# **Bank of England Quarterly Bulletin**



# August 1999

Volume 39 Number 3

# **Bank of England Quarterly Bulletin**

# August 1999

Summary	2
Recent economic and financial developments	
Markets and operations Box on merger of CGO and CMO with CREST	
The international environment	2
Research and analysis	
What makes prices sticky? Some survey evidence for the United Kingdom	, 4
The use of explicit targets for monetary policy: practical experiences of 91 economies in the 1990s	-
Report	
Financial sector preparations for the Year 2000	4
Speeches	
The Asian crisis: lessons for crisis management and prevention	
issues, originally published in the Journal of International Finance (1999), Vol 2:2	
<b>The MPC two years on</b> Speech by Mervyn King, Deputy Governor, given at the Queen's University, Belfa. on 17 May 1999	et,
<b>Price stability in the United Kingdom</b> Speech by John Vickers, Executive Director and Chief Economist, given as the Glasgow Trades House Lecture at Strathclyde University, on 26 May 1999	
The impact of the international environment on	

Volume 39 Number 3

Printed by Park Communications © Bank of England 1999 ISSN 0005-5166

# **The Quarterly Bulletin and Inflation Report**

**Inflation Report** (published separately) The Inflation Report reviews developments in the UK economy and assesses the outlook for with a short overview section; the second section investigates money and financial markets,

# Markets and operations (pages 237-52)

The international environment (pages 253-61)

# **Research and analysis** (pages 262-81)

UK inflation over the next two years in relation to the inflation target. The Report starts and the following three sections examine demand and output, the labour market and pricing behaviour respectively. The concluding sections present a summary of monetary policy since the May Report, an assessment of medium-term inflation prospects and risks, and information about non-Bank forecasts. Minutes of recent Monetary Policy Committee meetings are attached as an annex.

This article reviews developments in international and domestic financial markets in the second quarter of 1999, and describes Bank of England market operations. Stronger-than-expected economic growth and signs of an intensification of price pressures led US market interest rates to rise and the dollar to appreciate during Q2. All other major financial markets were influenced by these developments. The upward shift in the US yield curve was underpinned by the Federal Open Market Committee's adoption of a bias to tighten monetary policy on 18 May, followed by a 25 basis point rise in the federal funds target rate on 30 June. The euro-area and Japanese yield curves also shifted upwards over the quarter, influenced by higher US interest rates and signs of stronger domestic economic growth. In the United Kingdom, the Bank of England's repo rate was reduced by 25 basis points on two occasions in Q2, to 5.0%. But the implied interest rate profile, given by the futures and swap markets, rose and developed a hump at the two to five-year horizon. Globally, non-government bond issuance rose significantly in the first half of 1999. US, European and Japanese equity prices rose further in Q2, while the FT-SE 100 index was little changed over the quarter. On 30 July, the Bank of England announced a major extension to the range of securities eligible for use in its repo operations.

This article discusses developments in the global economy since the May 1999 Quarterly Bulletin. Overall, the outlook for the world economy has improved since the previous Quarterly Bulletin. Most short and long-term interest rates increased across the major international financial markets, partly reflecting developments in the United States. The Federal Open Market Committee increased the federal funds target rate by  $\frac{1}{4}$  to 5% on 30 June, and reverted to a neutral monetary stance. Growth slowed somewhat in the second quarter, after above-trend growth in the first quarter. Growth in the euro area appeared to have strengthened in the first quarter, after slowing throughout last year. Euro-area inflation remained at low levels, and the European Central Bank left interest rates unchanged, though noted some potential for upward pressure on prices in the future. In Japan, measured GDP grew by 1.9% in the first quarter of 1999, after six quarters of falling output. This increase may reflect one-off factors, and the impact of the recent fiscal stimulus. Oil prices increased by more than 15% since the previous Quarterly Bulletin, but indices of other commodity prices were broadly flat in dollar terms. In most emerging markets, output growth has been stronger than expected, and forecasts for growth were revised up.

Research work published by the Bank is intended to contribute to debate, and is not necessarily a statement of Bank policy.

What makes prices sticky? Some survey evidence for the United Kingdom (by Ian Small, and Tony Yates of the Bank's Monetary Assessment and Strategy Division). It is now widely accepted that price stickiness—the tendency for prices not to adjust immediately to changes in market conditions—is an important feature of the transmission mechanism of monetary policy. This article uses the Bank's price-setting survey to investigate what might make prices more or less sticky. It discusses the impact of competition; whether price changes are prompted by cost or demand shocks; if price stickiness is related to the characteristics of firm's customers; whether price changes vary if goods are sold abroad or into the domestic market; and, finally, whether prices are more sticky downwards than upwards. The article finds that all of these factors appear to influence how sticky firms say their prices are.

*The use of explicit targets for monetary policy: practical experiences of 91 economies in the 1990s* (by Gabriel Sterne of the Bank of England's Centre for Central Banking Studies). In June 1999 the Bank of England hosted its sixth Central Bank Governors' Symposium. This year the subject was 'Monetary policy frameworks in a global context', based on a report prepared by DeAnne Julius of the Bank's Monetary Policy Committee and Maxwell Fry, Lavan Mahadeva, Sandra Roger and Gabriel Sterne of the Bank's Centre for Central Banking Studies (CCBS). In this article Gabriel Sterne draws on one of the chapters of the report. The report uses a survey of 91 central banks to assess developments in monetary frameworks across a wide cross-section of economies. The final report, along with a selection of papers originally presented at a CCBS Academic Workshop in November 1998, will be published by Routledge in mid 2000.

*Report* (pages 282–84)

*Financial sector preparations for the Year 2000* (by the Year 2000 team of the Bank's Market Infrastructure Division). Since early in 1998, the Bank of England has been publishing regular progress reports on the preparations of the UK financial sector for the Year 2000. Since these reports began, awareness of the technical and business issues relating to the Year 2000 problem has grown significantly, and most technical remediation and testing work in the UK financial sector has been completed. There is a high level of confidence within the sector that it will be 'business as usual' over the year-end. The Bank's most recent report therefore focused on other topics: preparations in other financial centres; the impact of the Millennium date change on financial market behaviour; and contingency planning and risk mitigation work.

# **Markets and operations**

This article reviews developments in international and domestic financial markets in the second quarter of 1999, and describes Bank of England market operations.

- In the United States, market interest rates rose and the dollar appreciated, in response to stronger-than-expected economic growth and signs of a build-up of price pressures. All other major financial markets were influenced by these developments.
- The upward shift in US market interest rates was underpinned by the Federal Open Market Committee's adoption of a bias to tighten monetary policy on 18 May, followed by a 25 basis point rise in the federal funds target rate on 30 June.
- The European Central Bank cut its refinancing rate by 50 basis points in early April, while the Bank of Japan maintained its policy of keeping the call money rate close to zero. Nevertheless, both the euro-area and Japanese yield curves shifted upwards over the quarter, influenced by higher US interest rates and signs of stronger domestic economic growth.
- In the United Kingdom, the Bank of England's repo rate was reduced by 25 basis points on two occasions in Q2, ending the quarter at 5.0%. But the interest rate profile implied by the futures and swap markets rose, and developed a hump at the two to five-year horizon.
- Globally, non-government bond issuance rose significantly in the first half of 1999, suggesting that the market strains and credit concerns which had surfaced last year had receded further in Q2.
- US, European and Japanese equity prices rose by 6% or more in Q2, while the FT-SE 100 index was *little changed over the quarter.*
- On 30 July, the Bank of England announced a major extension to the range of securities eligible for use in its repo operations.

# International markets(1)

# US developments

During the second quarter, US developments were an important influence on international financial markets. Short and long-term interest rates in the United States, which had fallen during the international turbulence of summer and autumn 1998, continued to rise. Eurodollar interest rate futures rose by 25-40 basis points for 1999 contracts, and by 65-70 basis points for 2001 contracts (see Chart 1). At the end of June, the futures market priced the federal funds rate to rise to an average of 5.4% in December 1999.<sup>(2)</sup> In the Treasury market, the ten-year yield rose by around 40 basis points during the quarter to 6.0%, nearly 170 basis points above its October 1998 low point, and the yield on the long bond increased

A more detailed discussion of international economic developments can be found in 'The international environment' article on pages 253–62.
 This expectation is derived from the December 1999 federal funds futures contract traded on the Chicago Board of Trade exchange.

# Chart 1 US official and market interest rates



Source: Bloomberg.

<sup>(</sup>a) Interest rates implied by the eurodollar futures contracts at the two dates specified. From July 1999, dates on the x-axis relate to contract expiry dates.









Euribor implied interest rates<sup>(a)</sup>



(a) Interest rates implied by the euribor futures contracts at the two specified dates. The x-axis relates to contract expiry dates.

by some 30 basis points (see Chart 2).<sup>(1)</sup> Swap market rates rose by slightly more than Treasury yields.

The upward move in the yield curve mainly reflected developments in the US economic conjuncture, and the market interpretation of their implications for future monetary policy. Interest rates eased early in the quarter, continuing the correction of the sharp increase in market rates that occurred in February and early March. Though March inflation data (released in the first half of April) remained benign, financial market participants became increasingly concerned that price pressures might intensify. Most forecasts of US economic growth were revised upwards, as a series of unexpectedly strong sentiment surveys and economic data emerged in April and the first half of May. Market concerns about price pressures were reinforced by the larger-than-expected increases in the first-quarter GDP deflator, the import price data for April, and the April consumer price index.

Following these developments, on 18 May the Federal Open Market Committee (FOMC) announced that it had 'adopted a directive that is tilted toward the possibility of a firming in the stance of monetary policy'. This statement underpinned the substantial rise in bond yields that had already taken place, and led to a sharp upward shift in the shorter end of the yield curve. At its next meeting on 30 June, the FOMC announced a 25 basis point rise in the target federal funds rate to 5.0%. The accompanying press statement noted that 'the FOMC has chosen to adopt a directive that includes no predilection about near-term policy action'. This came as a surprise to most market participants; Treasury yields generally fell by 10–15 basis points on the day.

In the equity market, the Standard and Poor's 500 (S&P 500) index rose by more than 6% in Q2, outpacing the first quarter's gain, but failing to keep pace with the rise in the Dow Jones Industrial Average index. After reaching an all-time high on 20 May, equity prices fell back, as expectations of a rise in the federal funds target rate grew. During June, the S&P 500 index began to rise again. It was helped in the middle of the month by the release of benign consumer price data and by the Federal Reserve Chairman's 17 June Congressional testimony. The latter was interpreted by markets as indicating that monetary policy might not be tightened solely in response to higher equity prices.

#### Euro-area developments

On 8 April, the European Central Bank (ECB) announced a 50 basis point reduction in its two-week repo rate to 2.5%. Although there had been a growing market expectation of a cut, the reduction was larger than had been expected. Immediately following the cut, both short and long-term euro interest rates eased, with no further changes to the repo rate being expected over the short term. However, as the quarter progressed, interest rates at all but very short maturities began to rise and the yield curve steepened. The implied rate for December 1999, derived from the futures market, rose by nearly 10 basis points in Q2 to 3.08%, while the implied rate for March 2002 rose by 72 basis points to 4.46% (see Chart 3). Two and ten-year Bund yields were about

Unless stated otherwise, all note and bond yields in this section of the *Quarterly Bulletin* are Svensson par yields. A detailed explanation of the Svensson curve fitting technique is given in the August 1994 *Quarterly Bulletin*, page 232.

30 and 40 basis points higher than at the end of March, rising to 3.3% and 4.6% respectively by the end of the quarter.

The upward shift in the US yield curve was probably the most significant influence on euro-area interest rates in Q2. During the quarter, the 30-day rolling correlation between the daily change in the yield on the ten-year US Treasury bond and the same-dated Bund remained positive, and rose significantly. Tentative signs of stronger growth in Germany and the other large euro-area economies, which emerged towards the end of the quarter, also contributed to higher interest rates. In particular, March retail sales, first-quarter GDP, and April industrial production data for Germany were all stronger than expected.

National fiscal developments had some impact on trading in the euro-area markets during the second quarter, as market concerns about the process of policy coordination between the euro-area member governments may have dampened investor sentiment. News that Italy's planned fiscal deficit to GDP ratio for 1999 would be higher than expected tended to put upward pressure on rates. Markets feared that the relaxation of the Italian budget deficit target might lead to a more widespread relaxation of the terms and conditions of the European Union stability and growth pact. This had little lasting impact on yield spreads, however (see Chart 4). Furthermore, there was little immediate market reaction to Germany's announcement of spending cuts for next year's federal budget.<sup>(1)</sup>

According to market reports, some long positions in euro-denominated debt instruments that had been built up by foreign investors in the second half of 1998 were liquidated in 1999 Q2. In this way, investors reduced risk exposures and stopped accumulating losses as the euro depreciated. Such transactions could help to explain the coincidence of rising euro bond yields and the depreciation of the euro exchange rate.

Euro-area equity prices rose at a similar rate to those in the United States during the second quarter; both the Dow Jones Euro Stoxx 50 index (which covers 50 blue-chip stocks across the whole euro area) and the S&P 500 rose by around 6% (see Table A). Specific European factors that helped equity prices to rise included: the lowering of the ECB's repo rate; increased merger and acquisition activity; hopes that the Kosovo peace deal would lift European business and consumer confidence; and the upward revision to euro-area growth forecasts. At the national level, price gains tended to be greatest in Germany and France; consolidation was more evident in other countries, following sharp price increases during 1998.

# Japanese developments

Japanese short-term interest rates remained extremely low during the second quarter, as the Bank of Japan (BoJ) maintained its policy of keeping the uncollateralised call money rate as close to zero as possible. Over the quarter as a whole, the profile of future three-month euroyen interest rates implied by futures contracts expiring in 2000 and 2001 shifted upwards by around 25 basis points. At the end of June, the rates implied for December 1999,

# Chart 4 Ten-year European government bond vield spreads<sup>(a)</sup>



# Table AInternational equity performance

Percentage	price	changes	from	earlier	period	local	currencies

	1998	1999		
Index	Year	Q1	<u>Q2</u>	
United States				
S&P 500 Dow Jones 30	26.7 16.1	4.6 6.6	6.8 12.1	
Euro area				
Dow Jones Euro Stoxx 50 Dax (Germany) CAC 40 (France)	32.0 17.7 31.5	6.5 -2.4 6.5	6.4 10.1 8.1	
Japan				
Nikkei 225	-9.3	14.4	10.7	
Source: Bloomberg.				

<sup>(1)</sup> See 'The international environment' article on pages 253-62 for further details.

# Chart 5 Euroyen implied interest rates<sup>(a)</sup>





# Chart 6

#### Japanese government bond yield curve<sup>(a)</sup>



(a) Derived from Svensson par yield curve

# Table B Non-government international bond issuance by currency

\$ billions	US\$	Sterling	Euro	Other	Total
1996	261	51	153	108	573
1997	334	63	148	86	631
1998	342	78	209	65	693
1998 Q1	116	28	73	23	240
Q2	96	14	61	17	188
Q3	58	14	41	14	128
Q4	71	21	34	11	137
1999 Q1	131	24	122	20	297
Q2	118	28	138	18	303

Notes: Includes internationally targeted German mortgage bond (pfandbrief) issuance Quarterly figures may not sum to annual totals because of rounding.

Source: CapitalData Bondware

December 2000, and December 2001 were 0.68%, 1.02%, and 1.63% respectively (see Chart 5).

Longer-term interest rates fell during the first half of the quarter, reflecting growing market confidence that the BoJ would keep policy unchanged and that any additional fiscal stimulus package would be small (implying minimal changes to the Japanese government bond supply schedule). There were signs during the quarter of stronger demand for longer-dated Japanese government bonds (JGBs): the bid-to-cover ratio for the auction on 7 April of 20-year JGBs rose to 1.94, up from 1.62 at the previous auction. The yield fell sharply on the day of the auction and in the days that followed (by around 25 basis points). The JGB auction on 21 April was also well covered.

In the second half of the quarter, however, JGB yields started to rise. This reflected the increase in US Treasury yields and signs of improved growth prospects for the Japanese economy. In particular, JGB yields rose after the publication on 10 June of the estimated increase in Q1 GDP which, at 1.9%, was much larger than expected. In the light of these signs of stronger growth, market participants questioned how long the BoJ would maintain its policy stance. Over the quarter as a whole, two and ten-year JGB yields increased by around 10 and 40 basis points, to 0.39% and 2.04% respectively (see Chart 6).

Stock market prices strengthened sharply during Q2, with the Nikkei 225 index rising by more than 10%. Market participants reported increased foreign demand for equities, which may have reflected some improvement in the economic outlook, growing signs that the worst of the banking sector problems were over, the maintenance of very low interest rates, and improved progress on corporate restructuring.

#### International bond issuance

The credit concerns and other market strains which had emerged in the summer of 1998 receded further in Q2. Globally, non-government bond issuance rose to \$600 billion in the first half of this year.<sup>(1)</sup> This represents a significant increase, both from the depressed level of issuance in the second half of last year and relative to the first half of 1998 (see Table B). About 85% of this year's new issues were denominated in euros and dollars (in roughly equal amounts), 9% in sterling, and the remainder in other currencies. The euro has, therefore, already become a popular currency for issuers. The value of euro-denominated bond issuance in the first half of this year has virtually doubled from the amount issued in the legacy currencies in the first half of 1998.

# **Foreign exchange markets**

#### Major overseas currencies

The US dollar's effective exchange rate index continued to rise during the second quarter, as the dollar appreciated against the other major currencies (see Chart 7). In the six months to the end of June, the dollar rose by more than 5% in effective terms (see Chart 8). This appreciation largely reflected the continued strong

Non-government international bond issuance is defined as all international bond issuance, excluding that by central governments, local authorities, public finance and state/provincial authorities. The euro category includes issuance in the eleven legacy currencies and the Ecu prior to 1999.

# Chart 7 US dollar exchange rates



### Chart 8 US dollar and sterling effective exchange rates



performance of the US economy, and the growing expectation that the FOMC would raise official interest rates. The dollar strengthened moderately after the release on 14 May of stronger-than-expected consumer price data for April, and continued to appreciate following the FOMC's adoption of a bias to tighten monetary policy on 18 May. But expectations of higher interest rates did not always lead to dollar strength during the quarter. At times, the market was concerned about the possible negative impact on US economic activity of a significant monetary policy tightening. It was perhaps for this reason that the dollar appreciated, following the announcement of the FOMC's adoption on 30 June of a directive including no predilection about near-term policy action.

Over the quarter, the dollar appreciated by 2.2% against the yen. In April, there was speculation about a possible supplementary Japanese fiscal stimulus, with some market participants expecting a package to be announced in early May. This led the yen to appreciate, with the dollar-yen rate falling below \$119 at the end of April. In the event, there was no announcement of a fiscal package, and the yen rose back to \$121.

During June, upward revisions to forecasts of Japanese economic growth and the stronger-than-expected official estimate of first-quarter GDP increased the demand for yen. The BoJ was reported to have intervened to limit this appreciation, selling yen against both the dollar and the euro. In addition, there was a decline in the implied volatilities of yen exchange rates derived from options markets—against the dollar, in particular—and risk reversals became less heavily in favour of yen calls, suggesting that the reported intervention had succeeded in reducing the probability that the market attached to yen appreciation.<sup>(1)</sup> Nevertheless, the underlying demand for yen remained firm, reflecting Japan's continued current account surpluses and the repatriation of foreign currency denominated assets by Japanese investment institutions.

