilts also fell (Chart 4). UK long-term breakeven inflation rates, derived from the difference between yields on conventional and index-linked gilts were relatively little changed over the period. But at short horizons they fell internationally, having picked up a little earlier in the year (Chart 5).

Chart 3 Sterling nominal forward rates^(a)



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

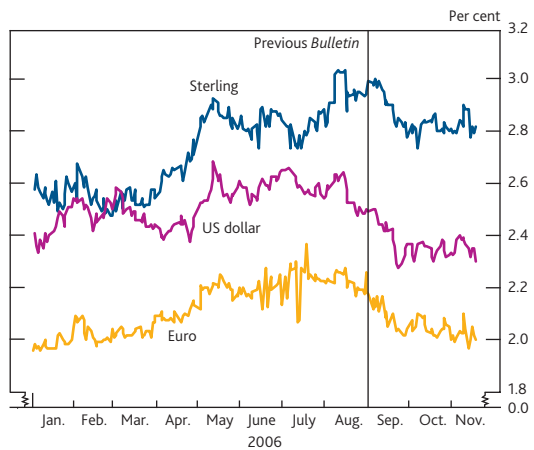
Chart 4 Changes in sterling forward rates since 1 September^(a)



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

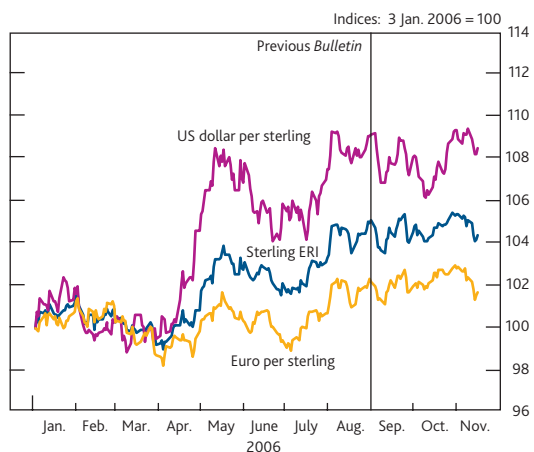
The sterling effective exchange rate index (ERI) ended the period a little lower, reflecting a slight depreciation against both the euro and the dollar, although it remained higher than its average level in the first half of the year (Chart 6). Realised and implied volatility in foreign exchange markets fell over the period, reaching low levels by recent historical standards (Chart 7). Furthermore, information from option prices suggested that market participants' views about the direction of future sterling exchange rate movements were broadly balanced.

Chart 5 International two-year inflation forward rates^(a)



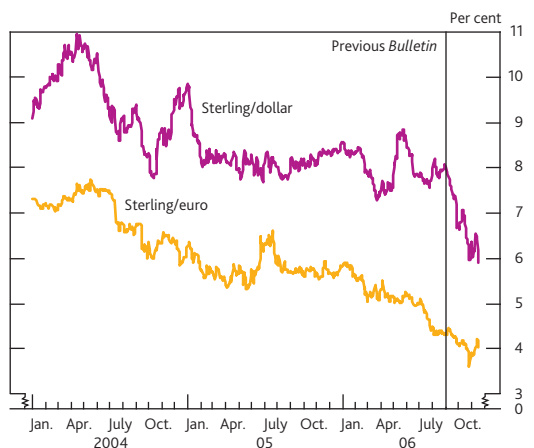
(a) Instantaneous forward rates. Dollar rates derived from the Bank's government liability curve. Sterling and euro rates derived from inflation swap rates. Dollar rates are based on 2½-year forward rate. Sterling rates referenced to RPI, dollar rates referenced to CPI and euro-area rates referenced to HICP.

Chart 6 Cumulative changes in sterling exchange rates since 3 January 2006



Source: Bloomberg.

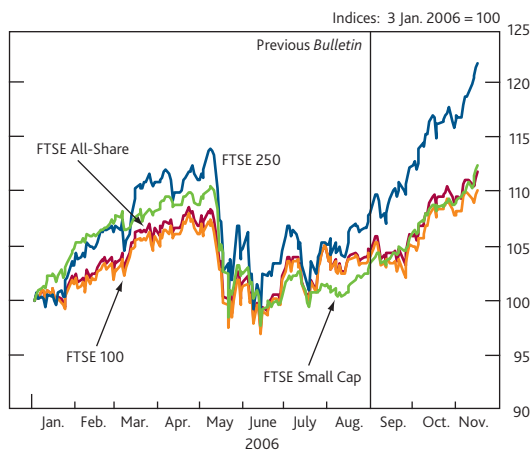
Chart 7 Three-month implied sterling exchange rate volatility



Source: Reuters.

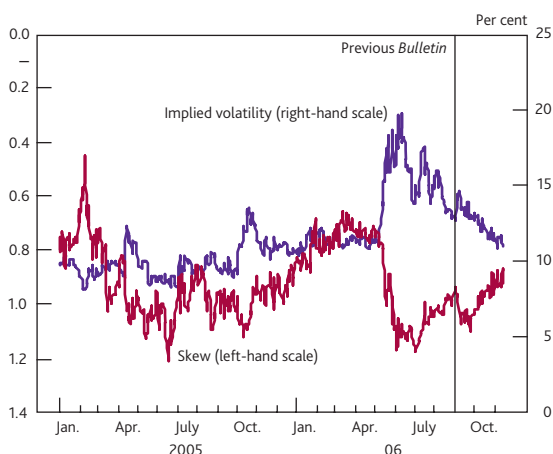
In line with most developed economies, UK equity prices continued to rise over the period, with particularly strong increases in the FTSE 250 index of medium-sized companies (Chart 8). Uncertainty surrounding expected future equity prices, as implied from equity index options, declined to levels similar to those observed prior to May and June (Chart 9). Furthermore, the implied distribution of future equity prices became less negatively skewed, implying that market participants attached less weight than previously to a large future downward movement in equity prices. Nevertheless, the skew remained slightly more negative than it was in mid-May (Chart 9).

Chart 8 Cumulative changes in UK equity indices since 3 January 2006



Sources: Bloomberg and Bank calculations.

Chart 9 FTSE 100 option-implied volatilities and skews(a)(b)



Sources: Bank of England and Euronext.liffe.

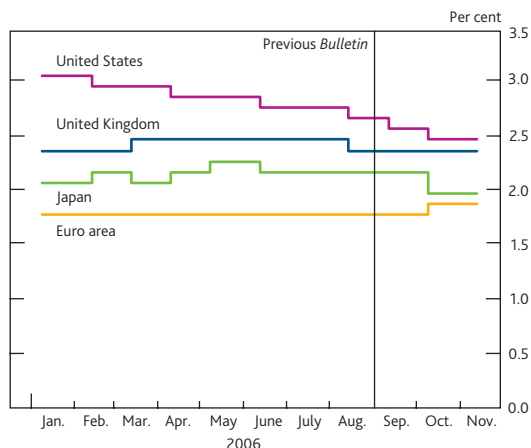
(a) Calculated from the distribution of returns implied from three-month options prices.
 (b) A negatively skewed distribution is one for which large negative deviations from the mean are more likely than large positive deviations.

Key recent influences on sterling markets

Movements in sterling financial markets could have been consistent with the perceived healthy outlook for the UK economy. In particular, as discussed in the November 2006

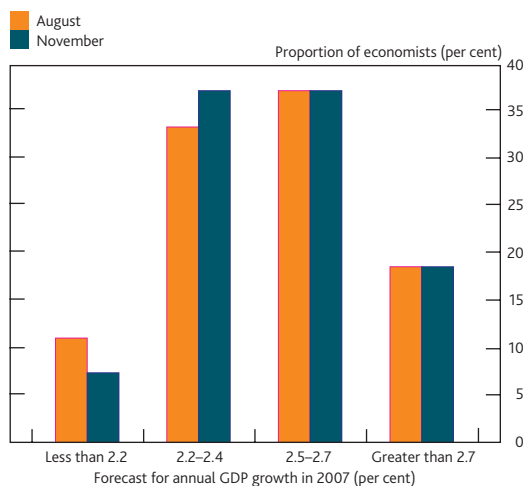
Inflation Report, UK domestic demand has continued to strengthen in recent quarters, despite the squeeze on real incomes associated with higher realised retail price inflation. Looking ahead, the average of economists' forecasts in November was for UK GDP growth to remain robust in 2007 (Chart 10). And the distribution of these forecasts showed fewer forecasters predicting a sharp weakening in economic growth next year (Chart 11).

Chart 10 Expected real GDP growth for 2007



Source: Consensus Economics.

Chart 11 Distribution of economists' forecasts for annual UK GDP growth in 2007



Source: Consensus Economics.

