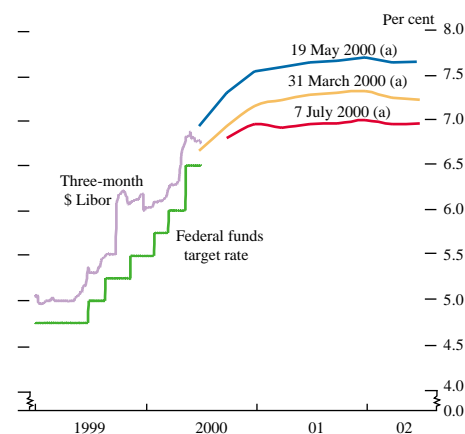


Markets and operations

This article reviews developments in international and domestic financial markets, drawing on discussions with the Bank of England's market contacts, and describes the Bank's market operations in the period 31 March to 7 July 2000.

- *Official interest rates were raised in the euro area and the United States by 75 and 50 basis points respectively during the review period, and were left unchanged in the United Kingdom. At the same time, short-term interest rate expectations for 2000 and 2001 were revised up by almost 50 basis points in the euro area, but were lowered by around 20 and 50 basis points in the United States and United Kingdom respectively.*
- *Uncertainty about the outlook for short-term interest rates appears to have lessened; an increasing number of market participants believe that the peak in the US and UK interest rate cycles is fairly close at hand.*
- *The US and UK government bond yield curves became less inverted and euro-area yield curves became flatter during the review period; long bond yields were little changed.*
- *World equity markets remained volatile, largely as a result of further significant changes in IT-related share prices in April and May.*
- *Tentative signs of a change in sentiment towards both sterling and the euro emerged, with the former depreciating and the latter appreciating over the period.*

Chart 1
US interest rates



Source: Bloomberg.

(a) Interest rates implied by eurodollar futures contracts at the dates specified. From July 2000 onwards, the x-axis relates to contract expiry dates.

International markets

Short-term interest rates

US short-term interest rate expectations rose through the first six weeks of Q2 and then fell back during the rest of the review period. Yields derived from eurodollar futures contracts expiring between 2000 and 2002 ended the period around 20–30 basis points lower (see Chart 1). Federal funds futures contracts followed a similar path. On 7 July, both of these futures markets implied an expectation that the Federal funds target rate would be increased to almost 6¾% by December 2000, and would remain unchanged throughout 2001–02. The Federal Open Market Committee's (FOMC) decision on 16 May to raise its target rate by 50 basis points to 6½% was widely expected by the market, owing to stronger-than-expected activity and inflation data at the end of April and in early May. The money markets were also largely unmoved following the announcement on 28 June of the decision not to change rates.

After the FOMC's May meeting, a series of weaker-than-expected data releases led to a decline in short-term interest rate expectations through most of the remainder of the period. In particular, rates implied by the December 2000 contract fell by more than 40 basis points between 30 May and 5 June; this was initiated by weaker-than-expected labour market data and a

Table A
Forecasts for GDP growth in 2000 and 2001

Per cent; *percentage points in italics*

	2000			2001		
	April	July	Change	April	July	Change
United States	4.6	4.8	<i>0.2</i>	3.1	3.1	<i>0.0</i>
Japan	1.0	1.5	<i>0.5</i>	1.5	1.6	<i>0.1</i>
Euro area	3.2	3.4	<i>0.2</i>	3.0	3.2	<i>0.2</i>
United Kingdom	3.2	3.0	<i>-0.2</i>	2.7	2.6	<i>-0.1</i>

Source: Consensus Economics.

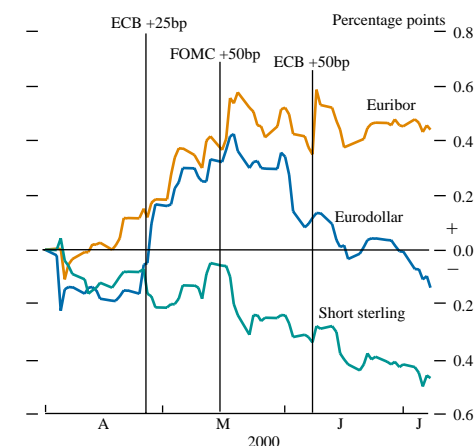
Table B
Forecasts for inflation in 2000 and 2001

Per cent; *percentage points in italics*

	2000			2001		
	April	July	Change	April	July	Change
United States	2.8	3.2	<i>0.4</i>	2.5	2.6	<i>0.1</i>
Japan	-0.2	-0.4	<i>-0.2</i>	0.1	0.0	<i>-0.1</i>
Euro area	1.7	1.9	<i>0.2</i>	1.6	1.7	<i>0.1</i>
United Kingdom	2.0	2.0	<i>0.0</i>	2.3	2.4	<i>0.1</i>

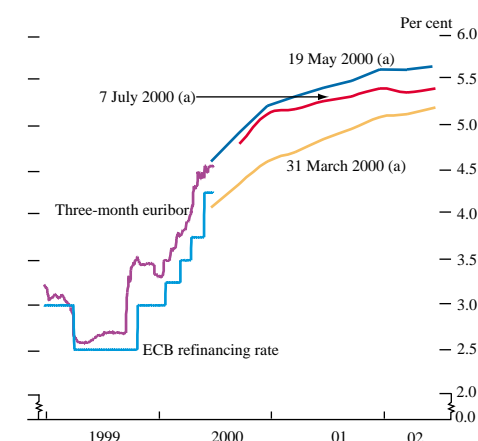
Source: Consensus Economics.

Chart 2
Cumulative changes in September 2000 futures rates since 31 March



Source: Bloomberg.

Chart 3
Euro-area interest rates



Source: Bloomberg.

(a) Interest rates implied by euribor futures contracts at the dates specified. From July 2000 onwards, the x-axis relates to contract expiry dates.

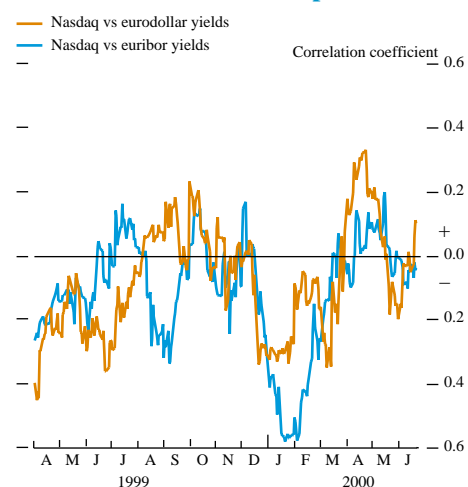
larger-than-expected fall in the National Association of Purchasing Managers' survey index. Nevertheless, over the period as a whole, most forecasters revised up their projections for GDP growth and inflation in 2000 (see Tables A and B). The 50 basis points increase in the Federal funds rate appears, therefore, to have increased the markets' belief that growth will slow, and that inflation will fall back to around 2½% in 2001.

During the first half of the period, implied interest rates from euribor futures contracts increased broadly in parallel with eurodollar futures, supported by the European Central Bank's (ECB) decision to raise its refinancing rate by 25 basis points on 27 April. But this link ended in mid-May. Thereafter, euribor contracts remained broadly unchanged, while eurodollar yields tended to decline (see Chart 2). Yields implied by euribor futures contracts expiring between 2000 and 2001 ended the period 30–55 basis points higher. Most commentators expected the ECB to raise its refinancing rate in June, in the light of evidence of rising euro-area inflationary pressures, price risks from higher oil prices and the weak euro, and stronger expectations for growth in 2000 and 2001 (see Tables A and B). But the consensus expectation was that the ECB would raise interest rates by only 25 basis points. Consequently, on 8 June, when the ECB increased its refinancing rate by 50 basis points to 4.25%, euribor rates immediately rose by 16–25 basis points. On 7 July, euribor futures contracts implied an expectation that the ECB refinancing rate would be increased to just under 5% by the end of 2000 (see Chart 3).

Some commentators argued that the Nasdaq composite equity price index was a significant influence on both US and euro-area interest rate expectations in April. Correlations between changes in stock market levels and short-term interest rates had been negative earlier in the year, possibly because rises in the cost of borrowing are generally associated with downward revisions to the profit forecasts of listed companies. During April and May, by contrast, correlations between daily changes in the Nasdaq and implied rates from eurodollar and euribor contracts were positive—falls in the Nasdaq possibly prompted downward revisions to assessments of consumers' wealth and an associated reduction in interest rate expectations. Nonetheless, the overall magnitude of this effect appears to have been relatively modest (see Chart 4). In particular, despite a 25% decline in the Nasdaq between 7 and 14 April, interest rates derived from eurodollar contracts fell by only 4–9 basis points. It seems likely, therefore, that the co-movements in US and European interest rate expectations in the first half of the period were more the result of the co-occurrence of stronger-than-expected activity and inflation indicators in both regions.