The euro weakened over the quarter, by 3.9% against the dollar, 2.2% against the yen and 2.2% against the pound. In addition to the factors listed above, the euro-dollar and euro-yen exchange rates were also influenced by market participants' concerns about economic growth in the largest euro-area countries, the conflict in Kosovo, and comments from European officials about the level of the exchange rate.

Towards the end of the quarter, there were some indications of an improvement in sentiment towards the euro. The euro-dollar exchange rate rallied by more than one cent following the release of the stronger-than-expected estimate of German first-quarter GDP growth on 8 June. The euro was also lifted at this time by news that the G8 had agreed a draft UN Security Council resolution on Kosovo. The euro stood at \$1.04 and \$124.9 at the end of the quarter.

#### Sterling

Sterling's effective exchange rate index (in which the euro has a 65% weight) appreciated by 1.1% over the quarter (see Chart 8).

<sup>(1)</sup> Risk reversals can be used to assess how the market sees the balance of risks between an appreciation and a depreciation of the exchange rate. When the risk reversal is large and positive, it suggests that higher probabilities are attached to appreciations (of the yen in this case), and when it is large and negative, it indicates expectations skewed in favour of a depreciation.





Within this overall movement, sterling appreciated by 2.2% against the euro and depreciated by 2.3% against the dollar (see Chart 9).

Sterling depreciation against the dollar mainly reflected expectations about relative interest rate movements. Sterling weakened in the days following the Monetary Policy Committee's (MPC's) statement on 6 May linking a possible further easing of interest rates to the strength of the pound. But it rose, temporarily, on 10 June after the MPC's decision to reduce the Bank repo rate by 25 basis points, as some market participants viewed this as possibly the last interest rate cut in the current cycle. However, the weaker-than-expected retail price and average earnings data in mid June led to speculation about a further rate cut, prompting the sterling-dollar exchange rate to fall decisively below the \$1.60 level. Previously strong demand for sterling had often emerged at rates at, or a little below, this level. But the release of the MPC minutes on 23 June, which showed an 8-1 majority of MPC members voting in favour of the 25 basis point reduction in interest rates announced on 10 June, prompted renewed expectations of further rate cuts and brought the sterling-dollar exchange rate below \$1.58. The rise in the federal funds target rate in the United States-which resulted in parity between US and UK official rates-may also have had a significant effect on sterling's depreciation against the dollar.

Sterling's appreciation against the euro was largely attributable to the negative sentiment towards the euro, to signs of a pick-up in the UK economy, and to the larger rise in implied interest rates in the United Kingdom than in the euro area over the period.

#### Emerging market currencies

Movements in emerging market currencies had little influence on the major industrial countries' financial markets in Q2, in contrast to developments in the second half of 1998. Most Asian emerging market currencies either appreciated further against the US dollar or consolidated their previous gains, reflecting increased optimism about growth prospects.

In Latin America, the Brazilian real stabilised following its weakness in the first part of the year. But other currencies did come under some pressure. In Argentina there was concern about the sustainability of the authorities' currency board arrangement; there were doubts whether, with the economy in recession, interest rates could be raised at a time when fiscal pressures were mounting. By the end of the quarter, the forward exchange market for Argentinean pesos was pricing in an increased chance of a devaluation over the next twelve months. In Colombia, the central bank was forced to devalue the peso and widen its intervention bands on 27 June.

# **Sterling markets**

### Interest rates

The Bank of England's MPC voted to cut the Bank's reportate by 25 basis points on two occasions in 1999 Q2, taking the rate to 5.0% at the end of the quarter. Nevertheless, short-term cash interest rates were slightly higher at the end of June than the market had expected at the end of March. For example, the June short

### Chart 10 UK official and market interest rates<sup>(a)</sup>



Sources: Bank of England and Bloomberg.

(a) Interest rates implied by short sterling futures contracts at the two dates specified. From July 1999, dates on the x-axis relate to contract expiry dates.





(a) Derived using Svensson curves.

#### Chart 12

Rolling correlations between changes in short sterling and eurodollar interest rate futures<sup>(a)</sup>



Sources: Bank of England and Bloomberg.

sterling futures contract settled at an implied level of 5.125% for three-month Libor, having been trading at an implied level of 4.97% at the end of Q1.

The UK short-term interest rate curve implied by short sterling futures contracts on three-month Libor shifted upwards and steepened during the second quarter (see Chart 10). In the swap market, the six-month forward rate increased by 1.2 percentage points at two years and by 0.7 percentage points at five years, to 6.8% and 6.1% respectively. However, swap market forward rates fell beyond seven years. In the gilt market, forward rates also fell at medium maturities, but were little changed at the very long end of the curve (see Chart 11).

Charts 10 and 11 show that the implied future interest rate profile rose for 1999, by increasing amounts for dates in 2000 and 2001, and by gradually smaller amounts for dates from 2002. Thus a hump developed in the profile, with its peak occurring between mid 2001 and mid 2002.

To some extent, this upward shift in the implied interest rate profile reflected the international developments discussed above; the dollar, euro and yen interest rate profiles also shifted upwards. The correlation between daily changes in interest rates implied by short sterling and eurodollar futures was particularly strong in May, and higher than its average over recent years (see Chart 12).

However, the sterling interest rate profile rose by much more than in other countries, reflecting UK-specific influences. Principal among these were further signs of a recovery in domestic economic growth, including increasingly optimistic business survey results and rising house prices. Reflecting the improved outlook for growth, most financial market economists revised their forecasts of the trough in official interest rates upwards during the second quarter (see Table C). At the beginning of July, the modal forecast for the timing of the next rise in official rates was 2000 Q2.

A second UK-specific factor behind the increase in implied interest rates at the two to five-year horizon was some reappraisal by the market of the timing of possible UK adoption of the euro. The likely date is now expected by the markets to be further into the future. On this revised view, there could be another full interest rate cycle before convergence of UK interest rates with those in the euro area.

This change of view had a significant market impact through the unwinding of 'convergence trades'. By undertaking such trades, investors had committed themselves to receiving streams of fixed-rate sterling interest, in many cases through the sterling swap market, in the expectation that sterling interest rates would fall as they converged with euro rates. The shift in expectations about the possible timing of UK entry into the single currency not only altered expectations about the future profile of UK interest rates, but also provoked large portfolio adjustments from those who wanted to unwind convergence trades that they had undertaken. This coincided with a period of repatriation of assets by Japanese investment institutions (as noted earlier).

A third, possibly related, factor for the increase in medium-term interest rates was stronger demand in the sterling swap market to

<sup>(</sup>a) 20-day rolling correlations of changes in interest rates implied by September 1999 and September 2001 futures contracts.

# Table CEconomists' interest rate forecasts

Date of survey	Mean	Mode	Lower quartile	Upper quartile
31 March 1999				
Level of trough (per cent) Timing of trough	4.66 end 1999	4.5 2000 Q1	4.5 1999 Q3	5 2000 Q1
1 July 1999				
Level of trough (per cent) Timing of trough Timing of next rate rise	4.825 1999 Q3 2000 Q2/ Q3	5 June 1999 2000 Q2	4.75 June 1999 2001 Q1/ Q2	5 Nov. 1999 2000 Q3/ Q4
Source: Reuters.				

Chart 13

# Implied distribution for sterling three-month interest rates<sup>(a)</sup>



Sources: LIFFE and Bank of England.

(a) The chart depicts the probability distribution for short-term interest rates and is rather like a contour map. At any given point, the depth of shading represents the height of the probability density function implied by the markets over a range of outcomes for short-term interest rates. The markets judge that there is a 10% chance of interest rates being within the darkest, central band at any date. Each successive pair of bands covers a further 20% of the probability distribution until 90% of the distribution is covered. The bands widen as the time horizon is extended, indicating increased uncertainty about interest rate outcomes.

# Chart 14 Sterling five-year market swap spreads



borrow at fixed interest rates and receive floating-rate interest. This was true, for example, for domestic lending institutions wishing to hedge fixed-rate mortgage income: the number of new fixed-rate mortgage loans increased in the second quarter. Furthermore, the upward-sloping yield curve may have encouraged some mortgage-lending institutions to seek to undertake such swap transactions in order to hedge fixed-rate mortgages sold in the future.

In summary, the resulting supply pressures in the medium-maturity fixed-income market caused implied future interest rates to rise to levels that probably exceeded most market participants' actual expectations of future rates. In addition, uncertainty about the likely path of short-term interest rates increased during the second quarter. Risk-neutral probability distributions of expected three-month market rates derived from options prices are shown in Chart 13. The width of the probability bands was greater at the end of June than at the end of March, and the skew was larger. At the end of Q2, market participants thought it more likely that the future path of interest rates would be above, rather than below, the modal expectation.

# Conventional gilts

Although short gilt yields rose by less than comparable swap rates during the second quarter, the gilt market was influenced by similar factors. By the end of the quarter, a hump in implied forward rates, similar in shape to that present in the swap market, had developed (see Chart 11). The six-month forward interest rate increased by 1 percentage point, to 5.5%, at three years, and by around 80 basis points, to 5.3%, at five years. But the six-month forward rate fell at the ten-year horizon and beyond.

The unwinding of EMU convergence trades and the hedging of mortgage income in Q2 occurred mainly in the swap market. At the same time, liquidity concerns relating to the approach of the Millennium led gilts to be more highly valued.<sup>(1)</sup> Consequently, at times, the spread between the five-year swap rate and gilt yield spiked higher (see Chart 14). Over the quarter as a whole, the five-year market swap spread over the gilt par yield increased by some 10 basis points to around 85 basis points.

Long-dated gilt par yields increased by 20 basis points during the quarter, to 4.65%. However, they continued to be restrained by strong demand for long gilts from pension funds and insurance companies. These institutions have regulatory and actuarial incentives to hold long gilts, such as the increasing maturity of pension funds and the Minimum Funding Requirement (MFR), applied under the Pensions Act 1995 to pension funds since 1997.

Some market participants have suggested that gilt market liquidity has decreased recently. This is said to reflect reduced gilt supply, a decrease in risk appetite (with much less activity apparent from leveraged players, such as hedge funds), and the introduction in early April of electronic trading for the long gilt futures contract traded on the London International Financial Futures and Options Exchange (LIFFE). A reduction in market liquidity could be reflected in wider bid-offer spreads, or a decrease in the average

<sup>(1)</sup> This reflects their eligibility for use in the Bank's repo operations, and the fact that banks can hold them as sterling stock liquidity to comply with supervisory requirements.

# Table DGilt market turnover

£ billions nominal value

	1997	1998				<u>1999</u>	
Gilts	Quarterly average	<u>Q1</u>	<u>Q2</u>	<u>Q3</u>	<u>Q4</u>	<u>Q1</u>	<u>Q2</u>
Conventional Index-linked Total	475 11 486	451 9 460	406 11 417	411 7 418	347 7 354	368 7 375	354 7 360
Futures							
Long gilt futures contracts (a)	245	246	316	419	241	262	231
Sources: London Stock Exchange and Bloomberg.							

(a) Relates to the front two contracts traded in the quarter.

# Chart 15 Fixed-rate sterling non-government bond issuance



Table E

GIII	auctions	

Date	Stock	Nominal amount issued (£ millions)	Total cover	Yield at common accepted price
28.04.99	41/8% Index-linked Treasury Stock 2030	500	0.94	1.97% (assumed inflation 3%)
26.05.99	6% Treasury Stock 2028	2,500	2.24	4.72%
22.06.99	5% Treasury Stock 2004	2,500	2.01	5.30%

 The nominal value is based on each gilt being priced at par (£100), which is often very different from the market value. Because gilt prices have risen, the market value of gilts traded will have fallen by less than the nominal value.

size of transactions, but such measures are difficult to obtain. Turnover data, which are more readily available, suggest that the largest reduction in liquidity occurred last year (see Table D). The nominal value of gilts<sup>(1)</sup> traded in the second quarter of this year was 4% lower than in Q1, and 14% down on a year earlier. On LIFFE, the nominal value of long gilt futures contracts traded during Q2 was around £230 billion. This was 12% lower than the volume of contracts traded in Q1 and 27% down on a year earlier.

There were two conventional gilt auctions during the second quarter, both of which were well covered, with bid-to-cover ratios exceeding 2 (see Table E). When the Debt Management Office (DMO) announced the details of the 2004 auction, in mid June, it also gave notice of its intention to offer holders of  $9^{1}/_{2}$ % Conversion 2004 the opportunity to convert into 5% Treasury 2004; details and terms of this conversion were made available on 1 July. On 30 June, the DMO announced that there would be one auction of conventional gilt-edged stock in Q3:  $5^{3}/_{4}$ % Treasury 2009 on 28 September.

Activity in the strips market remained subdued in the second quarter, with average weekly turnover of around £80 million, equivalent to only 0.2% of average weekly turnover in the conventional and index-linked markets (see page 249 for further details about the use of strips as collateral in market operations).

#### Other sterling bond issues

Total fixed-rate issuance (other than gilts) was £12.6 billion in Q2, slightly higher than in the previous two quarters and twice the level of issuance in 1998 Q2 (see Chart 15). Issuance was skewed toward longer maturities, with mediums (over 7 years) and longs (over 15 years) totalling £5.1 billion and £4.3 billion respectively, while shorts (under 7 years) amounted to £3.2 billion.

There were several reasons for the heavy issuance over the quarter. Alongside DMO auctions of 30-year and 5-year gilts in Q2, demand for longer-dated non-government sterling bonds remained high, as low gilt yields encouraged institutional investors to seek higher yields elsewhere (the 'crowding in' effect of low gilt supply). This demand was augmented by heavy cash inflows into PEP bond funds ahead of the April deadline.

Investors' appetite for a yield spread over gilts encouraged issuers from across the credit spectrum. As well as a number of large issues from well-known UK and overseas corporates, the period also saw several sub-investment grade ('high-yield') issuers tap the market. Expectations that interest rates may rise over the next 18 months (and possibly concerns that market liquidity might deteriorate ahead of the year-end because of Year 2000

# Table FSterling bond issuance in Q2

	Amount (£ billions)				
	Number		By cre	dit rating	g:
	of		AAA	AA/A	BBB and
	companies	Total			below
Fixed-rate issues					
UK corporates	19	4.5	0.0	2.8	1.8
UK financials	11	2.4	0.5	1.5	0.3
Overseas corporates	5	1	0.5	0.1	0.4
Overseas financials	15	4.6	3.9	0.3	0.4
Overseas public					
sector	1	0.1	0.1	0.0	0.0
Total	51	12.6	5	4.7	2.9
Floating-rate issues					
UK financials	14	4.3	1.5	1.6	1.2
Overseas corporates	1	0.2	0.2	0.0	0.0
Overseas financials	5	0.7	0.2	0.3	0.2
Total	20	5.2	1.9	1.9	1.4

Note: Credit rating figures may not sum to sector totals because of rounding.

Sources: Bank of England, credit ratings from Moody's and Standard and Poor's

# Chart 16 Average yield spreads: UK corporates vs benchmark gilts



### Chart 17 Real yields on index-linked government bonds







considerations<sup>(1)</sup>) may also have encouraged firms to bring forward funding programmes. As a result private, non-financial corporate bond issuance was again high over the quarter. UK firms issued  $\pounds$ 4.5 billion of fixed-rate sterling bonds, predominantly of more than ten-year maturities, and a further  $\pounds$ 1 billion was issued by overseas companies (see Table F).

Improved liquidity in corporate bonds following last autumn's market turbulence, historically low interest rates, and the current high levels of mergers and acquisitions activity also appear to have encouraged the greater use of bonds as a corporate financing medium. In particular, mergers and acquisitions were increasingly financed (or refinanced) through securitised debt issuance. Of the £2.4 billion fixed-rate bonds issued by UK financial institutions in the quarter, £1.3 billion were part of asset-backed deals.

There was very little change in average corporate bond spreads during the second quarter (see Chart 16). Wider swap spreads provided fixed-rate borrowers with opportunities to raise cheap floating-rate finance via swaps. Regular supranational and government-backed AAA-rated issuers raised £3.6 billion, and lower-rated overseas financial institutions raised a further £1 billion.

In addition, £5.2 billion of floating-rate notes were issued in the quarter. Of these, £1.8 billion were short-dated, mainly issued by banks and building societies, with the remainder almost exclusively long-dated, securitised issues. The latter included a £1 billion securitisation to finance the purchase of part of the Government's student loan book.

#### Index-linked gilts

Actuarial and regulatory influences have ensured continued strong institutional demand for index-linked gilts (IGs), keeping their yields below the likely true level of the real interest rate in the wider economy. A comparison with international markets illustrates the low level of UK real interest rates measured in this way (see Chart 17). However, real IG par yields did increase during the second quarter, by some 10–15 basis points.

Liquidity in the index-linked market remained low in the second quarter, although it rose ahead of the DMO's auction of  $\pounds500$  million nominal of  $4^{1/8}$ % Index-linked Treasury 2030 on 28 April, when prices eased slightly and real yields rose. The auction was not fully covered, however, and some lower bids were also rejected by the DMO, resulting in a strike price that implied a real yield of 1.97%. Market prices fell following the auction, but remained above the strike price; and although the 25-year real par yield rose to 1.96% for a short while, it had returned to the pre-auction level of 1.85% by the end of the following week. Residual official holdings of  $4^{1/8}$ % Index-linked Treasury 2030 were sold on 19 and 20 May, at prices above the auction strike price.

Various explanations have been suggested as to why the auction was not fully covered. First, although the price of the stock fell in the run-up to the auction, real yields remained at historic lows and were unattractive to those investors who did not have a pressing

(1) See 'Financial sector preparations for the Year 2000' on pages 282-84.

Chart 18 UK implied forward inflation rates<sup>(a)</sup>



<sup>(</sup>a) Derived using Svensson curves; ten-day moving average.

# Table GEconomists' inflation rate forecasts

	<u>1998</u> Q2	<u>Q3</u>	Q4	<u>1999</u> Q1	Q2
RPI, percentage change					
Barclays Basix Business economists 12–24 months ahead <b>RPIX, percentage change</b>	2.9	2.4	2.1	2.1	2.2
Consensus Forecasts Average 2000	2.7	2.6	2.3	2.2	2.4

Sources: Barclays and Consensus Economics.

# Chart 19 Gilt repo outstanding



reason to hold IGs. Second, a long-dated corporate bond issue on the same day as the auction may have diverted institutional attention away from the index-linked gilt market. Third, the rise in the UK equity market in April (see below) may have reduced the need for pension funds to switch into IGs for MFR purposes. Fourth, gilt-edged market makers (GEMMs) may have been reluctant to take positions ahead of the auction; short positions would have exposed them to the risk of prices rising (as happened following the over-subscribed November 1998 and January 1999 IG auctions). GEMMs may also have been unwilling to buy stock in the auction to establish long positions, because of an insufficient level of retail orders. Fifth, some market participants may have thought that the review of the MFR (by the Faculty and Institute of Actuaries Pensions Board) was likely to result in changes that would lessen institutional demand for IGs. The results of this review are expected to be presented to the Department of Social Security in March 2000; any change in legislation is unlikely before 2001.

