

Markets and operations

This article reviews developments in sterling fixed income and foreign exchange markets since the Summer Quarterly Bulletin.

- Sterling interest rates have fallen at all maturities, against a background of lower equity prices.
- Gilts were included in London Clearing House's RepoClear service.
- On 9 September, Continuous Linked Settlement for foreign exchange was introduced, greatly reducing settlement risk.

Sterling asset prices⁽¹⁾

Sterling fixed interest markets

The Bank of England's Monetary Policy Committee (MPC) left the official repo rate unchanged at 4% during the period, but forward interest rates, as implied by short sterling contracts and by gilts, fell significantly (Charts 1 and 2). As of 23 August, the December short sterling contract implied a rate of 4.01%, down from 5.22% on 17 May, and, according to market participants, consistent with a central expectation that the official repo rate would remain at 4% until the end of the year. Reuters' polls of economists' forecasts also showed a fall in interest rate expectations for the end of 2002 (Chart 3); the poll conducted over 27–29 August⁽²⁾ indicated a mean expectation of 3.98%, compared with

Chart 1
Sterling three-month Libor, and expectations from futures contracts

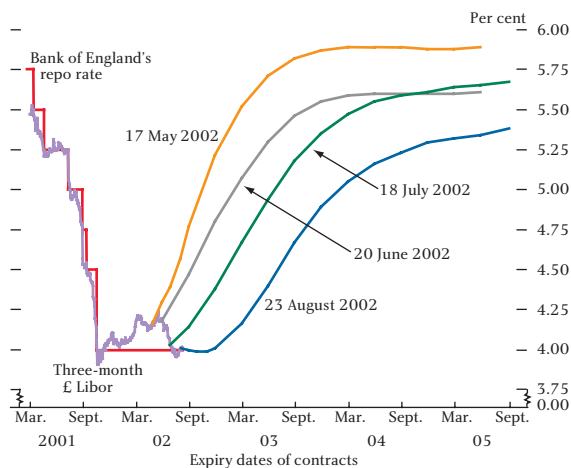
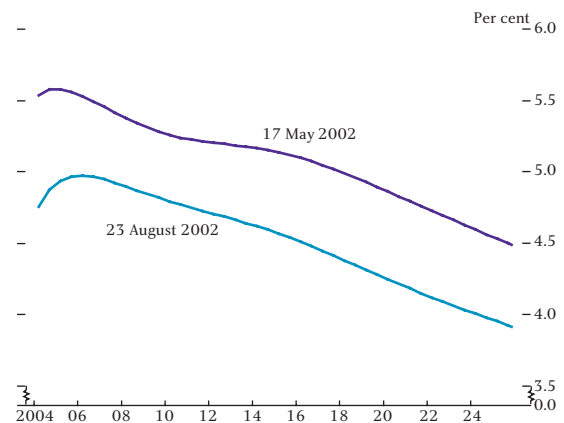
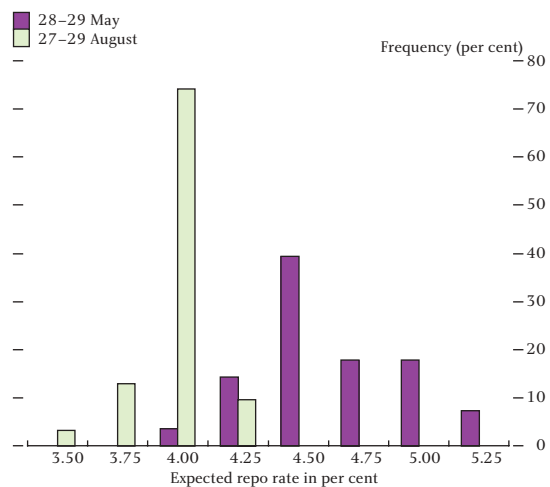


Chart 2
Three-month forward gilt yields^(a)



(a) Gilt yields are derived using the Bank's VRP curve. For further details see Anderson, N and Sleath, J (1999), 'New estimates of the real and nominal yield curves', *Bank of England Quarterly Bulletin*, November, pages 384–96.

Chart 3
Expectations of economists for the Bank's repo rate at end-2002

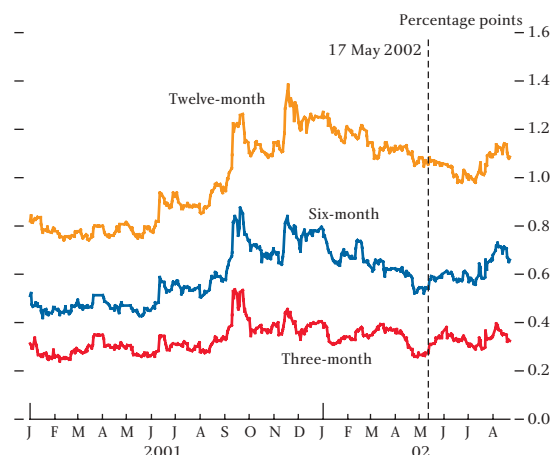


Source: Reuters.

(1) The period under review is 17 May (the data cut-off for the previous *Quarterly Bulletin*) to 23 August.
(2) Shortly after the end of the period under review.

4.63% for the poll conducted over 28–29 May. Short-term interest rate uncertainty in the United Kingdom, as inferred from options prices, increased from mid-July, but fell somewhat towards the end of the period (Chart 4).

Chart 4
Sterling interest rate uncertainty at various horizons^(a)

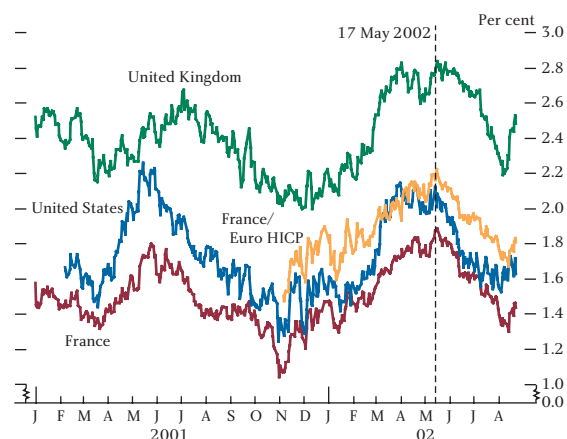


Sources: LIFFE and Bank of England.

(a) Implied standard deviations of short sterling futures contracts.

The nominal yields of conventional gilts fell by more than the real yields of index-linked gilts. In consequence, implied breakeven inflation rates—the difference between nominal yields and real yields—also fell (Chart 5). But market contacts did not suggest that changes in mean inflation expectations were a significant factor in explaining the fall in breakeven inflation rates. Real gilt yields rose during the middle of the period, perhaps partly in response to several index-linked corporate issues.

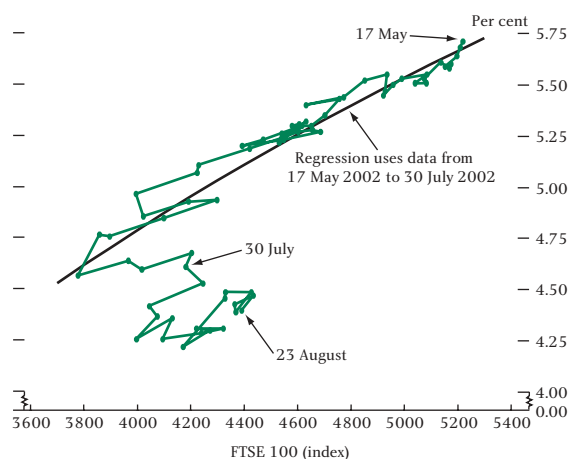
Chart 5
International ten-year breakeven inflation rates^(a)



(a) Breakeven inflation rates are calculated as the difference between the yield of a conventional bond and the yield of an index-linked government bond with a maturity of approximately ten years. Indexation is based on the following: RPI for the United Kingdom, CPI excluding tobacco for France, HICP excluding tobacco for French index-linked bonds indexed to euro-area inflation, and the CPI Urban index for the United States.