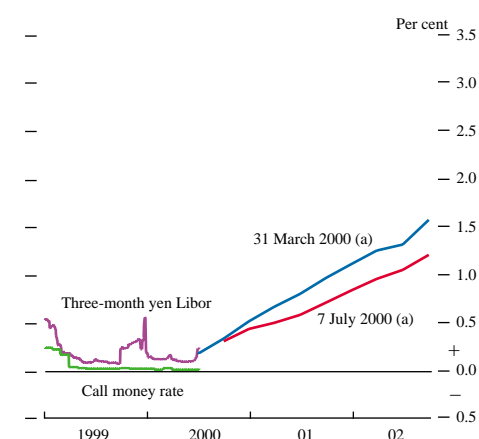
On 8 June, the ECB announced that it would begin to conduct its weekly refinancing operations using variable-rate rather than fixed-rate tenders. In a variable-rate tender banks bid for liquidity specifying both the amount of lending that they seek and the interest rate that they are prepared to pay. Successful banks then pay the interest rate that they bid. The ECB stressed that this was 'not intended as a further change in the monetary policy stance', but was designed to curb overbidding in the ECB's operations. Early evidence suggested that the change was successful, as overbidding did moderate. The euribor futures market broadly anticipated this technical change and so reacted little to the 7 basis

Chart 4
Correlations between the Nasdaq and short-term interest rate expectations^(a)



(a) 30-day rolling correlation coefficients between daily changes in the Nasdaq and the front eurodollar and euribor futures contracts.

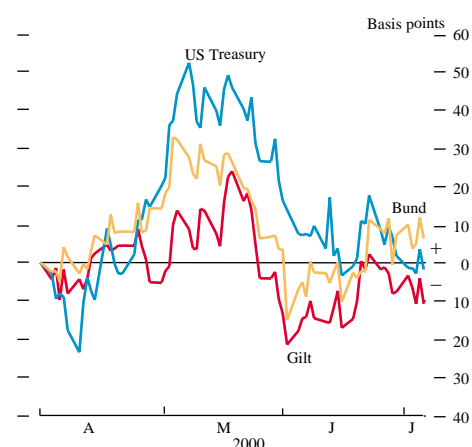
Chart 5
Japanese interest rates



Source: Bloomberg.

(a) Interest rates implied by euroyen futures contracts at the dates specified. From July 2000 onwards, the x-axis relates to contract expiry dates.

Chart 6
Cumulative changes in ten-year bond yields^(a) since 31 March



(a) Zero-coupon spot yields derived using the VRP (UK/US) and Svensson (Germany) curve-fitting techniques. For further details on these techniques see Anderson and Sleath, 'New estimates of the UK real and nominal yield curve', *Quarterly Bulletin*, November 1999, pages 384–92.

point rise from the previously fixed base rate to the weighted average of the various allotted rates that resulted from the first variable-rate tender on 27 June.

Short-term interest rate expectations in Japan fell marginally during the review period (see Chart 5). This largely reflected downward revisions to inflation forecasts, following negative and lower-than-expected inflation data. However, Tibor rates rose at the very short end, as speculation grew about the ending of the zero interest rate policy following upward revisions to projections for GDP growth in 2000 and the re-election of the LDP-led coalition on 25 June.

Interest rate uncertainty, as measured by the prices of options contracts settling on euribor and eurodollar futures, appears to have fallen during the period. However, exact measures of uncertainty about the outlook for interest rates are difficult to ascertain, due to the changing horizons of options contracts and the importance of technical factors in determining their price. Nevertheless, economists' views of the future path of interest rates have also indicated reduced uncertainty—for instance, the distribution of views about the peak in euro-area official rates during this cycle, as measured by Reuters, narrowed by 75 basis points over the period.⁽¹⁾

Long-term interest rates

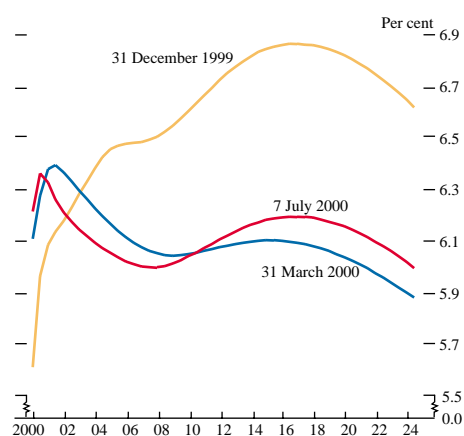
Correlations between movements in international bond markets fell in Q2 at both short and longer maturities. While the declining net supply of government bonds was a common theme in both the United States and Europe, the timing and relative sizes of such supply-related changes differed between the two regions. In Japan, by contrast, net government bond issuance continued to rise. Moreover, there was some evidence that the relative cyclical positions of the regions may have changed over the quarter as the United States showed tentative signs of a slowdown and Europe appeared to be growing faster than previously forecast.

US Treasury yields rose by around 50 basis points in the five weeks to 8 May, and gradually fell back again thereafter (see Chart 6). The yield on the ten-year Treasury bond ended the period almost unchanged, at 6%; yield changes during the period were very similar to those of eurodollar futures—both markets reacted to news about activity and inflation in broadly the same way.

Having inverted sharply in Q1, the US Treasury curve disinverted slightly in Q2 (see Chart 7): the yield spread between the two-year Treasury note and the 30-year Treasury bond fell from around 65 basis points at the end of March to around 55 basis points on 7 July. Technical factors may have contributed to this movement. In particular, a number of market participants, who had sought to take advantage of the earlier inversion trend by selling shorter-maturity Treasuries and buying longer-maturity Treasuries, appear to have unwound some of these trades and taken profits in Q2. In the light of strong cash flow, the US Treasury continued its debt buy-back programme—\$13 billion of government debt dated between 2015 and 2025 was redeemed early during the period—and

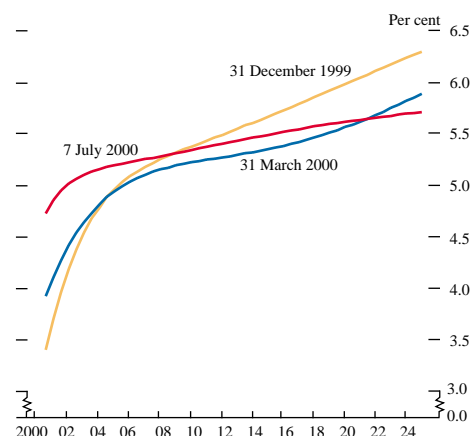
(1) Measured by the difference between the highest and lowest forecasts of a sample of 30 economists.

Chart 7
US Treasury zero-coupon yield curve^(a)



(a) Derived using the Bank of England's VRP curve-fitting technique.

Chart 8
German zero-coupon yield curve^(a)



(a) Derived using the Svensson curve-fitting technique.

Table C
International equity market performance

Percentage changes from previous period, in local currencies

	1999	2000	
	Year	Q1	Q2 (a)
United States			
S&P 500	19.5	3.0	-1.3
Wilshire 5000	22.1	4.3	-3.1
Europe			
CAC 40	51.1	6.2	4.5
DAX 30	39.1	13.4	-7.2
FTSE All-Share	21.3	-4.1	-0.2
FTSE 100	17.8	-5.6	-0.7
Japan			
Topix	58.4	-0.9	-6.4
IT indices			
Nasdaq Composite	85.6	10.7	-12.0
FTSE Techmark 100	56.1 (b)	14.6	-20.4
Neuer Markt	66.2	41.9	-18.9
Nouveau Marche	135.3	73.3	-30.3

Source: Bloomberg.

(a) From 31 March–7 July.

(b) For the period 4 November–30 December. The Techmark index began on 4 November 1999; earlier data are not available.

there was increasing speculation that the US Treasury would reduce issuance of shorter-dated securities, such as the two-year note and the one-year bill. These factors were supported by news that the budget surplus for the current year would be higher than previously expected, and by President Clinton's announcement on 26 June that the outstanding stock of government debt would consequently be paid off by 2012, a year earlier than previously thought.

Euro-area bond yields generally rose during the period, with the biggest changes at the short end. Two-year German bund yields rose by more than 50 basis points, to 4.99%, while the yield on the ten-year bund rose by around 5 basis points, and yields at the long end fell slightly. As a result, the German government yield curve continued to flatten during the period (see Chart 8). Other euro-area government bonds moved broadly in line with bunds, though spreads against German government bonds narrowed slightly at most maturities.

