

Markets and operations

This article reviews developments in sterling financial markets, including the Bank's official operations, since the 2010 Q2 *Quarterly Bulletin* up to 27 August 2010.⁽¹⁾ The article also summarises market intelligence on selected topical issues relating to market functioning.

Sterling financial markets

Overview

Following heightened concerns earlier in the year about the sustainability of fiscal positions in a number of European countries, sentiment in financial markets improved in June and July, before deteriorating somewhat in August.

In the United Kingdom, contacts noted that the formation of a new government and the announcement of its plans for fiscal consolidation had reduced a key source of uncertainty affecting sterling asset markets. Similarly, publication of the results of stress tests for European banks together with revised proposals for the introduction of new international prudential bank regulations helped to ease strains within financial markets. Subsequent to the review period, the governing body of the Basel Committee announced higher global minimum capital standards for banks.

However, concerns about sovereign default risk in some European countries persisted, with sovereign credit default swap (CDS) premia for these countries remaining elevated. Moreover, despite robust economic growth in the first half of the year, doubts about the durability and speed of the global economic recovery grew, in particular following weaker-than-expected US macroeconomic data. This was reflected in falls in medium-term government bond yields in the major economies, with, for example, US and UK yields approaching historic lows (**Chart 1**).

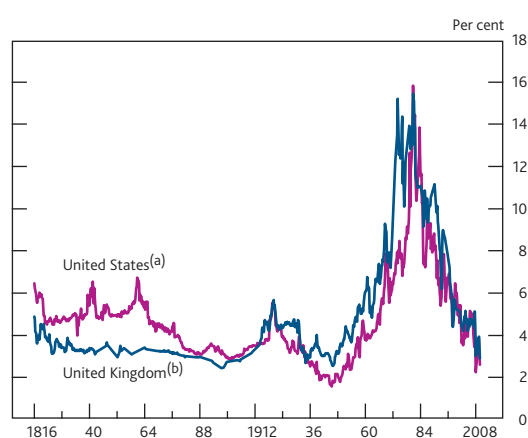
Against that background, UK monetary policy remained highly accommodative. And market participants continued to push back the timing of when they expected this accommodation to start to be removed.

Recent developments in sterling capital markets

Monetary policy and short-term interest rates

In each of the monetary policy meetings during the review period, the Bank of England's Monetary Policy Committee (MPC) voted to maintain Bank Rate at 0.5% and the stock of asset purchases financed by central bank reserves at

Chart 1 US and UK government bond yields



Source: Global Financial Data.

- (a) Ten-year US government bond yields.
 (b) Compiled from yields on 2.5% UK Consolidated Stock (Consols) up to 1958 Q1 and yields on ten-year UK government bonds from 1958 Q2 onwards. As Consols are undated stock, the time-series comparison is only approximate.

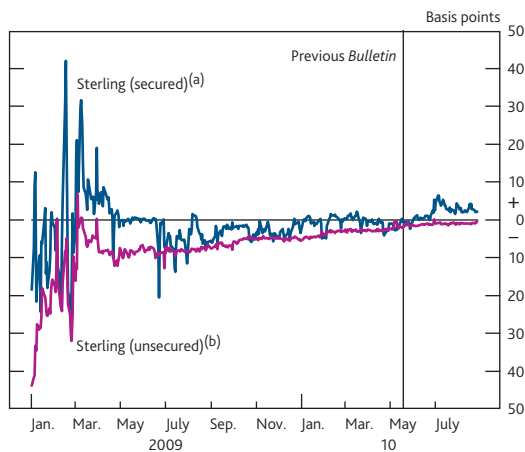
£200 billion. As a result, UK monetary policy remained highly accommodative, echoing the situation in most other industrial economies.

In terms of market interest rates, sterling overnight rates generally traded close to Bank Rate (**Chart 2**). There was a brief pickup in the secured overnight rate in July, which contacts attributed to a temporary increase in demand for short-dated secured borrowing around the time of the maturity of the ECB's first unlimited twelve-month refinancing operation.

Looking ahead, market participants continued to expect UK monetary policy to remain accommodative for some time. Overnight index swap (OIS) rates fell, as market expectations of Bank Rate at the end of 2011 and 2012 were revised down (**Chart 3**). In addition, a Reuters survey of economists showed a small increase in the number of respondents expecting the MPC to conduct further asset purchases. These developments in part reflected a reassessment of the global economic

(1) The data cut-off for the previous *Bulletin* was 21 May 2010.

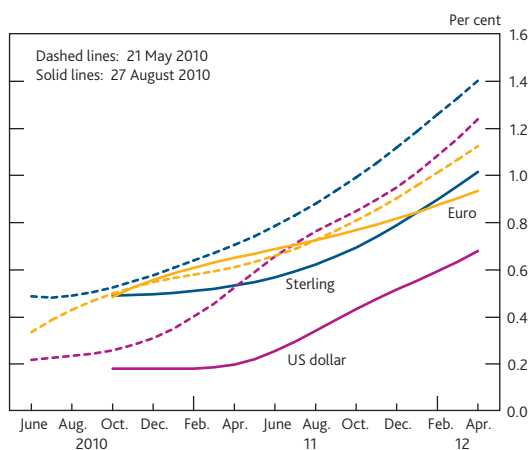
Chart 2 Spread to Bank Rate of sterling overnight interest rates



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

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

Chart 3 Instantaneous forward interest rates derived from OIS(a)



Sources: Bloomberg and Bank calculations.

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

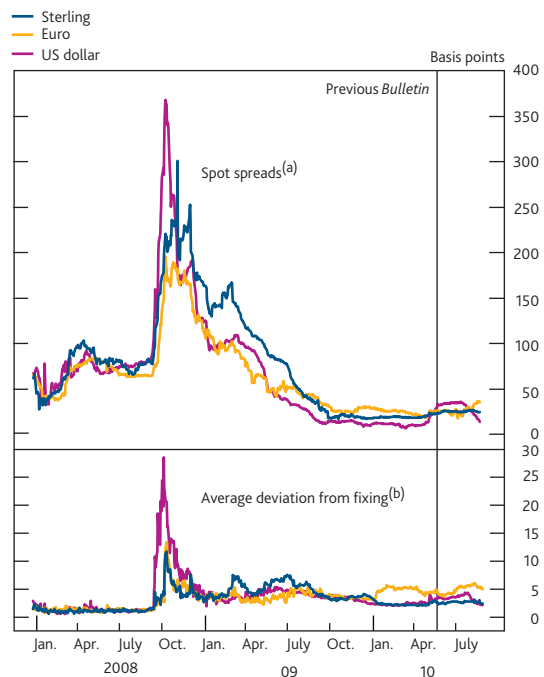
outlook. Consistent with that, there were similar falls in US dollar OIS rates, though euro OIS rates changed by less.