In the period of sharp equity market declines until late July, movements in market interest rates followed equity indices closely⁽¹⁾ (Chart 6), reflecting assessments of the implications for aggregate demand and hence monetary policy (see the August *Inflation Report*). Between 17 May and 30 July, for each 1% fall in the FTSE 100 the rate implied by the June 2003 short sterling contract fell, on average, by 3.3 basis points. Among economic data and surveys, weaker-than-expected RPIX data for May and June also led to falls in rates implied by futures contracts, as did the MPC's decision not to change the Bank of England's official rate in June (Table A). Short-term forward interest rates fell by more than those at longer maturities (Chart 7).

Chart 6
FTSE 100 and the rate implied by the June 2003 short sterling contract



Sources: Bloomberg and Bank of England.

Table A
Market interest rate reactions to some economic news and official publications^(a)

	Expected	Actual	Intraday change (basis points) (b)	Daily change (basis points) (c)
MPC decision (6/6)	n.a.	n.a.	-6	-6
UK industrial production (m-o-m) (11/6)	0.50%	1.10%	4	5
US advance retail sales (m-o-m) (13/6)	-0.30%	-0.90%	-3	-5
US Michigan confidence survey (preliminary) (14/6)	96.50	90.80	-6	-5
RPIX (18/6)	2.00%	1.80%	-3	-7
RPIX (16/7)	1.70%	1.50%	-11	-8
US GDP (31/7)	2.30%	1.10%	-4	-7
US ISM manufacturing (1/8)	55.00	50.50	-3	-7
UK industrial production (m-o-m) (5/8)	-0.70%	-4.30%	-4	-11
<i>Inflation Report</i> (7/8)	n.a.	n.a.	-1	-9
FOMC announcement (13/8)	n.a.	n.a.	-5	-2
SEC deadline (14/8)	n.a.	n.a.	5	14

n.a. = not available.

Source: Bloomberg.

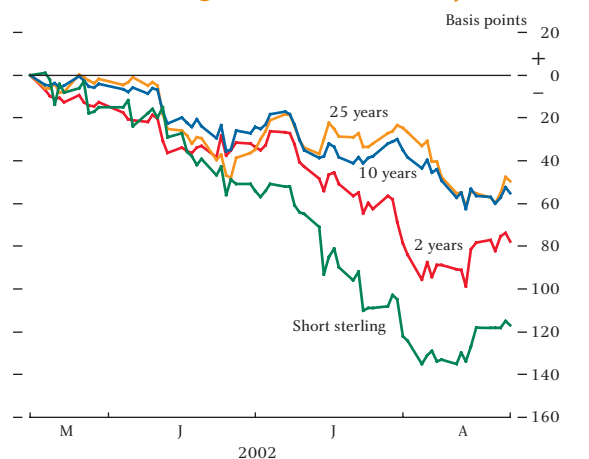
(a) Reactions in rates implied by short sterling futures contracts (September 2002 contract up to 19 June, subsequently December 2002 contract).

(b) Change in rates implied by short sterling from 15 minutes before to 15 minutes after the economic news release, publication of document or start of speech, or for overnight news from closing price to 30 minutes after start of trading the following day.

(c) For overnight news, from closing price on the day of the news to closing price the following day.

(1) In price terms, bonds and equities were highly negatively correlated.

Chart 7
Cumulative changes in interest rate expectations^(a)



(a) 'Short sterling' is the three-month Libor implied by December 2002 short sterling contract. Other rates are three-month forward rates, using the Bank's VRP curve.

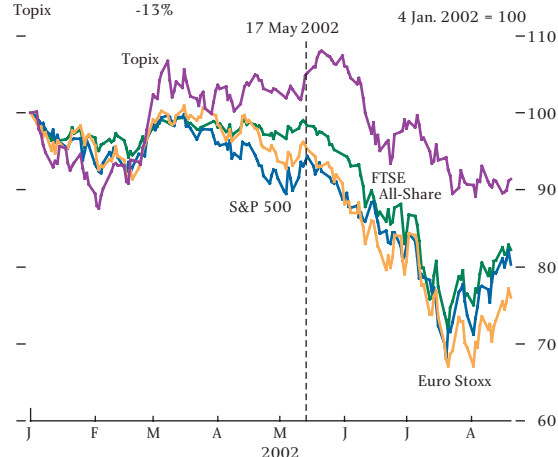
Short-run market interest rates falling in response to sharply weaker equity indices also characterised euro and US dollar markets (Charts 8 and 9). The close comovement of the major international equity indices (Table B) suggests that they were driven by common factors—the most obvious immediate trigger being revelations of accounting irregularities at US companies, notably WorldCom in May. Investors appear to have reassessed the reliability of reported earnings often used as the basis for equity valuations, and perhaps also the effectiveness of incentives (such as share options) and controls (such as external audit) designed to reconcile the interests of corporate managers with those of shareholders.

These concerns appeared to prompt a more widespread reappraisal of equity valuations internationally. The

Chart 8
International equity indices

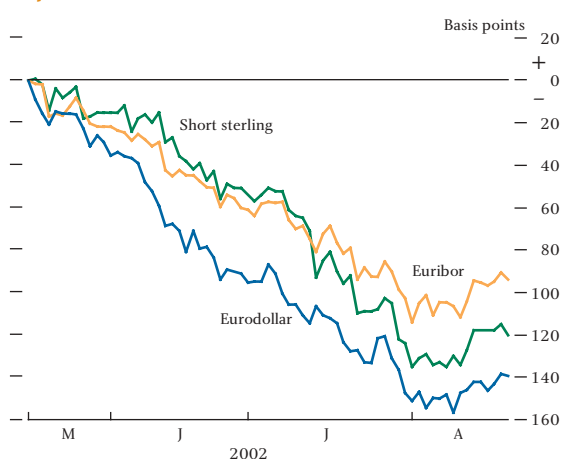
Percentage change 17 May 2002 to 23 August 2002

FTSE All-Share	-16%
S&P 500	-15%
Euro Stoxx	-20%
Topix	-13%



Source: Thomson Financial Datastream.

Chart 9
Cumulative changes in short-term interest rate expectations^(a)



Sources: Bloomberg and Reuters.

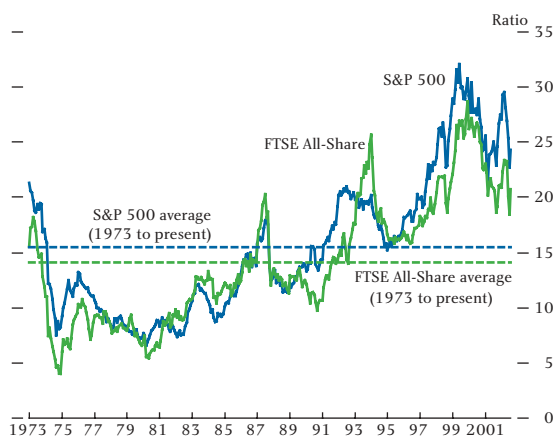
(a) As indicated by changes in interest rates implied by futures contracts maturing in December 2002.