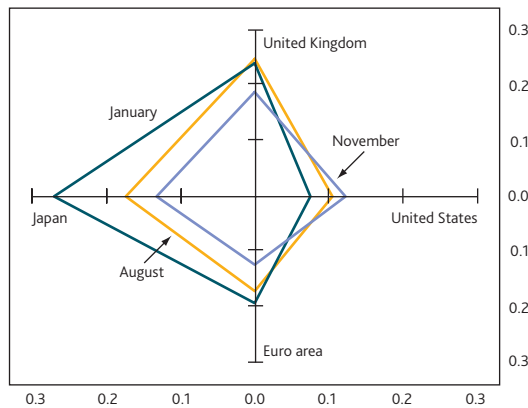
This robust outlook for the UK economy accords with stronger equity prices over the period, and may suggest that the fall in equity prices during May and June reflected a temporary increase in the equity risk premium rather than a reappraisal of underlying future earnings growth. The FTSE 250 index has outperformed the FTSE 100 by some margin (Chart 8), which might be consistent with the firms in the FTSE 250 index being more sensitive to cyclical changes,⁽¹⁾ although empirical

(1) Shares of some firms have a higher 'beta' than others, which means that, given the price of risk for all assets, movements in their prices are amplified.

evidence for this relationship is inconclusive. Alternatively, market contacts have suggested that medium-sized firms may have attracted further interest from hedge funds, seeking to exploit market inefficiencies and investing in relatively 'underresearched' mid-cap equities.

Consensus forecasts for growth in 2007 have not changed significantly for most of the major economies and indicate that continued robust growth is expected next year (Chart 10). However, forecasts for US GDP growth in 2007 were revised downwards during 2006. And the dispersion of these forecasts increased a little in recent months (Chart 12), perhaps reflecting economists' differing assessments of the possible effects of a slowdown in the US housing market on the wider economy.

Chart 12 Dispersion of forecasts for real GDP growth for 2007 for the major economies^(a)



Source: Consensus Economics.

(a) As measured by the coefficient of variation (standard deviation divided by the mean). A larger figure implies greater uncertainty.

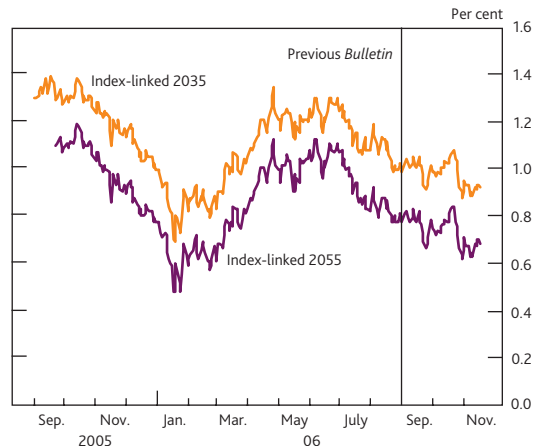
Against that economic backdrop, the strength in the sterling exchange rate during 2006 partly reflected changes in relative interest rates. In addition, as explained in the box on pages 360–61, holdings of sterling by overseas monetary authorities increased further in 2006. The associated investment flows have been small relative to overall turnover in foreign markets. But if other investors use official flows to inform their views about underlying fundamentals, changes in official holdings could have been another factor underpinning the appreciation of sterling through this year.

More generally, some market participants have also suggested that the actions of official investors could have contributed to the continued low levels of volatility in foreign exchange markets. Specifically, it is claimed that transactions by some monetary authorities have tended to limit upward and downward pressure on the major exchange rates due to the regular rebalancing of their portfolios to meet internal benchmarks.

Recent developments in sterling long-term real interest rates

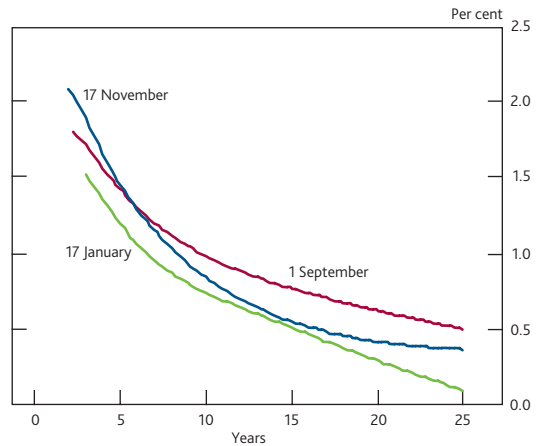
Recent falls have taken sterling long-term real rates back towards their January 2006 lows (Chart 13). The falls have also meant that the sterling real forward curve became more inverted (Chart 14).

Chart 13 Real yields on index-linked gilts maturing in 2035 and 2055



Source: Bloomberg.

Chart 14 Sterling real forward rates^(a)



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

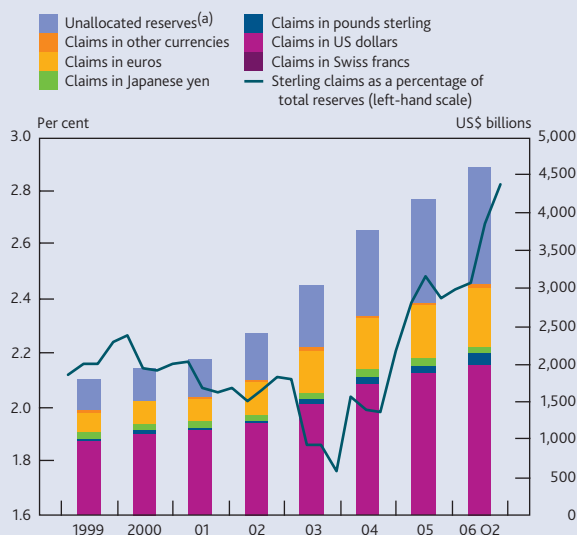
Long-term real rates have also fallen in overseas markets, suggesting that international factors have been important (Chart 15). As discussed in previous *Bulletins*, there are a number of possible reasons for the decline in global long-horizon real interest rates in recent years, although it is difficult to assess the relative importance of these different explanations.

One possible relevant factor is that market participants use developments in short-term interest rates to inform their views of long-term 'neutral' interest rates — that is, those rates that are consistent with economies growing at their

Sterling as a reserve currency

According to the IMF's currency composition of official foreign exchange reserves (COFER) survey, reserves held by monetary authorities worldwide increased to US\$4.6 trillion in 2006 Q2, 16% higher than a year earlier (Chart A).

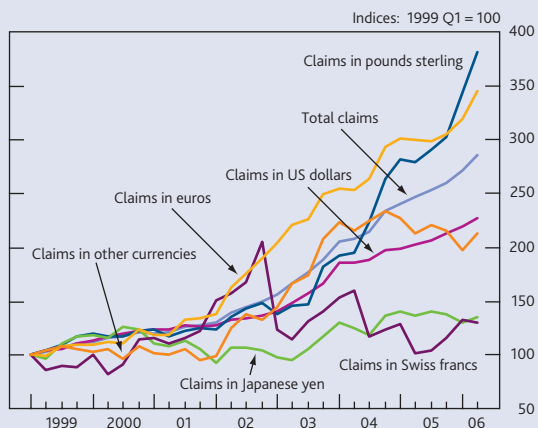
Chart A Official foreign exchange reserves by currency



Source: IMF.

(a) Refer to aggregate official reserves of countries that do not report currency composition data to COFER.

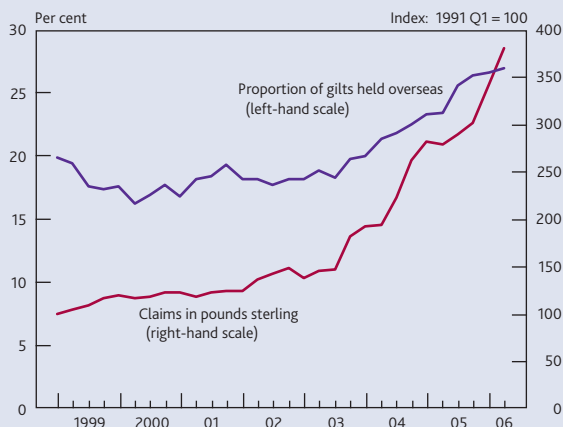
Chart B Cumulative changes in official foreign exchange reserves by currency



Source: IMF.

Within the total, the demand for sterling assets picked up (Chart B). In 2006 Q2, sterling reserves increased by approximately US\$13 billion, almost twice as much as in the whole of 2005, to just under US\$130 billion. As a result, the share of sterling-denominated assets in reserves portfolios increased to around 3%, apparently making sterling the third most held reserve currency behind the US dollar and the euro. The rising share of gilts held by overseas residents seems to be consistent with that (Chart C).

Chart C Official reserves held in sterling and proportion of gilts held by overseas investors



Sources: DMO and IMF.