Bank funding markets

In line with OIS rates, short-term interbank borrowing rates fell, having risen slightly in May around the time of heightened concerns over sovereign default risk in some European countries. As a result, sterling Libor-OIS spreads — an indicator of near-term bank funding conditions — remained broadly stable (**Chart 4**). Similarly, the results from the Bank's new indexed long-term repo (ILTR) operations suggested little material change in banks' demand for sterling liquidity from the Bank. These operations and others within the sterling monetary framework are described in the box on page 160.

However, not all banks can access interbank funding markets on the same terms. In particular, the average deviation of banks' euro funding rates, as indicated by their Libor

Chart 4 Three-month Libor-OIS spreads and average deviations from Libor fixings



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

- (a) Three-month Libor-OIS spreads derived from Libor fixings.
(b) Average absolute deviation of individual panel members' three-month Libor submissions from the Libor fixing.

submissions, increased a little. Contacts thought that banks that were perceived to rely more heavily on ECB facilities had to pay higher market interest rates to obtain funding.

Such variations in the cost of interbank borrowing were also evident in cross-currency funding markets. According to contacts, smaller European banks with less direct access than other banks to US dollar funding markets found it more expensive to borrow in sterling and euros and swap the proceeds into US dollars. Reflecting this, the implied cost of US dollar funding via foreign exchange markets increased in July and August, although it ended the review period broadly unchanged (**Chart 5**).

At longer horizons, five-year UK bank CDS premia — moves in which would typically be associated with changes in bank funding costs — fell during June and July but rose in August, mirroring international moves (**Chart 6**). Overall they were around 20 basis points lower than at the time of the previous *Bulletin*. And in line with US and European banking sectors, major UK banks' equity prices rose on average by around 5%, although there was considerable variation across institutions.

Overall, sentiment towards banks improved somewhat. This appeared largely to reflect three main factors. First, the publication of bank stress-test results by the Committee of European Banking Supervisors reduced uncertainty by providing greater disclosure about European banks' exposures to sovereign debt. Second, banks' earnings results for the

Operations within the sterling monetary framework

Over the review period, the level of reserves continued to be determined by two main factors: the stock of reserves injected via asset purchases and the level of reserves supplied by long-term repo open market operations (OMOs). The box on pages 164–65 provides more detail on the Asset Purchase Facility. This box describes the Bank's operations within the sterling monetary framework over the review period.

Indexed long-term repo (ILTR) OMOs

The Bank recently reformed the design of its long-term repo (LTR) operations to enable funds to be lent against different types of collateral depending on the degree of stress in the system. The new ILTRs replaced the three-month extended-collateral long-term repos and the three, six, nine and twelve-month long-term repos previously offered by the Bank against standard collateral.⁽¹⁾

The Bank offered £5 billion via three-month ILTRs on both 15 June and 13 July followed by a £2.5 billion six-month operation on 17 August. All three auctions were well covered, suggesting counterparties were comfortable with the new operations. **Table 1** shows the results of these operations.

Based on the pattern of bids received, the Bank allotted around 17% of the auction to bids against wider collateral in the three-month ILTR auctions held in June and July, producing a clearing spread on wider collateral of 26 basis points over Bank Rate in both auctions. In each case, the remaining 83% of the auction was allocated to bids against narrow collateral at or very close to Bank Rate, producing a stop-out spread (the difference between clearing spreads) of around 25 basis points.

In contrast, the six-month operation held in August produced clearing spreads of 1 basis point and 50 basis points on narrow and wider collateral respectively, resulting in a stop-out spread of 49 basis points. Consequently, a higher proportion of funds (24%) was allocated against wider collateral.

Reserves provided via ILTRs were more than offset by the maturity of three-month extended-collateral long-term repo operations and six, nine and twelve-month long-term repos. Consequently, the stock of LTRs outstanding declined.

Operational Standing Facilities

As a result of the suspension of reserves targets and the change to remunerate all reserves at Bank Rate announced on 5 March 2009, the rate paid on the Operational Standing Deposit Facility was reduced to zero. Reflecting this, average use of the deposit facility was £0 million in each of the maintenance periods under review. Average use of the lending facility was also £0 million over the period.

Table 1 Indexed long-term repo operations

	Total	Collateral set summary	
		Narrow	Wider
15 June 2010 (three-month maturity)			
On offer (£ millions)	5,000		
Total bids received (£ millions) ^(a)	7,685	5,300	2,385
Amount allotted (£ millions)	5,000	4,118	882
Cover	1.54	1.06	0.48
Clearing spread above Bank Rate ^(b)		0	26
Stop-out spread ^(c)	26		
13 July 2010 (three-month maturity)			
On offer (£ millions)	5,000		
Total bids received (£ millions) ^(a)	6,400	4,850	1,560
Amount allotted (£ millions)	5,000	4,138	862
Cover	1.28	0.97	0.31
Clearing spread above Bank Rate ^(b)		1	26
Stop-out spread ^(c)	25		
17 August 2010 (six-month maturity)			
On offer (£ millions)	2,500		
Total bids received (£ millions) ^(a)	4,657	3,687	980
Amount allotted (£ millions)	2,500	1,895	605
Cover	1.86	1.47	0.39
Clearing spread above Bank Rate ^(b)		1	50
Stop-out spread ^(c)	49		

(a) Due to the treatment of paired bids, the sum of bids received by collateral set may not equal total bids received.

(b) Amounts shown in basis points.

(c) Difference between clearing spreads for wider and narrow collateral in basis points.

Discount Window Facility

The Discount Window Facility (DWF) is a permanent facility to provide liquidity insurance to the banking system. On 6 July 2010, the Bank announced that the average daily amount outstanding in the DWF with an initial maturity of 30 days or less between 1 January and 31 March 2010 was £0 million. The average daily amount outstanding in the Bank's 364-day DWF between 3 February and 31 March 2009 was £0 million.

Other operations

Special Liquidity Scheme

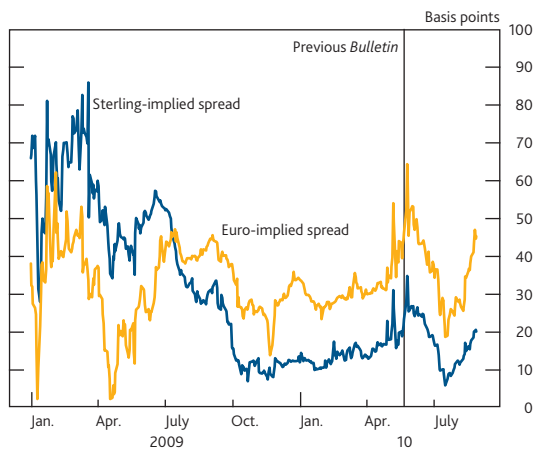
At the end of January 2009, £185 billion of UK Treasury bills had been lent under the Special Liquidity Scheme. As noted in the previous *Bulletin*, as at 28 February 2010, bills with a face value of £165 billion remained outstanding. Since that date, banks have continued to make repayments.