Over the quarter as a whole, low market liquidity limited the extent to which economic developments that influenced the swap and gilt markets were reflected in the index-linked market. The overall increase in implied forward inflation during Q2, calculated from the conventional and index-linked gilt markets (see Chart 18), increased by around 80 basis points, to 3.9%, at two years. This rise is likely to overstate the actual increase in inflation expectations in the economy as a whole. Evidence of this can be seen in other indicators of inflation expectations: some surveys conducted in the second quarter did suggest a slight pick-up in business economists' expectations of inflation in two years' time, but this rise was not as great as that derived from conventional and index-linked gilts (see Table G).

On 30 June, the DMO announced that there would be one auction of index-linked gilt-edged stock in Q3:  $2^{1/2}$ % Index-linked Treasury 2011 on 28 July.

#### Gilt repo

The value of gilt repo outstanding fell to £94 billion at the end of May, down from £104 billion at the end of February, as measured by the Bank's regular survey of market participants. As Chart 19 shows, a seasonal pattern in the stock of gilt repo outstanding has developed over the past two years. This is partly related to changes in the Bank's stock of refinancing (the amount of claims on the private sector held in the course of open market operations). The stock was larger in February than in November and May because of the seasonal pattern of the government's cash flow. The larger the money-market shortages which result, the more the Bank's counterparties have to operate in the private repo market to acquire collateral for the open market operations.

Repo outstandings have grown to almost 25% of the sterling money market, following their introduction at the start of 1996 (see Chart 20). This growth in share has mainly been at the expense of the unsecured interbank market, although in absolute terms the interbank market has also increased in size. Stock lending has also grown since 1996, indicating a degree of complementarity between repo and this older form of secured lending. Many gilts enter the

### Chart 20 Composition of sterling money markets: May 1999



Note: Figures in brackets are for December 1995.

# Chart 21 UK equity price indices



repo market through stock lending from the investors to intermediaries, who then repo the gilts out to the core repo market.

The development of central counterparty clearing systems, which allow market participants to benefit from multilateral netting of counterparty exposures, continued to be important. From the perspective of the market, the main perceived advantage of such systems is the reduction in balance sheet exposures that they make possible, although there are other important benefits, such as settlement netting and greater uniformity in operational and risk management procedures. The London Clearing House announced that it was looking to introduce such a system for Bund repo at the start of the autumn, expanding to other euro government bond repo markets and gilts next year. Clearnet<sup>OTC</sup> in France already offers a similar service for German and French government bonds, and Euroclear and GSCC plan a third system, to be operational in 2000.

Specials activity continued to be concentrated on 9% Treasury 2008, which was the cheapest stock to deliver into the June long gilt futures contract, as it had been for the March contract. 6% Treasury 2028 remained special, because underwriters, who price long-dated corporate bond issues off this gilt, hedged their exposure by going short of the stock, thereby increasing its demand in repos. However, pressure on 6% Treasury 2028 eased somewhat in Q2, following the announcement on 31 March that £2.5 billion of the stock was due for auction in May. Towards the middle of May, the repo market started to see some demand for very short-dated gilts, such as 8% Treasury 2000, 13% Treasury 2000 and 7% Treasury 2002. Gilts are used in the Bank's open market operations, and are held as sterling stock liquidity to comply with supervisory requirements. Banks may prefer to hold short-dated gilts for these purposes, because they carry a lower capital risk.

# Equities

The FT-SE 100 index of UK equity prices changed relatively little over the second quarter as a whole; by the end of June it stood at 6319, only 0.4% above its end-March level. In contrast, over the same period the FT-SE 250 share price index (which comprises medium-sized firms), rose by 7.0% and the FT-SE SmallCap share price index (which comprises smaller capitalised firms) rose by 10.4%. These indices had underperformed the FT-SE 100 index in previous quarters (see Chart 21).

The outperformance of the FT-SE 250 and SmallCap indices may have reflected a catching-up after their earlier underperformances, as investors reviewed relative values. In addition, it may also have reflected the improvement in UK growth prospects, because the constituent firms in the 250 and SmallCap indices are generally more domestically oriented than the firms in the 100-share index.

UK share prices rose in April, with the FT-SE All-Share price index (comprising FT-SE 100, 250 and SmallCap companies) gaining 4.2%, helped by the cut in UK interest rates, stronger-than-expected indicators of UK economic activity and the ECB's decision to cut official euro-area interest rates by 50 basis points. The FT-SE 100 reached a new high of 6664 on 4 May, but share prices internationally began to fall back in May as fears of a rise in US interest rates grew. The FT-SE 100 index reached its low for the

quarter in mid May, after the FOMC moved to a tightening bias. But from then on, developments in the UK and US equity markets became less closely linked; positive developments in the domestic economy were the dominant influence on the UK equity market, leading to a recovery in prices.

In Q2, the best-performing industrial sector in the FT-SE All-Share index was consumer goods, whose sub-index rose by 14%. The resources and general industrials sectors also performed strongly, rising by 12.1% and 9.8% respectively over the quarter. Many individual share price increases within these sectors were related to mergers and acquisitions activity and the rise in the price of oil.

# **Market operations**

## Open market operations and Treasury bill issuance

Daily money-market shortages were somewhat smaller in the second quarter of 1999 than in Q1 (see Table H), reflecting the seasonal pattern of government revenue and expenditure and the pattern of gilt financing and redemptions. The stock of money-market refinancing (excluding foreign exchange swaps) held by the Bank averaged £7 billion in April and £9 billion in May, down from an average of £13 billion in Q1. Furthermore, the stock of refinancing fell in June (see Chart 22), following the large payment of interest on strippable gilts on 7 June. In anticipation of this, the Bank increased the size of the sterling one-month Treasury bill tender by £200 million to £700 million a week from 28 May. This helped to support the size of the money-market shortages at a daily average of £0.9 billion in June, down from £1.2 billion in April and £1.4 billion in May. Short-dated interest rates (as measured by SONIA<sup>(1)</sup>) generally traded below the Bank's repo rate during this period of smaller shortages. This continued the pattern for June observed in previous years (see Chart 23).

As the period of smaller shortages drew to an end, the one-month Treasury bill tender was reduced again to £500 million a week from 25 June. The three-month tender remained unchanged, at £200 million a week, throughout the quarter. Demand for Treasury bills continued to be strong—cover at the tenders averaged around five times the amount of bills on offer, and the average yields were around 20–30 basis points below Libid.

Foreign exchange swaps are also used by the Bank to supply liquidity to the sterling money market. However, because the daily money-market shortages were smaller than in the first quarter of 1999, less use was made of foreign exchange swaps in Q2. The daily average value of swaps outstanding during the second quarter was £0.4 billion, down from £1.6 billion in Q1 (see Chart 22). The share of the various instruments in the Bank's refinancing during Q2 is shown in Chart 24. Gilt repo continued to account for just over one half of the total refinancing operations, while the shares accounted for by the other instruments were more volatile.

The Bank continued its programme of extending the range of securities eligible for use in its repo operations during the second quarter. Bank of England euro bills and gilt strips in member-to-member deliveries have been eligible as collateral in

(1) SONIA is the sterling overnight interest rate average.

# Table H

Average daily money-market shortages

£ millio	ons		
1996 1997 1998	Year Year Year	900 1,200 1,400	
1999	Q1 April May June	1,700 1,200 1,400 900	

# Chart 22

Stock of money-market refinancing and foreign exchange swaps outstanding (average balance)



# Chart 23

Monthly averages of SONIA minus the reportate



# Chart 24 **OMOs**—instrument overview



This chart shows the share of the various instruments in the Bank's daily open Note: arket operations in 1999 Q2. Figures in brackets relate to 1999 Q1

repo transactions since 15 April.<sup>(1)</sup> On 28 June, the Bank began to accept a range of bonds issued by other central governments in the European Economic Area (EEA) and the major international financial institutions, where the bonds had been issued directly into the Euroclear and Cedel settlement systems. The Bank accepts these issuers' bonds denominated in sterling,<sup>(2)</sup> and denominated in euro where they are eligible for use in the European System of Central Banks (ESCB) monetary policy operations.<sup>(3)</sup> These new securities have increased the amount of collateral eligible in the Bank's money-market operations by approximately £50 billion. So far, the Bank's counterparties have made only limited use of this new collateral, though the relative prices of some eligible and ineligible collateral were affected.

In addition, on 30 July the Bank announced a major extension to the securities it will accept in its daily repo operations. From 31 August, the list of acceptable securities will be extended to include securities issued by the central governments and central banks of the European Economic Area countries, where they are denominated in euro, eligible for use in ESCB monetary policy operations, and where the relevant central bank has agreed to act as the Bank's custodian under the Correspondent Central Banking Model (CCBM).<sup>(4)</sup> All eleven EMU central banks have agreed to act as the Bank's custodian, thereby ensuring that the pool of eligible securities will rise by approximately £2 trillion.

The Bank has also recently made several technical changes to its money-market operations. From 24 May, the yield at which bills may be sold outright to the Bank in its open market operations has been the Bank's repo rate; this replaced the discount rates previously posted for bills. From 28 June, margins on existing eligible collateral, as well as on the new eligible collateral, have been based on four maturity bands.<sup>(5)</sup> This allows the setting of more specific margins, and has enabled the Bank to lower its margin requirements in some cases. The four maturity bands are the same as those used for the Real Time Gross Settlements (RTGS) system collateral and those set by the ECB for ESCB monetary policy operations.

### HM Treasury and Bank of England euro issues

On 13 April, the Bank of England began taking over from HM Treasury as the issuer of euro bills, as had been announced on 5 January. All bills with maturity dates up to September 1999 continued to be issued as euro Treasury bills, while all bills with maturity dates from October 1999 onwards were issued as Bank of England bills. This meant that the regular monthly auctions of euro bills during the second quarter comprised € 200 million and  $\in$  500 million of one-month and three-month Treasury bills, and  $\in$  300 million of six-month Bank of England bills. The auctions continued to be oversubscribed, with issues being covered an average of 3.9 times the amount on offer. During the second quarter, bids were accepted at average yields of 10-21 basis points below the Euribid rate for the relevant maturity. At the end of June

Gilt strips have been eligible for use as collateral in the Bank's repo operations through the CGO's Delivery By Value facility since 27 April 1998.
 The new sterling-denominated securities are also eligible for use as sterling liquidity in the Real Time Gross Settlements (RTGS) system.

time Gross Settlements (RTGS) system.
 Lists of the new sterling and euro-denominated eligible securities are available on the Bank's web site under OMO on the 'Eligible Securities' page (www.bankofengland.co.uk/eligsec.htm).
 The CCBM was set up by the EU member states to facilitate the cross-border use of collateral, and is already used for RTGS and for ESCB operations.
 Additional margin is taken on euro-denominated securities to protect the sterling value of the Bank's collateral against exchange rate fluctuations.

# Merger of CGO and CMO with CREST

Following the recommendations outlined in the Securities Settlement Priorities Review, on 18 September 1998, the Bank of England and CRESTCo announced the transfer of ownership and responsibility for the Central Gilts Office (CGO) and Central Moneymarkets Office (CMO) settlement services to CRESTCO.<sup>(1)</sup> This is a precursor to the full integration of both services into CREST. The merger will deliver a more efficient use of credit and collateral; improve settlement efficiency; reduce development costs both centrally and in members' back-offices; and simplify the settlement interface with other European Security Settlement Systems.

# CGO

The transfer of gilts and bulldog securities to CREST has two distinct phases. Phase 1, involving the transfer of ownership and responsibility for the existing CGO service from the Bank to CRESTCo, took effect on 24 May 1999. This involved introducing a number of statutory changes, a re-contracting exercise with all CGO members, and the execution of bilateral agreements between CRESTCo and the Bank. The Bank will, however, continue to operate and support the CGO service until the completion of phase 2. Phase 2 is scheduled to take place in June 2000, and involves the migration of gilts settlement activity to CREST.

Following a detailed analysis, CRESTCo and the Bank concluded that the core functions of the two computer software systems are essentially the same. Nevertheless, there are a number of small differences. These fall into two main categories: aspects of the CGO system which reflect the specific needs of the gilt market (eg stripping and reconstitution facilities), and aspects of the CGO system which reflect different operational arrangements permitted under the Stock Transfer Act 1982.

To ensure that the merged system continues to meet market needs, CRESTCo has undertaken a wide consultation exercise with the market. A consultative paper, 'Gilts settlement in CREST' was issued in May 1999, addressing the operational changes to the system. The results of this exercise, which are also being discussed with external working parties, will be published in August 1999. A further paper has already been issued, addressing the more substantial changes that are proposed to the CREST system to accommodate gilts. It is proposed that these enhancements will be introduced early in 2000, but remain dormant in the CREST system until the completion of phase 2. Legislative changes will need to be implemented. Holdings and transfers of gilts in CGO are currently governed by the Stock Transfer Act 1982. Legislative changes will be needed in order to bring gilts under the Uncertificated Securities Regulations 1995 (USRs), made under Section 207 of the Companies Act 1989, which govern the holding and transfer of securities in CREST. These changes are currently being taken forward with HM Treasury, and are expected to be put in place during the second quarter of 2000. The Treasury is also consulting on changes to the USRs, to include electronic transfer of title to eliminate the lag between settlement and registration.

### CMO

Responsibility for the CMO service will be transferred to CRESTCo on 20 September 1999. The depository function—required because money-market instruments are bearer instruments—will continue to be operated by the Bank on behalf of CRESTCo. In this case, no legislative changes are necessary. Bilateral discussions between the Bank and CRESTCo are now almost complete, and revised membership agreements were issued for execution on 5 July in order to facilitate a re-contracting exercise between CRESTCo and CMO members.

Progress is also being made to facilitate transfer of the CMO system to the CRESTCo site on 25/26 September, and to set up network links between the CMO system and the depository. This will involve CRESTCo building and testing a clone of the current CMO environment, in order to facilitate the secure transfer of the live CMO database. It is expected that the transfer will remain largely invisible to the CMO membership, with minimal impact on the market.

#### **Future developments**

When CGO and CMO have both migrated to CREST, a number of further developments are planned. The next step is to integrate the CMO instruments into CREST to create a single unified securities settlement system in the United Kingdom. This forms a key objective of the work currently being conducted by the Money Market Instrument Review Working Group (under the chairmanship of the Bank of England), which is expected to make recommendations later this year. In parallel with this work, CRESTCO is pursuing a series of other initiatives, most notably the construction of cross-border links with other European securities depositories.

(1) CRESTCo is the operator of the CREST settlement system for equities and corporate bonds.

there were  $\in 2.6$  billion of UK Government euro Treasury bills and  $\in 0.9$  billion of Bank of England euro bills outstanding. By end-September, the final euro Treasury bills will have matured, and the programme will consist entirely of Bank of England euro bills.

On 20 April, the Bank reopened the UK Government euro Treasury note maturing on 28 January 2002 with a further auction for  $\in$  500 million, raising the amount of this note outstanding with the public to  $\in$  1.0 billion. There was strong cover at the auction of 4.3 times the amount on offer, and accepted bids were in a yield range of 2.67%–2.75%. The total of notes outstanding with the public under the UK euro note programme rose from  $\in$  4.5 billion in the first quarter of 1999 to  $\in$  5.0 billion in the second quarter. The 2002 note was reopened again in July and a further auction is planned for October 1999.

### United Kingdom gold auctions

On 7 May, HM Treasury announced its plans to rebalance the United Kingdom's gold and foreign exchange reserves. The Treasury intends to reduce the amount of gold in the reserves and increase the amount of foreign currency, through the sale of some 415 tonnes of gold over a number of years. Once these sales have been completed, HM Treasury will retain 300 tonnes of gold in the reserves portfolio. During financial year 1999/2000, the Bank of England will conduct a series of five auctions, selling 25 tonnes of gold at each.

The first auction was held on 7 July, and was conducted on a Dutch or common-price basis, in which all successful bidders pay the same price, equal to the lowest accepted bid. This method is used by the US Treasury for government debt auctions, and by the UK Debt Management Office for sales of index-linked gilts. It was substantially oversubscribed, with a cover ratio of 5.2; and the gold was sold at \$261.20 per ounce, just 10 cents below that morning's London fixing, established less than an hour earlier.

# The international environment

This article discusses developments in the global economy since the May 1999 Quarterly Bulletin.(1)

- Overall, the outlook for the world economy has improved since the previous Quarterly Bulletin.
- Most short and long-term interest rates increased across the major international financial markets, partly reflecting developments in the United States.
- The Federal Open Market Committee increased the federal funds target rate by 1/4% to 5% on 30 June, and reverted to a neutral monetary stance. Growth slowed somewhat in the second quarter, after above-trend growth in the first quarter.
- Growth in the euro area appeared to have strengthened in the first quarter, after slowing throughout last year. Euro-area inflation remained at low levels, and the European Central Bank left interest rates unchanged, though noted some potential for upward pressure on prices in the future.
- In Japan, measured GDP grew by 1.9% in the first quarter of 1999, after six quarters of falling output. This increase may reflect one-off factors, and the impact of the recent fiscal stimulus.
- Oil prices increased by more than 15% since the previous Quarterly Bulletin, but indices of other commodity prices were broadly flat in dollar terms.
- In most emerging markets, output growth has been stronger than expected, and forecasts for growth were revised up.

# Chart 1 US interest rates



# In the United States, the federal funds target rate was increased by <sup>1</sup>/<sub>4</sub>% to 5% on 30 June. Growth slowed somewhat in the second quarter, after above-trend growth in the first quarter.

The Federal Open Market Committee (FOMC) increased the federal funds target rate by <sup>1</sup>/<sub>4</sub>% to 5% on 30 June (see Chart 1). The Committee said that, following the policy easing last autumn, 'much of the financial strain has eased, foreign economies have firmed, and economic activity in the United States has moved forward at a brisk pace'. The Committee noted that 'labour markets have continued to tighten over recent quarters, but strengthening productivity growth has contained inflationary pressures'. The FOMC also announced that it had returned to a neutral stance on near-term monetary policy.

In its previous meeting on 18 May, the FOMC had announced a bias towards tightening with 'prospective developments more likely to warrant an increase than a decrease in the federal funds rate'. Benchmark bond yields increased by about 60 basis points between 1 May and 30 June, partly in response to the announcement, but also because of data releases interpreted as indicating a build-up in inflationary pressure, particularly the April consumer price inflation data released on 14 May. After the FOMC announcement of its

<sup>(1)</sup> Covering the period from 1 May to 30 July 1999, with charts finalised on 28 July.











return to a neutral stance, benchmark yields fell back by around 20 basis points (see Chart 1). Between 1 May and 16 July, US equity prices increased by more than 6%, but they fell back at the end of July.<sup>(1)</sup>

In the final release of GDP growth for the first quarter, output grew by 1.1%, with strong growth in consumption and investment partly offset by a fall in exports and strong growth in imports. But according to advance estimates, GDP growth slowed to 0.6% in the second quarter. The slowdown reflected a fall in government expenditure, slower growth in consumption, and a lower level of stockbuilding. However, investment continued to grow strongly and, although net trade made a negative contribution to growth, exports increased on the quarter, and import growth slowed.