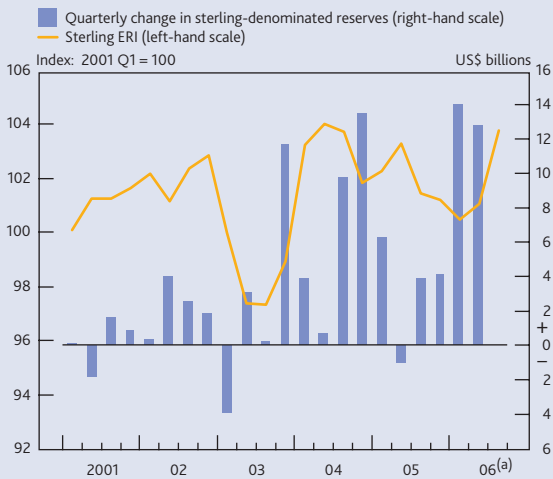
A number of factors have probably been influential.

First, the COFER data are denominated in US dollars. Sterling has appreciated against the dollar by around 18% since the beginning of 2003. Therefore, some of the increase in sterling's share of total dollar-denominated reserves will reflect this revaluation effect.

Second, increases in holdings of sterling assets could also have been motivated by a desire for higher-yielding assets, because in recent years short-dated sterling interest rates have been higher than those of other developed countries whose assets are typically held in reserves portfolios. Market contacts suggest that official institutions tend to hold relatively more short-dated compared with long-dated bonds. Although a positive interest rate differential might, in theory, have been expected to be offset by a currency depreciation, the relative stability of sterling over recent years could have increased the attraction of assets denominated in sterling.

Third, many developed and developing-country central banks seem to have adjusted the currency composition of their reserves in order to benefit from a more diversified portfolio. Over the past couple of years, for example, the Italian, Swiss, Norwegian and Russian central banks have publicly announced increases in their exposures to sterling.

The increase in sterling-denominated official reserves over the past year has been widely quoted by market participants as a likely factor underpinning the strong performance of the sterling ERI. However, Chart D suggests that any relationship between reserve flows and the exchange rate is weak. In the period since the beginning of 2005 to 2006 Q1 the sterling ERI declined steadily despite significant increases in reserves. When the sterling ERI began to rise in 2006 Q2 the quarterly increase in sterling reserves was still significant, but lower than in Q1.

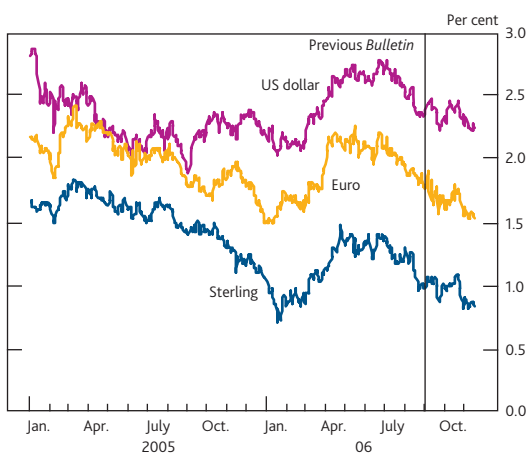
Chart D Sterling reserves and the sterling ERI

Sources: Bank of England and IMF.

(a) Data not yet available from sterling-denominated reserves for 2006 Q3.

The weakness in any empirical relationship between changes in official reserves and the value of sterling is perhaps not surprising since sterling-denominated official reserve flows still

trend growth rates and actual output equal to potential output. The neutral rate is determined by a range of supply-side factors, including productivity growth, investment and the size and quality of the labour force. So while the long-run neutral rate may change over time, in theory it should not move in response to short-term news. Put another way, it is hard to understand why news about the economic conjuncture should affect the expected policy rate ten years hence.

Chart 15 International ten-year real forward rates

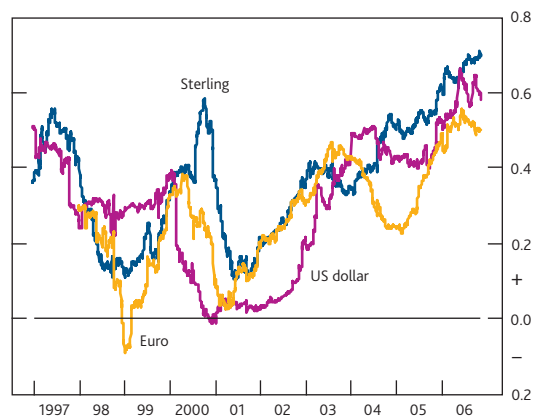
However, market participants may use news about cyclical economic conditions to update their views on the neutral rate, which might explain why long-term and short-term interest rates have tended to react to the same economic news. Consistent with that possibility, the correlation between long and short forward rates has risen in recent years (Chart 16),

represent a relatively minor share of total foreign exchange market activity. In 2006 Q2, the increase in known sterling official reserves was US\$13 billion, compared with an average daily foreign exchange market turnover in April 2006 of approximately US\$1 trillion.⁽¹⁾

However, regardless of their size, official institutional flows may still influence the investment decisions of some market participants who use them to infer underlying information about the fundamental determinants of exchange rates. Moreover, monetary authorities are perceived to have become more important players in foreign exchange markets. For example, some market participants have attributed the recent low levels of foreign exchange volatility to the actions of managers of official reserves who rebalance currency holdings to maintain portfolios in line with currency benchmarks. This typically requires them to buy currencies that have depreciated and sell those that have appreciated.

(1) For more details, see the results of the semi-annual foreign exchange turnover survey by the Joint Standing Committee available on the Bank of England website.

with an increasing correlation between long-term real forward rates and short-term nominal rates (Chart 17).

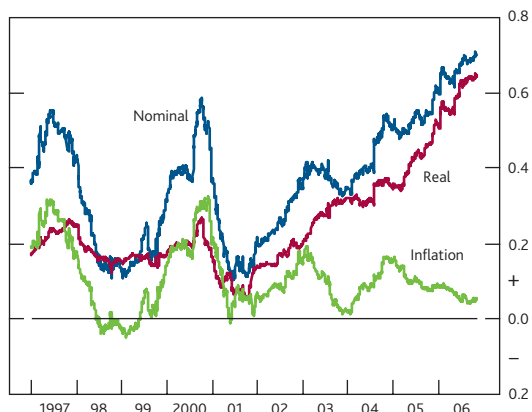
Chart 16 Comovement between changes in international nominal forward rates at one-year and ten-year horizons^(a)

Source: Bank of England calculations.

(a) This chart plots the coefficient from a regression of daily changes in ten-year nominal forward rates on daily changes in one-year nominal forward rates over a one-year rolling window.

An alternative possible explanation is that movements in global long-term interest rates have been driven by changes in 'real term premia' — the compensation required by investors for uncertainty about future real returns. Such term premia should, in theory, depend on investors' perceptions of uncertainty surrounding future pay-offs on index-linked bonds and also the degree to which investors dislike uncertainty about those pay-offs.

Chart 17 Comovement between one-year and ten-year sterling nominal, real and inflation forwards^(a)

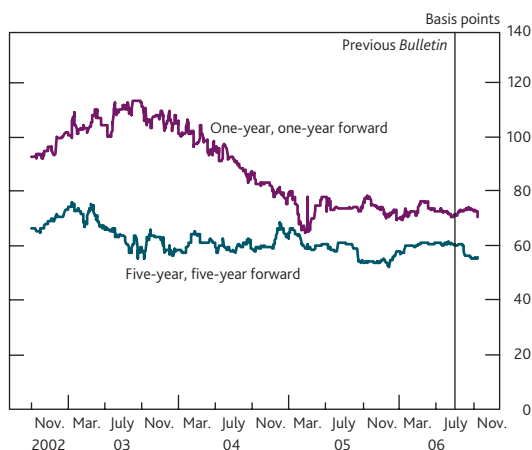


Source: Bank of England calculations.

(a) This chart plots the coefficient from separate regressions of daily changes in ten-year sterling nominal, real and inflation forward rates on daily changes in one-year nominal forward sterling rates over a one-year rolling window.

Changes in perceived uncertainty should be reflected in implied volatilities derived from option prices. Options on real long-term bonds are not widely traded. But forward implied volatility derived from sterling nominal swaptions has remained broadly stable at long horizons in recent years (Chart 18).

Chart 18 Forward implied volatility from sterling swaptions



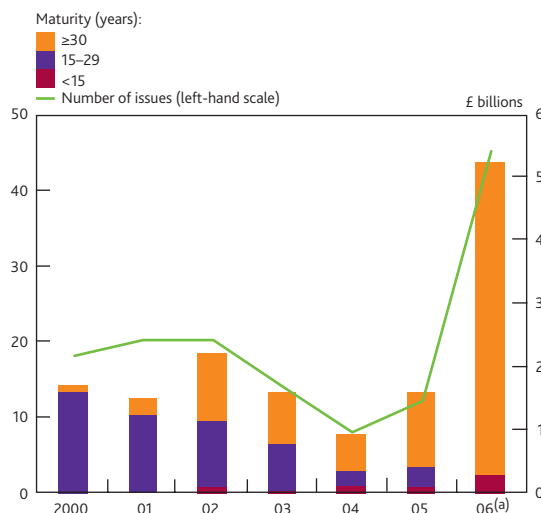
Source: JPMorgan Chase & Co.