At the short end of the curve, stronger-than-expected economic data and the continued weakness of the euro in the first half of the period fuelled speculation that the ECB would have to raise rates further. In contrast, longer-dated yields were more influenced by considerations relating to the future supply of bonds. In particular, the sale of licences for the Universal Mobile Telecommunications Systems (UMTS) was expected to generate additional revenues, thereby reducing the need for German government borrowing. On 21 June, the Bundesbank surprised the market by announcing that the German government would not issue any 30-year bunds in Q3. It also announced that it would use the UMTS proceeds to buy back up to €33 billion of the Ausgleichsfonds-Währungsumstellung floating-rate note, which had been issued to East German banks on unification.

Japanese government bond yields were little changed over the period, with yields at all maturities restricted to movements within a narrow range. The Lower House election results on 25 June were in line with bond market expectations and had little effect on the yield curve.

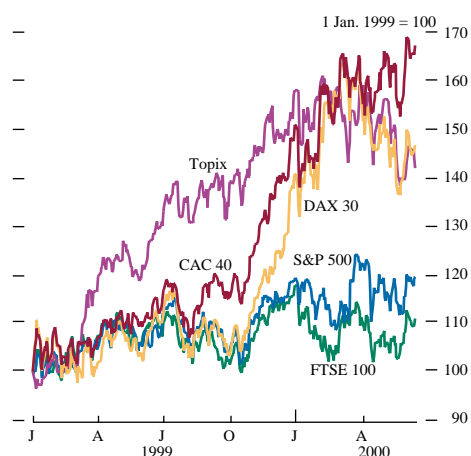
International equity market developments

Most of the major equity market indices fell between 31 March and 7 July (see Table C and Chart 9), and prices remained volatile. The FTSE All-Share, Wilshire 5000 (the broadest index for the US equity market), and the German DAX indices all fell, while the French CAC index rose. On 7 July, the FTSE 100 index stood at 6,497, 0.7% below its level at the end of March. Technology indices in the United Kingdom, United States, France and Germany fell by between 10% and 30% during the period, reflecting increased uncertainty about the appropriate value of 'new economy' stocks.

Correlations between the major equity markets generally rose in Q2. This largely reflected the strong correlations between the movements in technology-related stocks in the various equity markets.

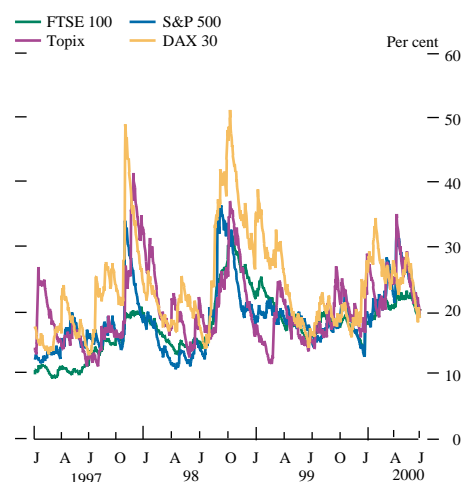
The volatility of equity markets increased in April, and, as noted above, appears to have had a small impact on interest rate expectations. However, markets were calmer in June (see

Chart 9
Selected world equity indices



Source: Primark Datastream.

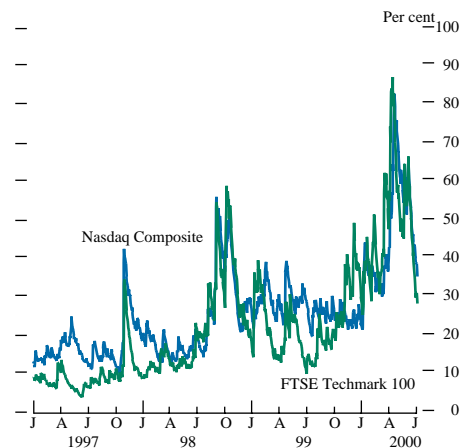
Chart 10
Volatility of international equity indices^(a)



Source: Primark Datastream.

(a) Volatility calculated as 252-day rolling exponentially weighted moving averages.

Chart 11
Volatility of technology indices^(a)



Source: Primark Datastream.

(a) Volatility calculated as 252-day rolling exponentially weighted moving averages.

Chart 10). Nonetheless, in the first half of the period technology stocks remained particularly volatile. The variance of the technology-heavy Nasdaq Composite index rose to record levels in mid-April (see Chart 11); the index saw the second-largest daily percentage price fall of its 29-year history on 14 April. In financial markets, unusually large price falls are sometimes followed by similarly large price rises. Such reversals occurred in Q2—the Nasdaq index recorded strong price increases in April and May, and its largest-ever daily percentage price rise on 30 May of more than 7½%. The volatility of the United Kingdom’s FTSE Techmark index generally moved in parallel with the Nasdaq.

In the United States, the higher volatility of technology stocks spilled over into the broader equity indices. In April, the volatility of the S&P 500 index was similar to that observed at the time of the Russian debt default and the near-failure of Long Term Capital Management in September 1998 (see Chart 10). By contrast, the FTSE was much less affected; though the volatility of the FTSE 100 increased during the period, it remained well below previous record levels.

Looking ahead, investors remain more uncertain about the nature and direction of further price movements in high-technology indices than in broader measures. Implied volatilities derived from options contracts on the Nasdaq index rose to record levels in April. Uncertainty has diminished since then, but remains at relatively high levels by historical standards. In contrast, implied volatilities derived from options contracts on the S&P 500 and the FTSE 100 have remained fairly stable. Skewness—which tends to be negative, as options are more frequently used for hedging downside rather than upside risks—has become less negative, which suggests diminished fears of further sharp falls in share prices.

Foreign exchange markets

Over the period, sterling was the most volatile of the major currencies. Its trade-weighted exchange rate index (ERI) rose by 3.6% between 31 March and its 3 May peak, before depreciating sharply to end the period 4% lower than at the start (see Chart 12). In contrast to sterling, the US dollar and the euro appreciated in ERI terms over the period, by 2.9% and 1.6% respectively; the yen effective exchange rate index fell by 4.2%.

Sterling depreciated by around 5% against the dollar and by around 4% against the euro during the period. Reflecting these movements, the sterling ERI fell back to its trading range of the second half of 1999 (see Chart 13). However, the profile of exchange rate changes against these two currencies was somewhat different within the period (see Chart 14). Sterling’s sharpest depreciation against both the dollar and the euro occurred between early May and mid-June, and coincided with a change of market sentiment towards the euro. During this interval the euro appreciated by 12% against sterling to £0.64 and by 9% against the dollar to \$0.96. In contrast, the yen spent most of the period trading within a range of ¥105–¥110 against the dollar; fears of intervention by the Japanese authorities helped to prevent the yen from appreciating much beyond ¥105, while demand for yen due to the hedging activities of Japanese exporters helped to cap any depreciation.

Chart 12
Effective exchange rate indices

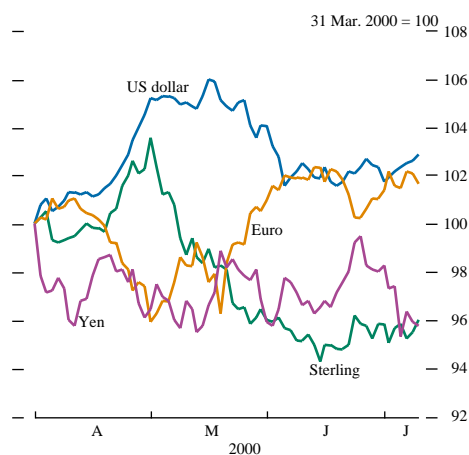
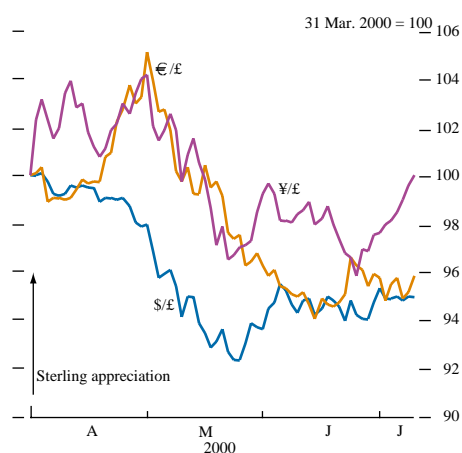


Chart 13
Sterling ERI



Chart 14
Sterling exchange rates



In Q2, the sterling-dollar exchange rate moved decisively out of the \$1.60–\$1.70 range in which it had traded during most of 1997–99 (see Chart 15). Market participants have suggested that this movement was linked to changes in perceptions about the growth prospects of the two economies. Estimates of both short-term and trend US GDP growth have been steadily revised up over the past year, whereas market estimates of UK trend growth have been little changed and forecasts of the United Kingdom's short-term growth prospects have been revised down in recent months (see Table A). However, other factors (see below) were also influential in determining the timing of sterling's sharp depreciation against the dollar in May. Elsewhere, upward revisions to euro-area growth forecasts for 2000 and 2001 were similar in magnitude to those of the United States, which may help to explain why the euro-dollar exchange rate ended the period broadly unchanged from its starting-level.