Private consumption growth slowed from 1.6% in 1999 Q1 to 1.0% in 1999 Q2. This reflects a return to more normal levels of growth, but also possibly a response to lower growth in personal disposable income. Nevertheless, consumption still grew faster than income, and the measured saving rate continued to fall. The saving rate has been on a downward trend since 1993, but has fallen particularly sharply in recent years. This probably reflects increases in household wealth, owing partly to the strength of equity prices but also to increases in house prices. (Annual house price inflation has been around 5% in the last two years, compared with just under 3% on average between 1990 and 1996.) One possible indication that the strength in the housing market has supported consumption is the increase in remortgaging, which rose from 30% of total new mortgages in 1996 and 1997, to more than 50% last year. This reflects households refinancing their mortgages at lower interest rates, and possibly greater equity withdrawal. Either explanation would imply that more household resources are available for consumption.

Investment continued to grow strongly in the second quarter. Most categories showed strong growth, but expenditure on information technology grew particularly strongly: for example private fixed investment in computers and peripheral equipment grew by 9.1%.

The level of exports has been somewhat erratic, with a small increase in exports in the second quarter following a fall in exports in the first quarter. The general weakness in export growth reflects the strength of the US dollar and weak growth in domestic demand in the United States' main trading partners. In contrast, US imports have continued to grow strongly, reflecting the strong growth in US domestic demand. As a result, the US current account deficit was 3.1% of GDP in 1999 Q1, and trade data suggest that the deficit widened further in the second quarter.

In the 1980s, the US government ran a significant financial deficit, which was the counterpart to the trade deficit. But Chart 2 shows how US financial balances have changed over the 1990s. The government financial balance has moved into surplus in recent years, as a result of expenditure restraint by the government and cyclical influences, which have boosted tax revenues and reduced some government expenditure. By contrast, the private sector has moved into deficit, reflecting the falling household saving ratio and strong private investment growth relative to profits. According to

 See the 'Markets and operations' article on pages 237–52 for further discussion of financial developments.

International environment

# Chart 5 US total factor productivity











IMF figures, the whole-economy aggregate financial deficit was 2.1% of GDP in 1998, and this was the counterpart to the US current account deficit.

Throughout 1998, US CPI annual inflation was around 1.5%, but it has risen to 2.0% in recent months, reflecting increases in oil prices. Core inflation (excluding energy and food) has continued to be on a flat or downward trend (see Chart 3), and has been below 2.5% since May 1997. The continued low inflation after such a protracted period of growth can be explained partly by the continued strength of the dollar depressing the price of imported goods. But it also reflects weak earnings growth and continued strong productivity growth, which has held down unit labour costs. Employment costs grew quite strongly in the second quarter, by 1.1%, but annual growth remained subdued.

Productivity has grown strongly in recent years, especially relative to the same stage of past upswings (see Chart 4). In the 1970s and especially the 1980s, productivity grew strongly at the start of the upswing, but then flattened off. In the current cycle, by contrast, productivity growth has been almost as high in the first quarter of this year as it was at the start of the upturn.

Chart 5 compares total factor productivity (the change in output not explained by growth in labour input and the capital stock) with our estimate of a simple linear trend. The chart suggests that for much of the 1990s, the level of productivity has been below its long-run trend. But in the last two years, the productivity level appears to have moved slightly above trend. This might suggest that productivity growth could moderate from its current high levels, particularly as the economy slows down. But it is also possible that supply-side developments—for example related to information technology—have increased the potential level, or growth rate, of productivity.

# Growth in the euro area appeared to have strengthened in the first quarter, after slowing throughout last year. Euro-area inflation remained at low levels, and the European Central Bank left interest rates unchanged, though noted some potential for upward pressure on prices in the future.

The euro effective exchange rate has fallen substantially since its launch in January 1999. It continued to fall in May, but was more stable from early June and picked up somewhat in July (see Chart 6). The fall in the exchange rate in May appeared to reflect rising uncertainty about prospects for growth in the euro area relative to the United States, and possibly market reaction to the revised fiscal deficit for Italy. In July, stronger survey data caused markets to revise up their forecasts for growth in the euro area, which partly explained the increases in the euro effective exchange rate. Ten-year bond yields in the euro area increased by around 90 basis points between 1 May and 30 July. This reflected developments in US interest rates in May and June, but in July euro-area yields increased relative to US yields, perhaps owing to stronger output data in Germany and France. Equity prices in Germany fell by 6% between 1 May and 30 July, and by 2% in France.

Since April, the European Central Bank (ECB) has left interest rates unchanged. The annual growth of M3 increased slightly over the

# Chart 8 Contributions to euro-area GDP growth



# Chart 9 Euro-area consumption and consumer confidence



(a) Deviation from mean, calculated since 1985.

# Chart 10 Euro-area industrial production and industrial confidence



period (see Chart 7), and was above the ECB's reference value of 4.5%. But euro-area inflation remained close to 1%, with increases in oil prices offset by lower inflation in other goods and services prices. Euro-area GDP increased by 0.5% in the first quarter of 1999, after growing by 0.3% in the fourth quarter of last year, suggesting that output growth may have stabilised after slowing during 1998. The annual growth rate of GDP continued to fall (see Chart 7). In July the ECB stated that the outlook for price stability was 'favourable', but 'upward pressures on prices will have to be monitored very carefully', given signs that output growth and consumer credit have started to pick up.

The latest measures of euro-area GDP reflect the new European System of National Accounts (ESA95) for most countries. The new system includes intangibles in investment, uses basic prices rather than factor cost valuation, and deflates the current price data using 1995 prices. The changes have meant relatively small amendments to estimated growth in Italy and France, but larger downward revisions (of 0.5 percentage points) to growth in Germany since 1996.

Chart 8 shows how the main components of euro-area GDP have contributed to quarterly growth in recent years. According to preliminary estimates, final domestic demand grew strongly in the first quarter of this year, particularly in Germany. Growth in household consumption was 1.2% in the first quarter, its strongest growth since 1991 Q4, and investment also grew strongly. The strong growth in final domestic demand in the first quarter was offset by a sharp fall in stockbuilding (again particularly in Germany). But estimates of stockbuilding are prone to large revisions, because it acts as the residual between measures of expenditure growth and output growth in preliminary estimates of GDP. So the picture of actual stockbuilding in 1998 and 1999 is still unclear.

Net trade continued to make a negative contribution to GDP growth in the first quarter. Export volumes were virtually flat, but import growth increased by 0.5%, reflecting stronger growth in domestic demand. As a result, the euro-area current account surplus fell from 1.2% of GDP in 1998 Q4, to 0.6% in 1999 Q1.

Charts 9 and 10 compare the European Commission surveys of business and consumer confidence with measures of actual manufacturing output and consumption. Both survey indicators are correlated with the actual measure of activity. Consumer optimism fell back in the second quarter, but remained at historically high levels, suggesting continued strong growth in consumption in 1999 Q2. Industrial confidence stabilised in 1999 Q2 after falling throughout 1998. Within the quarter, the monthly data increased consistently between April and June, possibly signalling a turning-point in business sentiment. There were also significant increases in the French and German measures of business confidence in June. This may suggest that growth in industrial production in the euro area has started to increase.

The stronger euro-area growth in the first quarter is attributable to higher growth in Germany and Italy. Growth fell slightly in France and was unchanged, in aggregate, in the rest of the euro area (see Chart 11). Nevertheless, the pattern of growth within the euro area continued, with somewhat weaker growth in the three largest

# Chart 11 Euro participants' GDP



Chart 12 Nikkei 225 index



### Chart 13 Japanese GDP



economies than in the rest of the euro area. Differentials in inflation rates persisted within the euro area, largely reflecting the level of output relative to potential in different member countries. Annual inflation in Spain, Ireland, the Netherlands and Portugal has been around 2% in recent months. Inflation in Austria, Germany and France has been closer to 0.5%, and other euro participants, including Italy, have had inflation of close to 1%.

Italy and Germany both announced plans for their fiscal budgets in 2000. The Italian government announced that, while its fiscal deficit in 1999 would be 2.4% of GDP (up from 2.0% in the stability programme), the government would take sufficient measures to ensure that the deficit fell to 1.5% of GDP in 2000. The German government stated that as a result of planned cuts in expenditure, it envisaged that its fiscal deficit would also fall to 1.5% of GDP in 2000, compared with its January 1999 stability programme forecast of a deficit of 2% of GDP.

# In Japan, measured GDP grew by 1.9% in the first quarter, after six quarters of falling output. This increase may reflect one-off factors, and the impact of the recent fiscal stimulus.

In Japan, the preliminary estimate of first-quarter real GDP growth showed that the economy grew at 1.9%, following six quarters of falling output (see Chart 13). This was considerably higher than expected; for example, the Consensus Economics survey of forecasts, published shortly before the data were released, suggested that the average forecast was for a 0.2% rise.

The Japanese Nikkei 225 stock market index increased by 6.9% between 1 May and 30 July (see Chart 12), with particularly strong increases following the release of first-quarter GDP data, and the US Federal Open Market Committee announcement of a return to a neutral stance on interest rates, which appeared to lift market confidence in most major economies. Equity prices fell by almost 6% at the end of July, but then recovered somewhat. There was upward pressure on the yen exchange rate in June and July, and the Japanese authorities intervened to hold down the value of the yen on several occasions. The yen/dollar exchange rate varied between ¥115 and ¥124 over the period; the rate showed no clear trend in May and June, but increased somewhat in July. Japanese overnight rates have remained close to zero, and yields on short-term instruments have also fallen towards zero, as the Bank of Japan has maintained its stance of keeping the overnight rate near to zero. However, Japanese longer-term bond yields have increased by about 30 basis points since the end of May, possibly relating to markets believing that a further fiscal stimulus package is more likely.

The strong upturn in first-quarter GDP growth was driven in part by a large increase in growth in private domestic demand (see Chart 13), with private consumption up by 1.2% and non-residential investment up by 2.5%. Both series had fallen throughout 1998. Private consumption was supported by stronger household income and the government's issue of free shopping vouchers. There were also reports of strong growth in sales of automobiles. Private investment was supported by the government's latest credit guarantee scheme, which appears to have enabled small firms to implement previously deferred investment. The fiscal package continued to boost GDP, with public investment up by 10.3% in 1999 Q1.





### Chart 15 Japanese GDP, retail sales and manufacturing output



### Chart 16 Emerging markets sovereign spread over US Treasury bills



Net trade made a negative contribution to growth in the first quarter, owing to a strong pick-up in imports (up by 1.8%), which was consistent with strong growth in private sector demand. As a result, Japan's current account surplus fell sharply in the first quarter. However, monthly trade data suggest that the decline in the trade surplus is likely to be considerably smaller in the second quarter.

Despite the strong growth in recorded output in Q1, employment continued to fall, down in June by 1.3% on the previous year. Unemployment increased to 4.9% in June, after an erratic fall in May. On 11 June, the Japanese government announced a \$520 billion (0.1% of annual GDP) emergency employment package intended to place more than 700,000 unemployed in jobs. The package consists of job subsidies for private companies that take on unemployed workers, and the creation of temporary jobs in the public sector.

Manufacturing unit labour costs remained flat, growing at 0.1% in April, with little growth in either wages or productivity. Japanese annual retail price inflation has been negative since February, and was -0.4% in May. Wholesale price deflation was stronger, with the June figure down 4% on the previous year. But this reflects a sharp fall in wholesale prices towards the end of 1998. So far this year, wholesale prices have been relatively stable (see Chart 14).

The strong estimate of GDP growth in the first quarter does not necessarily indicate that growth will continue to be strong. Growth may have been affected by seasonal factors, particularly a rush to spend budgets before 31 March, the end of the Japanese financial year. The Bank of Japan interpreted the growth in GDP as a sign that the 'economy had stopped deteriorating', but 'the prospect of a self-sustained economic recovery remained unclear'.

Chart 15 shows that the quarterly growth rates of retail sales and industrial production have shown some correlation with GDP growth. Industrial production growth picked up quite strongly in the first quarter, but retail sales fell on the quarter despite the estimated strength of total private expenditure. In 1999 Q2, industrial production fell back and retail sales were flat. The June Tankan survey, which reported business sentiment in the second quarter, showed an improvement, but the balance of sentiment was still at a low level. Firms also reported that employment and inventory levels continued to be too high, suggesting that employment might continue to fall in the coming months. However, firms did report that their financial situation was starting to improve, which should help to stabilise the economy.

# Bond spreads in emerging markets increased by 200 basis points in May, but equity prices increased strongly in some economies, as economic data suggested that growth was starting to increase. In general, commodity prices stopped falling, and oil prices continued to increase.

The spread between emerging market bond yields and US Treasury yields rose by more than 200 basis points in May (see Chart 16). The sharp increase in spreads reflected higher market expectations of US interest rates, in response to announcements by the US Federal Reserve and stronger US data. Markets perceived that higher US interest rates might reduce economic growth in those economies with strong economic links to the United States, and might also put

### **Consensus Forecasts of GDP growth in 1999**

	April	Latest (a)	Change
Latin America (b) Eastern Europe (c) North East Asia (d) South East Asia (e)	-1.0 -0.9 4.7 -0.8	-0.5 -0.3 5.7 1.3	0.5 0.6 1.0 2.1
countries (f)	0.8	2.2	1.4

Source: Consensus Economics

à

July, except Latin America surveyed in June. 14 countries including Argentina, Brazil and Mexico. 19 countries including Russia, Poland and Turkey. China, Hong Kong, South Korea and Taiwan. Indonesia, Malaysia, Singapore, Thailand and the Philippines. Egypt, Israel, Nigeria, Saudi Arabia and South Africa.

(e) (f)





# Chart 18 **Current account balances**



downward pressure on emerging market currencies relative to the US dollar. Spreads fell back in June, but concerns about a possible Argentinian devaluation pushed Latin America spreads back up in July.

Despite the increase in emerging market bond yields, equity prices and currencies strengthened in Asia, as economic data continued to suggest that recovery was under way. In Brazil the financial situation appeared to have stabilised, with little change in the exchange rate or equity prices. However, there has been some market speculation that the perceived fiscal difficulties in Argentina might threaten their currency board, and Argentinian equity prices have fallen by almost 20% since the May Quarterly Bulletin.

In general, private sector forecasts of GDP growth in emerging markets have been revised up in recent months (see the table). There have been particularly strong upward revisions to growth forecasts in most Asian economies, in response to stronger-than-expected output data. Revisions to forecasts of growth in Latin America have been more mixed. Forecasts of growth in eastern Europe have been revised up, reflecting some indications that the situation in Russia is at least stabilising.

Conditions have started to improve for most commodity-producing economies. After the sharp increase over the first quarter of 1999, the oil price slipped back in May but then increased again in June and July (see Chart 17). On 30 July, the price of Brent oil was \$20.10 per barrel, up by more than 15% since the previous Quarterly Bulletin. The continued increase in oil prices appears to be the result of improving prospects for world demand and, more crucially, the successful reduction in oil supply by OPEC agreed in March. In dollar terms, most metal prices increased over the quarter, while food prices continued to fall, leaving the Economist non-oil commodity price index broadly flat since April (see Chart 17). In sterling terms, commodity prices are now slightly higher than they were a year ago.<sup>(1)</sup>

The US current account deficit has continued to increase, and the current account surpluses of Japan and the rest of Asia remain high. The increase in the US deficit partly reflects lagged effects of the Asian crisis, but is also the result of cyclical divergence between the major industrial economies.

This section considers how the current account positions of different regions of the world have changed in recent years.

As Chart 18 shows, current accounts in 1998 were in greater imbalance than in any other year this decade. The US deficit increased throughout the 1990s, from 0.1% of GDP in 1991 to 2.7% in 1998. Over the same period, the European Union moved from deficit to surplus, while Japan had a current account surplus throughout the decade of between 1.4% and 3.2% of GDP. In aggregate, other developing countries (principally Latin America) ran current account deficits in the 1990s, which increased in 1998, but have since started to fall.

Chart 18 also shows the sharp move from current account deficit to surplus by the Asian emerging market economies between 1996

(1) For a fuller discussion, see Chapter 4 of the August 1999 Inflation Report.









and 1998, as a result of the emerging market crises. This was the counterpart to the sharp reversal of investor funds into Asian economies. In 1996, emerging Asia received a net inflow of \$100 billion in inward investment. By 1998 there was a \$50 billion net outflow (see Chart 19). The sharp turnaround in Asian current accounts was almost entirely associated with a reduction in domestic demand, which caused import volumes to fall sharply. The dollar value of exports was little changed, with a sharp increase in volumes mostly offset by lower dollar-denominated export prices, following the sharp currency depreciations. The monthly profile of Asian current accounts suggests that this correction was completed in mid 1998, with little change in current account surpluses since then.

Although the Asian crisis caused yield spreads to increase in most emerging markets, the net flow of funds to other emerging markets (predominantly Latin American countries) remained positive (see Chart 19). At the beginning of 1999, however, investor confidence in Brazil and other Latin American countries weakened, but the effect on capital flows does not appear to have been as large as for the Asian economies. The IMF's latest estimate is that net capital flows to Latin America will remain positive in 1999, but will be around \$30 billion below their level in 1998.

In the June 1999 *Economic Outlook*, the OECD identifies changes in current accounts due to direct trade with the Asia5 (South Korea, Thailand, Malaysia, Indonesia, and the Philippines). Chart 20 shows that exports to the Asia5 from the United States, Japan and the European Union fell strongly, but Japanese exports fell the most, as Japan exports more than the United States and European Union to the Asia5. The value of exports from the Asia5 to the United States and the European Union increased somewhat, but exports to Japan fell, owing to falling domestic demand during much of 1997 and 1998.

The large residual category in Chart 20 can be attributed partly to indirect effects from the Asian crisis, such as intensified competition in third markets. But the OECD argues that the bulk of the residual relates to cyclical divergence between the major economies (particularly the strong growth in the United States and recession in Japan), differences in saving preferences between the major economies, and possible misalignment of exchange rates.

Many forecasters project that current account imbalances among the major economies are unlikely to diminish in the short run. The IMF highlights two risks relating to these imbalances. The persistent US current account deficit has meant that US external debt has risen sharply, from 7% of GDP in 1989 to almost 20% of GDP in 1999. There is a risk that external demand for US assets could fall, causing a correction in the dollar exchange rate and in US asset prices, which could lead to a sharp reduction in US growth. There is also a risk that the counterpart to the current account deficit—a move into financial deficit by the private sector—makes the US economy more vulnerable to shifts in private sector sentiment. But the IMF notes that the US fiscal surplus gives some room for counter-cyclical fiscal policy, if GDP growth were to fall sharply.

# **Summary**

Overall, data released since the previous Quarterly Bulletin suggest a further improvement in the outlook for the world economy. In the United States, growth slowed somewhat in the second quarter, after above-trend growth in the first quarter. So far, there has been little indication of upward pressure on inflation. The Federal Open Market Committee raised the target federal funds rate by 1/4% on 30 June, and announced that it had reverted to a neutral monetary stance. In the euro area, growth appeared to be strengthening in the first quarter, after slowing throughout last year. Survey indicators suggest a further pick-up in growth in the second quarter. In Japan, measured output grew very strongly in the first quarter, probably reflecting one-off factors and the impact of the recent fiscal stimulus. As yet, however, there are fewer signs of a sustainable, broadly based recovery in private demand. In most emerging markets, output growth has been stronger than expected, and forecasts for growth were revised up.