Table B
Weekly correlations of changes in international equity indices

	Since 1992	2002	17 May to 23 August
All-Share/S&P 500	0.62	0.78	0.80
All-Share/Euro Stoxx	0.79	0.87	0.89
S&P 500/Euro Stoxx	0.67	0.82	0.79

share price rises of the late 1990s had left conventional valuation measures, such as price-earnings ratios, well above their historical averages, even after the correction from the peaks of 2000. As a result of the falls in equity markets, price-earnings ratios moved closer to their long-run averages (Chart 10). Prices of equity index options suggested, however, that market participants' perceptions of short-term equity market risk increased. In late July, implied volatilities rose to levels not reached since the Long-Term Capital Management (LTCM) crisis of 1998.

Chart 10
FTSE All-Share and S&P 500 price-earnings ratios^(a)

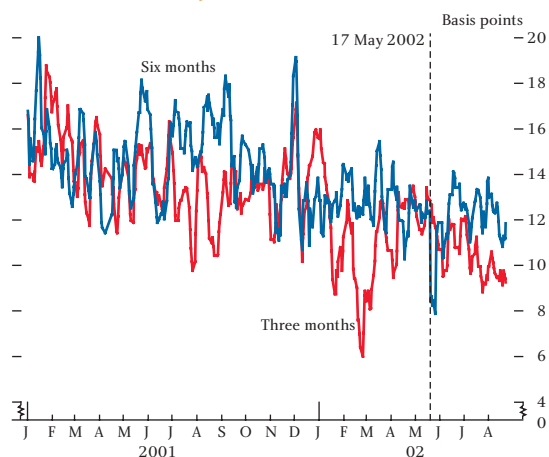


Source: Thomson Financial Datastream.

(a) 'Earnings' are those reported over the past year.

Trading in equity and bond markets seems, nevertheless, to have remained orderly—even during the sharp equity market falls in the first half of July. There was some talk of insurance companies selling equities and equity futures to limit losses in case of further price falls. But contacts suggested that selling of equities by a number of UK insurers had occurred steadily over a longer period in order to reduce the proportion of their portfolios invested in equities, often in favour of corporate bonds. Daily turnover of September FTSE 100 futures increased threefold in the first few weeks of July, more than in the underlying equity market. Market participants reported investor purchases of short-maturity gilts and Treasury bills as ‘safe-haven’ securities in the face of the sharp falls in equity markets. For example, the 6½% Treasury 2003 and 8% Treasury 2003 gilts briefly traded at low yields relative to general collateral (GC) repo rates. However, the spread of unsecured interbank rates over gilt repo rates did not widen significantly (Chart 11).

Chart 11
Spread of three and six-month sterling interbank rates over GC repo rates^(a)



(a) Interbank is the offer rate, GC repo is the bid rate; five-day moving averages.

Normalised implied volatilities of ten-year options on ten-year sterling interest rate swaps (swaptions⁽¹⁾) rose in June and July (Chart 12). Long-maturity sterling swaptions have in the past been used by UK insurance companies to hedge their exposure to interest rate risk from having issued guaranteed annuity products.⁽²⁾ The increase in long-maturity swaption volatilities in June and July may partly have reflected actual, or expected future, buying of long-maturity swaptions by some UK insurance companies following falls in equity markets and long-term interest rates. But by the end of

Chart 12
Normalised implied volatilities^(a) of ten-year/ten-year swaptions



Source: Deutsche Bank.

(a) Implied volatilities multiplied by the forward swap rate underlying the swaption.

the review period these implied volatilities had eased back.

From the end of July equity markets were more stable for a while, but money market interest rates continued to fall in early August, as market participants interpreted economic data in the United States and Europe as indicating that global economic recovery would be slower than previously expected. Weaker-than-expected industrial production data for June in the United Kingdom and GDP data in the United States, including downward revisions to 2001 GDP data, contributed to falls in implied rates (Table A).

Sterling forward interest rates at medium and long maturities fell during the first half of August (Chart 7), in line with US and European markets. Contacts suggested that this might have reflected UK institutional investors extending the maturity of their bond holdings.

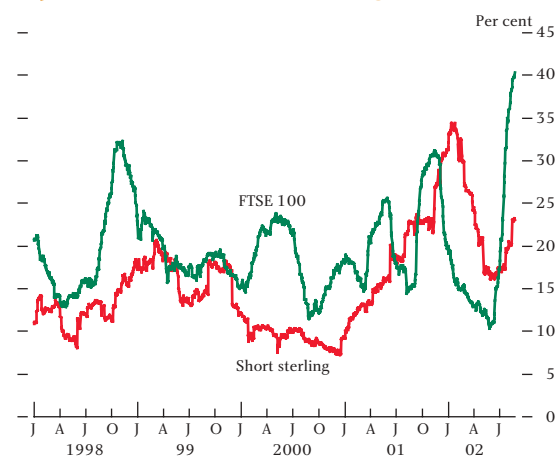
Following the passing of the US Securities and Exchange Commission's (SEC) 14 August deadline for companies to certify the accuracy of their financial statements, equities rose sharply, as did short-term interest rate expectations. That most chief executives and chief financial officers of large US companies attested to the accuracy of their financial statements without further significant revelations may to some degree have reduced concerns about the integrity of reported earnings. As equity indices increased, implied volatilities fell back somewhat from their late-July highs.

(1) Normalised implied volatilities are the product of implied volatilities of the swaption and the forward swap rate underlying the swaption. See *Financial Stability Review*, June 2002, page 24 for a description of swaptions.

(2) See *Financial Stability Review*, December 2001, pages 152–54.

In summary, equities were highly volatile during the period, both day-to-day and intraday, and, for a period when the official rate did not change, money market interest rates were also relatively volatile (Chart 13). Crucially, though, notwithstanding heightened uncertainty, market conditions were orderly and there was no generalised or abrupt ‘flight to quality’ as seen for example during Autumn 1998 when LTCM failed. While spreads between sterling swap rates and gilt yields widened during the review period, they widened much more sharply during the second half of 1998 (Chart 14).

Chart 13
Historical standard deviations of FTSE 100 index and implied rates from short sterling futures contracts^(a)



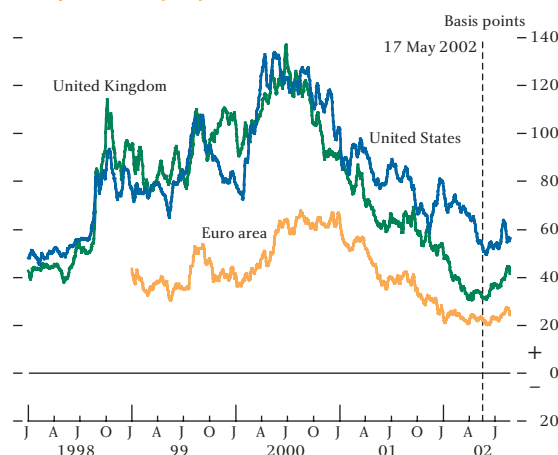
Sources: Bloomberg, LIFFE and Bank of England.