US dollar repo operations

In response to renewed strains in the short-term funding market for US dollars, from 11 May the Bank, in concert with other central banks, reintroduced weekly fixed-rate tenders with a seven-day maturity to offer US dollar liquidity. As of 27 August 2010, there has been no use of the facility.

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

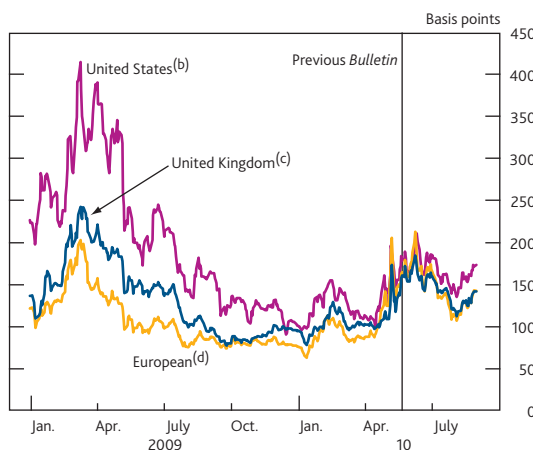
Chart 5 Spread of foreign exchange implied cost of three-month US dollar funding over US dollar Libor^(a)



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

(a) Spread of three-month US dollar Libor implied from foreign exchange forwards over actual three-month US dollar Libor. For more details on the construction of these measures see *Bank of England Quarterly Bulletin*, Vol. 48, No. 2, page 134, Chart 26 and *BIS Quarterly Review*, March 2008, pages 73–86.

Chart 6 Selected international banks' credit default swap premia^(a)



Source: Markit Group Limited.

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

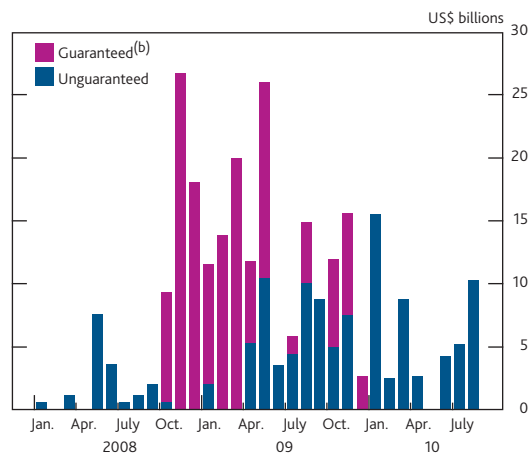
second quarter, although generally lower than in the first quarter, were higher than analysts' expectations. Third, revised proposals for the new international prudential bank regulations — the so-called Basel III rules — were perceived as less stringent and, more importantly, according to contacts, potentially allowed for a longer implementation period. Together, these factors arguably removed some of the near-term pressure on banks to raise capital levels significantly, which in the short term at least would be expected to support bank profitability.

As part of the new Basel III rules, banks will need to lengthen the term of their funding should they not wish to hold additional liquid assets on their balance sheets. However, contacts noted that new regulations for money market funds

(MMFs) — a key provider of short-term financing for banks — may ultimately encourage those institutions to shorten the maturity of their assets.⁽¹⁾ Partly in response to these international regulatory initiatives and following changes to bank liquidity rules in the United Kingdom, UK banks used innovative types of short-term funding instruments. Examples of these products are discussed in more detail in the box on pages 168–69.

UK banks also continued to issue longer-term debt in both senior unsecured (Chart 7) and covered bond markets. And there were signs of activity in UK asset-backed securities markets including some public issuance of collateralised loan obligations.⁽²⁾ But the longer-term funding challenge for banks remained — at the end of June, an estimated £750 billion–£800 billion of term funding for major UK banks was due to mature by the end of 2012.⁽³⁾

Chart 7 UK bank senior debt issuance^(a)



Source: Dealogic.

(a) Issuance with a value greater than or equal to US\$500 million equivalent and original maturity greater than one year.
 (b) Senior debt issued under HM Treasury's Credit Guarantee Scheme.

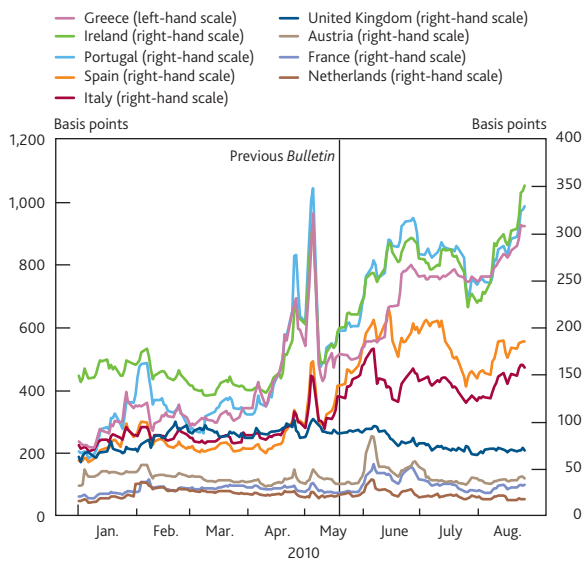
Long-term interest rates

Contacts suggested that investors continued to seek safety in the most liquid government bond markets, away from those where sovereign risks were perceived to be greatest. Reflecting this, some European countries' sovereign CDS premia increased and yields on their government debt rose relative to those on German government bonds (bunds). Greek and Irish government bond yields rose sharply, with the latter affected by the downgrade of Ireland's sovereign credit rating by Standard and Poor's in August.

In contrast, the spread between gilt and bund yields narrowed over the review period (Chart 8). Market participants noted

(1) The SEC 2a-7 rule now limits the weighted average maturity of US MMFs to 60 days (from 90 days previously). New guidelines announced by the Committee of European Securities Regulators in May are expected to place similar restrictions on European MMFs.
 (2) An asset-backed security backed by the receivables on loans. Banks package and sell their receivables on loans to investors in tranches of varying currency and risk.
 (3) See June 2010 *Financial Stability Report*, pages 50–54.

Chart 8 Selected European ten-year government bond spreads^(a)



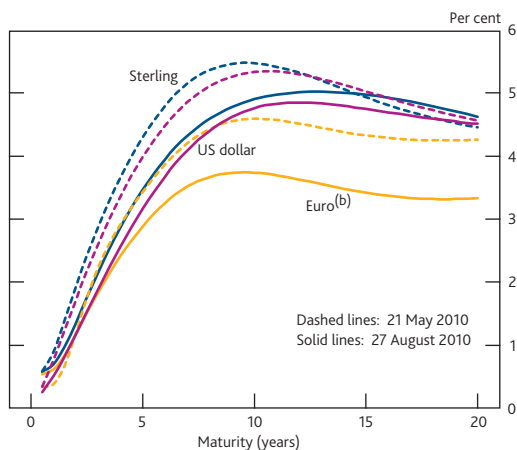
Sources: Bloomberg and Bank calculations.