Instead, changes in term premia might reflect a shift in investors' risk preferences. One interpretation is that the marginal buyers of long-dated index-linked debt have become more willing to pay a premium for these assets. In the UK context, such an explanation might be consistent with widespread reports of strong institutional demand for long-dated index-linked bonds, particularly from pension funds. These institutions typically have long-term inflation-linked liabilities they wish to hedge,⁽¹⁾ and hence might have a strong preference for index-linked bonds to ensure they receive real cash flows over long-time horizons.

Put another way, the returns on index-linked gilts may incorporate negative real term premia. That is, rather like entering into an insurance contract, investors may be willing to pay a higher price for index-linked securities because the pay-offs may be received in states of the world when they are most valued.⁽²⁾

Recently, market contacts have reported stronger institutional demand for long-dated index-linked gilts, and this coincided with renewed falls in long-term sterling real rates. That occurred despite a notable increase in very long-dated sterling index-linked issuance by firms during 2006, largely reflecting issuance by utility companies (Chart 19).

Chart 19 Non-government sterling inflation-linked bond issuance



Source: Dealogic.

(a) Year to 17 November.

Interpreting moves in UK breakeven inflation rates

Investors' risk preferences could also be important for interpreting developments in breakeven inflation rates. More specifically, if institutional investors have become more willing to pay a premium for index-linked gilts to guarantee real cash flows and there has been no equivalent effect on the conventional gilt market, this would have tended to push up observed breakeven inflation rates.

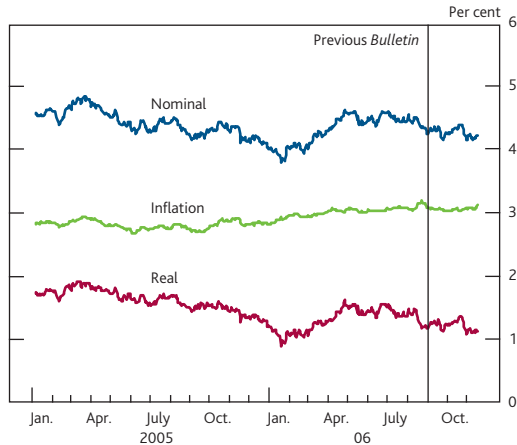
In fact, over the past few years breakeven inflation rates have been much less volatile than nominal or real rates, which have generally moved in tandem (Chart 20). Some market contacts have said this was because traders typically have a clearer view of what they consider an appropriate level for inflation compensation, at least at medium-term horizons, given the

(1) See the box entitled 'Pension fund valuation and liability driven investment strategies' in the Spring 2006 Quarterly Bulletin, pages 8–9.

(2) For a fuller discussion of the influence of risk premia on global real rates see the box 'Real interest rates and macroeconomic volatility' in the Autumn 2005 Quarterly Bulletin, pages 308–09.

explicit inflation target in the United Kingdom. Hence the yields on conventional bonds have tended to move in line with those on index-linked bonds, whereas breakeven rates have traded in a narrower range.

Chart 20 Sterling five-year forward rates^(a)



(a) Five-year rates starting five years forward derived from the Bank's government liability curves.

Nevertheless, sterling breakeven inflation rates drifted up a little during 2006 (Chart 20). That could have reflected either an increase in market participants' expectations of future inflation or a larger inflation risk premium to compensate investors for the uncertainty about future inflation. But as noted in the November 2006 *Inflation Report*, survey evidence did not show a pickup in long or medium-term expected inflation. And discussions with market contacts suggested that there was not a widespread increase in investors' medium-term inflation expectations. Instead, the recent rise in breakeven inflation rates could have been because market participants revised up their assessment of future inflation volatility a little in the light of recent inflation outturns.

A further consideration is whether particular structural features of the sterling inflation-linked market could also have been important in explaining recent developments in breakeven inflation rates. The sterling inflation-linked market has developed substantially in recent years, both in terms of size and efficiency, as explained in the article on pages 386–96. However, there remain market frictions, which may influence observed market rates, at least temporarily. For example, the index-linked market tends to be less liquid than the conventional gilt market.

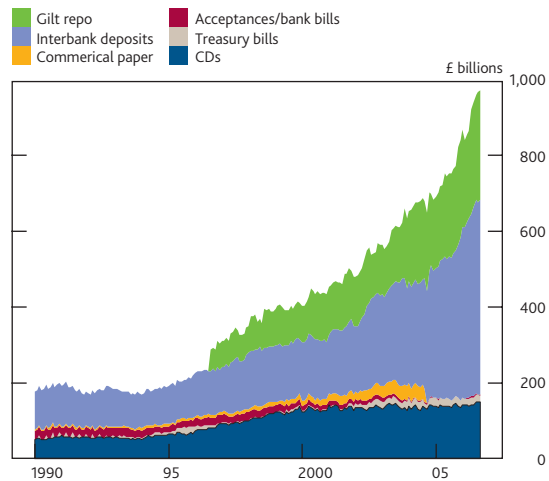
Developments in market structure

Ten years of the gilt repo market

The gilt repo market is now ten years old. Its introduction in January 1996 was one of the most significant changes to the structure of sterling financial markets since 'Big Bang' in 1986.

The gilt repo market quickly developed into the major sterling market in secured money. It grew alongside the existing unsecured money markets, and over time there has been a shift towards gilt repo taking a larger share of sterling money market transactions (Chart 21). Having monitored the initial growth in scale and depth of the market, in 1997 the Bank started conducting open market operations in gilt repo. The box on pages 364–65 provides more detail on how the market has developed and reviews the reasons for it being established.

Chart 21 Sterling money market assets



In July 2000, the Bank's Central Gilts Office was merged into CREST. Since then, settlement of gilt repo transactions has been in CREST, either against deliveries of specific gilts or using the delivery-by-value (DBV) mechanism. DBVs are overnight collateral deliveries used to settle repos and securities loans where the intention is to finance a basket of collateral rather than deliver specific securities. The merger was part of the creation of a single settlement system for gilt, money market and equity transactions in order to create a more efficient and effective UK securities settlement system. Harmonisation and consolidation of settlement systems has continued, for example via Euroclear's initiative to consolidate its domestic settlement services — including CREST — into a single platform for European settlement.

CREST settlement

The 2006 Q3 *Quarterly Bulletin* reported that the daily settlement of UK securities in CREST had been completed later than scheduled during a short period following the transfer of major aspects of CREST settlement to Euroclear's Single Settlement Engine (SSE) on 28 August.

CREST has implemented a package of changes designed to improve performance, particularly in the processing of DBVs. These restored the settlement timetable to normal. Also, additional flexibility has been created to keep the market for US dollar-denominated DBVs open later, as an additional financing option, by separating the US dollar and euro currency

Ten years of the gilt repo market

The gilt repo market began on 2 January 1996 and was one of the most significant changes to the structure of sterling financial markets since 'Big Bang' in 1986. This box looks back at its introduction and considers its development during the past decade.

A gilt sale and repurchase (repo) transaction involves one party agreeing to sell gilts to another party with a legally binding commitment to repurchase equivalent gilts at an agreed price at a specified future date. Gilt repo provides a mechanism for, in effect, 'borrowing/lending' cash against gilt collateral and also for 'borrowing/lending' particular gilts.

Until 1996, a variety of regulations limited which institutions could lend and borrow gilts, and the intermediaries through which such transactions had to be made. The creation of what was referred to at the time as an 'open' gilt repo market made it possible for all financial institutions to transact in gilt repo. That meant anyone could finance outright short positions (ie sell gilts they did not own) by taking delivery of gilts via reverse repos. In parallel, the gilt stock lending market was liberalised so that end-investors in gilts, such as pension funds and insurance companies, could lend them against the collateral of other securities, such as bank certificates of deposit.

To facilitate the successful introduction of the market, various further changes were introduced by the authorities. These included the development of a market standard legal agreement, changes to settlement systems and changes to tax on gilt dividend (coupon) payments. And in order to avoid market disruption caused by malpractice, which had occurred in some overseas bond repo markets, market practitioners and regulators worked with the Bank to draw up recommended market practices. These were set out in a Code of Best Practice.

Gilt repo and the sterling money markets

The gilt repo market quickly developed into the major sterling market in secured money. By the end of 1996, gilt repo comprised around 20% of the stock of sterling money market assets. By mid-2006 this had increased to around 30%.

The gilt repo market has become an important financing mechanism for many gilt market participants. Banks and others will often use other securities (eg certificates of deposit, corporate bonds and asset-backed securities) as collateral to borrow gilts from lenders, such as pension funds and insurance companies, at a fee, in order to deliver the gilts in the repo market to raise cash. In this way, the gilt stock lending and repo markets can be used together to finance holdings of a wider range of securities.⁽¹⁾ Gilt repos are also

used to take positions on the future level of short-term interest rates.