# What makes prices sticky? Some survey evidence for the **United Kingdom**

# By Ian Small,<sup>(1)</sup> and Tony Yates of the Bank's Monetary Assessment and Strategy Division.

It is now widely accepted that price stickiness—the tendency for prices not to adjust immediately to changes in market conditions—is an important feature of the transmission mechanism of monetary policy. This article uses the Bank's price-setting survey to investigate what might make prices more or less sticky. It discusses the impact of competition; whether price changes are prompted by cost or demand shocks; if price stickiness is related to the characteristics of firm's customers; whether price changes vary if goods are sold abroad or into the domestic market; and, finally, whether prices are more sticky downwards than upwards. The article finds that all of these factors appear to influence how sticky firms say their prices are.

# Introduction

# In 1776 Adam Smith wrote:

' ... when the quantity of any commodity which is brought to market falls short of ... demand ... a competition will *immediately begin... and the market price will rise more or* less... according as either the greatness of the deficiency, or the wealth and wanton luxury of the competitors, happen to animate more or less the eagerness of the competition.'

Much research has been devoted to understanding why prices are sometimes immune to the 'wanton luxury of the competitors' and are, in other words, sticky. This research has been driven by the observation that, if prices are sticky, markets are cleared by changes in quantities. That this is true is crucial for a central bank charged with setting monetary policy. The degree of price stickiness will affect the responsiveness of inflation to changes in the bank's official interest rate, and will also affect the impact of policy changes on the real economy.<sup>(2)</sup>

In September 1995, the Bank of England conducted a survey of price-setting behaviour by UK firms to find out just how sticky prices were.<sup>(3)</sup> This article—based on the data that were collected in that survey-tries to shed light on what makes it more or less likely that prices will be sticky in the way Adam Smith described: that they will not respond immediately to changes in market conditions.

The survey enables us to tackle several questions. Are prices stickier when a firm is in a less competitive industry? Do prices respond differently to demand and cost shocks? Are *money* prices stickier in a market where a firm's profits would not change a great deal if the firm changed relative prices, ie if there is 'real rigidity'? Does price stickiness vary depending on how long firms have been dealing with their customers? Are prices stickier when goods are sold

into foreign markets and denominated in foreign currency? (Is there, in other words, 'pricing to market'?) Do prices respond differently to shocks that would imply that they ought to rise than to shocks that would imply that they ought to fall?

The advantage of using survey data of this sort is that respondents can be asked to answer hypothetical questions, such as 'If this or that occurs, what would you do?'. Conventional applied economics is usually devoid of 'natural experiments', especially natural experiments in which there are sufficiently few things happening simultaneously to identify the effect of the experiment. We could think of our survey questions as artificial experiments. The disadvantage of our data is that we have to assume that firms' responses describe what they would actually do, should this or that happen.

# **Theoretical background**

Our data will enable us to address a number of questions that have concerned economists and policy-makers in recent years. Before describing the results of the survey, we look at each of these theoretical issues in turn.

# Real rigidity magnifies nominal rigidity

One proposition, first made by Ball and Romer (1990), is that price stickiness depends on the balance between two things. First, the costs of changing nominal price tags, or 'menu costs'; and second, the benefits from changing prices. Ball and Romer argued that the more sensitive profits are to shocks, with prices unchanged, the more likely it is that firms will change prices; this amounts to arguing that 'nominal rigidity' (the stickiness of observed prices) depends on 'real rigidity'. There are a number of factors affecting the sensitivity of profits that we can proxy in our survey.

Ian Small currently works at Lexecon PLC; this article was based on work done while at the Bank's Structural Economic Analysis Division.
 For a full discussion, see 'The transmission mechanism of monetary policy', *Quarterly Bulletin*, May 1999, pages 161–70.
 This research was reported in 'How do UK companies set prices?', by Simon Hall, Mark Walsh and Tony Yates, in the May 1996 *Quarterly Bulletin*, May 1996, pages 161–70.

**Rulletin** 

#### (i) Market structure

The first is market structure. Intuitively, the more competitive an industry is, the more profits would change if firms did not change prices in response to shocks. For a given cost of changing price tags (a given 'nominal rigidity'), competition should make it more likely that prices will change in response to shocks. Most macroeconomic models cannot address this: models of imperfect competition tend to assume a fixed market structure to motivate sticky prices, and then derive the model's responses to different shocks. However, one model that studies exactly this question in a dynamic setting is Martin (1993). He uses the model of price adjustment in Rotemberg (1982). In this model, firms face quadratic/increasing costs of adjusting prices, and set their current price as a weighted average of lagged and future expected prices. In particular, the less profits change when firms set prices away from the marketclearing price, the smaller are the benefits from adjusting more rapidly relative to the costs of adjusting, and so the more slowly firms adjust their price towards the optimum. Martin then employs a model of oligopolistic competition to show how the profit function flattens (and hence prices become more sticky) the fewer firms there are in an industry, and the more collusive is their behaviour.

#### (ii) Trade unions and technology

We study two types of real rigidity that may flatten the supply, rather than the demand, curve. First, there may be imperfect competition in the labour market: for example, unions may bargain on behalf of workers over wages (eg McDonald and Solow (1981)); or firms may hold wages up to discourage shirking (eg Shapiro and Stiglitz (1984)).<sup>(1)</sup> These models (of which there are many other examples) will generate what we can loosely term 'real rigidity'—in this case, flatter labour (and therefore product) supply curves. Another possibility is that there are constant or increasing returns to scale. This may not be a plausible assumption for the economy as a whole, but it could be relevant for particular firms producing at particular levels of output. We analyse our data to see whether real rigidity on our measures does indeed magnify nominal rigidity. We have measures of market structure, measures of the presence of trade unions for bargaining purposes, and a measure of the slope of firms' marginal cost curves.

#### (iii) Customer markets

Another kind of real rigidity might result from customer behaviour, as firms may operate in 'customer markets'. These are markets—perhaps not unlike markets in realitywhere customers incur costs in collecting the information they need to make their purchases optimally. These could be the costs of calculating relative real prices (allowing for quality differences): the costs, for example, of walking up and down the high street checking prices and trying out new goods. Such costs might also influence how monopolistic

producers set prices. They may, for example, as Okun (1981) argued, trade off the gains from charging monopoly premia against the benefits of encouraging repeat purchases. Repeat customers, as Okun pointed out, may be able to help firms plan ahead by reducing the expected future variance of demand. Firms may have a policy of maximising the continuity of prices from one period to the next, or restrict price changes to times when costs change, when such price changes would be perceived as 'fairer'.

Okun also pointed out that customer markets may lead to a kink in the demand curve. Prices may stick at the kink, because an increase in prices would encourage existing loyal customers to search elsewhere for their products, whereas price cuts, which customers loyal to other firms would not be aware of, would not generate much increase in demand.<sup>(2)</sup>

So it is possible that when we move away from the stylised view of goods markets as auction markets populated by large numbers of consumers with perfect information, the responsiveness of prices to shocks might change.

#### Demand and cost shocks

The second broad question that we address is whether prices will respond differently to cost or demand shocks. This has received some attention in the theoretical literature. A classic reference-although there are many others-is Rotemberg and Saloner (1987). They specified a model that compares the relative incentives for monopolists and oligopolists engaged in Bertrand competition<sup>(3)</sup> to adjust their prices when there are menu costs. They argue that the incentives for a duopolist to change prices in response to a cost shock are greater than those for a monopolist; and that the reverse is true when firms experience a shock to demand.

How do they reach this conclusion? Consider first Rotemberg and Saloner's duopolists. If their costs fall, the incentive to cut prices is very large. To see this, imagine what would happen if one cut prices and the other did not: in this case the price-cutter would take the whole market and the price-fixer would make no profits. Conversely, if costs rise, then as price is now below marginal cost, each firm can reduce its losses by raising its price. The incentive for doing so is large, as if one firm does not raise its price it will end up supplying the whole market and incurring losses on every unit of output. In a monopoly industry, however, leaving prices fixed will not result in these all-or-nothing outcomes. For example, profits will fall if prices do not fall to match cost reductions, but will not disappear entirely.

Now consider a demand shock. Suppose that marginal costs are constant as output rises (ie there are constant returns to scale). In Bertrand competition, the duopolists price at marginal cost, so a demand shock will have no effect on the optimal price. A monopolist, however, chooses the point on the demand curve where marginal revenue equals marginal

Ball and Romer (1990) demonstrate the impact on nominal rigidity of efficiency wages à la Shapiro and Stiglitz (1984). These insights have been made use of by, among others, Stiglitz (1984), and Phelps and Winter (1970). Bertrand competition is where two firms compete in a market and choose prices simultaneously and independently, and then sell whatever is demanded at those prices. It contrasts with the Cournot model where firms choose quantities, rather than prices. (3)

cost (prices will not necessarily equal marginal cost at this point). So the optimal price may well change if there is a demand shock, and the monopolist will therefore have a greater incentive to change prices (even though the losses from not doing so are second order).<sup>(1)</sup>

This model-stylised though it is-at least opens up the possibility that we can explain why firms' price responsiveness might differ depending on the source of the shock.

# Pricing to market

Another reason why firms may not alter nominal prices in response to shocks is that, because they are selling in foreign markets, they may want to 'price to market'. Models based on this idea are invoked to explain why the (foreign currency) price of products sold abroad does not respond to changes in the nominal exchange rate. These models are potentially important in explaining why nominal exchange rate fluctuations can have large transitory effects on the profitability of the traded sector of the economy. There are two types of pricing-to-market model. One type argues that if firms expect the exchange rate change to be transitory, then they will weigh the costs of incurring losses from not changing prices against the costs of adjusting supply. The latter may include fixed costs of entry into the foreign market (which are assumed to exceed those facing local suppliers to home markets), which the firm could not recoup if it decided to pull out or scale down supply.(2)

The second type of pricing-to-market model focuses on demand-side explanations of price rigidity. For example, Froot and Klemperer (1989) argue that firms' future demand will depend on current market share. If an exchange rate shock is expected to be temporary, the future demand will still be of the same value to the firm; so the current price, which determines current market share, may not change. These models provide an additional source of nominal rigidity which we consider below.

# **Asymmetries**

The literature on sticky prices has also focused on the question of whether prices are more sticky in response to a shock that warrants a price decrease than a price increase. Such asymmetries arise in some models because of strategic or collusive behaviour (see for example Granero (1996), Hansen et al (1996) and Kovenock and Widdows (1991)); there are other models (of time-dependent menu costs when steady-state inflation is positive) that generate asymmetries in price adjustment, for example Ball and Mankiw (1994); and there are models that argue that price adjustment will be asymmetric because of capacity constraints: for a discussion see Finn (1996) or Laxton et al (1995).

Importantly, there is no theoretical unanimity as to whether prices will be more sticky when warranted prices move up or down.

These theoretical models are quite controversial (see Yates (1998) for a discussion) and perhaps something of a curiosity. Nevertheless, asymmetric rigidity has been used to explain the findings of de Long and Summers (1988), Cover (1992), Ravn and Sola (1995), Debelle and Laxton (1996) and Laxton et al (1995), all of whom provide evidence showing that the consequences of monetary shocks for aggregate output differ depending on the direction of the shock.(3)

# The survey

The data used in this paper come from a survey of pricing behaviour conducted by the Bank of England in September 1995. The survey, based on a similar survey carried out by Blinder et al (1998)(4) in the United States, asked around 670 firms about various aspects of their pricing behaviour, including what factors caused them to change their prices. The sample was drawn from industrial contacts of the Bank's Agents. Hall, Walsh and Yates (1996) describe the survey, the sample characteristics and some of the other results contained within it in more detail.(5)

The variable that we use to gauge the relative stickiness of prices in response to different shocks is based on firms' answers to the question:<sup>(6)</sup> 'For your main product (or product group), which factors would be likely to cause an increase/decrease in prices?'. Two of the choices available to firms were an increase/decrease in the prices of fuel, raw materials or components, which we assume constitutes a 'cost' (supply) shock, and a rise/fall in demand, which we assume represents a demand shock.

We need to sound two notes of caution before reporting our results. First, we have interpreted firms' answers to our questions as referring to nominal rather than real prices. In other words, we assume that firms have in mind the actual money price of goods, rather than the price of goods relative to all other goods in the economy. Our second word of warning is that we have to interpret these questions as telling us either about the short-run rigidity of prices in response to a permanent shock, or about the rigidity of prices-over an indeterminate period-in response to a temporary shock (or at least a shock not yet known to be permanent). Why so? If firms read 'a rise in demand' to mean a permanent rise in demand, then any answers that did not include a change in prices would not make sense for profit-maximising firms in the long run. To restate the general point: our ability to make inferences from the survey results depends on how correct we are in assuming

To see which effect dominates, Rotemberg and Saloner examine the situation when both cost and demand shocks are affected by changes in the aggregate price level. They find that for small changes in the aggregate price level the cost effect outweighs the demand effect, so their model predicts that monopolists are less likely to adjust their prices than firms in more concentrated industries. Examples of this type of model include Krugman (1986), Baldwin and Krugman (1987), Dixit (1987 a,b), and Kasa (1992). In fact, monetary contractions are typically shown to have a larger effect on output than monetary expansions. Although the Blinder *et al* survey was only published in 1998, Hall *et al* based their questionnaire on one designed by Blinder some years before the Bank survey was carried out. Hall *et al* (*op cit*) compare the survey results with other surveys, insofar as this is possible. In addition to deciding which shocks were likely to cause changes in prices, firms were also asked to rank the statements in terms of their relative importance.

<sup>(4)</sup> 

<sup>(5)</sup> (6) importance.

that our interpretation of the survey questions is the same as that of our respondents.

Table A shows the proportion of firms that reported that they would change prices, grouped by different firm characteristics and different types of shock. There are a number of points to note. First, if we take upward and downward demand shocks together, just over half of the sample reported that they would adjust their prices in response to a change in demand. Our survey actually suggests that prices are less sticky—more responsive to shocks—than other microeconomic survey evidence suggests. Haskel *et al* (1997) found that less than 10% of establishments in the 1990 Workplace Industrial Relations Survey (WIRS) would change prices following a change in demand, and less than 13% of Bhaskar *et al*'s (1993) sample of firms said that demand shocks would cause price changes.

# Table ADescriptive statistics

Percentage of firms who would change prices in response to a shock

	Number of firms	Reduce price in response to a fall in demand	Raise price in response to an increase in demand	Reduce price in response a to reduction in costs	Raise price in response to an increase in costs	
All firms	355	62.3	47.2	54.5	88.3	
No of compet	itors:					
1-5	117	56.8	48.3	50.0	89.8	
6-10	130	65.4	42.3	54.6	91.5	
11-30	61	77.1	49.2	55.7	88.5	
More than 30	47	82.3	55.1	63.3	75.5	
Own market share:						
1%-10%	140	66.0	50.7	59.7	86.1	
11%-20%	47	61.7	42.6	42.6	85.1	
21%-30%	52	65.4	50.0	53.9	86.5	
> 30%	116	56.5	43.5	53.0	93.0	
Main market	:					
United Kingo Whole of the	lom 58	56.7	56.7	53.3	80.0	
United Kinge	dom 177	66.1	41.7	55.6	92.2	
International	120	59.3	50.9	53.4	86.4	
Proportion of output exported:						
<11%	167	62.8	45.4	59.9	89.5	
11%-50%	107	63.2	46.2	49.1	92.5	
>50%	81	60.0	52.5	50.0	80.0	
Constant marg	inal					
cost	201	60.2	42.8	57.7	92.5	
SEARCH	259	61.0	46.7	60.2	90.7	
Union recogni	tion 198	64.1	49.0	55.6	92.9	

Which survey results should we believe? It is difficult to reach a conclusive answer, but we suggest two reasons why the Haskel *et al* and Bhaskar *et al*'s results might be less informative than those from the Bank survey. First, the WIRS survey on which Haskel *et al* base their research is a survey of establishments and not firms. If pricing decisions are a strategic, company-wide decision in a particular firm, then respondents might report that they will not change prices, simply because they do not have the autonomy to do so. And the Bhaskar *et al* survey is too small and too focused on small firms to be comparable with our result.<sup>(1)</sup>

Second, Table A provides evidence that prices respond differently to demand and cost shocks, and also as to whether shocks warrant price increases or price decreases; 62% of firms report that they would reduce price in response to a fall in demand, whereas only 47% of firms report that they would raise prices in response to an increase in demand. In terms of cost shocks, 88% of firms report that they would raise prices in response to an increase in costs, while 54% report that they would reduce prices in response to a fall in costs.<sup>(2)</sup>

We can see that more firms report that they would adjust prices in response to a cost shock—of whichever direction than would adjust to a demand shock. This finding is consistent with Geroski and Hall (1995).

# **Estimation and results**

In this section we briefly explain the empirical model used to analyse our data and the survey proxies for the theoretical characteristics (real rigidity, customer markets, etc) discussed earlier. Table A provided some descriptive statistics, but does not tell us about the marginal effect of each of the characteristics of firms on price stickiness. This is what we analyse in the rest of the article.

# The dependent variable

Our left-hand side or 'dependent' variable reports whether firms said that they would change prices in response to a change in demand or a change in costs. We created four dummy variables to capture the probability that firms would raise prices in response to a change in demand (*pud*), or lower prices in response to a change in demand (*pld*); similarly for cost shocks (*puc*, *plc*). To illustrate, suppose the question was 'would you raise prices in response to a rise in demand?' then *pud* = 1 if the firm reported that it would, and *pud* = 0 otherwise; if the question was 'would you lower prices in response to a reduction in costs?' then *plc* = 1 if the firm said it would, and *plc* = 0 otherwise. Since we are dealing with discrete, one-zero dummies as our dependent variable, we report probit estimates.<sup>(3)</sup>

# The independent variables

Our first proposition was that nominal rigidity was magnified by real rigidity. We have several proxies for this concept of real rigidity.

We have two different measures of market structure, as shown in Table A. Both are self-reported. The first is a set of discrete dummies (NCP1–5, NCP6–10 and NCP11–30) that measure the number of competitors in the product

Note that we do not find that price stickiness varies according to firm size, when we control for the separate influence of other factors.
 Table A also shows how price responsiveness varies according to firm characteristics; the variables that define these characteristics are defined and matching to the balance of the balan

 <sup>(2)</sup> Fault A also shows now proceeding and the component of the standard errors of our estimated coefficients are calculated in a way that takes account of the fact that the observed dependent variable has only two values (change prices or not?) rather than being distributed normally, as is assumed when ordinary least squares regressions are run.

market. The second, (MARKSHARE), is a continuous variable that measures the firm's market share in their 'main' market.

We have a proxy for whether a firm's marginal cost curve is flat, which we call 'CONSTANT MC'. This takes the value one if the firm considered that it has constant marginal costs, and zero otherwise.(1)(2)

We also have a variable UNION which takes the value one if the firm recognises trades unions for wage-bargaining purposes, and zero otherwise.