(a) For FTSE 100, calculated as the rolling 60-day standard deviation (annualised) of logarithmic returns. For short sterling, calculated as the rolling 60-day standard deviation (annualised) of percentage change in yield as implied by the mean of the probability density function six months ahead, as derived from options.

In the sterling market, the yield spread of the bank liability curve over gilts widened at all maturities over the review period, and by most at longer maturities (Chart 15).⁽¹⁾ Late in the period, the spread became wide enough to prompt supranational issuance of fixed-rate sterling debt. Such issuers usually swap their liabilities back to floating rate, receiving sterling fixed in a swap. Reflecting this, the issuance triggered a slight narrowing in the swap spread.

Spreads of sterling corporate bond yields over swap rates also widened, particularly for sub investment-grade bonds (Chart 16). For investment-grade bonds, spreads widened by most on BBB and A-rated bonds, of which a large proportion was issued by UK non-financial companies (Chart 17). Spreads on

Chart 14
Ten-year swap spreads^(a)



Source: Bloomberg.

(a) Five-day moving average of the difference between ten-year swap rates and ten-year government bond yields.

Chart 15
Spread of bank liability curve over GC repo/gilt curve zero coupon yields^(a)



(a) GC repo/gilt yields using the Bank’s VRP curve (see Chart 2). For BLC curve, see footnote 1 on this page.

sterling corporate bonds issued by media and financial (including insurance) companies widened most over the period.⁽²⁾ In contrast, spreads on mortgage-backed and other asset-backed securities narrowed slightly.⁽³⁾

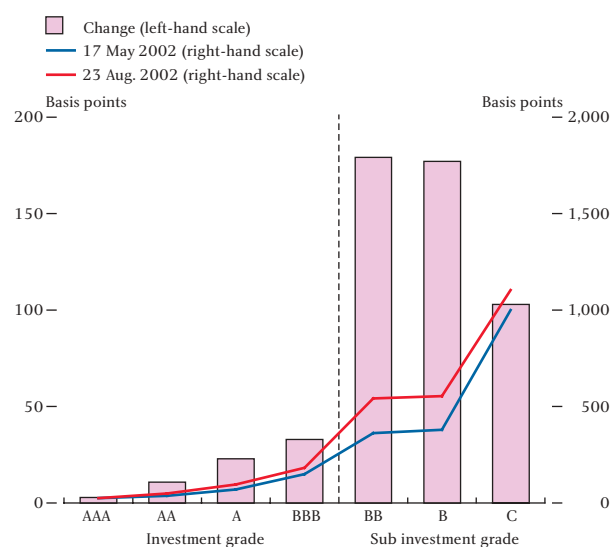
Issuance in the sterling-denominated non-government bond market was about £18.5 billion in 2002 Q2 (Table C), compared with about £17 billion in 2002 Q1. New issues were predominantly long-maturity fixed-rate bonds. A large proportion was rated AAA, with about 60% backed by mortgages or other assets. Some issues by UK non-financial companies also carried an

(1) The bank liability curve is a yield curve derived from interbank money market interest rates and interest rate swaps. For more information, see Brooke, M, Cooper, N and Scholtes, C (2000), *Bank of England Quarterly Bulletin*, November, pages 392–402.

(2) Based on Merrill Lynch Global Index System indices.

(3) Based on Merrill Lynch Global Index System indices.

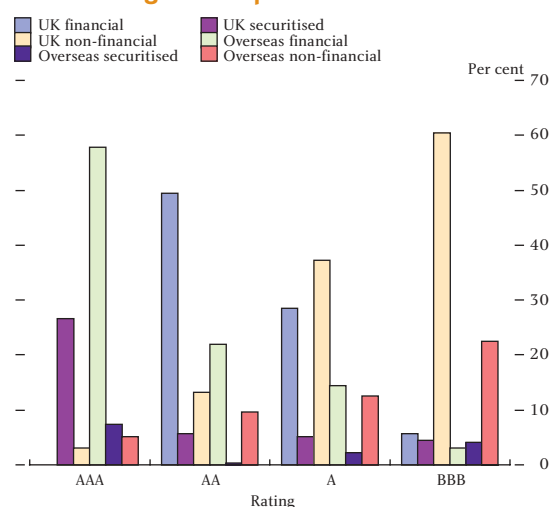
Chart 16
Sterling corporate bond spreads by credit rating



Source: Merrill Lynch.

AAA-rating as a result of credit enhancement in the form of a guarantee (or 'wrap') from a monoline insurance company.⁽¹⁾ Total issuance by UK non-financial companies was little changed on the previous quarter, while issuance by overseas companies was higher. The widening of corporate spreads may have deterred issuance towards the end of the review period, particularly for lower-rated issuers: issuance between the start of August and 23 August was lower than the average for the equivalent period in 1999, 2000 and 2001.

Chart 17
Composition of Merrill Lynch sterling investment-grade corporate bond indices^(a)



Source: Merrill Lynch.

(a) As per August member lists.

Sterling exchange rates

Between 17 May and 23 August, sterling appreciated by 4.1% against the dollar and depreciated by 1.4% against the euro and by 1.0% against the yen (Chart 18). Sterling's effective exchange rate index (ERI) ended the period slightly lower, down 0.4%.

Over the review period, the change in the dollar-sterling exchange rate was broadly consistent with relative movements in interest rates, but the change in the euro-sterling exchange rate was less consistent. Table D

Table C
Sterling bond issuance in 2002 Q2

DMO gilt auctions (£ millions)

Conventional	Date	Amount issued	Stock
	29.05.02	2,250	5% Treasury Stock 2025
	25.06.02	3,000	5% Treasury Stock 2008
Index-linked	Date	Amount issued	Stock
	24.04.02	425	2 ¹ / ₂ % Index-linked Stock 2020

Corporate issuance

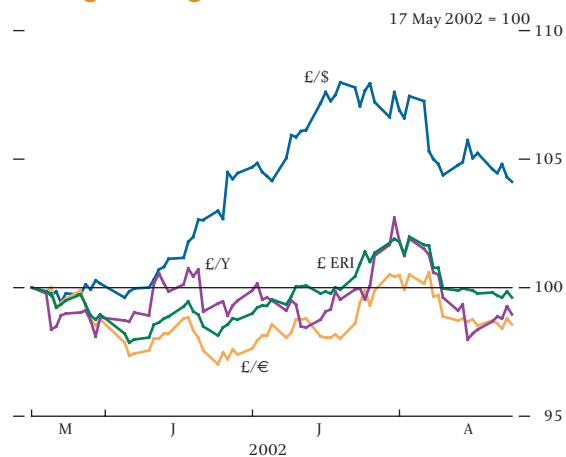
	Number of issues	Amount (£ billions)	By credit rating:			
			AAA	AA	A	BBB and lower
		Total (a)				
<i>Fixed-rate issues</i>						
UK corporates	17	4.1	1.1	0.0	1.4	1.7
UK financials	12	1.7	0.4	0.4	0.9	0.1
Supranationals	1	0.2	0.2	0.0	0.0	0.0
Overseas borrowers	19	6.5	1.4	1.9	2.6	0.7
Total (a)	49	12.6	3.1	2.3	4.8	2.4
<i>FRNs</i>						
UK corporates	2	0.7	0.0	0.0	0.0	0.7
UK financials	35	4.5	3.4	0.1	0.9	0.2
Supranationals	0	0.0	0.0	0.0	0.0	0.0
Overseas borrowers	9	0.8	0.2	0.5	0.2	0.0
Total (a)	46	6.0	3.5	0.5	1.1	0.9

Sources: Bank of England, Debt Management Office, Moody's and Standard and Poor's.