Market participants have commented that changes in short-term interest rates also appeared to have influenced exchange rate movements during the period. The widening in short-term interest rate differentials between the dollar and sterling, and the narrowing of short-term interest rate differentials between sterling and the euro, may help to explain sterling's depreciation against both currencies in Q2 (see Table D). In particular, the depreciation of sterling against the dollar occurred around the time of the MPC's 3 May decision to leave interest rates unchanged and the FOMC's 16 May decision to increase the Federal funds target rate by 50 basis points. As a result, official US interest rates rose above those in the United Kingdom. Furthermore, short-term US interest rates were expected to remain above comparable UK rates for a substantial period, for the first time since 1984. In contrast, however, it is difficult to rationalise movements in the euro-dollar exchange rate with reference to interest rate changes—despite a substantial narrowing in the US/euro-area short-term interest rate differential, the euro-dollar exchange rate ended the period broadly unchanged from its starting-point.

Economic theory suggests that interest rate differentials at all maturities should influence exchange rate movements. However, changes in longer-term interest rate differentials during the period (such as those derived from government bonds and the swaps markets) were not consistent with sterling's depreciation against the dollar and the euro; ten-year government bond yields in the United Kingdom actually rose slightly during the period while they fell in the United States and the euro area. Market participants' lack of focus on these interest rate differentials as an explanation for exchange rate movements may reflect the reduced liquidity of these markets. Changes in the supply of government bonds have tended to increase the volatility of bond prices, thereby raising the risk associated with cross-currency investment strategies using these instruments. Similarly, the volatility of UK swap rates has also increased, partly reflecting large corporate bond issuance from telecommunications companies (see Other sterling bond issues).

Market participants also cited technical factors as important influences on the timing of exchange rate movements in Q2. In particular, the sharp depreciation of sterling in the first half of May partly reflected sales related to mergers and acquisitions activity.

Chart 15
Sterling-dollar exchange rate

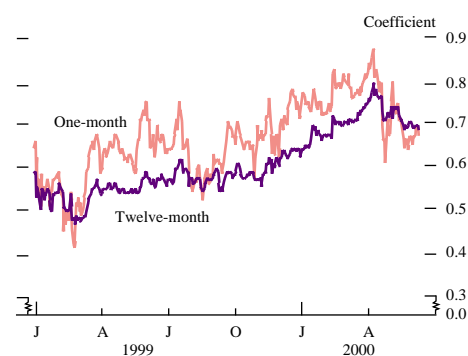


Table D
Expectations for three-month Libor interest rates in December 2000

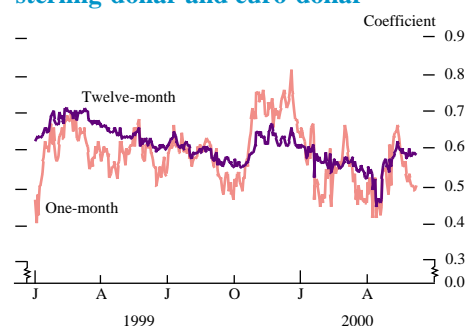
	Per cent		Change (basis points)
	31 March 2000	7 July 2000	
United States	7.16	6.95	-21
Japan	0.53	0.44	-9
Euro area	4.59	5.13	54
United Kingdom	6.92	6.36	-56

Source: Bloomberg.

Chart 16
(a) Implied correlations between euro-dollar and euro-sterling



(b) Implied correlations between sterling-dollar and euro-dollar



These flows were exacerbated by momentum traders—a group that have played a more influential role in foreign exchange markets over the past year—who started selling sterling after the initial depreciation. Momentum trading is also likely to have been a factor in the depreciation of the euro. By early May, the euro was increasingly seen as undervalued. Furthermore, many investors were reported to have been underweight in euro-denominated assets relative to their benchmark portfolio allocations. The change in sentiment towards the euro may have prompted them to increase their holdings of euro-denominated assets to return their portfolios closer to a balanced position.

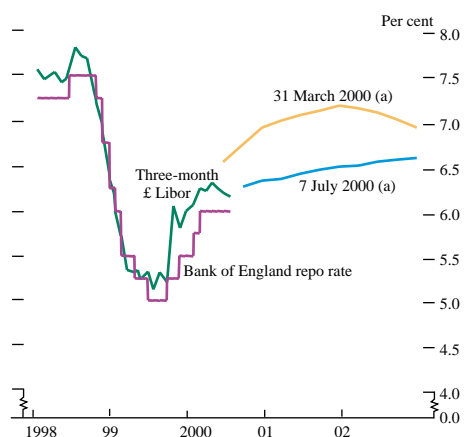
The fall in sterling against the dollar to its lowest level since February 1994 has led to some speculation about an ending of the relative stability of this exchange rate. Chart 16 shows implied correlations between euro-dollar and euro-sterling exchange rates and implied correlations between sterling-dollar and euro-dollar exchange rates. These correlations are derived from options markets and measure the extent to which market participants expect currencies to move together one month and twelve months ahead.⁽¹⁾ Chart 16(a) shows the degree to which markets expect the dollar and sterling to move against the euro. As can be seen, generally the relationship has been positive and fairly strong, suggesting that the dollar and sterling are expected to move together against the euro. However, the one-month implied correlation dipped sharply in late May, as the sterling-dollar exchange rate moved out of its 1997–99 trading range, and it has been quite volatile since then. The twelve-month correlation also declined during the period but generally remained above the one-month correlation, suggesting that market participants expected the dollar and sterling to move together more closely in the longer run than in the near term. This appears broadly consistent with a temporary decoupling of sterling from the dollar, as market participants adjusted their expectations about the sterling-dollar exchange rate to a new trading range.

Chart 16(b) shows implied correlations between sterling-dollar and euro-dollar and measures the extent to which sterling and the euro are expected to move together against the dollar. Since the start of the year, these correlations have generally been more volatile and smaller in magnitude than those between euro-dollar and euro-sterling. Taken together, the correlations in Charts 16(a) and 16(b) suggest that sterling is expected to be influenced by both the euro and the dollar exchange rates but with the dollar continuing to be a slightly more important factor.

In summary, tentative signs emerged of a change in sentiment towards sterling and the euro during the period, with the former depreciating and the latter appreciating. Market participants suggest that sterling's depreciations against the dollar and the euro in Q2 were influenced by movements in short-term interest rate differentials and revisions to growth expectations. Technical factors, such as momentum trading and exchange rate flows related to M&A activity, also appear to have influenced the timing of exchange rate movements. In contrast, however, changes in short-term interest rate differentials appear to have had little influence on movements in the euro-dollar exchange rate.

(1) See Butler, C and Cooper, N, 'Implied exchange rate correlations and market perceptions of European Monetary Union', *Quarterly Bulletin*, November 1997, pages 413–23.

Chart 17
UK interest rates



Sources: Bank of England and Bloomberg.

(a) Interest rates implied by short sterling futures contracts at the dates specified. From July 2000 onwards, the x-axis relates to contract expiry dates.

Recent developments relating to the currencies of the newly emerging market economies of Asia are discussed in the box opposite.

Sterling markets

Short-term interest rates

The MPC left the Bank's repo rate unchanged at 6% over the review period and short-term interest rate expectations for the rest of 2000 and 2001 fell quite sharply (see Chart 17). Ahead of the April MPC meeting, market expectations for the decision were balanced between no change and a 25 basis points rise, with a slight bias towards the former. A Reuters poll of economists conducted before the May meeting suggested that an average probability of 60% was attached to a 25 basis point rise in the Bank's repo rate. In both cases, rates implied by short sterling futures contracts fell by a few basis points immediately after the announcements. Market participants' uncertainty about the likely outcomes of the June and July meetings was considerably less, with the central expectation being no change in rates: Reuters polls ahead of the meetings suggested that the average probabilities attached to rates being left unchanged were 70% and 80% respectively.

Interest rates implied by short sterling futures contracts for dates in 2000 and 2001 fell by around 45–70 basis points over the review period. On 31 March, the futures market projected that three-month Libor would reach a peak of around 7¼% in December 2001; by 7 July the shape of the short sterling futures curve had become much flatter, with the market projecting Libor to rise to 6½% by 2002 (see Chart 17).