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

that the new UK Government's fiscal consolidation plans had reduced uncertainty.

Over the review period as a whole, the gilt yield curve shifted lower, mirroring changes in other major government bond markets (**Chart 9**). Indeed, medium-term yields on US and UK government bonds fell towards historical lows (**Chart 1**).

Chart 9 International nominal government bond yield curves^(a)



Source: Bank calculations.

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

Part of the fall in yields reflected lower real forward rates as concerns rose about the durability and speed of the global economic recovery. Against that backdrop, the US Federal Reserve announced that it would reinvest the principal payments from its US Agency debt and agency mortgage-backed securities portfolio in long-term

Changes to the inflation indexation of UK defined benefit pension fund liabilities

On 8 July 2010, the UK Government announced that it would change the price index used to calculate the minimum rate (required by the 1993 Pension Schemes Act) at which private defined benefit pension fund liabilities accrue. Previously, the minimum reference rate had been calculated using the UK retail prices index (RPI). However, for revaluations in 2011 (based on inflation in the year to September 2010), and future years, it will be calculated using the UK consumer prices index (CPI).

Though in principle the change applies to both deferred pensions and pensions in payment, the total amount of liabilities which will be affected remains uncertain. In particular, it will depend on individual scheme rules, the decisions of employers and pension scheme trustees and the extent of any other legislative changes. For example, some pension funds' rules explicitly specify a minimum uplift linked to RPI, rather than referring to the statutory minimum rate. In this case, a pension fund would retain the link to RPI but in order to comply with the statutory minimum it may need to accrue its liabilities at the higher of CPI and RPI each year.

This change in indexation rules may have implications for how pension funds manage their exposure to future inflation when trying to ensure that they have sufficient assets to meet future pension payouts. RPI-linked financial assets, which are currently typically used by pension funds as a hedge against RPI-linked liabilities, may be less suitable as a hedge for CPI-linked liabilities if the two price indices evolve differently.⁽¹⁾

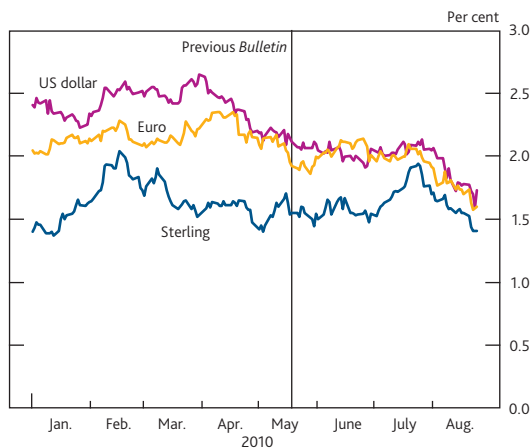
Contacts suggested that funds seeking to hedge their future pension liabilities would ideally like to invest in assets whose pay-offs are closely linked to the relevant price index used for their annual revaluation. At present there is no active market for CPI-linked financial instruments in the United Kingdom and market contacts generally expected that pension funds would continue to hedge their CPI-linked liabilities with RPI-linked instruments. Likewise, contacts noted that there had not been any significant changes in pension fund hedging behaviour in response to the July announcement, although there was some volatility in index-linked gilt yields around that time.

(1) For more discussion on the differences between CPI and RPI measures see the box 'The wedge between RPI and CPI inflation' on pages 29–30 in the Bank of England *Inflation Report*, November 2005.

US government bonds with the aim to support the US economic recovery.

In the United Kingdom, real forward interest rates rose in July (Chart 10). This might in part have reflected an initial reaction by investors to the proposed legislative changes to UK pension fund indexation rules (see the box opposite for more details). But contacts thought that the main factor behind this increase in real forward rates was the issuance of the 2040 index-linked gilt, which boosted the available supply of UK index-linked debt. These effects proved temporary and medium-term sterling real interest rates fell in August in line with international markets.

Chart 10 International five-year real interest rates, five years forward^{(a)(b)}



Source: Bank calculations.

- (a) Sterling and US dollar real interest rates derived from the Bank's government liability curves. Euro rates derived using the Bank's inflation swap and government liability curves.
 (b) Sterling real interest rates are derived from instruments that reference RPI inflation, while US dollar and euro real rates are derived from instruments referencing CPI inflation. This partly explains why the level of medium-term sterling real rates has been consistently below similar-maturity US dollar and euro real rates.

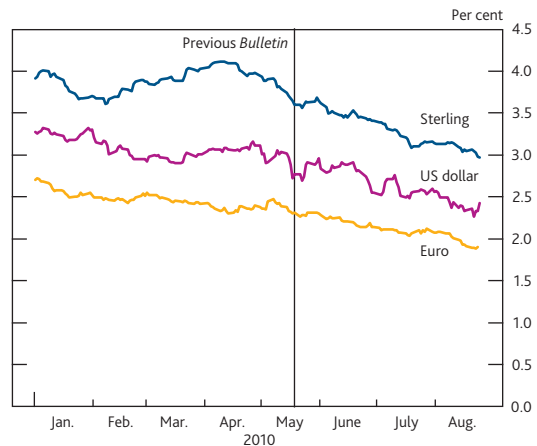
Perhaps consistent with investor perceptions of a protracted period of subdued real and nominal global demand, medium-term forward inflation rates declined somewhat over the review period (Chart 11).

At the same time, information derived from UK inflation options indicated that investors placed less weight on the possibility of high inflation over the medium term, despite recent above-target outturns and the prospective uplift from the VAT changes announced in the June *Budget*, and placed slightly more weight on below-zero outturns (Chart 12).

Foreign exchange

Developments in relative interest rates might have accounted for some of the 5.6% appreciation of the sterling effective exchange rate index (ERI) over the period (Chart 13). In particular, at times during the period, worries about the US economic outlook pushed down on US dollar interest rates relative to sterling interest rates. However, in general, sterling appears to have appreciated by more than would be suggested

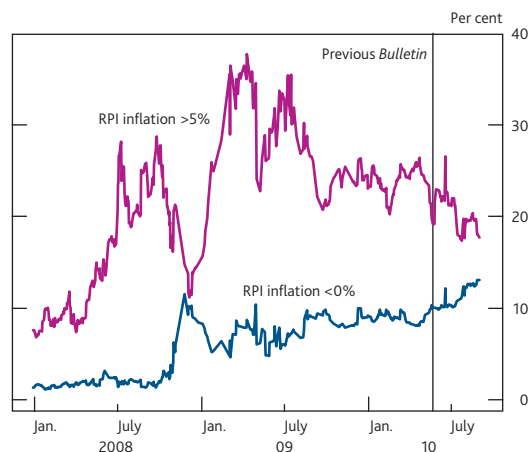
Chart 11 International five-year implied inflation rates, five years forward^(a)



Source: Bank calculations.