We have a proxy for the likelihood that consumers face search costs in their dealings with firms. This variable, 'SEARCH', tries to capture the size of inflows to and outflows from a firm's customer base. The lower are search costs, the higher we would expect inflows and outflows to be, as the incentives to look around are more favourable.<sup>(3)</sup>

These were our proxies for real rigidity, the tendency for profits to vary little if firms do not change prices in response to shocks. Note that those real rigidity variables which are meant to proxy the slope of the firm's supply curve-the trade union (UNION) and constant marginal cost (CONSTANT MC) variables—are only used to explain the responsiveness of prices to demand shocks (since, other things being equal, the responsiveness of prices to demand shocks depends on the elasticity of supply). Market structure and customer markets could have implications both for supply and demand, and so also appear in regressions used to explain the responsiveness of prices to changes in supply.

Another question noted earlier was whether or not we can find evidence of prices being more sticky (in foreign currency terms) if goods are sold into foreign markets. We have two sets of variables to control for this possibility. First, we have dummy variables, which we term EXPORTS, that divide firms up by the self-reported export intensity. Second, we have two dummies 'UK' and 'INTL' that record whether respondents considered the market for their main product to be a UK market or an international market, as distinct from a 'regional' market, which is the base case. These variables may also pick up the effects of market structure if it is the case that (other things being equal) the more firms' outputs are traded, the more competitive is the market.

Finally, we include a set of dummies to separate firms from different industries, and another set to distinguish firms of different size. We do not have theories of nominal rigidity that predict that particular industries or firms of a specific size will be more or less likely to change prices. But these dummies help to control for unobserved characteristics of

firms, which are correlated with firm size or are prevalent in a particular industry, that might influence price stickiness.

# **Results**

Table B gives the probit estimates of our model for whether firms adjust prices in response to a change in demand, and Table C gives the estimates of whether firms change price in response to a change in costs. The first and third columns in each table contain the estimates when all the market

### Table B

# Price adjustment in response to a change in demand Probit estimates

Dependent variable	Reduce price in a fall in demand	response to ( <i>pld</i> )	Increase price in response to <u>a rise in demand (<i>pud</i>)</u>	
	(1)	(2)	(3)	(4)
Constant	0.3598 (0.3727)	0.5829 (0.1114)	0.2605 (0.3580)	0.3264 (0.1443)
NCP1-5	-0.2031		-0.0177	
NCP6-10	-0.0145		-0.2015	
NCP11-30	(0.2390) -0.2921 (0.2651)		(0.2292) -0.1486 (0.2585)	
MARKSHARE	-0.7815 **	-0.7780 ** (0.2725)	-0.5000 *	-0.4721 *
EXPORTS >50%	0.1796	(0.2723)	0.2397	(0.2037)
EXPORTS 11%-5	0% 0.1302		0.2087	
UK	(0.1960) 0.4365 **	> 0 2717 *c	-0.2162	-0.2788 *
INTL	0.3275	$\left\{ (0.1963) \right\}$	-0.0923	(0.1359)
UNION	0.1638		(0.2955) 0.1910	
CONSTANT MC	(0.1553) -0.1048		(0.1506) -0.3037 **	-0.2377 *
SEARCH	(0.1442) -0.2397		(0.1407) 0.0213	(0.1366)
LARGE	(0.1646) -0.1558		(0.1577) -0.0751	
MEDIUM	(0.2207) -0.1293		(0.2134) -0.1036	
MIN&CHEM	(0.2105) 0.2793		(0.2040) 0.1605	
OTHMF	(0.2098) 0.0592		(0.2049) -0.0909	
NONMPROD	(0.1942) 0.0968 (0.3231)		(0.1905) 0.4988 * (0.3208)	
RETAIL	0.5162		-0.0669	
OTHERS	0.4036 (0.3153)		0.2423 (0.2972)	
LogL	-225.23	-230.42	-239.57	-237.63
$\chi^2$ (dof) (p-value)	20.14 (18) (0.33)	9.76 (2) (0.01)	20.08 (18) (0.33)	(0.03)
Functional form $\chi^2$ (dof)	4.33 (3)	5.17 (3)	1.29 (3)	0.01 (3)
Heteroskedasticity $\chi^2$ (dof)	26.34 (36)	4.45 (4)	17.98 (36)	5.26 (6)
$\chi^2$ (dof) N	3.98 (2) 355	4.54 (2) 355	1.09 (2) 361	0.00 (2) 361

Notes: Standard errors in parentheses, \*\* indicates significance at the 5% level. \* indicates significance at the 10% level. The first  $\chi^2$  test reported is the cross-section analogue of the F test in time series regressions, which tests for the joint significance of all of the independent variables. The functional form, heteroskedasticity and normality tests are  $\chi^2$  score tests for probit models, as described in Chesher and Irish (1987).

structure and control variables are included in the regressions. The second and fourth columns contain the estimates for restricted versions of these regressions, ie excluding insignificant variables. For both cost and demand shocks we estimate separate regressions for upward and downward shocks. In Table D, we pool the increases and decreases and test for the significance of demand and cost increase dummies.

In the survey, firms were asked the following question: 'Some companies find that their variable costs per unit are roughly constant when production rises, and because of this they do not change their price when increasing output. Is this true for your company?'.
 Robert Hall (1986) noted that prices would be sticky if marginal costs were constant.
 This variable tries to capture inflows and outflows by measuring the proportion of very long-term customers (who have been with the firm for more than five years), relative to the proportion of medium-term customers (who have been with the firm for more than one year).

# **Table C** Price adjustment in response to a change in costs

Probit estimates

Dependent	Reduce price in r	esponse to	Increase price in response to	
variable	(1)	(2)	(2) $(3)$	
	(1)	(2)	(3)	(4)
Constant	-0.4332	-0.3885	0 2567	0 5244
constant	(0.3577)	(0.1478)	(0.4884)	(0.2119)
NCP1-5	-0.2589	(011170)	0.2938	(01211))
110110	(0.2479)		(0.3292)	
NCP6-10	-0 2343		0.3624	
11010 10	(0.2358)		(0.3169)	
NCP11-30	-0.1333		0.4114	
110111 50	(0.2648)		(0.3498)	
MARKSHARE	0.2827		1 6093 **	1 7943 **
NII IIIIIDIII IIIE	(0.3061)		(0.5916)	(0.5299)
EXPORTS 50%	0.4637 *		1 4286 **	0.7010 **
EAI OK15 >50%	(0.2814)	<b>)</b> -0 2926 ** (	(0.4725)	(0.2305)
EXPORTS 11%	(0.2017)	(0.1364)	0 3738	(0.2373)
LAI OKIS 11/0	(0.1887)	J (0.1.501) (	(0.3155)	
UK	0.2321		0.2018	
UK	(0.2321)		(0.23160)	
INITI	0.2222)		0.8155 *	
INTL	(0.2026)		$(0.8133)^{++}$	
SEADCH	0.5050)	0 5126 **	(0.4762) 0.6274 **	0 6017 **
SEARCH	$(0.3214 \cdots )$	0.5150	(0.0374 ***	(0.2146)
LADCE	(0.1013)	0.1342	(0.2280)	(0.2140)
LAKUE	-0.0214		-0.3948	
MEDIUM	(0.2000)		(0.5208)	
MEDIUM	-0.12/7		-0.2071	
	(0.2036)		(0.3320)	
MIN&CHEM	0.218/		0.4143	
	(0.2065)		(0.30/4)	1.0246 **
OTHMF	0.3742 *		1.1663 **	1.0346 **
NON OPPOP	(0.1907)		(0.3846)	(0.3357)
NONMPROD	0.7012		0.2074	
DETAIL	(0.3293)		(0.4363)	
RETAIL	0.5843 *		-0.0225	
	(0.3195)		(0.4171)	
OTHERS	0.0147		-0.7766 **	-0.9343 **
	(0.3031)		(0.3494)	(0.2929)
т. т.	007.14	000 75	04.20	00.07
LogL	-227.14	-233.75	-94.39	-99.27
$\chi^2$ (dof)	00.01.(1.0)	15 50 (2)	(1.20, (1.0)	54.54 (5)
(p-value)	28.81 (16)	15.59 (2)	64.30 (16)	54.54 (5)
T 10	(0.03)	(0.00)	(0.00)	(0.00)
Functional form	4 (1 (2))	0 (1 (2))	04 (7 (0)	0.07 (2)
$\chi^2$ (dof)	4.61 (3)	2.64 (3)	24.67 (2)	8.87 (3)
Heteroskedasticity	y 10.04 (22)	2 54 (1)	00.40.000	10 (1 (6)
$\chi^2$ (dof)	18.94 (32)	2.64 (4)	88.48 (36)	18.61 (6)
Normality	2.20 (2)	2 (1 (2)	10.04 (2)	2.06 (2)
$\chi^2$ (dof)	3.38 (2)	2.64 (2)	12.84 (2)	3.96 (2)
N	351	351	351	351
Notes: as for Table I	В.			

Our key results are as follows:

First, market structure does appear to affect nominal rigidity. Our measure of market share (but not our measures of the number of competitors in an industry), is associated with a significantly lower responsiveness of prices to a change in demand. This result is also consistent with studies using industry-level data, which mainly find that price adjustment is slower in less competitive industries (for example Geroski (1992)).(1)

However, if we look at the regressions concerning the responsiveness of prices to a change in costs, we find that the competition and market share variables are either 'wrongly' signed and/or insignificant.<sup>(2)</sup> So though increasing market share reduces the responsiveness of prices to a change in demand, it either does not affect or increases the responsiveness of prices to costs. This is precisely the reverse of the argument put forward by Rotemberg and Saloner (1987).

### **Table D**

### Price adjustment in response to a change in demand or costs; pooling upward and downward shocks

Probit estimates

Dependent variable	Change price in response to a change in demand (1)	Change price in response to a change in costs (2)
Constant	0.5120 *	-0.6635 **
Increase dummy	-0.3968 **	(0.2855) 1.1800 **
NCP1-5	(0.0957) -0.1082	(0.3577) -0.0115
NCP6-10	(0.1738) -0.1097	(0.1180) -0.0297
NCP11-30	(0.1643) -0.2171	(0.1935) -0.0902
MARKSHARE	(0.1841) -0.6376 **	(0.1843) 0.5481 **
EXPORTS >50%	(0.2202) 0.2004	(0.2071) -0.7036 **
EXPORTS 11%-50%	(0.1967) 0.1653	(0.2540) -0.3077 **
UK	(0.1349) 0.1035	(0.1540) 0.2699
INTL	(0.1555) 0.1185	(0.2290) 0.6087 **
UNION	(0.2110) 0.1727	(0.1772)
CONSTANT MC	(0.1000) -0.2018 **	
SEARCH	(0.1074) -0.1046	0.5227 **
LARGE	(0.1131) -0.1164	(0.2454) -0.1194
MEDIUM	(0.1525) -0.1151	(0.1264) -0.1329
MIN&CHEM	(0.1455) 0.2178	(0.1687) 0.2908 *
OTHMF	(0.1460) -0.0180	(0.1667) 0.5102 **
NONMPROD	(0.1354) 0.2924	(0.1655) 0.5201
RETAIL	(0.2260) 0.2084	(0.1569) 0.3733
OTHERS	(0.2164) 0.3123 (0.2147)	(0.2609) -0.3403 (0.2505)
LogL χ <sup>2</sup> (dof) (p-value) N	-472.36 41.77 (19) (0.00) 716	-339.05 158.97 (17) (0.00) 702

Notes: Standard errors in parentheses. \*\* indicates significance at the 5% level. \* indicates significance at the 10% level.

Does the slope of the marginal cost curve affect price stickiness (in response to a demand shock)? We have mixed evidence. Our UNION variable is insignificant and 'wrongly' (ie positively) signed. But the variable indicating whether firms think their marginal cost curve is flat-CONSTANT MC—does significantly reduce the likelihood that prices will rise in response to an increase in demand. This variable is also significant in the pooled demand regressions in Table D.(3)

Do 'customer markets' influence price stickiness? We find that our measure of the size of inflows and outflows of customers (SEARCH) does not significantly affect the responsiveness of prices to a change in demand, but it does significantly increase the responsiveness of prices to a change in costs.

However, it contrasts with what Bhaskar *et al* report. They found that firm market share had no effect on the probability that a firm would adjust its price in response to a change in demand. It also contrasts with Weiss (1993) who found that, in a sample of Austrian manufacturing industries, firms in more concentrated industries adjusted prices more quickly in response to demand shocks (and more slowly in response to cost shocks) than firms in less concentrated industries.
 Market share significantly increases the responsiveness of prices to an increase in costs, according to Table C, but these regressions are problematic, the response to a since of the responsiveness of prices to an increase in costs.

Water share significantly increases the responsiveness of prices to an increase in costs for us to be C, but these regressions are problemate as too many of our respondents would in fact increase prices in response to an increase in costs for us to be able to model the variation in responsiveness properly. The pooled regressions in Table D are more appropriate here. We find that we do not have an explanation for the asymmetry of the effect of the slope of the marginal cost curve on price responsiveness; perhaps the marginal cost curve is flatter above current levels of output than below it, or perhaps respondents have problems hypothesising changes in demand in different directions. (3)
Is there evidence of 'pricing to market'? Since, as we noted above, there were both demand and supply-side explanations of pricing to market, we included our export intensity and self-reported market geography variables both in the change in demand and the change in cost regressions. Looking at the export intensity variables first, we found that these did not significantly affect the responsiveness of prices to a change in demand. However, the export intensity of firms did significantly reduce the price responsiveness to changes in costs (in either direction). This evidence supports demand-side rather than supply-side models of 'pricing-to-market' rigidity; (note that the responsiveness to a change in costs is, of course, a function of the slope of the demand curve). The market geography variables, UK and INTL, which record whether firms think the market for their main product is regional, national, or international, give less readily interpretable results, and are anyway mostly insignificant.

The final question we posed was whether or not there were asymmetries in the responsiveness of prices to changes in cost and demand. Table D brings the asymmetry of the models to the fore. What we find is interesting: whereas a demand increase is significantly less likely to prompt a price response than a demand decrease, a cost increase is much more likely to prompt a price change than a cost decrease. Our first finding, that prices are upwardly rigid in response to changes in demand, contradicts the macroeconometric literature. Our second finding, that price responsiveness to changes in costs is greater when the change in cost is positive, perhaps lends some support to models of downward nominal rigidity that are founded on strategic interaction between firms (see our earlier discussion).<sup>(1)</sup>

# Conclusion

We have used the Bank's recent survey of price-setting behaviour in the United Kingdom to examine a number of questions about the nature and causes of price stickiness. Are prices more sticky in less competitive markets? Does real rigidity magnify nominal rigidity? Do customer characteristics affect price stickiness? Do firms price to market? If so, do supply or demand-side models provide the best explanation? Are there asymmetries in the responsiveness of prices? Do prices respond more to demand than supply shocks?

We have several findings from our survey. The more competitive are firms' product markets, the greater is the propensity to change prices in response to a demand shock; but market structure does not affect the responsiveness of prices to changes in costs. Second, there is some evidence that real rigidity (measured by the flatness of the supply curve) reduces the responsiveness of nominal prices to demand shocks. Third, there is evidence that the lower are search costs in product markets (at least measured by our proxy), the greater is the responsiveness of prices to changes in costs; although search costs seem to have no effect on the responsiveness of prices to changes in demand. Fourth, the export intensity of firms appears to reduce the responsiveness of prices to changes in costs; this supports pricing-to-market models based on rigidities in demand, as opposed to those based on the sunk costs of supply. Fifth, there are significant asymmetries in the responsiveness of prices to the direction of cost and demand shocks. Demand increases appear less likely to prompt price changes than demand decreases; but cost increases are more likely to prompt price changes than cost decreases.

Our results confirm some theories of price stickiness, but reject others. What weight should we place on these results? The answer depends on how valid we think our research strategy is as a device for testing economic theories. One view that has much currency in modern economics is that economic theories should not be constructed from ad hoc relationships, but be judged by how well founded they are in microeconomics; so analogously we might argue that, where possible, we should look for theories to be well founded in microeconometrics. So the evidence is a useful complement to macroeconometric studies. Moreover, much of the empirical evidence on price stickiness, based on aggregate or individual firm data, faces the difficulty of identifying natural experiments that correspond to the theories being tested. Our questionnaire, which asks firms what they would do in particular situations, sets up those natural experiments explicitly. Clearly, to place any weight on our findings assumes that firms would actually do what they said they would do, if confronted with the situations hypothesised in the questionnaire. We conclude by recalling an old joke, that economists are supposed to be scholars who spend their time investigating whether an idea that works in practice also works in theory. We hope that this article proves that economists sometimes do things the other way round.

<sup>(1)</sup> We also tested whether the effect of our independent variables on price responsiveness was dependent upon the direction of the demand or cost shock; for both types of shock we found that there were no significant asymmetries in the effects of market structure, export intensity, real rigidity, or customer characteristics.

# References

- Baldwin, R and Krugman, P (1987), 'The persistence of the US trade deficit', *Brookings Papers on Economic Activity*, No 0(1), pages 1–43.
- Ball, L and Romer, D (1990), 'Real rigidities and the non-neutrality of money', *Review of Economic Studies*, Vol 57, pages 183–203.
- Ball, L and Mankiw, N G (1994), 'Asymmetric price adjustment and economic fluctuations', *Economic Journal*, Vol 104, pages 247–61, March.
- Bhaskar, V, Machin, S and Reid, G (1993), 'Price and quantity adjustment over the business cycle: evidence from survey data', *Oxford Economic Papers*, Vol 45, pages 257–68.
- Blinder, A, Canetti, E, Lebow, D and Rudd, J (1998), 'Asking about prices: a new approach to understanding price stickiness', Russel Sage Foundation, New York.
- Chesher, A and Irish, M (1987), 'Residual analysis in the grouped and censored normal linear model', *Journal of Econometrics*, Vol 35, pages 33–62.
- Cover, J (1992), 'Asymmetric effects of positive and negative money supply shocks', *Quarterly Journal of Economics*, Vol 107, November, pages 1,261–82.
- **Debelle, G and Laxton, D (1996)**, 'Is the Phillips Curve really a curve? Some evidence for Canada, the United Kingdom and the United States', IMF, *mimeo*.
- de Long, B and Summers, L (1988), 'How does macroeconomic policy affect output?', *Brookings Papers on Economic Activity*, No 2, pages 433–80.
- Dixit, A (1987a), 'Entry and exit decisions of firms under fluctuating real exchange rates', Princeton University, mimeo.
- Dixit, A (1987b), 'Hysteresis, input penetration, and exchange rate pass-through', Princeton University, November, mimeo.
- Finn, M (1996), 'A theory of the capacity utilisation/inflation relationship', *Federal Reserve Bank of Richmond Economic Quarterly*, No 82/3.
- Froot, K and Klemperer, P (1989), 'Exchange rate pass-through when market share matters', *American Economic Review*, pages 637–54, September.
- Geroski, P (1992), 'Price dynamics in UK manufacturing: a microeconomic view', Economica, Vol 59, pages 403-19.

Geroski, P and Hall, S (1995), 'Price and quantity response to cost and demand shocks', *Oxford Bulletin of Economics and Statistics*, Vol 57, pages 185–204.

Granero, L M (1996), 'Strategic price rigidity', Barcelona University, Working Paper 361.96.