(a) Totals may not sum exactly due to rounding.

(1) For more information, see the box on monoline bond insurers in Rule, D (2001), 'Risk transfer between banks, insurance companies and capital markets', *Financial Stability Review*, December, pages 137–59.

Chart 18
Sterling exchange rates^(a)



(a) A number above 100 indicates sterling appreciation.

Table D
Exchange rate movements and interest rate news:
17 May to 23 August^(a)

Percentage points

	Sterling ERI	Euro-sterling	Dollar-sterling	Dollar-euro
[A] Actual change	-0.37	-1.41	4.12	5.61
[B] Interest rate news	-0.05	-0.29	3.67	3.96
of which [C] domestic	-7.28	-7.28	-7.28	-6.99
[D] foreign	7.23	6.99	10.95	10.95

(a) [B] = [C] + [D]. Interest rate calculations use the Bank's VRP curve. For details, see Chart 2.

illustrates a decomposition of exchange rate movements according to the uncovered interest rate parity condition, which seeks to identify the role of interest rate news in explaining exchange rate moves.⁽¹⁾ Interest rate news here is measured as the cumulative expected return on a ten-year government bond over a ten-year horizon. In the United States, this measure fell by almost 4 percentage points more than in the United Kingdom (11.0 versus 7.3 percentage points respectively), broadly consistent with the direction and magnitude of the change in the dollar-sterling exchange rate. But in the euro area, it fell by only 0.3 percentage points less than in the United Kingdom (7.0 versus 7.3 percentage points). While this difference was consistent with the direction of the euro-sterling exchange rate movement, it was not large enough to explain its size.

The change in the dollar-sterling exchange rate also appears to have been broadly consistent with changes in relative economic growth forecasts, but the change in the euro-sterling exchange rate was not. Between May and August, *Consensus* growth forecasts for the United Kingdom for 2002 were scaled down by 0.1 percentage points, compared with 0.5 percentage points for the

United States and 0.2 percentage points for the euro area.

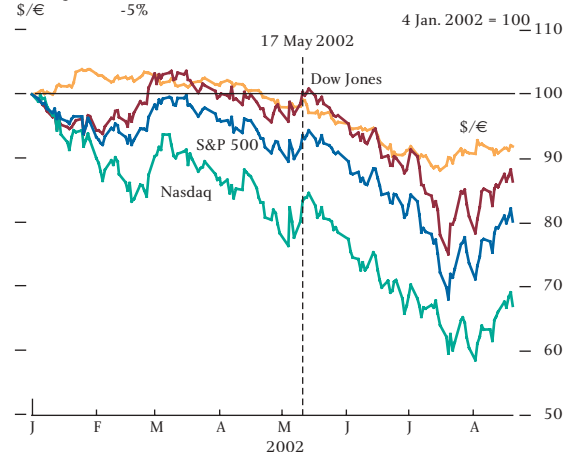
Several other factors also influenced sterling's value against other currencies. The depreciation of the sterling ERI from 17 May until the end of June (Chart 18) may have been partly attributable to a relatively high level of actual and potential merger and acquisition activity by UK companies abroad. Market contacts also reported some speculative EMU convergence trades during this period, particularly short positions against the Swedish krona, putting pressure on sterling.

The sterling ERI appreciated throughout July. This was primarily accounted for by a change in the value of the dollar, which depreciated against all major currencies. Market contacts suggested that this in part reflected renewed concerns about the sustainability of the US current account deficit and the cross-border capital flows required to finance it. The dollar's depreciation appeared to be linked to falls in equity markets (Chart 19), and perhaps therefore to increased doubts about whether US assets would continue to deliver relatively higher returns.

Chart 19
US dollar and US equity indices

Percentage change 17 May 2002 to 23 August 2002

Dow Jones	-14%
S&P 500	-15%
Nasdaq	-21%
\$/€	-5%



In the second half of July, sterling appreciated against all major currencies, but particularly the euro. Market contacts mentioned as factors the perception of a more positive economic outlook for the United Kingdom compared with the countries of the euro area, and the positive impact on sterling from the unwinding of EMU

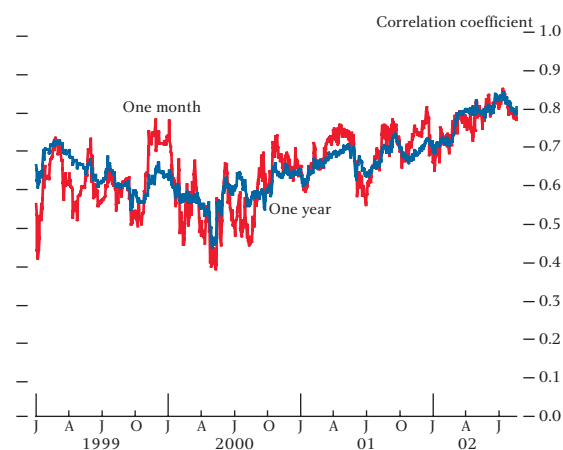
(1) The method of decomposing the uncovered interest parity condition to assess the impact of interest rate news on the exchange rate is explained in Brigden, A, Martin, B and Salmon, C (1997), 'Decomposing exchange rate movements according to the uncovered interest rate parity condition', *Bank of England Quarterly Bulletin*, November, pages 377-89.

convergence trades, particularly of short positions against the Swedish krona. In addition, market contacts reported increased demand for sterling by UK corporates engaged in active hedging of overseas earnings.

During August, sterling initially depreciated against all three major currencies, leading to a fall in the sterling ERI. This may in part have been attributable to a strengthening of the US dollar, but also to weaker-than-expected UK macroeconomic news, such as industrial production and consumer confidence. Sterling subsequently rose against both the euro and the yen, but fell against the dollar, so that the sterling ERI changed little over the remainder of the period.

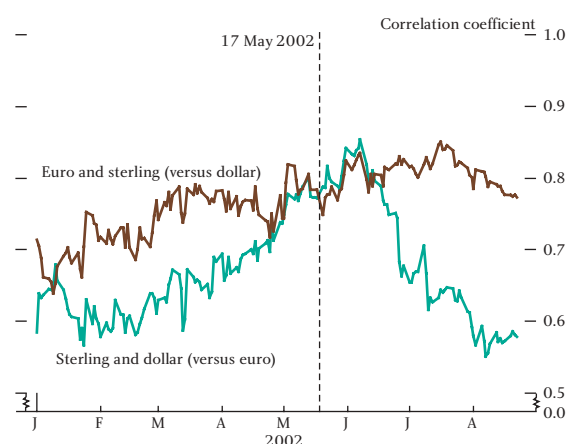
On previous occasions when the dollar has depreciated against the euro, so has sterling. Over this period, sterling's depreciation against the euro was broadly consistent with the historical correlation between the euro-sterling and euro-dollar exchange rates. Options prices can give an indication of how closely correlated the sterling and euro exchange rates are expected to be. The implied correlation between sterling and the euro (based on exchange rate movements against the dollar) rose slightly over the review period at both the one-month and one-year maturity (Chart 20). The one-month implied correlation coefficient rose to 0.80 from 0.78, while the one-year implied correlation coefficient rose to 0.80 from 0.79. Since mid-2000, this implied correlation had steadily increased, at both maturities. On 16 July 2002, both measures reached their highest level since the creation of the single currency in 1999.