- (a) Sterling and US dollar forward inflation rates derived from the Bank's government liability curves. Euro forward inflation rates derived using the Bank's inflation swap curve.

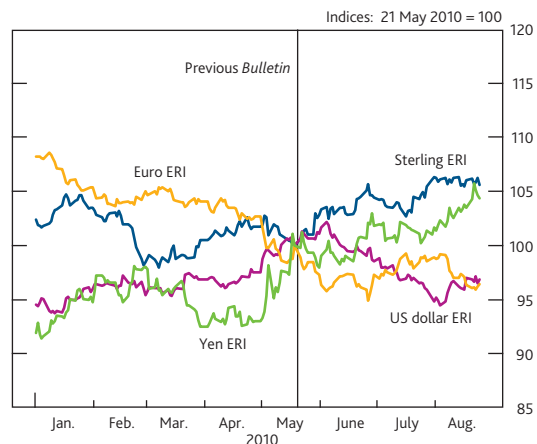
Chart 12 Weight on high and low UK RPI inflation outturns implied by options^(a)



Sources: Bloomberg, Royal Bank of Scotland and Bank calculations.

- (a) Probability that RPI inflation will be below zero or greater than 5% based on the average probability distribution of annual RPI outturns for six to seven years ahead implied by options.

Chart 13 International exchange rate indices



Sources: Bloomberg and Bank calculations.

Asset purchases⁽¹⁾

The Bank did not undertake any gilt purchases under the Asset Purchase Facility (APF) over the review period. As a result, the stock of gilts held by the APF (in terms of the amount paid to sellers) was maintained at £198.3 billion.⁽²⁾ The Bank continued to offer to lend some of its gilt holdings via the Debt Management Office (DMO) in return for other UK government collateral.

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

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

Gilt lending facility

In the three months to 30 June 2010, a daily average of £2.12 billion of gilts were lent as part of the gilt lending facility. Use of the facility continued to be concentrated in gilts in which the Bank held a large proportion of the free float (the total amount of a gilt in issue less the amount held by the UK Government).

Corporate bonds

In order to improve the functioning of the sterling corporate bond market, the Bank continued to offer to purchase and sell

corporate bonds via the Corporate Bond Secondary Market Scheme.

During the review period, activity in the Bank's auctions continued to reflect broader market conditions. In particular, the Bank received increased offers in its purchase auctions in May and June, with £507 million offered on 8 June, the largest amount of offers in a single auction (**Chart A**). Despite the deterioration in investor sentiment during this period, the Bank also saw an increase in the number of bids received in some sale auctions.

Activity in the Bank's purchase auctions fell in July and August. Spreads also narrowed and there was continued activity in the Bank's sale auctions.

As of 26 August 2010, the Bank portfolio totalled £1,571 million, compared to £1,419 million at the end of the previous review period.

Commercial paper

The Bank continued to offer to purchase sterling-denominated investment-grade commercial paper (CP) issued by companies that make a material contribution to UK economic activity.

Spreads on sterling-denominated CP widened marginally in May and June, reflecting broader market conditions. But they stabilised and subsequently narrowed towards the end of the review period. And the majority of spreads on primary

Table 1 APF transactions by type (£ millions)

Week ending ^(a)	Commercial paper	Gilts	Corporate bond		Total ^(b)
			Purchases	Sales	
20 May 2010 ^{(c)(d)}	251	198,275		1,419	199,945
Thursday 27 May 2010	200	0	91	1	290
Thursday 3 June 2010	0	0	25	14	11
Thursday 10 June 2010	0	0	107	11	96
Thursday 17 June 2010	50	0	6	3	53
Thursday 24 June 2010	0	0	4	11	-7
Thursday 1 July 2010	0	0	4	0	4
Thursday 8 July 2010	0	0	2	0	2
Thursday 15 July 2010	0	0	5	2	3
Thursday 22 July 2010	140	0	9	0	149
Thursday 29 July 2010	0	0	0	8	-8
Thursday 5 August 2010	0	0	0	19	-19
Thursday 12 August 2010	0	0	2	8	-6
Thursday 19 August 2010	120	0	0	9	111
Thursday 26 August 2010	0	0	5	4	1
Total financed by a deposit from the DMO ^{(d)(e)}	120	–		340	460
Total financed by central bank reserves ^{(d)(e)}	0	198,275		1,231	199,506
Total asset purchases ^{(d)(e)}	120	198,275		1,571	199,966

(a) Week-ended amounts are for purchases in terms of the proceeds paid to counterparties, and for sales in terms of the value at which the Bank initially purchased the securities. All amounts are on a trade-day basis, rounded to the nearest million. Data are aggregated for purchases from the Friday to the following Thursday.

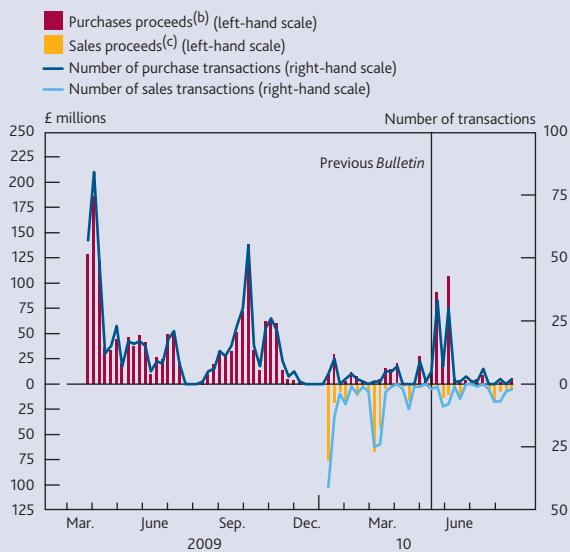
(b) Weekly values may not sum to totals due to rounding.

(c) Measured as amount outstanding as at 20 May 2010.

(d) Proceeds paid to counterparties less redemptions at initial purchase price on a settled basis.

(e) Data may not sum due to assets maturing over the period.