Monetary policy

Following the initial growth in the gilt repo market, the Bank decided in 1997 to make gilt repo the primary instrument used in its open market operations (OMOs). This increased the pool of collateral eligible for use in OMOs and, at the time, reduced the strain on the eligible/commercial bill market. Since then, the Bank has added European government and supranational securities to the pool of collateral for its OMO repo operations. But gilt repo has remained the largest part of the Bank's OMOs, even after its recent money market reforms.

Impact on the gilt market

The gilt repo market has also come to play a central role in the market for UK government bonds and created new possibilities for participants in this market.⁽²⁾

- Liquidity in the gilt market has increased, in part because dealers can cover short positions in gilts more easily using gilt repo.
- Arbitrage in the gilt market has been aided by the extension of the ability to take short positions in gilts to all wholesale market participants. This, together with the greater liquidity, has made pricing anomalies less likely to persist and short-term changes in supply and demand more easily absorbed.

Implications for the banking system

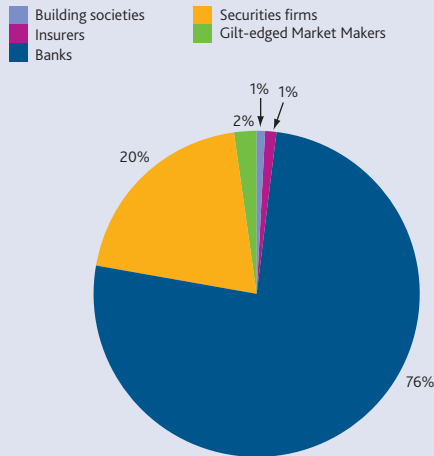
The gilt repo market has provided UK banks with a new tool for managing liquidity and credit risk. For example, by permitting secured lending and borrowing, gilt repo has allowed banks to manage their sterling liquidity with less credit exposure, hence allowing more efficient use of capital. And, in combination with the expansion of eligible collateral in the Bank's OMOs, gilt repo has enabled many market participants to switch their holdings between a wide range of different types of European government securities to optimise their risk and return.

Banks remain the most active participants, accounting for around three quarters of the amount of gilt repo outstanding (**Chart A**), compared with around two thirds a decade ago. The large UK retail banks hold gilts as part of their prudential stock of high-quality liquid assets in order to meet day-to-day liquidity needs and regulatory requirements.⁽³⁾ In the past, banks typically bought gilts outright but that has changed and banks now almost entirely borrow gilts through the repo market on a term basis for this purpose.

The greater use of secured funding compared with borrowing in unsecured money markets reflects a desire of banks to

reduce their credit risk. Spreads between secured and unsecured overnight rates have been volatile but are currently at broadly similar levels to those in early 1996.

Chart A Share by institutional type in gilt repo market^(a)



(a) Data refer to August 2006.

Evolution of the structure of the gilt repo market

One important structural change is that, since 2002, it has been possible for all market participants to trade with each other through a central clearing counterparty, the London Clearing House (LCH), which reduces participants' balance sheet usage as positions with the LCH can be netted against each other, and facilitates anonymous trading. Another is that settlement of gilt repo transactions is now carried out by CRESTCo following the transfer, in July 2000, to CREST of the Bank's Central Gilts Office in 1996.

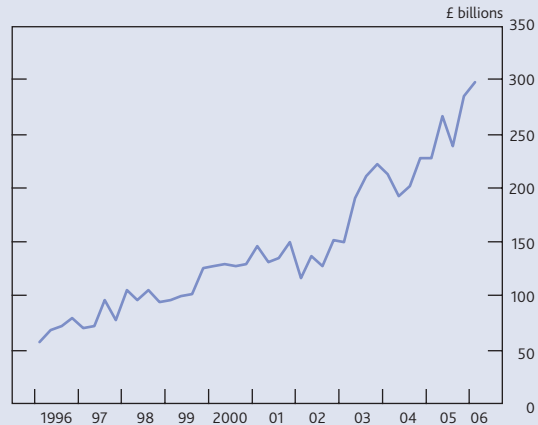
The way that brokers operate has also changed, with electronic broking increasing. That has increased the ease with which participants can view rates and the size of bids and offers in the market, promoting liquidity, though a significant amount of trading is still conducted bilaterally or through voice brokers.

The stock of outstanding repo transactions has risen to around £300 billion, according to the Bank's quarterly survey of repo market participants (**Chart B**). Turnover has also risen from around £7 billion per day in early 1996 to around £40 billion in the quarter ending August 2006. Around two thirds of this turnover has a maturity of one or two days. This is much the same as a decade ago — only around 5% of overall turnover is for a maturity of one month or longer.

But while the market has evolved greatly in the past decade, its framework remains largely the same. Through the Securities Lending and Repo Committee (SLRC) and Money Market Liaison Group, the Bank is currently facilitating a

market debate on the continued need for a Gilt Repo Code now that the market is well established.⁽⁴⁾

Chart B Gilt repo amounts outstanding



Overall, the development of the gilt repo market has had a profound impact on the sterling money markets and the gilt-edged market. They now benefit from greater liquidity, a more developed market in secured money, lower financing costs and improved hedging opportunities.

(1) See the box on collateral upgrade trades on page 371.

(2) Since the Bank introduced gilt repo, there have been other important changes to the gilt market, including responsibility for UK debt management being transferred to the Debt Management Office in 1998.

(3) Gilts are included within the category of assets allowable as high-quality liquidity under the FSA's Sterling Stock Liquidity Regime.

(4) The SLRC continues to bring together market practitioners and the authorities to discuss structural (including legal) developments. Recent work by the SLRC is described in the box on pages 136–37 of the Summer 2006 *Quarterly Bulletin*.

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

£ billions					
Liabilities	8 Nov.	2 Aug.	Assets	8 Nov.	2 Aug.
Banknote issue	39	39	Short-term sterling reverse repo	31	34
Reserve account balances	16	21	Long-term sterling reverse repo	15	15
Standing facility deposits	0	0	Ways and Means advance	13	13
Other sterling deposits, cash ratio deposits and the Bank of England's capital and reserves	13	10	Standing facility assets	0	0
Foreign currency denominated liabilities	13	12	Other sterling-denominated assets	4	5
			Foreign currency denominated assets	16	15
Total^(c)	80	82	Total^(c)	80	82

(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: 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.

deadlines. This had followed a few occasions when US dollar settlement (which previously had the same settlement deadline as euro DBV in CREST) was closed before DBVs could be processed owing to the deadline for closing of the pan-European TARGET euro payment system.

During the past few months, CREST settlement performance has been discussed at meetings of the Money Market Liaison Group and Securities Lending and Repo Committee, both chaired by the Bank. Members of the committees stressed the need for a clear timetable of proposed changes to be published for market participants. The Bank has a direct interest in CREST performance because cash settlement in CREST occurs across RTGS accounts at the Bank and gilt repo transactions as part of the Bank's operations to implement monetary policy settle in CREST.

Market contacts reported that delays in the processing of DBVs may have been increased by CREST users entering many trades close to the deadline typically associated with the financing of client's equity positions. CREST's link to the SSE meant that transactions now take slightly longer to reach settlement, so that market participants had greater uncertainty very near the deadlines. Some changes in business practices might be required.

LCH plans for netting of gilt DBV repos

The 2006 Q3 *Quarterly Bulletin* also described LCH.Clearnet's plans for the extension of its gilt repo clearing service to gilt DBVs, planned for October 2006. That launch has been put back until there has been a sustained period of stability in CREST's DBV processing.

Bank of England official operations⁽¹⁾

The Bank's management of its balance sheet is directed to policy purposes. Changes in the Bank's assets and liabilities are, accordingly, related to the implementation of monetary policy through establishing Bank Rate in the money markets;

management of the Bank's foreign exchange reserves; provision of banking services to other central banks; provision of payment services for the UK financial system and wider economy; and management of the Bank's free capital and cash ratio deposits from financial institutions.

Monetary policy implementation

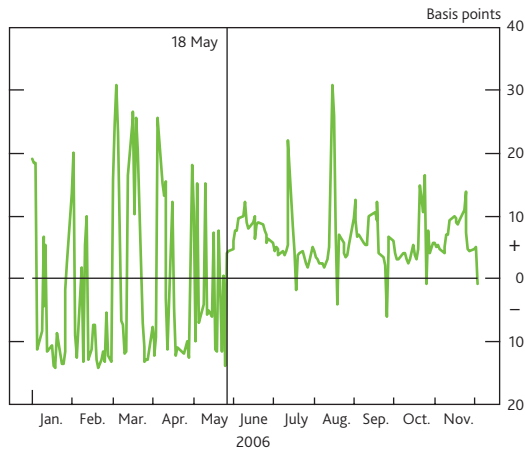
The overall size of the balance sheet fell over the review period, reflecting a reduction in banks' and building societies' target reserve balances (**Table A**). The 41 reserves scheme members chose to target around £18 billion in the maintenance period ending 6 September and around £16 billion in the period ending 8 November. More experience of the new reserves scheme may have prompted banks to reduce reserves targets — some banks held higher reserves immediately after the launch of the new framework for precautionary reasons. Some settlement banks also reverted to raising more of their intraday liquidity against eligible collateral rather than holding reserves for that purpose.