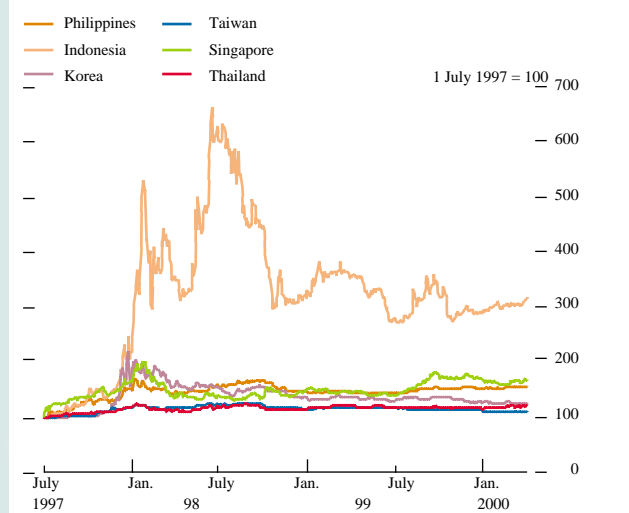
Much of the fall in interest rate expectations reflected weaker-than-anticipated domestic activity and inflation indicators, particularly in April and June. In April, this primarily reflected the weaker-than-expected industrial production and Q1 GDP data, monthly falls in house prices, the MPC's decision to leave rates unchanged, and survey evidence showing a decline in consumer and business confidence. The strength of sterling also contributed to lower interest rate expectations. During the first two weeks of May, short-term interest rate expectations increased, owing to stronger-than-expected UK industrial production and US labour market data and sterling's sharp depreciation. Sentiment then changed again, following the release of weaker-than-expected average earnings and retail sales data for March and April respectively. The publication of the MPC minutes also led to a decline in interest rate expectations—the minutes showed that the Committee had voted unanimously for no change in rates at the May meeting, whereas most market commentators had expected that some MPC members would have voted for a rate rise. UK short-term rate expectations continued to fall for most of the rest of the period.

Concerns about the inflationary impact of higher oil prices arose periodically but had little effect on interest rate expectations. International factors occasionally influenced UK rate expectations but their overall impact was somewhat smaller than usual. Revisions to consensus forecasts of GDP growth since April—downwards in the United Kingdom and upwards in the United States and euro area—help to explain why interest rate expectations

Asian currencies

Since January 1999, the exchange rates of the Asian emerging market economies have been relatively stable (see the chart) and have appeared to track movements in the US dollar more closely. What empirical evidence is there to substantiate this?

Asian exchange rates against the US dollar



The methodology outlined by Frankel and Wei (1994)⁽¹⁾ can be used to examine the relationship between the six regional currencies and the US dollar, Japanese yen and the Deutsche Mark (all in terms of the Swiss franc).

Four arbitrary sample periods were chosen:

- (a) pre-crisis: January 1995 to June 1997;
- (b) crisis: July 1997 to December 1998;
- (c) post-crisis 1: January 1999 to date; and
- (d) post-crisis 2: January 2000 to date.

Post-crisis 1 was chosen on the basis of the first signs of economic recovery while post-crisis 2 only covers the first six months of this year, a period when the recoveries were more firmly established.

The results are shown in the table. Each entry represents the percentage change in the regional currency with respect to a 1% change in the major currency. For example, during the pre-crisis period, a 1% depreciation

Regression results

	Pre-crisis Jan. 1995– June 1997	Crisis July 1997– Dec. 1998	Post-crisis 1 Jan. 1999– July 2000	Post-crisis 2 Jan. 2000– July 2000
Thai baht				
US\$	0.91 (a)	0.75 (a)	0.89 (a)	0.83 (a)
Yen	0.14 (a)	0.34 (a)	0.09 (a)	0.13 (a)
Indonesian rupiah				
US\$	1.00 (a)	0.77 (a)	0.94 (a)	0.88 (a)
Yen	-0.11	0.38 (a)	0.24 (a)	0.17
Korean won				
US\$	1.02 (a)	1.11 (a)	0.98 (a)	0.96 (a)
Yen	0.02	0.16	0.08 (a)	0.08
Philippine peso				
US\$	1.00 (a)	0.84 (a)	0.98 (a)	0.99 (a)
Yen	-0.02	0.29 (a)	0.04	0.04
Taiwanese dollar				
US\$	0.99 (a)	0.93 (a)	0.98 (a)	1.01 (a)
Yen	0.05	0.06 (a)	0.00	-0.05
Singaporean dollar				
US\$	0.80 (a)	0.65 (a)	0.82 (a)	0.79 (a)
Yen	0.11 (a)	0.36 (a)	0.13 (a)	0.16 (a)
DM	0.14 (a)	0.25 (a)	0.07	0.00

(a) Significant at the 95% level.

of the US dollar *vis-à-vis* the Swiss franc was typically associated with a 0.8% depreciation of the Singaporean dollar against the Swiss franc on the same day.

In the pre-crisis period, Thailand and Singapore operated a currency basket system, while the other countries' currencies were more tightly linked to the US dollar. But even in the case of Singapore, the weight of the US dollar in the basket (or the elasticity) was as high as 0.8. During the crisis, the behaviour of the regional currencies, apart from the Korean won and Taiwanese dollar, was more flexible; the elasticity with respect to the yen typically rose to around 30%. However, the pattern has changed since the beginning of 1999 with an increased weight for the US dollar for all the currencies studied. In particular, the Taiwanese dollar, the Philippine peso and the Korean won now appear to follow movements in the US dollar very closely.

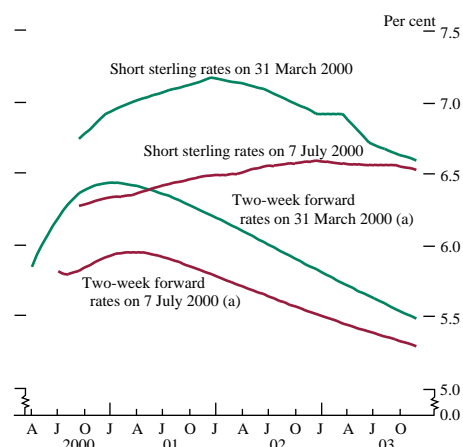
There is little difference between the results in the two post-crisis periods. Both suggest that movements in the regional currencies have reverted to a closer association with the US dollar.

(1) Frankel, J and Wei, S J (1994), 'Yen bloc or dollar bloc? Exchange rate policies in the East Asian economies', in *Macroeconomic linkage: savings, exchange rates, and capital flows*, University of Chicago Press.

fell by more in the United Kingdom than elsewhere (see Table D and Chart 2).

Other measures of expectations for the future path of short-term interest rates include forward rates derived from the gilts market and the overnight interest rate swaps market, as well as survey-based indicators. There are some differences between these measures: futures contracts settle against three-month Libor; surveys are typically based on the Bank's two-week repo rate; the

Chart 18
Short sterling and two-week gilt forward curves



Sources: Bank of England and Bloomberg.

(a) Derived from GC repo rates and conventional gilt yields.

Table E
Summary of interest rate expectations
(selected dates)

Per cent

	5 Jan.	30 Mar.	30 June
Dec. 2000			
Short sterling (a)	7.13	6.69	6.19
Forward gilt yield (b)	6.82	6.59	6.16
Poll of economists (c)	6.32	6.43	6.24
Overnight interest rate swaps (d)	6.94	6.64	6.00
Peak			
Short sterling (a)	7.22 Dec. 2001	6.69 Dec. 2001	6.42 Dec. 2002
Forward gilt yield (b)	6.85 2001 Q1	6.59 2001 Q1	6.20 2001 Q2
Poll of economists (c)	6.52 2000 Q3/4	6.52 2000 Q3/4	6.34 2000 Q4

Sources: Bloomberg, Reuters and Bank of England.

- (a) Implied three-month Libor rate, adjusted for typical difference between three-month Libor rate and the Bank of England's repo rate.
 (b) Implied two-week forward rates, adjusted for typical difference between gilt repo rates and the Bank's repo rate.
 (c) Mean expectation for Bank's repo rate.
 (d) Implied overnight interest rate.

two-week forward rate that the Bank derives from the gilt market most closely approximates two-week general collateral (GC) repo rates;⁽¹⁾ and the expectation derived from the overnight interest rate swap market is a daily rate.⁽²⁾

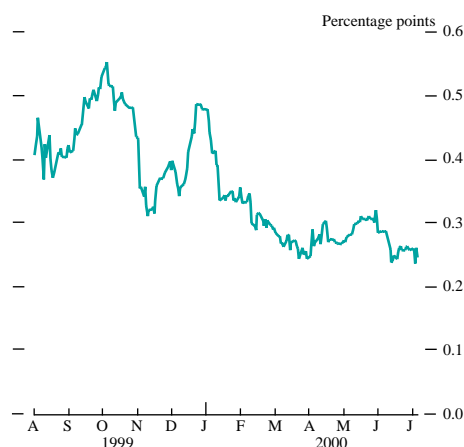
Interest rate expectations derived from each of these measures fell over the review period (see Chart 18 and Table E). In addition, there was a further convergence of the rates implied by futures contracts toward the rates implied by the other three measures. The main factor that contributed towards this is likely to have been hedging activity, which often occurs in the short sterling market rather more than in other markets. As interest rate expectations declined, market participants saw less need to hedge against the risk of higher interest rates by selling futures contracts against their holdings of other assets, such as bonds. The *ex ante* supply of futures contracts therefore fell, causing their price to rise and the interest rates derived from these contracts to fall.