Chart 20
Implied correlation between the euro and sterling (versus the dollar)



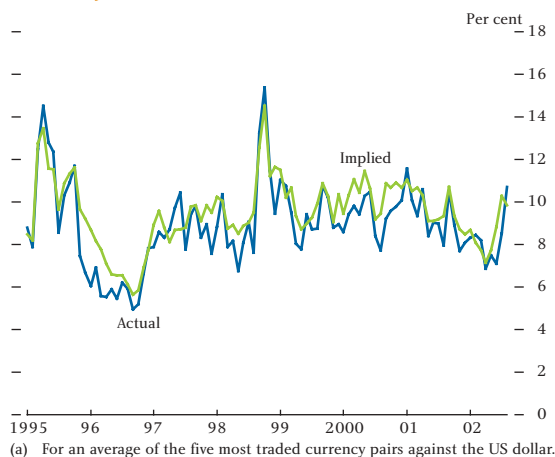
In contrast, the one-month implied correlation coefficient of sterling with the dollar (based on exchange rate movements against the euro) fell to 0.59 from 0.77 over the period from 17 May to 23 August, indicating that market participants expected that sterling would be less correlated with the dollar in future (Chart 21).

Chart 21
One-month implied correlations



As in other asset markets, uncertainty increased in foreign exchange markets, as measured by implied volatilities derived from options prices (Chart 22). In April 2002, actual and implied one-month volatilities for an average of the five most traded currency pairs against the US dollar⁽¹⁾ fell to their lowest levels since May 1998 and November 1996, respectively. But between May and August, actual and implied one-month volatilities rose by 3.2 and 2.1 percentage points respectively. The one-month implied volatility for US

Chart 22
One-month implied and actual exchange rate volatility^(a)



(a) For an average of the five most traded currency pairs against the US dollar.

(1) As reported in the Bank for International Settlements' (BIS) *Triennial Central Bank Survey* (April 2001), the five most traded currency pairs by turnover against the US dollar are the euro, the yen, sterling, the Swiss franc and the Canadian dollar. For further analysis, see the box on 'Exchange rate volatility' (2002), *Bank of England Quarterly Bulletin*, Summer, pages 142–45.

dollar-sterling increased by 2.3 percentage points. In contrast, the implied one-year volatility of the euro-sterling exchange rate was unchanged, and the actual one-year volatility for euro-sterling fell slightly, by 0.4 percentage points (Chart 23).

Chart 23
One-year euro-sterling exchange rate volatility



Against the background of the usual summer lull in activity in the foreign exchange market, the increase in implied volatility may have reflected a reduction in risk-taking. Especially in the latter half of the period, the most conspicuous actors in the market were thought to have very short investment horizons, and market contacts frequently ascribed sharp intraday movements to model-based traders. Increased uncertainty about the global growth outlook led many medium and longer-term speculators to withdraw from the market, contributing to a relative lack of liquidity in some currency pairs at times. Against this, trading volumes have increased over the course of the year, with high volumes perceived to have been traded on high-volatility days.

Developments in the structure of sterling markets

The past few months have seen two significant developments in the sterling market infrastructure, as well as further developments in instruments and trading patterns.

Continuous Linked Settlement (CLS)

The Continuous Linked Settlement Bank (CLSB) began live operations on 9 September, settling foreign exchange transactions between seven major currencies, including sterling. The other currencies included from

the start are the Australian dollar, Canadian dollar, euro, Japanese yen, Swiss franc and US dollar, with more likely to be added in due course.

The intraday principal exposures entailed in foreign exchange settlement were highlighted in 1974 by the failure of Bankhaus Herstatt. The official sector's response was to strengthen bank supervision against internationally agreed standards promulgated by the Basel Committee on Banking Supervision, which was established in 1974. During the 1980s and into the 1990s, payment system reforms focused primarily on strengthening *domestic* wholesale payments mechanisms through the introduction of real-time gross settlement (RTGS). As those agendas made progress, in the mid-1990s attention returned to curing the remaining 'Herstatt risk' problem. In a 1996 report prepared by the G10 Committee on Payment and Settlement Systems,⁽¹⁾ central banks set out a remedial strategy, a key component of which was that private-sector groups should provide risk-reducing multi-currency settlement services. CLS has been the main industry response. It is designed to enable settlement banks to eliminate foreign exchange settlement risk by settling bought and sold currencies on a 'payment-versus-payment' basis.

CLSB settles foreign exchange transactions in a five-hour window. It holds accounts with the respective central banks and uses their RTGS payments systems to make and receive payments. Settlement members submit trades to CLSB, and by 6.30 am Central European Time (CET) are told the net amounts they are due that day to receive (for currencies in which they are long overall) and pay for (for currencies in which they are short overall). Settlement members pay in the net amounts they owe between 7.00 CET and 12.00 CET, subject to a schedule set by CLSB, with minimum amounts required to be paid in by specific times. During this period CLSB attempts to settle trades individually—this can occur only if both settlement members have sufficient funds in their respective accounts to do this. If not, the trade is sent to the back of a queue and CLSB attempts to settle the next trade. Each trade is checked until all are settled and all long balances have been paid out (by 12.00 CET); if funds are insufficient, CLSB cannot settle the trade. There are a number of safeguards in place in case a bank fails to pay in the funds it owes, but ultimately CLSB will eliminate settlement risk only for those trades it has been able to settle and not necessarily for all those trades that have been submitted to it.

(1) See <http://www.bis.org/publ/cps17.htm>

At least initially, some foreign exchange transactions are being settled outside and some through CLSB. As a result, sterling settlement members could potentially face imbalances between CLSB pay-in obligations in a particular currency and receipts relating to transactions settled outside CLS. The pay-in window for sterling is in the morning UK time, and CHAPS banks providing sterling banking services to settlement members may use their access to intraday liquidity from the Bank of England against eligible RTGS collateral in order to bridge any such intraday sterling mismatches. The Bank of England is monitoring the pattern of demand for such liquidity.

It is difficult to assess what impact CLS will have eventually on the broad structure of the foreign exchange market. At present, 66 shareholder banks own CLSB. Many will be settlement members and will seek to sign up non-shareholder banks in order to offer them third-party settlement services within CLS, so the total number of banks eventually using CLS, both directly and indirectly, is potentially large. This could bring cheaper settlement costs for all market participants. Market anecdote from some participants suggests that a differential pricing structure could develop between trades settled in CLS (and thus not subject to settlement risk) and those settled outside CLS. There has also been discussion of the possibility that higher fixed and lower marginal costs of foreign exchange settlement could lead to a concentration of business into a smaller number of global players, with other banks using their pricing and settlement services for their own clients. The Bank will keep any such behavioural effects under review.

LCH RepoClear for gilts and SwapClear

On 5 August, the London Clearing House (LCH) added gilts to its RepoClear service, under which it acts as central counterparty (CCP) for bond repo transactions and also for outright purchases.⁽¹⁾ This has the following effects:

- Balance-sheet netting. When a trade is registered with LCH, the existing bilateral agreement is replaced by two new agreements between LCH and the two banks. As a result, exposures are netted multilaterally.
- This type of netting also reduces the number of deliveries, as participants have a single settlement

per security with LCH, rather than with many other market participants. LCH estimates an average daily netting efficiency of the order of 65% for RepoClear.