Active use of the reserves averaging scheme plays a key role in meeting the Bank's objective for overnight market interest rates to be in line with Bank Rate during the monthly maintenance periods. Over the review period, overnight unsecured rates, in general, continued to trade close to Bank Rate (**Chart 22**). Day-to-day volatility of unsecured sterling rates continued to compare favourably with that of overnight rates in other currencies (**Chart 23**).

As noted in the previous *Bulletin*, since the launch of the new framework, unsecured market rates have tended to rise relative to Bank Rate at month-ends, and at the end of July secured market rates fell sharply. This appears to be because some banks put limits on interbank lending around month-ends in order to reduce the size of their risk-weighted assets for internal and regulatory reporting purposes.

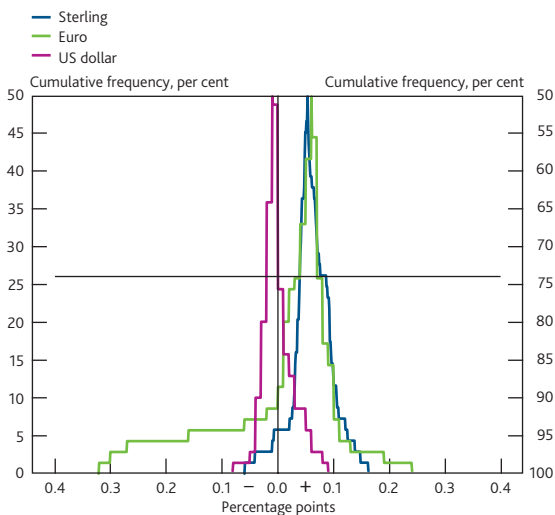
(1) This section reviews the three maintenance periods from 3 August to 8 November.

Chart 22 Spread to Bank Rate of unsecured sterling overnight interest rates



Sources: Wholesale Market Brokers' Association and Bank calculations.

Chart 23 Folded cumulative distribution^(a) of spread of international unsecured overnight interest rates to official interest rates^(b)



(a) Distribution of the spread between the 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.

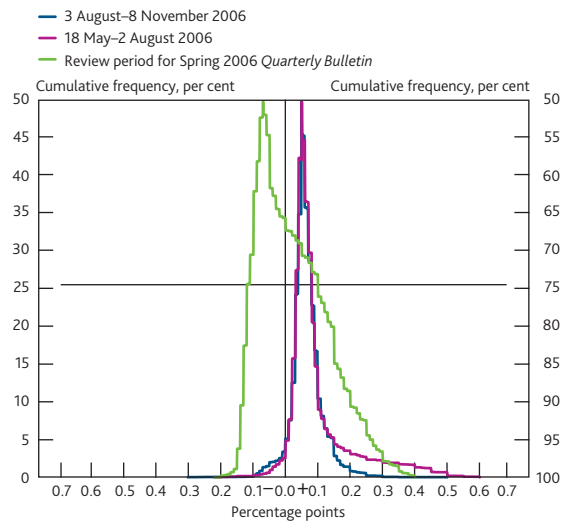
(b) Chart shows distribution for period 3 August to 8 November.

Over the current review period, month-end effects have continued but have been somewhat less pronounced. Those reserves scheme members without balance sheet constraints at month-ends have been able to arbitrage money market rates so that overnight unsecured rates have traded closer to Bank Rate. Reflecting this, the range of rates at which overnight unsecured trades were executed narrowed during the period, and the vast majority of trading occurred within 15 basis points of Bank Rate (**Chart 24**). Moreover, the majority of trading has taken place within a much narrower range of rates than was the case under the previous regime.

Volumes in the unsecured overnight market increased following a decline over the summer period, but then fell

ahead of the September quarter-end. Such falls are not uncommon at quarter-ends, though there is some evidence that the falls this year have become more pronounced, possibly consistent with a greater desire to reduce risk-weighted assets.

Chart 24 Folded cumulative distribution^(a) of spread of sterling unsecured overnight interest rate (trade weighted) to Bank Rate



Source: Wholesale Market Brokers' Association.

(a) The cumulative distribution function shows the percentage of trades executed at or below a given spread to Bank 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.

Secured overnight market interest rates have also tracked Bank Rate closely — almost all trades executed were within 10 basis points of Bank Rate. But there were a few days around the end of September, when the secured overnight rate increased relative to Bank Rate (**Chart 25**). Discussions with market contacts and at the Money Market Liaison Group (see box on pages 368–69) suggest that this reversal of the experience of end-July appears to have reflected caution among repo traders who were unwilling to put themselves in the position of needing to lend cash against gilt collateral after the end-July 'squeeze'. In response to the events of 31 July, the Bank made changes to its operational timetable to allow counterparties to substitute other types of collateral for gilts later in the day, and not just in the morning. That should help to alleviate any frictions in the supply of gilt collateral at month-ends and at other times. In the light of market feedback received on the Bank's plans to provide longer-term financing through outright bond purchases,⁽¹⁾ the Bank will consider lending its outright gilt holdings in due course.

The effectiveness of reserves averaging in keeping market rates in line with Bank Rate depends on the willingness of reserves

(1) See www.bankofengland.co.uk/markets/money/documentation/consult_bond_purchases.pdf.

The work of the Money Market Liaison Group in 2006

The Money Market Liaison Group (MMLG), chaired by the Bank of England, was established in 1999. It provides a high-level forum for discussion of market or structural developments affecting sterling money markets and related infrastructure and, where appropriate, responses to them. Typically, it meets quarterly and comprises representatives from market participants, trade associations and the authorities.

Discussions of developments in the Bank of England's official operations

Money market reform

The MMLG has been the main discussion forum for issues arising from the Bank's reforms to its operations in the sterling money markets. Ahead of the launch of the reforms, the Bank liaised with the group at each stage, including discussing the dress rehearsal for participants and the start of the Bank's long-term repo open market operations (OMOs). Since the launch of the new framework, the MMLG has provided market participants with an opportunity to offer the Bank feedback on the changes.

Membership of the MMLG has been broadened to include representatives of institutions involved in the various components of the new operational framework (settlement banks, reserves scheme members, OMO counterparties and standing facility participants), ensuring that the Group reflects all parts of the sterling money markets. Following the reforms more than 60 banks, building societies and securities dealers participate in the Bank's new monetary policy implementation framework, consistent with the Bank's objectives to promote competitive and fair sterling money markets.

The MMLG has also been consulted on the Bank's proposals to provide long-term financing to the banking system through outright bond purchases, in particular regarding the mechanics of tenders. Members have also been invited to comment on the proposal that the Bank should move to electronic bidding for all of its OMOs.

The Group has also been used to communicate smaller technical changes to the Bank's operations, including proposals for the collateralisation of interest on repos; changes to the implementation of the Bank's collateral concentration limits; and the possibility of the Bank accepting delivery of euro-denominated collateral using Euroclear and Clearstream 'links' into national central securities depositories.

Survey of sterling market participants

To help assess whether its money market reforms have achieved their objectives, the Bank intends to conduct an extensive survey of sterling money market participants, including end-users. Members have commented on the design, format and timing of the survey, which is expected to be carried out during the first quarter of 2007.

Contingency planning

In the event of a crisis, the MMLG plays two co-ordinating roles. First, it provides a means of communication between sterling market participants via conference call arrangements. Second, if necessary, it makes recommendations on trading or market conventions in money markets.

The group has published — and updates regularly — a document detailing how decision-making in sterling money markets and their supporting infrastructure would work in a crisis, including the respective roles of the Bank, CREST, CHAPS and the MMLG.⁽¹⁾

The MMLG is also sponsoring a sterling market 'live' contingency exercise, to be conducted in 2007. The intention is to move large parts of the sterling market to backup sites, with a skeleton team left at primary sites to be called upon in the event of any problems. The aim is to test the resilience of staffing contingency arrangements of major sterling money market participants, in particular their ability to communicate and trade with each other from their contingency sites, and not just in isolation. That follows up a recommendation made by the FSA as a result of its Resilience Benchmarking Project. A test on such a large scale as this will require careful planning.

MMLG has also discussed and approved the British Bankers' Association's (BBA) contingency plans for the continued publication of BBA Libor rates.

The Operations Sub-Group

A key priority for 2006 was to establish an Operations Sub-Group, to provide a forum for discussion of important structural developments affecting trading, clearing, payments and settlement infrastructure in sterling markets. The Sub-Group was also tasked with addressing contingency planning, including testing — it has led on planning the sterling money market exercise described above and it participated in the market-wide exercise on planning for an influenza pandemic in October/November 2006.