In addition, market participants typically only use the front short sterling contracts, which are the most liquid, to speculate on the future course of interest rates. These contracts are more likely to represent genuine market views about interest rate expectations than futures contracts with a longer maturity. Liquidity in these longer-term contracts has fallen since the financial market turbulence of late 1998, and their rates tend to be influenced to a much greater extent by hedging activity, so they give less information about 'true' market interest rate expectations. Consequently, the short sterling futures curve will tend to give a more reliable indication of the expected peak in rates as the date of the peak draws nearer. On 7 July, futures rates suggested that the peak in rates would arrive by mid-2002. At this maturity, futures contracts are likely to be more influenced by hedging activity, suggesting that survey evidence and gilt forward rates may give a better indication of the level and timing of the expected peak in short-term interest rates. Gilt forward rates and the survey of economists indicated an expected peak in the Bank's repo rate of around 6¼%,⁽³⁾ though the timing of this peak differed—gilt forwards pointed to a peak in rates in April next year, whereas the Reuters poll suggested a peak at the end of this year.

In addition to the fall in interest rate expectations, there was also a decline in interest rate uncertainty over the review period. Chart 19 shows the implied standard deviation (a measure of market uncertainty derived from the prices of options contracts) of short sterling futures contracts three months ahead, on a constant-horizon basis.⁽⁴⁾ The relatively high level of uncertainty in December last year was related to concerns about the century date change, though

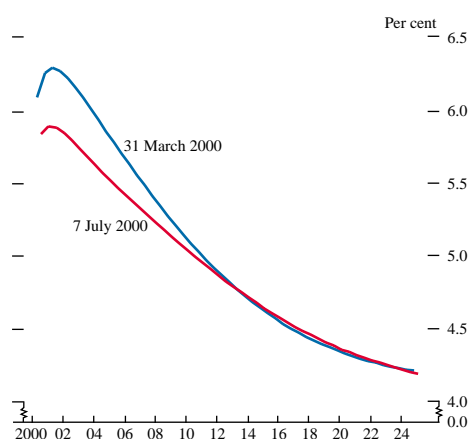
- (1) GC repo typically trades at rates slightly below the Bank's repo rate, mainly because the Bank accepts a wider pool of collateral than just gilts in its money market operations, and also allows substitutions of collateral.
 (2) Typically the overnight rate varies around the Bank's repo rate. The floating leg of the swap is calculated by taking a one-month average of the overnight rate, one month from when the swap begins.
 (3) Gilt forwards have been adjusted here to reflect the typical difference between GC repo rates and the Bank repo rate. On average, the two-week GC repo rate trades at around 15 basis points below the Bank's repo rate.
 (4) Short sterling options contracts have fixed expiry dates corresponding to the maturity of the underlying futures contracts. This feature can make comparing volatility over time difficult, because the implied volatility naturally decreases as the expiry date of the option draws nearer. The constant-horizon approach allows for this by interpolating across the volatilities of contracts with different maturities. For a fuller explanation, see Clews, R, Panigirtzoglou, N and Proudman, J, 'Recent developments in extracting information from options markets', *Quarterly Bulletin*, February 2000, page 50.

Chart 19
Interest rate uncertainty^(a)



(a) Standard deviation of three-month constant-horizon short sterling probability density function.

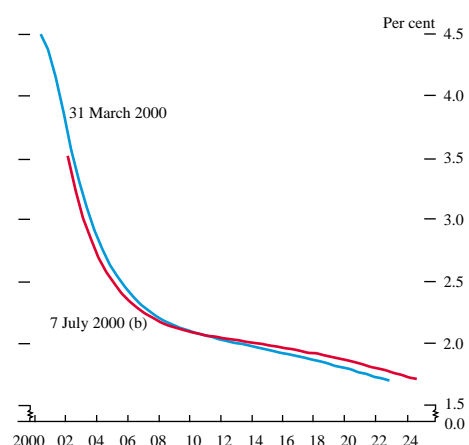
Chart 20
Gilt yield curve^(a)



Source: Bank of England.

(a) Derived using the Bank's VRP curve-fitting technique.

Chart 21
Index-linked gilt yield curve^(a)



Source: Bank of England.

(a) Derived using the Bank's VRP curve-fitting technique.
(b) The curve starts at 2002 because 2½% Index-linked Treasury Stock 2001 is not included, given its closeness to maturity.

this uncertainty receded before the year-end as markets became increasingly confident that the date change would pass smoothly. The main fall in uncertainty over the review period happened in the second half of May, coinciding with a significant fall in interest rate expectations.

Longer-term interest rates

The gilt yield curve became less inverted over the review period, as yields at shorter maturities fell while those at longer maturities remained broadly unchanged (see Chart 20). The declines in short-maturity bond yields were driven mainly by the same data and policy-related news noted in the short-term interest rate section above. While this information was also occasionally influential at other maturities, medium yields were affected to a greater extent by international bond movements (see Chart 6).

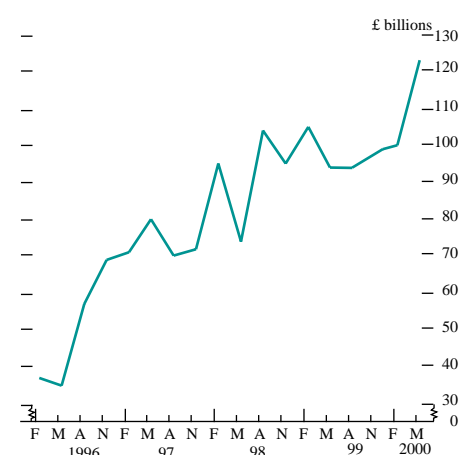
Another influence on long-maturity gilt yields was speculation about the publication of the review of the Minimum Funding Requirement. A common view among market commentators was that the review would allow the liabilities of pension funds to be valued by reference to yields on assets other than gilts, such as corporate bonds. This would give pension funds an incentive to invest a greater proportion of their assets in non-government bonds, thereby reducing the downward pressure on long gilt yields and helping to narrow swap and corporate bond spreads. On occasion, this view gained in prominence and contributed to a small rise in long gilt yields. However, the review had not been made public by the end of the period that this article considers.

Proceeds from the government's auction of the Spectrum mobile phone licences, of £22.5 billion, led HM Treasury to publish a revised financing remit for the Debt Management Office (DMO) on 12 June, in which they lowered planned gilt sales for 2000/2001 by £2.2 billion, cancelled all medium-dated conventional stock sales, and dropped the conventional gilt auction planned for September. After accounting for reduced gilt sales and contingency measures (that were set out in the previous DMO remit), the remaining licence receipts of £10.7 billion will be used to reduce net short-term debt or to increase the amount of stock repurchased by the DMO through debt buy-back auctions. This news might ordinarily have been expected to produce a fall in gilt yields. However, the market had expected the medium-dated auction to be cancelled and the remaining two long-dated auctions to go ahead as planned. Consequently, reaction to the announcement was limited.

Index-linked gilts

The real interest rate curve generated from index-linked gilts became slightly less inverted over the review period (see Chart 21). This was similar to the change in the shape of the conventional gilt yield curve, though the fall in short-maturity conventional yields was greater. The divergent performance mainly occurred in May. On 16 May, publication of the RPI data (showing a monthly rise of 1%) caused calculated real yields to rise. This was mainly because of a statistical consideration. In order to calculate the real yield on an index-linked gilt an assumption must be made about the rate of inflation between now and the maturity of the gilt. This assumed rate is used to project the value of future coupons and the final redemption value. When new RPI data are released, they are substituted into the calculation. Unless the monthly change in RPI

Chart 22
Gilt repo outstanding



Source: Bank of England's Repo Stock Lending quarterly survey.

is equal to the assumed rate, the reported real yield will change—the published RPI rate on 16 May was higher than the assumed rate and real yields consequently rose. There was a similar, but smaller, effect from the published RPI data in April. In addition, in the second half of May, the international rally in bond markets affected conventionals more than index-linked bonds.

Gilt auctions

During the review period, the DMO held one index-linked and one conventional auction and completed a gilt switch auction. On 3 May, the DMO sold £375 million (in nominal terms) of 2½% Index-linked Treasury Stock 2020. The DMO then sold £2.5 billion (nominal) of a new stock, 4¼% Treasury Stock 2032, on 24 May. This auction was 1.6 times covered and the coupon was the lowest on a conventional gilt stock for 13 years. Finally, on 22 June, the DMO switched £1.5 billion of 8% Treasury Stock 2015 into 4¼% Treasury Stock 2032, increasing the latter's size to £4.55 billion (nominal).