- Likewise, usage of bilateral credit lines is reduced. Rather than having many exposures to each other, participants have margined exposure to LCH.
- Because exposures are to LCH, rather than to other market participants, anonymous trading is facilitated.
- LCH provides the option of Straight-Through Processing (STP), which greatly reduces the need for ticket writing and paperwork. This, together with the single counterparty and standardised contract terms, helps reduce operational risk in repo.

In general, provided that a CCP is well constructed, with highly professional and effective risk management, it can improve the management of some risks within a market, and make the functioning of the market more resilient during a crisis.⁽²⁾

In the first 14 days of operation, daily volumes averaged £5.6 billion split between 120 tickets, with an average maturity of 7.6 days. Automatic trading systems and voice brokers both had significant proportions of the business, with a greater proportion of business executed via voice brokers than in other European government repo markets cleared through LCH. Money market participants had already reported that the liquidity at the short end of the sterling cash yield curve had deepened following greater use of automatic trading systems ahead of the introduction of central counterparty settlement; this may help to explain the increase in turnover in the gilt repo market in 2002 Q2 shown in Table F. Some say that the benefits outlined above will enable them to do greater amounts of gilt repo business, especially at calendar quarter ends. But it is too soon to judge the significance of any increase in market depth and liquidity.

In June LCH expanded to 30 years the maturity of sterling (along with US dollar, euro and yen) interest rate

(1) For more information on RepoClear, see LCH's web site: <http://www.lch.co.uk/RepoClear/BusinessBenefits.htm> and http://www.lch.co.uk/press_releases/05082002.htm

(2) See Hills, R and Rule, D (1999), 'Counterparty credit risk in wholesale payment and settlement systems', *Financial Stability Review*, November, pages 98–114.

swaps for which it will act as CCP through SwapClear.⁽¹⁾ Previously the limit had been ten years. Reflecting SwapClear's standardised processes, around 80% of swap trades cleared by LCH are now confirmed between counterparties (and cleared) within a day of the trade, which represents a significant improvement on previous industry practice.

Money market funds

In addition to these developments in sterling markets, contacts have commented on the growth of money market funds. As elsewhere, they invest in money market assets such as CDs, Treasury bills, repo and commercial paper. In contrast with the United States, where funds are also popular with retail investors, sterling money market funds typically cater for institutional clients, for example companies, pension funds and local authorities. They offer such customers an alternative to keeping their cash balances in demand deposit accounts, the return on which is typically related to the overnight rate.

The United States has a large domestic money market mutual fund sector, with assets of \$2,238 billion in 2001.⁽²⁾ Its growth was stimulated in the 1970s as retail savers switched some of their deposits from banks to money market mutual funds, as market interest rates rose above maximum interest rates on time deposits imposed by Regulation Q.⁽³⁾ Restrictions on the payment of interest on companies' current (checking) accounts may also have contributed. In contrast to France, where there are currently no interest-bearing sight deposits, no such distortion is present in the United Kingdom, so it is not clear how much sterling money market funds will grow in future.

Table E
Sterling money markets

Amounts outstanding: £ billions

	Interbank (a)	CDs (a)	Gilt repo (b)	Stock lending (b)	Eligible bills (a)	Commercial paper (a)	Other (c)	Total
2000 Q1	156	132	100	51	14	15	6	474
Q2	159	135	124	54	12	16	7	507
Q3	162	125	127	53	12	16	7	502
Q4	151	130	128	62	11	18	9	509
2001 Q1	171	141	126	67	13	19	7	544
Q2	177	151	128	67	12	22	6	543
Q3	187	134	144	52	11	21	6	555
Q4	185	151	150	48	11	20	16	541
2002 Q1	190	139	154	66	11	22	14	576
Q2	229	130	144	46	11	26	20	606

(a) Reporting dates are end-quarters.

(b) Reporting dates are end-February for Q1, end-May for Q2, end-August for Q3, end-November for Q4.

(c) Including Treasury bills, sell/buy-backs and local authority bills.

(1) See *Financial Stability Review*, June 2002, page 97.

(2) Figure taken from 'Money Fund Report', produced by iMoneyNet Inc.

(3) Regulation Q was issued by the Federal Reserve. See Eatwell, J *et al* (1992), *The New Palgrave Dictionary of Economics*, Macmillan.

(4) Figures taken from 'European Money Fund Report', produced by iMoneyNet Inc.

(5) See also Chaplin, G, Embrow, A and Michael, I (2000), 'Banking system liquidity: developments and issues', *Financial Stability Review*, December, pages 93–112, and the *Financial Stability Review*, June 2002, pages 86–87.

Members of the UK-based Institutional Money Market Funds Association, whose funds are rated AAA, had assets under management of \$22.8 billion in sterling, \$15.5 billion in euros and \$65.1 billion in US dollars, as at 16 August 2002.⁽⁴⁾ For comparison, £606 billion was outstanding in the sterling money market in the United Kingdom as of end-June 2002 (Table E).

Sterling money markets

More generally, amounts outstanding in the sterling money markets rose by £30 billion to £606 billion in 2002 Q2, having risen by £35 billion in the previous quarter (Table E). Within the total, interbank deposits increased sharply, by around £40 billion, compared with an increase of under £20 billion over the previous twelve months. In part, the increase reflected intragroup activity following a group restructuring. Market contacts suggest, however, that the increase might also have reflected increased precautionary investment in short-term money market assets, including cash deposits. Non-bank financial institutions' (such as pension funds, insurance companies and securities dealers) sterling deposits with banks in the United Kingdom increased by £3.6 billion over the quarter, and by almost £10 billion in June, compared with a fall over the year to March.

Data collected by the Financial Services Authority for the sterling stock liquidity regime (SLR), which ensures that the major UK-incorporated banks match an element of their potential outflows of sterling liabilities with holdings of liquid assets,⁽⁵⁾ indicate that over the three months to mid-July, these banks' net wholesale funds becoming due over the next five days fell significantly.

Table F
Turnover of money market instruments

Average daily amount, £ billions

	2001				2002	
	Q1	Q2	Q3	Q4	Q1	Q2
Short sterling futures (a)	60.0	66.0	71.5	69.6	74.1	69.9
Gilt repo (b)	15.7	17.9	18.2	20.0	21.3	25.1
Interbank (overnight)	10.3	11.1	9.3	10.8	12.4	12.4
CDs, bank bills and Treasury bills	11.8	12.4	11.4	11.7	10.5	11.1

Sources: CrestCo, LIFFE, Wholesale Markets Brokers' Association and Bank of England.

(a) Sum of all 20 contracts extant, converted to equivalent nominal amount.

(b) Quarters are to end-February (Q1), end-May (Q2), end-August (Q3) and end-November (Q4).

Market contacts suggested that this partly reflected an increase in short-term (overnight to five days) interbank lending, which is netted against short-term wholesale borrowing for SLR purposes; this would be consistent with the increase in interbank deposits shown in Table E. The banks' apparent preference for lending funds short term in the interbank market, rather than holding longer-term money market assets, may have reflected a reported reluctance to take positions beyond very short maturities, given the relatively flat money market yield curve and perceived interest rate uncertainty.