- Hall, R (1986), 'Market structure and macroeconomic fluctuations', *Brookings Papers on Economic Activity*, No 2, pages 285–322.
- Hall, S, Walsh, M and Yates, A (1996), 'How do UK companies set prices?', Bank of England Quarterly Bulletin, Vol 36(2), pages 180–92.
- Hansen, P, Mollgaard, H, Overgaard, P and Sorensen, J (1996), 'Asymmetric adjustment in menu cost duopoly', Aarhus University, *Department of Economics Working Paper*, No 1996-10.

- Haskel, J, Kersley, B and Martin, C (1997), 'Labour market flexibility and employment adjustment: microevidence from UK establishments', *Oxford Economic Papers*, No 49, pages 362–79.
- Kasa, K (1992), 'Adjustment costs and pricing to market: theory and evidence', *Journal of International Economics*, Vol 32, pages 1–30.
- Kovenock, D and Widdows, K (1991), 'Price leadership and asymmetric rigidity', *Purdue University Working Paper*, No 1008, April.
- Krugman, P (1986), 'Pricing to market when the exchange rate changes', NBER Working Paper, No 1926, May.
- Laxton, D, Meredith, G and Rose, D (1995), 'Asymmetric effects of economic activity of inflation', *IMF Staff Papers*, Vol 2, No 2.
- Martin, C (1993), 'Price adjustment and market structure', Economic Letters, Vol 41, pages 139-41.
- McDonald, I M and Solow, R M (1981), 'Wage bargaining and employment', *American Economic Review*, Vol 71, No 5, pages 896–908.
- Okun, A (1981), 'Prices and quantities: a macroeconomic analysis', Brookings Institute, Washington DC.
- Phelps, E and Winter, S (1970), 'Optimal price policy under atomistic competition', in Phelps, E (ed), *Microeconomic Foundations of Employment and Inflation Theory*, Macmillan, London.
- Ravn, M and Sola, M (1995), 'Reconsideration of the empirical evidence on the asymmetric effects of money supply shocks', Southampton University, *mimeo*.

Rotemberg, J (1982), 'Sticky prices in the United States', Journal of Political Economy, December, Vol 90, pages 1,187–211.

- Rotemberg, J and Saloner, G (1987), 'The relative rigidity of monopoly pricing', *American Economic Review*, Vol 77, pages 917–26.
- Shapiro, K and Stiglitz, J (1984), 'Equilibrium unemployment as a worker discipline device', *American Economic Review*, Vol 74, No 3, pages 433–44.
- Smith, A (1776), The wealth of nations, Penguin.
- Stiglitz, J (1984), 'Price rigidities and market structure', American Economic Review, Vol 74, pages 350-55.
- Weiss, C (1993), 'Price inertia and market structure: empirical evidence from Austrian manufacturing', *Applied Economics*, Vol 25.
- Yates, A (1998), 'Downward nominal rigidities and monetary policy', Bank of England Working Paper, No 82.

# Appendix

Descriptions of variables:

NCP1-5	A $1/0$ dummy which is 1 if the firm reports it has between $1-5$ competitors.
NCP6-10	A 1/0 dummy which is 1 if the firm reports it has between 6–10 competitors.
NCP11-30	A 1/0 dummy which is 1 if the firm reports it has between 11–30 competitors.
MARKSHARE	Self-reported market share of the firm's main product.
EXPORT >50%	A 1/0 dummy which is 1 if the firm exports more than 50% of its output.
EXPORTS 11%-50%	A 1/0 dummy which is 1 if the firm exports between 11%–50% of its output.
UK	A 1/0 dummy which is 1 if the firm recognises that the United Kingdom is it's main market.
INTL	A 1/0 dummy which is 1 if the firm recognises the international market as its main market.
LARGE	A 1/0 dummy which is 1 if the firm has more than 500 full-time equivalent employees.
MEDIUM	A 1/0 dummy which is 1 if the firm has between 100–500 full-time equivalent employees.
	A set of 1-digit industry dummies.
LTR1-LTR5	A 1/0 dummy which is 1 if the firm has dealt with a higher proportion of its customers for more than
	one year than it has for five years.
UNION	A 1/0 dummy which is 1 if the firm recognises unions for bargaining purposes.
CONSTANT MC	A 1/0 dummy which is 1 if the firm reports that it has constant marginal cost.

# The use of explicit targets for monetary policy: practical experiences of 91 economies in the 1990s

# By Gabriel Sterne of the Bank of England's Centre for Central Banking Studies.

In June 1999 the Bank of England hosted its sixth Central Bank Governors' Symposium. This year the subject was 'Monetary policy frameworks in a global context', based on a report prepared by DeAnne Julius of the Bank's Monetary Policy Committee and Maxwell Fry, Lavan Mahadeva, Sandra Roger and Gabriel Sterne of the Bank's Centre for Central Banking Studies (CCBS). In this article Gabriel Sterne draws on one of the chapters of the report. The report uses a survey of 91 central banks to assess developments in monetary frameworks across a wide cross-section of economies. The final report, along with a selection of papers originally presented at a CCBS Academic Workshop in November 1998, will be published by Routledge in mid 2000.<sup>(1)</sup>

# Introduction

'... I find myself wondering if this swing of the pendulum to more autonomy [of central banks] can really be sustained. No matter how hard we work at disclosure, as long as there are perceptions that the central bank is making judgments about some important policy trade-off... I wonder whether we all won't get pushed to far more narrowly defined objectives'.

Gordon Thiessen (Governor), Bank of Canada, speaking in 1994 at the Tercentenary Symposium of the Bank of England on 'The Future of Central Banking'.<sup>(2)</sup>

A monetary policy framework comprises 'the institutional arrangements under which monetary policy decisions are made and executed' (McNees (1987), page 3). Following the breakdown of the Bretton Woods system of exchange rates, policy-makers have employed a variety of monetary frameworks in order to increase the credibility of monetary policy.<sup>(3)</sup> Since the key characteristic of the framework is often an explicit target for monetary policy, the aim of this article is to assess the use of such targets in a range of economies in the 1990s. The analysis is based on data provided by 91 central banks that responded to a questionnaire on monetary policy frameworks circulated by the Bank of England in late 1998. Table A lists the participating countries.

Explicit monetary policy targets have become more widely used in the 1990s than at any time since the Bretton Woods era. In the survey of 91 central banks,<sup>(4)</sup> 96% (all but four countries) were using some form of explicit target or monitoring range in 1998.<sup>(5)</sup> This contrasts sharply with 1990, when only 55% had an explicit target or monitoring

range.<sup>(6)</sup> So Governor Thiessen's prediction, that objectives might become increasingly narrowly defined, appears to have been fulfilled across this broad sample. So does the role he suggested for an explicit target-that of helping to define an institutional relationship between the central bank, the government and the population.

### **Table A** The countries included in the survey

Industrial	Transitional	Developing				
Industrial Australia Australia Austria Belgium Canada Denmark Finland France Germany Greece Hong Kong Iccland Ireland Ireland Israel Italy Japan Korea Malta Netherlands New Zealand Norway Portugal Spain Sweden Switzerland Taiwan United Kingdom United Kingdom	Transitional Albania Bosnia Herzegovina Bulgaria Croatia Czech Republic Estonia Georgia Hungary Kazakhstan Kyrgyz Republic Latvia Lithuania Macedonia Moldova Poland Romania Russia Slovakia Slovenia Turkmenistan Ukraine	Developing Argentina Bahamas Bahrain Bangladesh Barbados Belize Botswana Chile China Cyprus Eastern Caribbean Ecuador Egypt Fiji Ghana Guyana India Indonesia Jamaica Jordan Kenya	Kuwait Lebanon Malaysia Mauritius Mexico Mongolia Mozambique Namibia Nigeria Peru Sierra Leone South Africa Sri Lanka Tanzania Thailand Tonga Turkey Uganda Uruguay Vietnam West African States Zambia			
Note: The European Monetary Union countries were surveyed pre-entry.						

The article assesses in detail the use of explicit targets. The first section of the article argues that the choice of policy target rests not just on the likelihood and utility of hitting a single number. Other important roles for explicit targets may include defining informal or formal contractual

 <sup>&#</sup>x27;Key issues in the choice of monetary policy frameworks in Industrial, Transitional and Developing Economies', in *Monetary Policy Frameworks in a Global Context*, forthcoming.
 See Capie, Goodhart, Fischer and Schnadt (1994), page 258.
 See Cotarelli and Giannini (1997) for a detailed assessment of the experience since Bretton Woods.
 The survey aimed to include a wide variety of countries. However, some sample selection bias may remain. For example, small open developing economies that target the exchange rate are under-represented.
 The exceptions include Japan, but not the United States. In 1998 the Federal Reserve still published a monitoring range for broad money growth.
 Of the countries in the survey, seven did not exist in 1990; so 55% relates to 84, not 91, monetary frameworks.

relationships between institutions, and focusing analysis on particular economic indicators.

The second section goes on to examine which targets have been adopted in the 1990s by the 91 countries sampled, and the degree of flexibility with which they have been implemented. The announcement of an explicit target can represent full commitment to a particular outcome, or it may be no more than a benchmark used to explain deviations from the target. The sample provides extremes of experience that include rigidly fixed exchange rates on the one hand, and loose monitoring ranges for one or all of the exchange rate, money and inflation on the other.<sup>(1)</sup> In the case of domestic monetary targets, the data used in this article relating to the deviations of outcomes from targets indicate that, in many cases, targets have been implemented quite flexibly.

# A review of the arguments for different explicit targets

The reported changes between 1990 and 1998 show a shift towards some form of explicit monetary policy target. And most of the central banks that said that their monetary frameworks targeted a particular variable specified the exchange rate, money or inflation. The choice depends on a number of diverse though interrelated factors. The following six factors are among those that influence the choice of policy target.

#### *(i) The role of the targeted variable and the impact of* different shocks on the transmission mechanism from policy instruments to inflation

Much of the literature<sup>(2)</sup> on the choice of target has focused on the stability of the relationship between the target and the final objective of monetary policy. In turn this relationship depends partly on structural economic changes. For example, rapid financial liberalisation can lead to instability in the velocity of money; this was one explanation for industrialised countries such as Australia and Canada dropping money targets in the 1980s. More recently some transitional and developing economies have followed suit because of similar problems.<sup>(3)</sup> In contrast, Issing (1997) argues that velocity has been stable in Germany, partly because of the stability with which policy has been implemented.

Similarly, aggregate supply shocks can undermine inflation targets. In the case of Uganda, Atingi-Ego (1998) stresses the importance not only of the unpredictable velocity of money, but also of volatility in domestic food prices, related to rainfall.<sup>(4)</sup> And the closeness of the relationship between the exchange rate and the final policy objective may also depend upon structural factors; for example exchange rates may be more closely related to consumer prices in small

open economies where a high proportion of consumer goods are imported.(5)

Though these structural factors remain important, the diversity of experience in the choice of explicit target illustrates that the choice also depends on a range of other factors.

#### (ii) The role of the target in defining a relationship between the central bank, the government, external institutions and the private sector

An important function of explicit inflation targets has been to define the roles of the government and the central bank in the monetary strategy. The global experience offers a variety of approaches, ranging from demarcation of responsibilities to drawing together institutions to formulate targets. Chart 1 represents the responses of 91 central banks when asked whether they or the government set the explicit target in 1998, or whether it was set jointly.

Chart 1

#### Who sets explicit targets and monitoring ranges for the exchange rate, money and inflation?



From a sample of 91 economies describing their practices in late 1998; the figures in the bars indicate the number of economies with this arrangement. The length of the bars indicate the percentages set under different arrangements.

Source: Bank of England survey of monetary frameworks

(a) These mainly include countries that are defined by the IMF as having a fixed exchange rate, but that do not announce an explicit target.

In a contractual approach, the government sets a target in a contract with the central bank, and gives the central bank operational independence so that it can use its policy instruments in pursuit of the target. Countries including Israel and the United Kingdom have adopted this approach. In 15 of the 55 economies with an explicit inflation target in 1998, the target was set by the government only. There are circumstances, however, when it is difficult to specify objectives that are narrow enough to define a contract. Some countries have important financial stability or balance of payments objectives, as well as inflation targets. And for countries that are undertaking disinflation, there are often at

<sup>(3)</sup> 

Fry, Julius et al (op cit) measure the degree to which policy in different countries focuses on different objectives. Starting with Poole (1970). See Hrnčif and Smidkova (1998) for an assessment of velocity developments in Czech Republic. Their paper also illustrates the difficulties of specifying an inflation target in the presence of supply shocks. Similarly, Alfaro and Schwartz (1999) argue that many of the shocks that affect price developments in Mexico are beyond the immediate control of monetary rolicy. These include developments in the acchange rate, wages controlled prices and external inflation.

<sup>(4)</sup> 

monetary policy. These include developments in the exchange rate, wages, controlled prices and external inflation See Crockett (1999) for a more detailed assessment of the effect of structural factors on the choice of target. (5)

least two inflation targets; one for the current period and one for the long run. In the event of inflation falling below the short-term target but remaining above the long-term one (as happened in 1998 in Israel, Czech Republic, Chile and Poland), it may be difficult for a contract to specify adequately the policy objective. For example, if inflation in the short term is below the short-term target but above the long-term target, while output is no lower than expected, should monetary policy aim for a higher rate of inflation?

Where contracts become complicated, an alternative approach may be for the government and the central bank to agree an explicit target, in order to emphasise joint ownership of the monetary strategy. In 22 cases out of 55 (40% of the countries with explicit inflation targets), the government and the central bank jointly set the inflation target. A further possibility is 'target independence', where the central bank sets its own explicit objectives. 18 central banks set inflation targets independently. In some cases, (such as Chile), this is indicative of the central bank having a high degree of goal independence. In others, the capacity to set an explicit target is less related to goal independence. For example some central banks set an inflation target, but this target may remain subordinate to a government-set target for the exchange rate.

The government had a role in setting the target in 76% of the countries with exchange rate targets<sup>(1)</sup> (see Chart 1). In contrast, money targets have generally been the central bank's prerogative: in 36 out of 37 cases the central bank either solely or jointly sets the money target. Assumptions about inflation, output and velocity developments are a prerequisite for setting money targets, and central banks have a comparative advantage in researching banking system developments that may cause changes in velocity. Thus a government that wishes to instruct the central bank to meet an explicit target is more likely to set an inflation or exchange rate target.

The importance of targets in defining relationships between different agents in the economy goes beyond that of the central bank and the government. For countries with IMF programmes, levels of money and credit aggregates are used as performance criteria which must be met to ensure continued financial support from the Fund. Cottarelli and Giannini (1998) argue that where policy-makers in developing countries have little anti-inflationary credibility, adopting a Fund programme may be the most effective means of enhancing the credibility of a disinflationary strategy.

### (iii) The role of targets and forecasts in providing a basis to explain outcomes

Targets and forecasts may be used either as means of pre-committing to a particular outcome, or as benchmarks for explaining deviations from predicted outcomes. Mexico uses a combination of the two. Alfaro and Schwartz (1999) describe how the annual programme of the Banco de México involves setting an annual inflation target, which, subject to certain shocks, represents a pre-commitment. The programme also incorporates a forecast for the daily path of the monetary base, given the information available in early January of each year, which represents a benchmark. Such a benchmark provides a basis for comparing developments during the year with those anticipated at the start of the year.

## *(iv) The skills and experience within the central bank*

Central banks have limited budgets for analytical resources. The constraints are particularly binding in poorer countries, because less money is available and skilled staff are more scarce.<sup>(2)</sup> Skills may include knowledge of reserve money programming, broad money targeting, inflation targeting or analysis of the implications of implementing crawling exchange rate bands. So there may exist some 'transaction costs' from buying in to one or other domestic monetary framework, both in terms of re-education within the central bank, and in terms of explaining policy to the public. This may help to explain why many central banks take an evolutionary approach to changing monetary frameworks, with radical shifts generally taking place only in response to external shocks and crises.(3)

### (v) The extent to which 'policy technology' gives policy-makers confidence in their ability to influence targeted variables in a predictable fashion

Central banks may require comprehensive data and powerful analytical tools to be confident that they are setting instruments optimally. But in many countries, data can be patchy, infrequent, and available only for short time series; rapid structural change may wrap very wide confidence intervals around estimated relationships between macroeconomic variables.

The question of whether the availability of good data and analytical techniques should affect the choice of target is controversial. On the one hand, inflation targeting in industrialised economies has benefited from the existence of macroeconometric forecasting models. But such models are difficult to estimate accurately where data are inadequate, and if analytical capacity is limited.<sup>(4)</sup> This might seem to suggest that countries that lack good data and analytical capacity should not be setting inflation targets. On the other hand, poor analytical capacity undermines implementation of any domestic target; money targets depend implicitly upon an inflation projection, whether or not the projection is cast in terms of a forecast, target, or desired outcome. One possible solution to poor knowledge about domestic transmission may be to announce an exchange rate peg, but even the choice of peg may increase the costs of disinflation if there is limited knowledge of the equilibrium exchange

<sup>(1)</sup> (2)

Excluding those countries that did not provide details about who set the exchange rate target. Fry, Goodhart and Almeida (1996), pages 90–96, illustrate that in developing countries, the proportion of graduate staff increases with a country's

<sup>(3)</sup> (4)

Income. Changes to the monetary framework are analysed in greater detail in Fry, Julius *et al.*, (*op cit*). In response to the question 'Have researchers in your bank considered the Phillips curve and output gaps in the last five years?', only 24% of the transitional and developing countries responded that they had been considered in detail.

rate.<sup>(1)</sup> Analytical limitations may indeed influence the optimal choice of target, but it is not clear that the influence will be in a particular direction in all cases.

# (vi) Attempts to impose discipline on fiscal and monetary policy

Fry, Julius et al show that exchange rate targeting has been the only regime which has delivered five-year periods of low, stable inflation in developing economies between 1970 and 1996. And Crockett (1999) argues that 'although exchange rate targeting has frequently ended in currency crisis, it cannot be denied that exchange rate pegs have also often been instrumental in braking inflation expectations'. Much of the credit for this must be due to the widespread understanding that exchange rate pegs imply strict constraints on credit expansion. Exchange rate pegs have frequently acted as a means of engendering fiscal and monetary discipline. And as it is possible for the private sector to understand what is at stake, inflation expectations can be rapidly lowered when the peg is implemented.

# **Explicit targets in the 1990s**

The past three decades have seen marked swings in the choice of explicit targets and monitoring ranges.<sup>(2)</sup> These are summarised in Chart 2.(3)

### Chart 2 **Explicit targets in the 1990s**



The data highlight three particular trends:

Explicit targets have become much more widespread in the 1990s than in the previous two decades. The use of explicit targets-whether for the exchange rate, money or inflation-grew in the 1990s. Their use is now more widespread than at any time since Bretton

Woods. The number of countries with explicit exchange rate targets increased from 30 to 47; the number of countries with explicit money targets increased from 18 to 39. The number of countries with inflation targets increased almost seven-fold, from 8 to 54.<sup>(4)</sup> Of the 54 countries that had inflation targets in 1998, 13 (14% of all countries) had inflation targets only. At the start of 1990, 8 countries had explicit inflation targets, and only one of these (New Zealand) claimed it to be the centrepiece of its monetary framework.