The sterling money market

The sterling money market grew by 11% between end-February and end-May to stand at £516 billion.⁽¹⁾ Gilt repo, interbank deposits and certificates of deposit continued to account for the largest shares of the money market in terms of size outstanding (see Table F).

The largest growth over the quarter was in gilt repo. According to the Bank's latest quarterly survey, the amount of gilt repo outstanding rose by £23 billion in the three months to end-May, to £123 billion. This is the highest outstanding amount since the market was introduced in 1996 (see Chart 22). Nearly half of this increase was in the on call and next-day maturity category. The rise over the quarter appears to have reflected a number of factors. First, the DMO made significant use of gilt repo in its cash management operations. Second, there was a rise in the average daily money market shortage (implying a greater need for refinancing in the Bank's open market operations). And third, the share of gilt repo in the Bank's daily open market operations continued to increase, reaching 65%.

There was a slight widening in the spread between secured (GC repo) and unsecured (interbank) interest rates at the one-month

Table F
Sterling money markets^(a)

Amounts outstanding: £ billions

	Interbank	CDs	Gilt repo	Treasury bills	Eligible bills	Stock lending	Commercial paper	Sell/buy-backs (b)	LA bills (c)	Total
1990	89	53	n.a.	9	23	n.a.	5	n.a.	2	181
1995	93	66	n.a.	8	20	n.a.	6	n.a.	2	195
1998	150	122	95 (b)	1	17	35 (b)	10	2	1	433
1999	155	135	99 (b)	4	14	49 (b)	13	3	0	472
2000 Feb.	155	127	100	2	14	51	13	2	0	464
May	165	138	123	2	14	54	17	3	0	516

n.a. = not available.

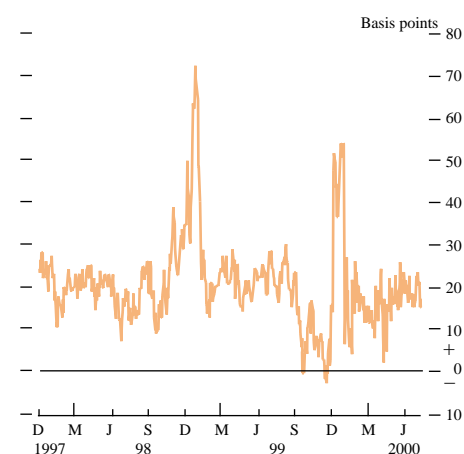
(a) 1990 and 1995 data are end-March; other data are end-period.

(b) End-November data.

(c) Local authority bills.

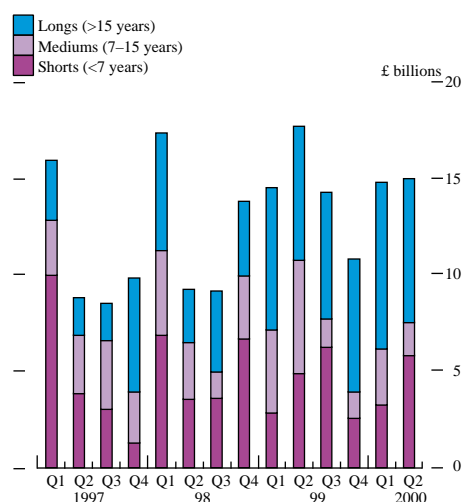
(1) The sterling money market is defined for this purpose as the sum of the outstanding amounts in the interbank, certificate of deposit, gilt repo and stock lending, sell/buy-backs, Treasury bill, eligible bank bill, local authority bill and commercial paper markets.

Chart 23
Spread between repo and interbank rates
at one month^(a)



(a) GC repo (bid) rate minus interbank offer rate.

Chart 24
Sterling non-government bond issuance



Source: Bank of England.

Table G
Sterling bond issuance in 2000 Q2

	Number of issuers	Amount (£ billions)			
		Total	By credit rating		
			AAA	AA/A	BBB and below
Fixed-rate issues					
UK corporates	12	2.4	1.3	0.7	0.4
UK financials	5	0.9	0.0	0.8	0.1
Supranationals	6	3.5	3.5	0.0	0.0
Overseas borrowers	15	3.2	1.5	1.6	0.1
Total	38	10.0	6.3	3.1	0.6
FRNs					
UK corporates	1	1.0	0.4	0.4	0.2
UK financials	10	2.8	1.1	1.7	0.1
Overseas borrowers	7	1.2	0.1	0.9	0.2
Total	18	5.0	1.6	3.0	0.5

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

maturity in May and June, to around 20 basis points (see Chart 23). In the first four months of 2000, the spread had declined to around 15 basis points, having previously widened considerably in the run-up to the Y2K period. Market participants attributed the increase to three factors. First, a greater demand for gilts, as a result of the increased collateral acquired by the DMO in its cash management operations arising from the extra government receipts from the Spectrum mobile telephone auctions. Second, the strong increase in issuance of certificates of deposit during the quarter, which may have led to a more general rise in unsecured lending rates. And third, there was some degree of balance sheet adjustment by market participants as the half year end approached.

Issuance of certificates of deposit rose by £11 billion over the quarter. This offset the previous quarter's decline, which had been associated with Y2K liquidity management. Although the stock of Treasury bills was largely unchanged over the quarter, the DMO has issued a greater range of maturities since assuming responsibility for Exchequer cash management in April. In addition to issuing bills of a one and three-month maturity at its weekly auctions, the DMO has also held tenders for shorter-dated Treasury bills on an *ad hoc* basis in order to smooth the Exchequer's net cash position.

Other sterling bond issues

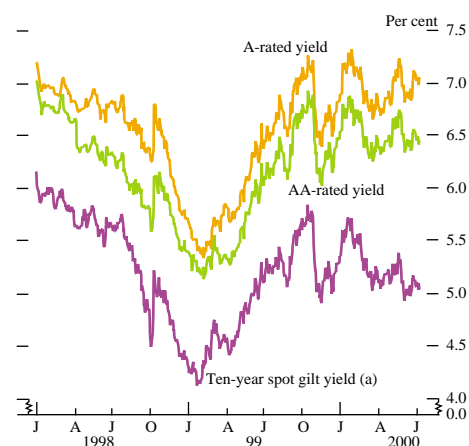
Gross sterling bond issuance (other than gilts) increased to £15.1 billion in the second quarter, the highest level since 1999 Q2 (see Chart 24). Longer-dated issues made up half of the total, as demand from UK institutional investors remained focused on longer maturities. Issuance of short-dated bonds rose to £5.8 billion as the decline in short-term interest rate expectations led to greater demand for these bonds. Fixed-rate issuance declined relative to Q1 but remained broadly in line with the average quarterly issuance level observed in the past two years. In contrast, issuance of floating-rate notes rose sharply to £5.1 billion in Q2, up from £3 billion in Q1. This primarily reflected greater issuance by UK and overseas financials to finance their loan and mortgage books, as well as a £1 billion asset-backed bond for a UK corporate.

Fixed-rate issuance by UK firms fell to £3.3 billion in Q2, down from £5.6 billion in Q1, while issuance by overseas firms and supranationals increased slightly to £6.7 billion (see Table G). Overseas borrowers continued to be attracted by the relatively wide spreads that exist between sterling swap rates and the par yields they pay on their sterling-denominated bonds.⁽¹⁾ Deutsche Telecom was the largest single bond issuer during the period, raising \$14.5 billion from bonds denominated in US dollars, euro, sterling and yen.

The United Kingdom's auction of Spectrum mobile phone licences, completed on 27 April, had a significant impact on bond yields over the quarter. The auction proceeds were £22.5 billion, well in excess of the £3 billion assumed in the Chancellor's March Budget. As noted earlier, there has been a consequent reduction in this year's forecast for net gilt supply. Though the DMO has taken steps to maintain long gilt issuance, yield spreads over gilts widened during the quarter due to rising swap and corporate bond rates (see Charts 25 and 26).

(1) For further details, see the box on page 130 of the May 2000 *Quarterly Bulletin*.

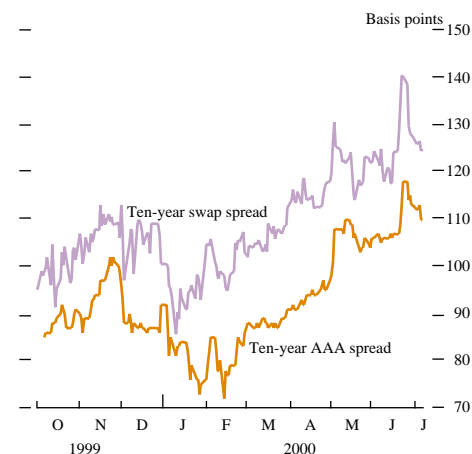
Chart 25
Ten-year corporate yields



Source: Bloomberg.