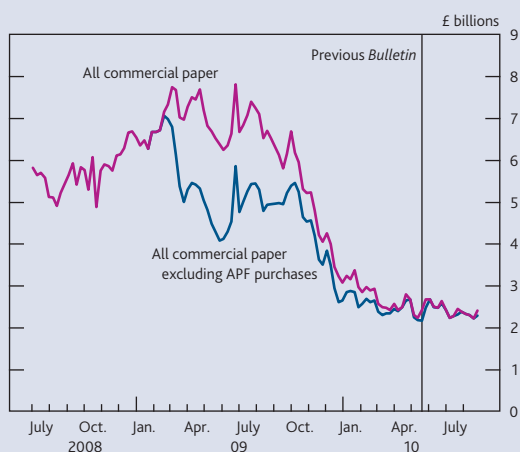
Chart A Weekly transactions of sterling corporate bonds^(a)



- (a) Data start on 26 March 2010.
 (b) Weekly (Friday-Thursday) amounts in terms of the proceeds paid to counterparties, on a trade-day basis.
 (c) Weekly (Friday-Thursday) amounts in terms of value at time of initial purchase, on a trade-day basis.

issuance remained below the levels at which the APF offered to purchase CP. Accordingly, the APF made few purchases during the review period. The stock of APF purchases fell from £251 million on 20 May to close to zero during much of the review period. Following purchases during August, the outstanding stock stood at £120 million as of 26 August 2010. Over the same period, the stock of CP issued by UK corporate and non-bank firms stabilised at around £2.5 billion (**Chart B**).

Chart B Sterling commercial paper outstanding for UK corporates and non-bank financial firms



Sources: CP Ware and Bank calculations.

Secured commercial paper facility

The Bank continued to offer to purchase secured commercial paper (SCP) backed by underlying assets that are short term and provide credit to companies or consumers that support economic activity in the United Kingdom.⁽³⁾ There has been no use of the facility to date.

Credit Guarantee Scheme

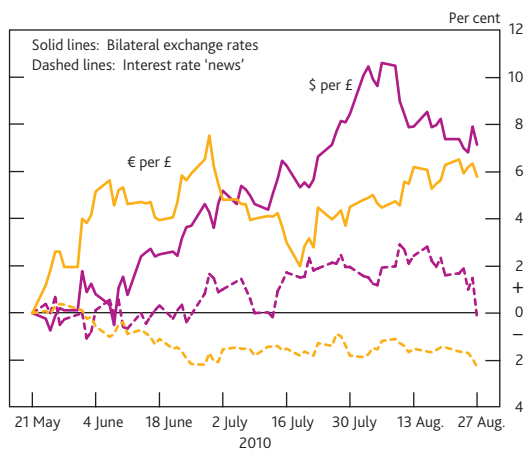
The Bank did not make any purchases of bank debt issued under the Credit Guarantee Scheme (CGS) from the secondary market, but stands ready to do so should conditions in that market deteriorate. The UK Government's 2008 CGS closed for new issuance on 28 February 2010, although institutions are able to refinance existing debt guaranteed by the Scheme.

(1) The data cut-off for this box is 26 August 2010, unless otherwise stated.

(2) Further details of individual operations are available at www.bankofengland.co.uk/markets/apf/gilts/results.htm.

(3) The SCP facility is described in more detail in the Market Notice available at www.bankofengland.co.uk/markets/marketnotice090730.pdf.

Chart 14 Implied contribution of interest rate 'news' to cumulative changes in sterling bilateral exchange rates since the previous *Bulletin*^(a)



Source: Bank calculations.

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

by interest rate differentials (Chart 14). This implies that other factors were also important. For example, contacts suggested that perceptions about the relative risk of investing in sterling-denominated assets improved, perhaps because of reduced uncertainty about the UK fiscal outlook. This could have underpinned the increase in the value of sterling.

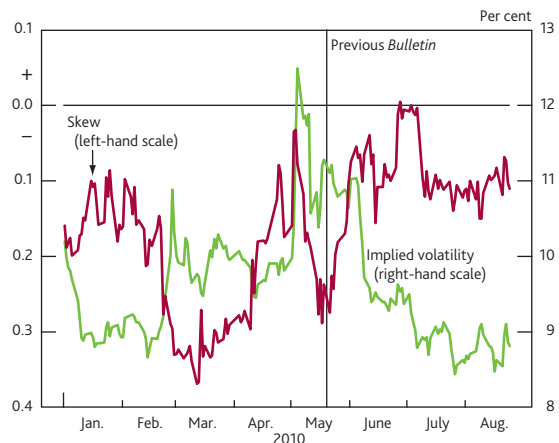
Perhaps consistent with a decline in perceived risks, options-based measures of forward-looking uncertainty in sterling exchange rates fell and the implied probability distribution around future values of sterling became less negatively skewed (Chart 15). This might indicate that market participants were less willing to pay to protect themselves from a large future depreciation of sterling. However, similar measures of uncertainty for other currencies also fell, suggesting this development was not unique to sterling.

Corporate capital markets

Spreads on investment-grade bonds issued by non-financial companies were little changed for much of the period (Chart 16). Taken together with the fall in government bond yields, the cost of corporate bond financing declined slightly. An indicative measure of the cost of equity finance was broadly unchanged (Chart 17).

Market contacts reported that turnover and liquidity in the sterling corporate bond market had been reduced at times. But they also noted that the corporate bond scheme of the Bank's Asset Purchase Facility (APF) continued to provide a helpful backstop for both purchases and sales of sterling corporate bonds. In particular, the APF received increased offers in its purchase auctions at the beginning of June. The box on pages 164–65 provides more information about the activities of the APF over the review period.

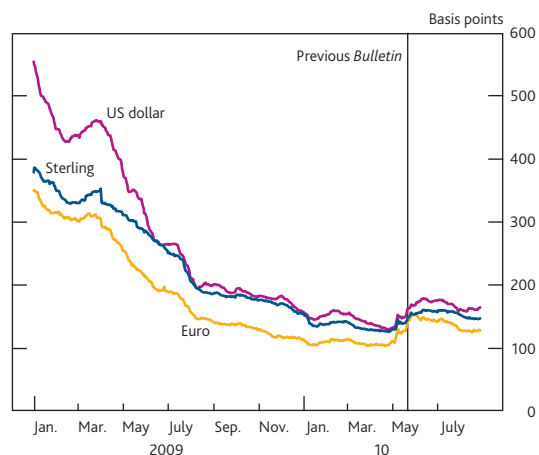
Chart 15 Three-month option-implied volatility and skewness of simplified sterling ERI returns^{(a)(b)(c)}



Sources: ICAP and Bank calculations.

- (a) Returns are defined as the logarithmic difference between the current forward rate and the spot rate at the maturity date of the contract.
 (b) The simplified sterling ERI places 70% weight on the euro-sterling bilateral exchange rate and 30% weight on the US dollar-sterling bilateral exchange rate.
 (c) For more detail on using options prices to derive a probability distribution for the sterling ERI, see the box in the *Bank of England Quarterly Bulletin*, Summer 2006, pages 130–31.