The group comprises representatives from operations and treasury areas in a range of sterling market participants and infrastructure providers and meets quarterly ahead of MMLG meetings.

Discussions/initiatives relating to wider issues for the sterling money market

Euroclear proposals for a single platform

During 2006, the MMLG has monitored and offered feedback on Euroclear's proposals to migrate its national central securities depositories to a single platform. The first phase of this is the Single Settlement Engine (SSE), which concentrates on core settlement functionality. Major aspects of settlement for UK and Irish securities in CREST moved to the SSE at the end of August. The communication issues between CREST and the SSE, described on pages 363 and 366, were discussed in depth by the MMLG at its October 2006 meeting.

LCH clearing of gilt DBV repo

The Group has also monitored and contributed views on LCH.Clearnet's plans to extend its central counterparty clearing service for gilt repo transactions to deliveries of gilts through CREST's delivery-by-value (DBV) service. Members of the MMLG expected the product to improve liquidity in the gilt repo market at longer maturities.

Changes to UCITs rules for the eligibility of assets

The Group discussed an EU review of the eligibility of different asset types in UCITs vehicles, including money market funds. MMLG members had stressed the importance of the continued eligibility of bank certificates of deposits (CDs) for purchase by such funds.

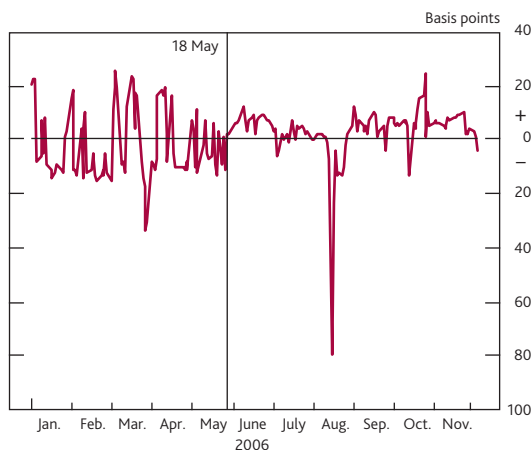
Secured/unsecured spreads

Following volatility in the spread between overnight unsecured interbank rates and gilt repo rates at the ends of June and July, the Group discussed the causes of occasional collateral shortages and of higher unsecured rates at month-ends. Members emphasised constraints on banks' ability to lend unsecured in the overnight market because of a desire to limit reported risk-weighted assets; and a knock-on effect to the repo market if intermediaries reduced holdings of CDs that could be used to collateralise borrowing of gilts from securities lenders.

(1) The 'Contingency Matrix' is posted on the Bank's website, www.bankofengland.co.uk/markets/money/contingency_matrix060317.pdf.

scheme members to vary their reserves balances actively in response to changes in market interest rates.

Chart 25 Spread to Bank Rate of secured market interest rates^(a)

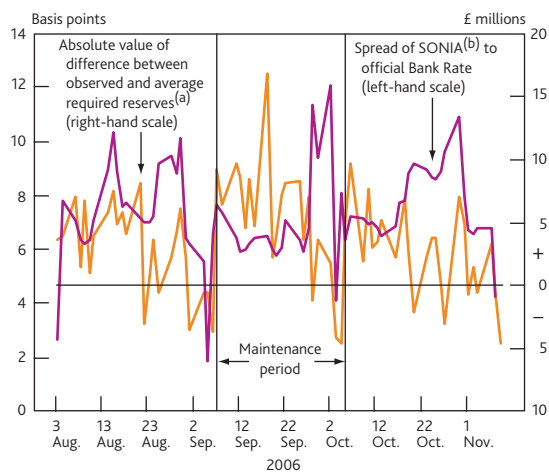


(a) ICAP GC overnight repo fixing less Bank Rate.

Over the review period, there was evidence of more active management of reserves among scheme members as a whole, despite a fall in the level of aggregate target reserves. One way of gauging the degree of active management is the difference between each bank's actual reserves balance at the end of each day and the average balance it would have needed to hold over the remainder of the maintenance period in order to hit its reserves target exactly. **Chart 26** shows the sum of (the absolute value of) this difference across all reserves scheme members; a higher value indicates more active

reserves management. Active management appears to have, in general, been slightly greater in the past few maintenance periods, which may reflect greater experience of the new system and is consistent with unsecured overnight rates trading close to Bank Rate.

Chart 26 Reserve averaging and spread of sterling unsecured overnight market interest rate to Bank Rate



(a) The line indicates the extent to which reserves scheme members were actively managing their reserve accounts. For each day, it sums the absolute difference between each member's observed balance and the average balance it would have needed to hold in order to hit its reserve target. Higher values suggest a greater degree of active reserves management.
(b) Sterling overnight index average.

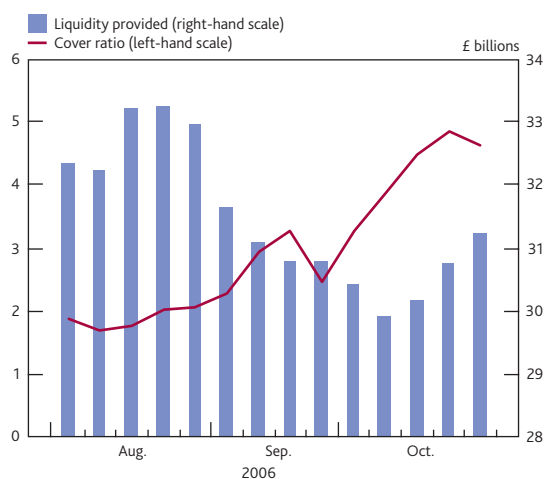
In its open market operations (OMOs), the Bank aims to supply enough cash so that all scheme members can achieve their reserves targets exactly, at the mid-point of the $\pm 1\%$ range around these targets within which reserves are

remunerated at Bank Rate. Reserves scheme members face interest penalties if they hold a balance outside (either above or below) the target range.⁽¹⁾ Excess reserves above the top of the target range are not remunerated. Any shortfalls of reserves below the target range are charged at Bank Rate and deducted from the interest paid.

Over the review period 'excess' reserves totalled £1.5 billion, implying foregone interest of more than £215,000. These excess reserves arose owing to errors in the liquidity management of some reserves scheme members. So far, there have been no instances of a reserve bank holding a balance below its target range.

The Bank corrects for any excess reserves in its weekly or fine-tune OMOs to ensure that other reserves scheme members are still able to meet their reserves targets exactly. Over the review period, the size of the weekly short-term OMO fell, reflecting the reduction in aggregate reserves targets. Cover (the ratio of bids to the amount on offer) in the short-term OMOs increased steadily for the first six weeks of the period and more rapidly in October (Chart 27). The concentration of short-term OMO allocations — as measured by a Herfindahl index⁽²⁾ — decreased.

Chart 27 Liquidity provided in weekly operations and cover ratio

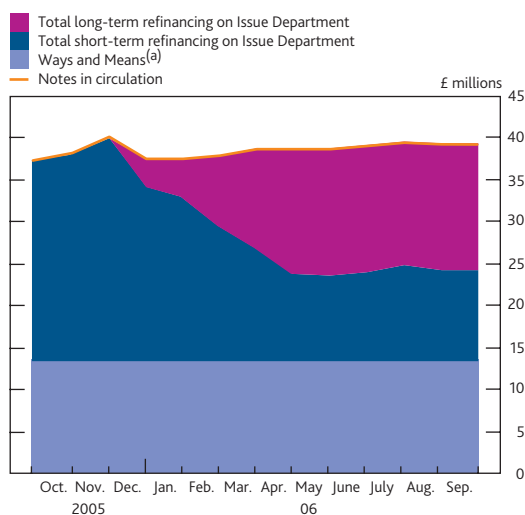


Two fine-tuning OMOs were conducted. On 6 September, the fine-tune supplied reserves of £4.7 billion. This was the largest fine-tune to date, reflecting a combination of standing deposit facility usage, some banks holding excess reserves and other movements in 'autonomous factors'.⁽³⁾ On 8 November, the fine-tune drained £2.4 billion of reserves from the system, reflecting changes in autonomous factors.

The Bank introduced long-term repo OMOs (at market interest rates) in January as part of the reforms to its operations in the sterling money markets. Reflecting this, a significant proportion of the assets financing the banknote

issue is now accounted for by long-term reverse repos (Chart 28). Over the review period, yield tails in the monthly long-term repo OMOs remained small and each maturity was more than fully covered (Table B).

Chart 28 Assets backing notes in circulation



(a) An advance to HM Government. This fluctuated prior to the transfer of responsibility for UK central government cash management to the UK Debt Management Office in April 2000. The Ways and Means is now usually constant, varying only very occasionally.