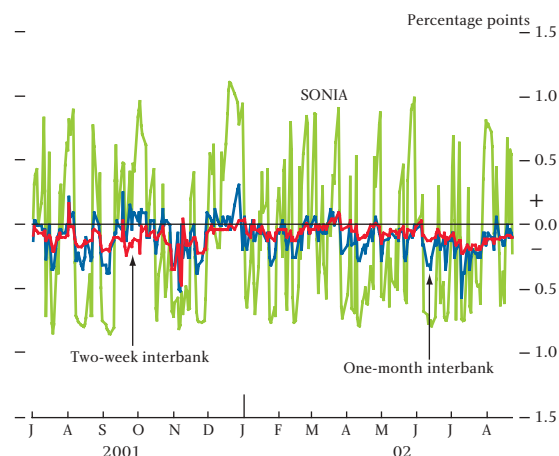
Major UK-owned banks' holdings of CDs and bank bills also fell over the three months to mid-July, and the value of CDs outstanding in the market as a whole declined significantly in the three months to end-June (Table E). To the extent that large UK banks received inflows of deposits from institutional investors, this may have reduced their need for CD issuance.

Bank of England official operations

Over the review period, spreads of one-month CD, interbank and general collateral repo rates averaged 14, 7 and 18 basis points below the Bank's repo rate respectively, compared with 10, 9 and 20 basis points over the year to 17 May. Overnight cash rates almost entirely remained within the range determined by the Bank's collateralised overnight lending and deposit facilities. The average spread between the Sterling Overnight Index Average (SONIA) and the Bank's repo rate was minus 10 basis points in May, minus 48 basis points in June, minus 25 basis points in July and plus 16 basis points from 1 to 23 August (Chart 24).

Volatility, as measured by the standard deviation of the daily changes in two-week interbank interest rates over a one-month window, remained broadly constant throughout 2002, at around 10 basis points.

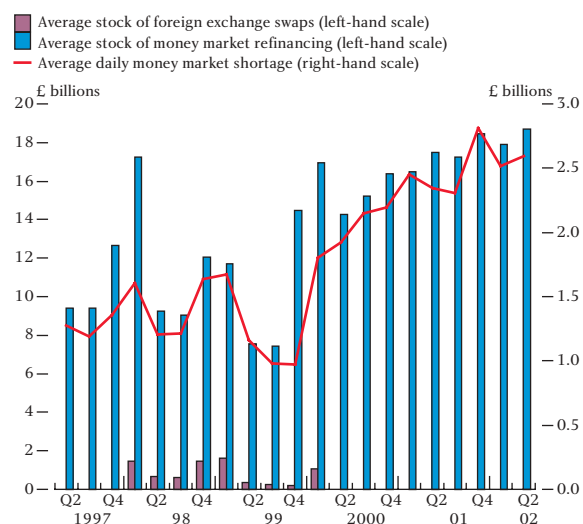
Chart 24
Spread of SONIA, two-week and one-month interbank rates over the Bank's repo rate



Open market operations (OMOs)

The stock of money market refinancing held on the Bank's balance sheet (comprising the short-term assets acquired via the Bank's open market operations) was slightly higher than in the previous three-month period (Chart 25). This reflected an increase in the note circulation, partly as a result of increased demand associated with the Jubilee weekend and the World Cup.

Chart 25
Stock of money market refinancing and daily shortages



The effect of the small increase in the stock of refinancing was offset by a fall in the rate of turnover of the stock, leaving the average daily shortage broadly unchanged. Daily money market shortages averaged £2.59 billion between May and July, compared with £2.53 billion during the previous three-month period (Table G). During May, June and July, counterparties

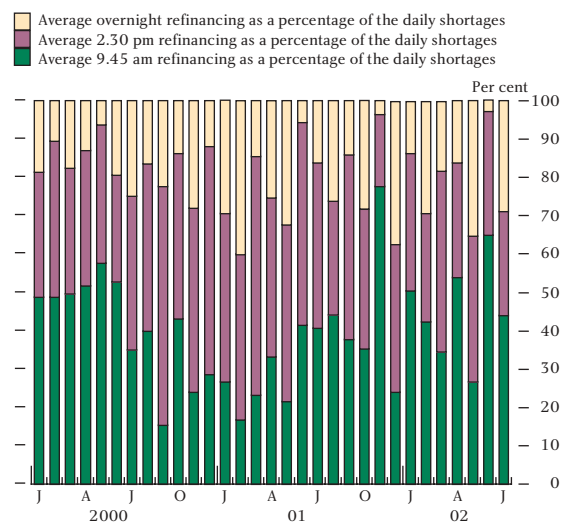
Table G
Average daily money market shortages

£ billions

1998	Year	1.42
1999	Year	1.20
2000	Year	2.02
2001	Year	2.48
2002	Q1	2.51
	April	2.17
	May	3.28
	June	1.92
	July	2.46

refinanced 78% of the daily money market shortages in the 9.45 am and 2.30 pm rounds of operations (which largely have a two-week maturity) at the official repo rate, and 22% in the late rounds of operations, on an overnight basis and at a spread over the official repo rate (Chart 26).

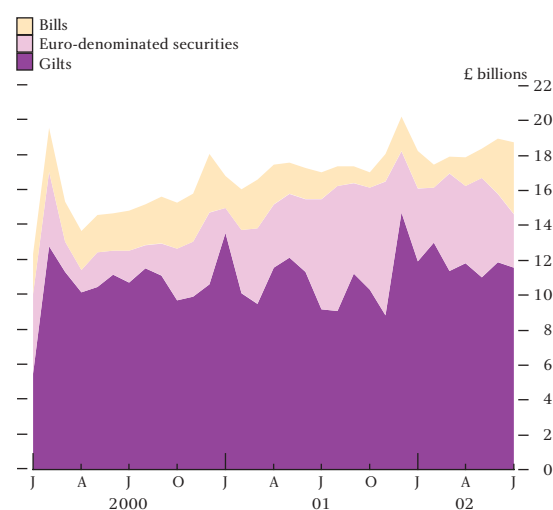
Chart 26
Refinancing provided in the Bank's open market operations



Counterparties made use of the Bank's deposit facility on three days during the review period. In order to leave the market square by close of business, the Bank accordingly increased the amount of refinancing available to settlement banks at the 4.20 pm late repo facility by the size of these deposits. On each occasion, the settlement banks borrowed the full amount of refinancing available. The deposit facility provides a floor to the interbank overnight rate, and consequently other short-dated market interest rates.

Gilts accounted for around £11.5 billion (or 62%) of the stock of collateral taken by the Bank in its official money market operations during May, June and July (Chart 27). Euro-denominated eligible securities⁽¹⁾ (issued by EEA governments and supranational bodies) accounted for around £4 billion (or 23%) of the collateral, the same absolute level as in the previous three-month period. The increase in the use of bills as OMO collateral towards the end of the period may partly have reflected increased Treasury bill issuance by the Debt Management Office: the stock of Treasury bills increased from about £8 billion at end-April to about £13 billion at end-July.

Chart 27
Instruments used as OMO collateral



Bank of England euro issues

The Bank of England continued to hold regular monthly auctions of euro bills during the period. Each month €900 million of bills were auctioned, comprising €600 million of three-month and €300 million of six-month Bank of England euro bills. The stock of euro bills outstanding on 23 August was €3.6 billion. The auctions continued to be oversubscribed, with the issues being covered an average of 6.5 times the amount on offer; bids were accepted at average yields of between Euribor minus 8 and 12 basis points.

The Bank of England did not issue any euro notes during the period under review.

(1) A list of eligible securities is available on the Bank's web site: www.bankofengland.co.uk/markets/money/eligiblesecurities.htm