Chart 16 International investment-grade, non-financial, corporate bond spreads^(a)



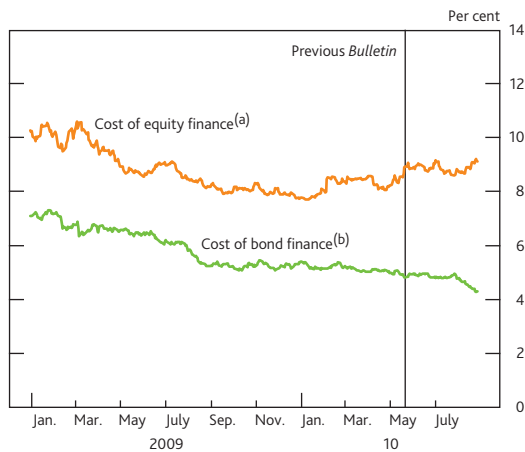
Sources: Bank of America/Merrill Lynch and Bank calculations.

(a) Option-adjusted spreads.

Despite the difficult market conditions early in the review period, gross bond issuance by private non-financial corporations (PNFCs) in the calendar year up to July was broadly in line with average issuance over 2005–08. Gross issuance of equity capital picked up towards the end of the review period, although cumulative issuance in the first seven months of 2010 was below the comparable average over 2005–08 (Table A).

Overall, while equity issuance net of share buybacks was positive, repayments of maturing debt tended to exceed new bond issuance (Chart 18). Combined with a continued net reduction in loan financing, this indicates that in aggregate UK PNFCs continued to deleverage their balance sheets.

Chart 17 Indicative cost of sterling corporate bond and equity finance



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

(a) The cost of equity is measured as a risk-free rate plus an equity risk premium. The risk-free rate is approximated by a ten-year nominal gilt yield. The equity risk premium is inferred from a dividend discount model applied to the FTSE All-Share index, which includes financial institutions. For further details of the latter, see Inkinen, M, Stringa, M and Voutsinou, K (2010), 'Interpreting equity price movements since the start of the financial crisis', *Bank of England Quarterly Bulletin*, Vol. 50, No. 1, pages 24–33.

(b) The cost of bond finance is measured as the average yield-to-maturity on the Bank of America/Merrill Lynch Sterling Corporate Industrials and Utilities indices.

Table A Cumulative bond and equity issuance by UK PNFCs

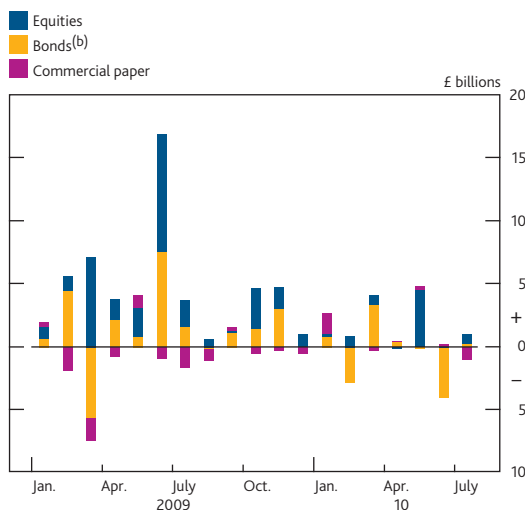
£ billions	Bonds ^(a)		Equity	
	Full year	January to July ^(b)	Full year	January to July ^(b)
2005	12.8	4.9	20.2	10.5
2006	24.1	15.1	34.2	19.3
2007	24.2	11.5	27.3	18.1
2008	35.4	21.2	57.4	35.2
2009	44.7	34.2	78.5	55.6
2010		15.0		15.6
2005–08 average	24.1	13.2	34.8	20.8

Sources: Dealogic, London Stock Exchange and Bank calculations.

(a) Converted from US dollar to sterling using monthly averages of the US dollar per sterling exchange rate.

(b) Cumulative issuance from the beginning of January to the end of July in each calendar year.

Chart 18 Net capital market issuance by UK PNFCs^(a)



(a) Non seasonally adjusted.

(b) Includes stand alone and programme bonds.

Market intelligence on developments in market structure

In discharging its responsibilities to maintain monetary and financial stability, the Bank gathers information from contacts across a wide spectrum of financial markets. This market intelligence helps inform the Bank's assessment of monetary conditions and possible sources of financial instability and is routinely synthesised with research and analysis in the *Inflation Report* and the *Financial Stability Report*. More generally, regular dialogue with market contacts provides valuable insights about how markets function, which provides context for policy formulation, including the design and evaluation of the Bank's own market operations. And the Bank conducts occasional market surveys to gather additional quantitative information on certain markets.

The boxes on pages 168–69 and page 170 summarise recent market intelligence on two selected topics: innovations in money market instruments and ratings-based termination triggers in derivatives contracts.

Innovations in money market instruments

Ongoing funding pressures in short-term money markets have led to the use of innovative funding instruments by banks that help them diversify across providers of funds and increase the maturity of their wholesale funding. These instruments include so-called puttable certificates of deposit (CDs) and extendible repos.⁽¹⁾ Such instruments typically differ in the maturity of the funding they provide, the degree of optionality embedded in them, and methods of pricing. This box describes these instruments in more detail.

Puttable CDs

CDs are unsecured short-term debt issued by banks. As such, they provide banks with unsecured funding, generally for a period of between one month and 18 months. Puttable CDs are very similar to ordinary CDs but contain a put option that gives the investor the right (but not the obligation) to sell the CD back to the issuing bank at a pre-defined date prior to its original maturity date. By exercising this option, investors can thus obtain early return of the funds they provided.

A typical structure involves a twelve-month CD with a put option that can be exercised daily but with a 95-day notice (or 'lock-in') period. **Chart A** plots the effective outstanding maturity — the minimum remaining period for which the funds will be available to the bank — of such a puttable CD against the elapsed time since issuance. The red area shows how the effective outstanding maturity changes over time for the case when the put option has been exercised after 40 days. In that case, the puttable CD matures after a total of 135 days. The blue area shows the effective outstanding maturity for the same CD should the option not be exercised. In that case, the effective outstanding maturity will start to decline after 265 days and the CD will mature after 360 days.

Extendible repos

Repo transactions provide funding to banks via a secured investment — the bank sells a security in exchange for cash and agrees to buy it back at a particular date. Extendible repos are similar, except that the date of repayment can be continually extended.

A typical transaction might involve an initial 30-day repo transaction that specifies a pre-defined date (usually fifteen days before maturity) when the transaction can be extended to its original 30-day maturity or, alternatively, be left to run-off. Any extension requires the consent of both parties to the transaction.