Table B Long-term repo operations

	Three month	Six month	Nine month	Twelve month
19 September 2006				
On offer (£ millions)	1,800	750	400	200
Cover	2.93	3.01	2.63	4.00
Weighted average rate ^(a)	4.892	5.014	5.115	5.190
Highest accepted rate ^(a)	4.900	5.015	5.115	5.190
Lowest accepted rate ^(a)	4.880	5.010	5.115	5.190
Tail ^(b) basis points	1.2	0.4	0	0
17 October 2006				
On offer (£ millions)	1,500	750	400	200
Cover	2.56	3.39	2.25	2.75
Weighted average rate ^(a)	4.973	5.063	5.145	5.215
Highest accepted rate ^(a)	4.975	5.072	5.145	5.215
Lowest accepted rate ^(a)	4.97	5.055	5.145	5.215
Tail ^(b) basis points	0.3	0.8	0	0
14 November 2006				
On offer (£ millions)	1,500	750	400	200
Cover	3.16	2.02	1.88	2.25
Weighted average rate ^(a)	5.073	5.152	5.205	5.245
Highest accepted rate ^(a)	5.075	5.165	5.205	5.245
Lowest accepted rate ^(a)	5.070	5.140	5.205	5.245
Tail ^(b) basis points	0.3	1.2	0	0

(a) Per cent.

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

- (1) The Bank sets the range at $\pm 1\%$ of a reserves scheme member's cumulative balance throughout the entire maintenance period, thereby providing a range large enough to absorb likely errors in the Bank's liquidity forecast on the final day of the maintenance period.
- (2) This index squares the share of each counterparties' allocation, sums them, and divides by the total allocation. The higher the index, the greater the degree of concentration.
- (3) Autonomous factors are changes in sterling flows across the Bank's balance sheet and includes deposits/withdrawals from customer accounts and changes to note circulation.

Collateral upgrade trades

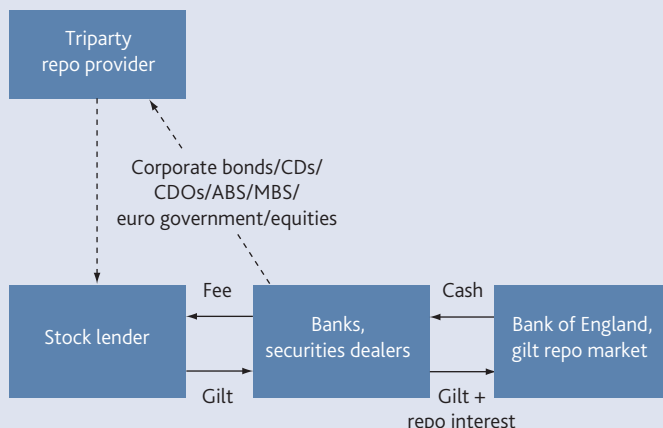
These trades involve using higher-yielding securities (such as non-government bonds or equities) to collateralise the borrowing of lower-yielding securities (such as government bonds) that can then be delivered against cash in the repo market in order to minimise funding costs. The general structure is shown in **Diagram A**. For dealers, there are two main benefits.

First, it is a cheaper way of financing their expanding inventories of non-government securities, including asset-backed securities, collateralised debt obligations (CDOs), corporate bonds and equities. Rather than financing such securities at Libor⁽¹⁾ (or above) by borrowing unsecured, they can borrow government bonds by paying a fee to a gilt lender and providing higher-yielding collateral, and then use the gilts to access cheaper funding in the repo market. Provided the combined cost of the repo interest rate and fee is less than Libor, the dealer obtains a funding advantage.

Second, the dealer is able to use a less liquid asset to borrow a more liquid asset (government bonds).

Gilt lenders, such as pension funds and insurance companies, are said to be increasingly willing to accept wider and lower-rated collateral, partly in search of higher fees, partly because some custodian banks acting as their lending agents will provide indemnities against the risk of borrower default and partly because triparty settlement services have made the processing of such transactions more straightforward.

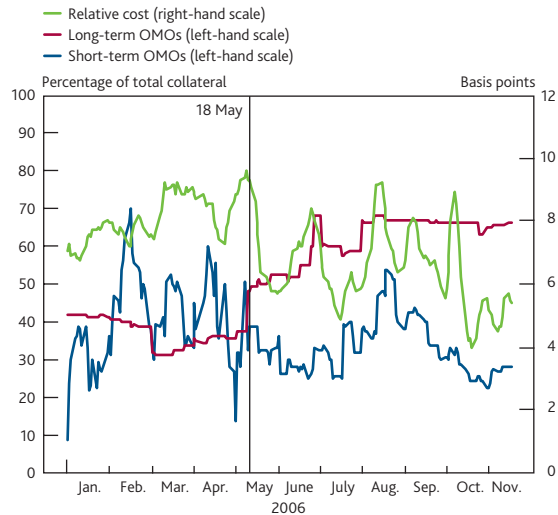
Diagram A Illustrative collateral upgrade trade



(1) Libor stands for the London interbank offered rate and is the rate of interest at which banks borrow funds, in marketable size, in the London interbank market.

The proportion of gilt collateral provided in the Bank's short-term repo operations increased slightly whereas in the long-term repo operations it was stable (**Chart 29**). One reason for the use of gilt collateral, reported by the Bank's contacts, is increased activity in so-called 'collateral upgrade' trades, as explained in the box opposite.

Chart 29 Relative cost and use in OMOs of euro-denominated EEA government securities^(a)



(a) Cost of euro-denominated collateral relative to sterling-denominated collateral relative to sterling-denominated collateral is calculated as the five-day moving average of the difference between the sterling and euro secured-unsecured (one-month) interest rate spread.

In July the Bank issued a consultation paper on its plans to provide longer-term finance to the banking system via outright purchases of bonds as part of its OMOs.⁽¹⁾ In the light of comments received on the consultation, on 24 November the Bank issued a Market Notice setting out the framework for bond purchases that it is minded to adopt.⁽²⁾

The Notice outlines proposals for the detailed mechanics of the Bank's planned purchases of both gilts and high-quality foreign currency government bonds (with the foreign currency cash flows swapped into fixed-rate sterling); for example, the number of bonds to be purchased in each tender, the size of tenders, and on what date and at what time the tenders should take place.

The Notice also sets out the criteria for selecting which foreign currency bonds the Bank will purchase outright as part of its OMOs: the Bank intends to purchase domestic-currency conventional bonds issued by AAA-rated sovereign issuers, with a minimum issue size of at least £4 billion, and where issuers' bonds contribute at least 2% of all bonds eligible for sale to the Bank. (Currently, this would permit the Bank to purchase bonds issued by the governments of Austria, Canada,

(1) See the box entitled 'Provision of longer-term financing through outright bond purchases' on page 288 of the 2006 Q3 *Quarterly Bulletin*.

(2) Available at www.bankofengland.co.uk/markets/money/documentation/061124.pdf.

Denmark, France, Germany, Netherlands, Spain and the United States.) The Bank intends that the bonds of all issuers eligible for outright purchase should in principle also be eligible to collateralise its OMO repo and swaps exposures, and will be exploring the practical consequences.

Feedback from the consultation also supported the proposed introduction of an electronic tender system for all OMOs (ie short and long-term repos as well as outright bond purchases). The Bank is planning to use SWIFTNet Browse to deliver the electronic tender system and is continuing to consult its counterparties on the design of the system.

In the light of feedback on the Notice and continuing dialogue with market participants, the Bank will issue, in due course, further detail and a proposed timetable for implementation.

Foreign currency reserves

As part of the remit it was given by the Chancellor of the Exchequer in 1997, the Bank holds its own foreign exchange reserves. These assets, together with others used to facilitate participation in the euro area's TARGET payment system, have been financed by issuing foreign currency securities.

Under current arrangements, the Bank holds approximately €3½ billion of euro-denominated assets to facilitate the United Kingdom's participation in TARGET.

As detailed in the 2006 Q3 *Quarterly Bulletin*, the Bank will no longer participate as a direct member when the European System of Central Banks (ESCB) replaces TARGET with TARGET2.⁽¹⁾ The changes to TARGET arrangements mean that the Bank will eventually be able to hold fewer foreign currency assets, thereby reducing its need for foreign currency financing.

As previously reported, the Bank announced on 24 April 2006 that the euro bill issuance programme, which provided €3.6 billion of regular financing, would cease with immediate effect. The outstanding euro bills have been maturing over the previous six months and the final bill matured on 12 October 2006.

Capital portfolio

As set out in previous *Quarterly Bulletins*, the Bank holds an investment portfolio. This portfolio is of approximately the same size as its capital and reserves (net of equity holdings, eg in the ECB and the BIS, and the Bank's physical assets, eg premises) and aggregate cash ratio deposits.

The portfolio is invested in gilts (currently around £2 billion) and other high-quality sterling-denominated debt securities (currently £1.1 billion). These investments are generally held to maturity. Over the current review period, gilt purchases were made in accordance with the published screen announcements: £37.6 million in September, £37.6 million in October and £37.6 million in November.

(1) The planned changes to the euro area's payment system, including the introduction (and membership) of TARGET2, are detailed on the ECB's website www.ecb.int/paym/target/target2/html/index.en.html.