(a) Derived using the Bank's VRP curve-fitting technique.

Chart 26
Ten-year credit spreads versus gilts



Sources: Bank of England and Bloomberg.

The increase in corporate bond yields reflected two main considerations. First, the higher-than-anticipated bids for the mobile phone licences led to an associated expectation of heavy corporate bond issuance by telecommunications companies. Increases in the supply of corporate bonds tend to lower their price, thereby raising corporate bond yields. Second, the high cost of the licences has also led to increased fears about the credit risk of telecoms firms, due to the associated rise in their financial gearing levels and the potential impact on future earnings. Reflecting these fears, some telecoms firms were put on credit watch during Q2 while others had their credit ratings downgraded.

Market participants have reported that much of the increase in sterling swap rates in Q2 reflected the swapping of proceeds from dollar bond issues into sterling. Given the poor relative liquidity of the sterling swap market at ten years' maturity and beyond, a large increase in the demand to pay fixed in long-dated sterling swaps can have a significant short-term impact on swap rates.

As mentioned above, the review of the Minimum Funding Requirement (MFR) was also a focus of attention for the sterling bond market over the quarter. A number of speculative trades (anticipating a narrowing in corporate bond spreads) had been put in place prior to its expected release in late May. However, the delay in publication, and the widening in swap spreads related to the financing of mobile phone licences, forced the unwinding of these trades and contributed to the rise in swap rates. Anticipation of greater pension fund demand for corporate bonds has, however, encouraged corporate issuers of index-linked bonds; a further three such issues were brought in the quarter, raising just over £300 million.

Market operations

Open market operations

The DMO assumed full responsibility for managing the Exchequer's daily cash position on 3 April. The level of the government's outstanding Ways and Means advance on the Bank's balance sheet has been frozen and the DMO now offsets the Exchequer's cash position with the money market each day. Rather than varying the size of the Ways and Means advance to balance the Exchequer's short-term financing needs each day, the DMO now aims to achieve a small, unchanged precautionary deposit at the Bank. Consequently, the Bank's balance sheet has become more stable and predictable and the money market's need for refinancing from the Bank is no longer influenced by the Exchequer's net cash position. Following the cash management transfer, the two principal factors that influence the money market's need for refinancing from the Bank are changes in the note issue and maturing refinancing operations. In Q2, the stock of money market refinancing held at the Bank averaged £14 billion and daily money market shortages averaged £1.9 billion (see Table H and Chart 27). As the quantity of refinancing required by the money market was stable during the second quarter, the Bank did not use foreign exchange swaps as an additional means of supplying liquidity.

Over Q2, the sterling overnight index average (SONIA) generally traded closer to the Bank's repo rate than in Q1 (see Chart 28). This was partly because January was affected by Y2K

Table H
Average daily money market shortages

£ millions

1996 Year	900
1997 Year	1,200
1998 Year	1,400
1999 Year	1,200
2000 Q1	1,800
April	2,000
May	1,800
June	2,000

Chart 27
Stock of money market refinancing and daily shortages

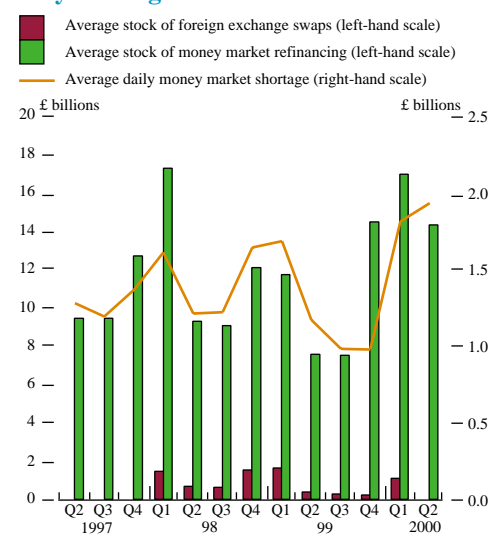
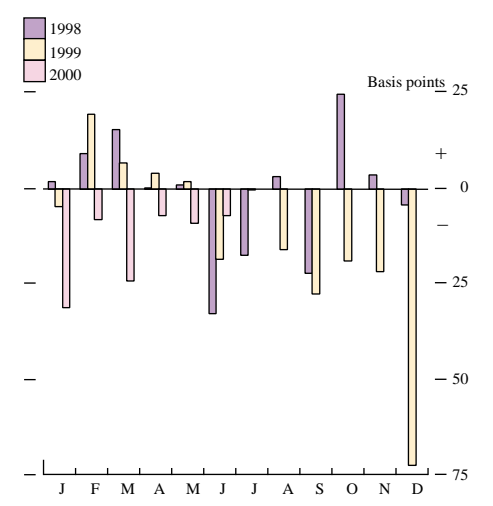


Chart 28
Monthly averages of SONIA minus the Bank's repo rate



considerations. However, the size of the spread between SONIA and the Bank's repo rate also diminished when comparing the average for Q2 with the average for February and March. Nevertheless, there were some periods in the second quarter when short-dated market rates traded further below the Bank's repo rate than was desired. The Bank responded to this development by increasing, in stages, the amount by which it left the market short after the 9.45 am round of operations, even when the available refinancing was fully bid for by market participants. This led to a narrowing of the spread between short-dated market rates and the Bank's repo rate.

The Bank's counterparties continued to make use of euro-denominated eligible securities⁽¹⁾ as collateral in repo operations in Q2. These accounted for an average of 11% of the collateral taken by the Bank in its open market operations during April, May and June. By the end of Q2, gilts accounted for around 70% of the stock of collateral held by the Bank (see Chart 29).

As well as announcing changes to the DMO's gilt remit on 12 June, the Treasury stated that the remaining proceeds from the Spectrum licence auction would be used to reduce its net short-term debt, which may include repaying some of the Ways and Means advance. Decisions about the composition of the reduction in net short-term debt will be made at the time of the Pre-Budget Report, when any revision to the forecast net cash requirement can also be taken into account.

At the beginning of July, gilts settlement migrated from the Central Gilts Office to CREST, the UK system for the electronic transfer and settlement of dematerialised equities. This was a step towards the aim of a single settlement system for gilts, money market instruments and equities. A small number of non-British government sterling securities ('bulldogs') did not migrate to CREST, and the Bank of England's list of eligible bulldogs has been amended to reflect this change.

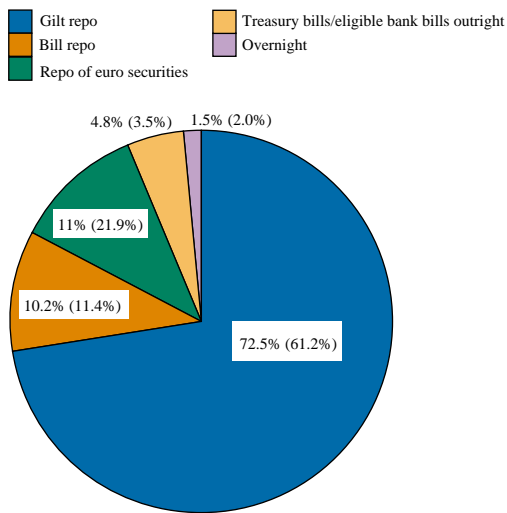
HM Treasury and Bank of England euro issues

The Bank of England continued to hold regular monthly auctions of €1 billion of bills during the second quarter of 2000, comprising €200 million of one-month, €500 million of three-month and €300 million of six-month Bank of England bills. The stock of euro bills outstanding was therefore maintained at €3.5 billion throughout the quarter. The auctions continued to be oversubscribed, with issues being covered an average of 5.2 times the amount on offer in Q2. During the quarter, bids were accepted at average yields of around the euribid rate for the relevant maturity.

On 18 April, the Bank reopened the UK Government euro Treasury note maturing on 28 January 2003 with a further auction for €500 million, raising the amount of this note outstanding with the public to €1.0 billion. Cover at the auction was 2.2 times the amount on offer and accepted bids were in a range of 4.71%–4.78%. The total of notes outstanding with the public under the UK euro note programme thus rose from €4.5 billion at the end

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

Chart 29
OMOs—instrument overview^(a)



(a) The chart shows the average share of the various instruments held by the Bank as a result of open market operations in 2000 Q2. Figures in brackets relate to 2000 Q1. Figures may not sum to 100% because of roundings.

of Q1 to €5.0 billion in Q2. Further reopening auctions of the 2003 note will be held on 18 July and 17 October 2000.

UK gold auctions

On 3 March, HM Treasury announced plans for a programme of six gold auctions in the financial year 2000/01. The first auction in this series took place on 23 May: 25 tonnes of gold were sold at a price of \$275.25; the auction was 2.7 times covered. The second auction in this programme took place on 12 July and the remaining auctions will take place in September and November of this year and in January and March 2001.