Chart B shows the maturity profile of such a 30-day extendible repo. The red area shows the effective maturity outstanding in the event that the repo is extended after fifteen

Chart A Maturity profile of a twelve-month puttable CD

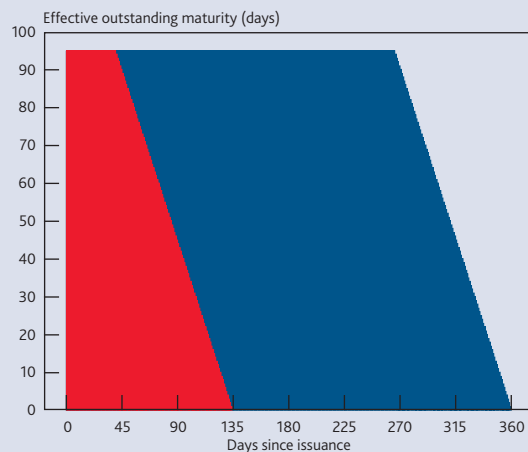
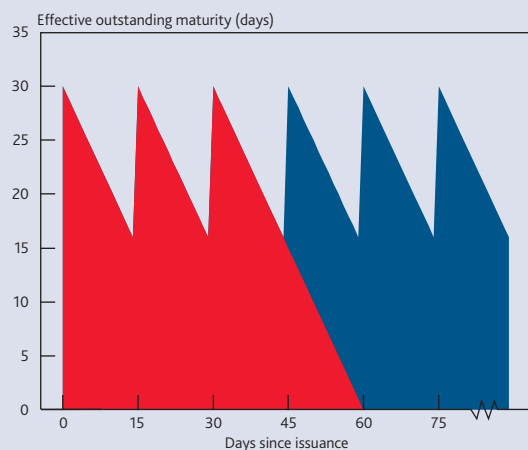


Chart B Maturity profile of a 30-day extendible repo



and 30 days but not after 45 days. At that time, rather than reverting to the original effective outstanding maturity of 30 days, the transaction matures fifteen days later after a total of 60 days. In theory, the repo can be extended indefinitely as illustrated by the blue area.

Market characteristics

These instruments are an alternative source of term funding for banks to traditional money market instruments. Although UK banks have shown notable interest in these instruments, the value of most transactions appears so far to have been modest relative to banks' overall funding bases.

Some of the attraction of these instruments is likely to reflect recent regulatory developments. In particular, the notice periods have partly been structured to help banks meet new regulatory liquidity requirements that aim to lengthen banks' funding profiles. In the United Kingdom, one part of the Financial Services Authority's liquidity rules is structured around a stress test that makes wholesale funding of less than three months' maturity less attractive to banks. So, for example, puttable CDs with a 95-day notice period start off

with an effective maturity of more than three months and, hence, do not fall within the regulatory stress test.

From the perspective of investors (ie lenders to banks), these instruments offer higher returns than shorter-maturity instruments while allowing them to redeem their investments early. The short-dated nature of these puttable CDs makes them especially attractive to money market funds (MMFs), particularly in the United States, whereas the secured nature of an extendible repo makes it an attractive investment for securities lenders and banks. **Table 1** summarises the main market characteristics including the typical investors involved and the geographical coverage.

Table 1 Market characteristics

	Puttable CD	Extendible repo
Currency	Mainly US\$	Mainly US\$
Investors	MMFs and asset managers	Securities lenders, banks and asset managers
Size	Small but growing	Large
Region	United States and Europe	Global

As with banks, the new instruments may help investors meet new regulatory rules. For example, in the United States, following changes to the Securities and Exchange Commission (SEC) rules, the maximum weighted average maturity of US MMFs' investments was reduced from 90 days to 60 days. Puttable CDs with a 95-day notice period potentially offer returns comparable to those from longer-dated ordinary CDs, so they appeal to MMFs regulated by the SEC.

(1) Extendible repos were popular among US regional banks before the onset of the financial crisis and have recently been used by UK banks, though backed by more traditional collateral.

Additional Termination Event clauses

Additional Termination Event (ATE) clauses are embedded in many derivatives and a wide range of other financial products that include derivatives (eg asset-backed securities). This box focuses in particular on those ATE clauses that apply to derivative transactions between UK pension funds and those banks that are the main derivative dealers.

Defined benefit pension funds' use of derivatives

A defined benefit (DB) pension scheme typically guarantees members an income on retirement irrespective of the performance of the fund's assets. This means that a DB scheme bears the risk that the return on the investments may not be sufficient to meet its liabilities.

Given the structure of their liabilities (in particular the requirement to index them to inflation), UK DB pension fund schemes face risks arising from unexpected changes in nominal interest rates, life expectancy, inflation and scheme members' wage growth. To mitigate such risks some DB pension schemes engage in so-called Liability Driven Investment (LDI) strategies. LDI strategies aim to invest in a portfolio that closely matches the risks of the fund's DB liabilities. In particular, pension funds can choose to hedge their exposure to interest rate and inflation risk by entering into derivative transactions such as long-dated interest rate swaps and long-dated inflation-linked swaps.

What are ATEs?

Whenever two counterparties enter into a derivative trade (such as a swap) many of the terms and conditions of the trade are pre-defined in a legal agreement: the ISDA master agreement (often called 'the ISDA').⁽¹⁾

Many ISDAs define a standard range of events that trigger an option to allow one counterparty to terminate the trade early. For example, a derivatives trade could be terminated if a counterparty loses regulatory approval or defaults on an obligation. In addition, many ISDAs can include so-called ATE clauses which stipulate additional criteria that may permit early termination of the trade.

ATE clauses that apply to derivative trades between dealers and pension funds typically allow the pension fund to terminate the trade with the original dealer in the event that the dealer is downgraded below a certain credit rating threshold. The most common credit rating threshold is A-.

Such ATE clauses may also allow the pension fund to replace the derivative trade with an alternative dealer and charge the costs of replacing the trade to the original dealer. The details of the replacement costs vary according to the specifics of the

ISDA. But if the market in which the derivative trade is being re-established has become more volatile, the costs of replacing the trade will typically be greater than the cost incurred during periods of normal volatility.

Why are they important?

Unexpected credit downgrades of financial institutions have in the past been associated with significant volatility in asset prices. Over recent years, the credit ratings of the major dealers have been moved closer to the A- threshold. As a result, the presence of ATE clauses could potentially amplify asset price moves should dealers' ratings be lowered below A-. Contacts indicated that this could be especially disruptive if there were simultaneous downgrades of a number of dealers. This is because the volume of derivatives trades that pension funds might potentially seek to replace would be large relative to the typical daily turnover in those markets.

Moreover, against a backdrop of heightened market volatility, the replacement costs due under an ATE are most likely to rise. The increased replacement costs charged to the original dealers could therefore add to liquidity and capital pressures on those dealers.

In light of this, contacts report that some dealers have sought to renegotiate the credit rating trigger levels to a lower threshold. Alternatively, in some instances, ATE clauses have been modified to allow dealers to place additional collateral with a pension fund instead of paying the replacement cost of the derivative. This reduces the credit exposure of the pension fund to the dealer. However, such collateral triggers may have drawbacks as they require dealers to fund additional collateral at times when their access to funding may be under greater stress.

(1) ISDA stands for International Swaps and Derivatives Association.