- Many countries in the sample use more than one explicit target. In 1998, 55% of the sample announced an explicit target (or monitoring range) for more than one of the exchange rate, growth in money or credit, and inflation. In 1998, each country published an average of  $1^{1/2}$  targets for these variables. And 24% of all countries announced targets simultaneously for (only) money and inflation.
- In the 1990s, there were 101 examples of a country announcing a new explicit target for any of the exchange rate, money and inflation; and only 17 countries dropped an explicit target. Ten of the targets dropped were exchange rate targets. These were for Egypt (1991), Finland, Norway, the United Kingdom, Sweden (1992), Croatia (1993), Mexico (1994), Mozambique (1995), Czech Republic (1997), and Russia (1998).<sup>(5)</sup> The majority of these changes were in response to an exchange rate crisis. A further seven economies dropped money targets (or monitoring ranges) during the period. These were Portugal (1992), Turkey (1992), Spain (1994), Macedonia (1995), Czech Republic, Poland, and the United Kingdom (1997). Generally, these represented an acknowledgment that money growth was not necessarily at the top of the central bank's hierarchy of indicators. There were virtually no cases of a country dropping its explicit inflation target in the 1990s.(6)

# Flexibility and uncertainty in the implementation of inflation and money growth targets

Policy-makers may sometimes regard it as acceptable to miss their target. In the analysis that follows, a larger miss is associated with a relatively flexible approach to policy targeting. An important caveat, however, is that even when policy attempts to adhere rigidly to targets, transmission lags may imply that policy is unable to restore a variable to its targeted path within the period. The data used here cannot distinguish between these two scenarios.

Some countries that joined the European single currency may have dropped formal targets for domestic inflation in 1999

See Christoffersen and Doyle (1998) (1)(2)

See Christoffersen and Doyle (1998). In the remainder of the article we refer to 'targets' rather than 'targets and monitoring ranges'. Nevertheless, we acknowledge that some countries, including the United States, have stated that monitoring ranges have limited importance in terms of guiding monetary policy. See Fry, Julius *et al.* (*op cit*). There are cases where the government publishes a forecast for inflation in its annual budget that may or may not represent an explicit target for monetary policy. We regard these as explicit targets of monetary policy only if a central bank responded that there was an explicit inflation target. There do not include any of the Asian economies that abandoned their 'soft-dollar' pegs.

<sup>(4)</sup> 

Charts 3 and 4 show the average performance relative to target and the distribution of misses for broad money growth and inflation targets.<sup>(1)</sup> In each year of the 1990s the charts show the median miss, plus the value of the miss for the country at the 25th and 75th percentile of the distribution. Thus the shaded area encloses the outcomes for the half of the sample with the smallest misses above and below the target ('accurate' observations). The analysis focuses on the median rather than the mean, because the distribution is skewed by a very small number of wide target misses.





Chart 4

#### The distribution of broad money target 'misses' in the 1990s



The number of observations varies from year to year, as do the median target levels (see Table B). For both money and inflation targets, the number of observations is particularly small in 1990–92. So we focus on the results between 1993 and 1998, when there are between 20 and 51 observations in each year.

#### **Table B**

#### Number of observations of inflation and broad money target misses in each year, and the median target

	Number of observations for inflation targets and outcomes (a)	Median inflation target	Number of observations for broad money targets and outcomes (a)	Median broad money target
1990	6	3.8	10	11.5
1991	10	6.0	11	10.0
1992	13	10.0	14	10.0
1993	22	10.0	20	12.0
1994	29	8.0	24	12.7
1995	35	8.0	26	13.6
1996	42	7.0	27	15.0
1997	48	7.1	30	15.0
1998	51	6.5	21	13.5

Source: Bank of England survey of monetary frameworks

(a) Some outcomes for 1998 are not yet available from central banks. Where possible, these outcomes have been estimated using IMF data.

The data raise several questions:

To what extent is the increased use of explicit targets indicative of a more rigid approach to monetary policy?

For inflation targets between 1993 and 1998, the average width of the range of target misses between the 25th and 75th percentile is 4 percentage points (see Chart 3). Chart 4 illustrates country experience with broad money growth targets. Between 1993 and 1998, the average width of the range enclosed by the 25th percentile miss and the 75th percentile miss is 7.3%. These data suggest that broad money targets have not been treated as rigid rules.

The cross-sectional evidence presented here is complementary to the time series evidence that assesses the likelihood of adhering to particular inflation outcomes. The time series evidence from the 1980s and earlier suggests a humbling degree of inaccuracy in central banks' capacity to meet targets. Haldane and Salmon (1995) estimate a model for inflation in a particular country (the United Kingdom) and observe errors based on historical experience.<sup>(2)</sup> They find that on the basis of UK data between 1960 and 1994, in some of their simulations there is 'only a 50% probability of adhering to a target range of 6 percentage points'. As a result, Haldane (1995) suggests that the central bank faces a trade-off between 'credibility and humility'.(3)

The cross-sectional evidence from our survey suggests that, in the 1990s, central banks have done considerably better in meeting explicit inflation and money targets than might have been expected from earlier experience.<sup>(4)</sup> Nevertheless, the results from Table C.1 show that the median absolute miss in the 1990s was between 1 and 5 percentage points; ie there was approximately a 50% success rate in adhering

<sup>(1)</sup> Data are responses to the Bank of England questionnaire. As far as possible we have sought to make data consistent by asking for information about when the target was set in the year prior to which the target referred. Where there is a target range, we have taken the average as the reference point. Where the target is specified as a ceiling, we have treated the ceiling as the reference point.
(2) The authors use a small macro model, add to it a policy rule, and then solve the system by feeding in a set of shocks calibrated from the historically estimated residuals. The authors control for policy-induced volatility. Their results are in line with time series results for other countries estimated estimated residuals.

at the same time. Haldane (1995), page 203

ctional analysis used here has the disadvantage of being unable to explain such good performance. Though the cross

to an inflation target range of  $\pm 1.5$  percentage points in the 1990s.<sup>(1)</sup> For countries setting an inflation target of less than 3.5%, there has been around a 50% probability of adhering to a much narrower range of  $\pm 0.8$  percentage points. For money targets and outcomes, Table C.2 suggests greater accuracy than that predicted by models based on time series data. For explicit money targets, there was approximately a 50% success rate in achieving an outcome within 3.2 percentage points either side of the target.

#### **Table C**

#### Summary of misses from inflation and broad money targets in countries that announced explicit targets in the 1990s

#### Table C.1

#### Summary of median<sup>(a)</sup> misses from inflation targets

Total number of annual observations = 256. Total number of countries = 54.

Percentiles					
in distribution	All	0–25th	25th-50th	50th-75th	75th–maximum
Range of targets					
implied by percentiles					
(percentage points)		Less than 3.5	3.5 - 7.8	7.8-13.8	Above 13.8
Median miss	0.2	-0.5	0.2	0.5	1.4
Median absolute miss	1.5	0.8	1.1	1.9	6.4

#### Table C.2

#### Summary of misses from broad money targets

Total number of annual observations = 183. Total number of countries = 31.

Percentiles in distribution	Δ11	0_25th	25th_50th	50th_75th	75th_maximum
Range of targets	<u></u>	0-2500	2500-5000	<u></u>	
implied by percentiles					
(percentage points)		Less than 8.0	8-12.5	12.6-17.0	Above 17.0
Median miss	1.5	0.1	0.4	2.4	3.8
Median absolute miss	3.2	2.3	4.3	2.9	6.0

#### Table C.3

#### Comparison of misses from inflation and broad money targets in economies where both were announced in the same year

Total number of annual observations = 115. Total number of countries = 25.

Observations for:	All observations		Low target observations (b)		High target observations (b)	
	Inflation	Money	Inflation	Money	Inflation	Money
Median absolute miss	1.9	3.8	1.1	2.8	4.2	6.2
<ul> <li>(a) The analysis focuses large misses strongly</li> </ul>	on median r affects the r	ather than th nean miss.	ne mean, beca	use a very	small number	of very

(b) The 'high' and 'low' groups were divided according to the magnitude of the sum of the inflation and money target in that year.

Why is the time series and cross-country evidence different? One possibility is that judgment combined with models markedly improves the accuracy of policy. Another is that whereas the time series results are based on estimates over several decades, the results from our survey refer only to the 1990s, when there may have been fewer exogenous (non policy induced) shocks that induced inflation volatility. This explanation is consistent with the view that the 1990s provided a relatively shock-free environment highly conducive to credible explicit targets.<sup>(2)</sup>

 Are the results suggestive of bias—ie do outcomes tend to overshoot or undershoot the target on average? Chart 3 suggests that inflation outcomes have, since 1994, not been obviously biased in either direction relative to target. In the years since 1994, the median miss has been within the range of +0.8 to -0.7 percentage points. And in the sample as a whole, the median miss is +0.2 percentage points (see Table C). In contrast, Chart 4 provides evidence that money targets have been overshot more often than undershot. Table C.1 shows that the median money target miss for the entire sample was +1.5 percentage points.

# • To what extent do the results depend upon the rate of inflation when the targets are being set?

The sample contains examples of targets announced when inflation is low, and examples of explicit targets being announced as part of a policy plan to reduce inflation from high rates. High inflation that occurs because of adverse shocks or because there are pressing policy objectives other than low inflation is likely to make it harder to achieve monetary targets. Table C summarises the relative size of target misses in 'low' and 'high' inflation economies. Table C.1 contains the median misses from explicit inflation targets in the 1990s for all observations. It also divides the sample into four groups, according to the magnitude of the target. One quarter of observations represent countries targeting a rate of inflation of under 3.5%; half are below 7.8%; and three quarters are below 13.8%. Table C.2 provides analogous information, based on the experience of explicit targets for money growth. The data used in each section of the table are set out in two rows. The first relates to the median miss, which may be greater or less than zero depending upon whether targets are relatively more likely to be overshot or undershot. The second gives the median absolute misses, irrespective of whether the outcome was above or below the target.

Each section of Table C shows that misses are higher when the targets are higher, for inflation and for money growth. Overall, the table shows that misses remain roughly in proportion to the level of the target. There are more than 60 observations in total for annual inflation targets of less than 3.5%. They illustrate that the median miss is just -0.5 percentage points (the minus sign indicating that low-inflation countries have undershot the target more often than overshooting it), and the median absolute miss is 0.8 percentage points. Low-inflation countries have established a track record of accuracy in hitting targets, with little evidence of systematic over or undershooting. For countries with higher targets, Table C.1 confirms that misses have been larger and outcomes are more likely to be above target.

Money growth targets exhibit a similar pattern of misses, increasing in magnitude for higher-target observations. However, in absolute terms, the median misses are similar in each of the ranges up to 17%. This is because several economies, such as Taiwan, have had considerable success in anticipating shifts in velocity and meeting money targets, even when the targets are set at relatively high growth rates.

This is the median absolute miss for the entire sample—shown in the first column of Table C.1.
 What is less clear is how the proliferation of explicit targets has helped to create such a shock-free environment.

The final question to be addressed using these data is:

Are monetary and inflation targets implemented with equal or differing degrees of flexibility?

Table C.3 provides information on countries that had explicit inflation and money growth targets in the same year. This makes it possible to compare the flexibility with which inflation and money targets are implemented in countries that announce both. An important caveat is that the misses could be attributable not only to greater flexibility in policy, but could also arise because of the differing impact of demand, supply and velocity shocks on money and inflation targets. If policy is not able to restore the variable to target within the period because of relatively long transmission lags, then even attempts to adhere rigidly to targets may not succeed in eliminating target misses.

The results show that inflation outcomes were significantly closer to target than broad money growth outcomes, irrespective of whether the targets were low or high. The median inflation target miss (in absolute terms) for countries that announce both inflation and money targets is 1.9 percentage points, compared with 3.8 percentage points for broad money growth. The results are consistent with the view that over a broad range of countries, the mix of shocks leads to greater deviations from money targets than inflation targets. In particular, velocity shocks may have led to relatively larger deviations from money targets. The results may also reflect the priority that policy-makers give to inflation targets over money targets, in the event of a conflict between them.

The results also illustrate that in practice it is difficult to assert that inflation targets imply any more or less discretion than do money targets. It might be thought that inflation targets are more discretionary in the short term. Cottarelli and Giannini (1997) note that money targeting is 'characterised by the announcement of a short-term intermediate target, either in the form of a monetary aggregate or of a (typically crawling) peg'.<sup>(1)</sup> Policy instruments typically affect money aggregates sooner than inflation, and hence policy-makers wishing to adhere to money targets may have to act sooner and with less discretion.<sup>(2)</sup> Yet money target outcomes have deviated from target by more than inflation outcomes, indicating that money targets are either harder to hit or are interpreted more flexibly. This would support the view that policy may be set in a pragmatic manner, irrespective of the published target.

# **Rules versus discretion revisited**

The debate about rules versus discretion in monetary policy can be traced back a number of decades.<sup>(3)</sup> The arguments are well summarised by Guitian (1994). He describes how,

under a successful rules-based policy, 'the predictability of policy should help offset the unpredictability of the environment'. In contrast, a successful discretionary approach involves using 'policy adaptability as a means of keeping an uncertain environment under control'.

The choice of intermediate target for monetary policy has usually been framed in terms of the controllability of a particular variable and the stability of the relationship between that variable and the final objective.<sup>(4)</sup> Yet it is hard to explain some countries' choice of targets using such a framework. Why do so many liberalising countries with poor data and unstable velocity use money targets? Why do other countries that have poor data and are vulnerable to supply shocks use explicit inflation targets? Are 'explicit targets' in some cases better described as benchmarks for variables, against which outcomes can be usefully measured and deviations analysed?

In the light of this debate, explicit targets for domestic nominal variables can be seen as an attempt to maximise the benefits of both rule-based and discretionary approaches. This is a point taken up by King (1996), who argues that:

'The search for a simple policy rule to guide the transition is an illusion. But central banks can try to accelerate the learning process by 'teaching by doing'; in other words making clear their own preferences and explaining their own view of how the economy behaves.' (1996, page 444.)

On this view, the choice of target depends not only on the role of the candidate variable in the transmission mechanism, but also on the issues of transparency and governance in monetary policy. We noted above the increase in the number of economies that announced targets for more than one variable. Chart 2 above illustrated that the fastest-growing 'regime' is the combined use of explicit money and inflation targets. This combination was used by 24% of the sample, more than the combined total of inflation targets only (14%) and money targets only (5%). The use of dual targets is consistent with the view that targets sometimes represent benchmarks. Policy-makers use explicit targets because they find that it is better to have narrow objectives and explain misses, rather than having imprecise objectives that make success or failure difficult to measure.

Many authors assessing the international context of monetary frameworks have reinforced the message of compromise between explicit targets and flexibility. In summarising the debate between rules and discretion, Guitian reminds us that 'there is an exception to every rule'. Similarly Bernanke, Laubach, Mishkin and Posen (1999) describe inflation targets as 'a framework not a rule' and 'constrained discretion'.<sup>(5)</sup> And responses to our survey

This argument about the nature of the implementation of intermediate money targets does not necessarily conflict with the view that inflation is purely a monetary phenomenon in the long term.
 Although if inflation targeting implies rigid adherence to an inflation forecast, this may limit the scope for discretion even when policy does not attempt to hit the current inflation rate. Goodhart (1999) assesses how targeting future inflation may still leave scope for discretion in policy decision.
 Simons (1948) stresses the policy benefits of stable money rules, also promoted by Friedman (1960).
 See Guitian (1994), page 36, and Bernanke, Laubach, Mishkin and Posen (1999), pages 293 and 299.

illustrate the flexibility in money targeting. Indian policy-makers describe their framework as 'money targeting with feedback', and the Swiss respondent to our survey described their framework as 'money targeting with an escape clause'. The Swiss response also informs us as to how a central bank may implement such 'constrained discretion':

'Overall, money targeting provided a useful framework to explain current policy and deviations from targets. Target misses were explained in detail and attributed to specific shocks. Deviations resulted in a policy response but not necessarily within the same year. The combination between a long-term commitment to price stability and short-run policy discretion was reaffirmed in 1989 by the change from annual targets to multi-year targets. Since then the SNB [Swiss National Bank] has tried to use the flexibility provided by a multi-year target without letting the deviations get out of hand. The multi-year target itself may be described as an ideal path that would be valid in the absence of shocks, ie with output matching potential and inflation equal to the inflation target.'

The increasingly widespread use of explicit targets over the past decade reflects the progress of the debate between rules and discretion. Explicit targets can be used to demonstrate that a particular variable ranks high up the hierarchy of indicators, even if it is acceptable to miss the 'target'.

To improve the trade-off between flexibility and credibility, policy-makers have attempted to build flexibility into the design of targets. The designers of policy targets face a number of trade-offs in their attempts to produce an optimal indicator of policy. Yet there may be trade-offs between the target's comprehensiveness and its clarity (Cufer, Mahadeva and Sterne (1998)). Fry, Julius *et al* assess the use of differing target bandwidths, time horizons of targets, and exclusions of measurable components from target indices. The data from the survey illustrate highly diverse practices used in central banks. It is clear that even if attempts are made to design targets in such a way that provide for flexibility in policy, it would be difficult to specify a target that encompasses the entire range of shocks. Explaining

misses will inevitably remain important. So it is unsurprising that the increasing push towards explicit targets has been associated with greater efforts by central banks to explain policy.

# Summary and conclusions

Throughout the world, monetary policy objectives in the 1990s have become increasingly focused on more narrowly defined objectives that are consistent with central banks' statutory objectives of price and monetary stability. From the wealth of experience evident from the responses to the questionnaire, it is clear that explicit targets are being used more than at any time since Bretton Woods, and the publication of targets for domestic aggregates has never been more widespread. This represents a marked convergence in the approach to policy.

The results have illustrated that countries have been far more successful in minimising the deviation of outcomes from target than might have been expected on the basis of experience in the 1960s, 1970s and 1980s. This may be partly the result of a relatively low incidence of external shocks (such as hikes in commodity prices) that contributed to higher global inflation in previous decades. But it is also likely to reflect the value of an explicit target as a forward-looking guide to central bank action.

The variety of combinations of published targets and the varying degrees to which targets are met illustrate their possible use as either a pre-commitment or a communication device. Such diversity reflects widely differing economic and institutional circumstances in the various countries in the survey.

The greater use of explicit targets does appear to be part of a broader move to build credibility through transparency. In the long run, credibility is built primarily by actions and achievements. But a strong message from the survey is that defining objectives more narrowly, and making an effort to explain the outcome of targeted variables more clearly, can be an important contribution to central bank credibility and policy.

## References

- Alfaro, S and Schwartz, M (1999), 'Money versus inflation targets: the recent experience of monetary policy in Mexico', paper presented at workshop on Choice of Intermediate Monetary Policy Targets, Bank of England, November 1998, Centre for Central Banking Studies.
- Atingi-Ego, M (1998), 'The choice of intermediate monetary policy targets: the Ugandan case', paper presented at conference on Intermediate Monetary Policy Targets, Bank of England, December 1998, Centre for Central Banking Studies.
- Bernanke, B, Laubach, T, Mishkin, F, and Posen, A (1999), 'Inflation targeting: lessons from the international experience', Princeton University Press, New Jersey.
- Capie, F, Goodhart, C, Fischer, S and Schnadt, N (1994), 'The future of central banking', The Tercentenary Symposium of the Bank of England, Cambridge University Press.
- Christoffersen, P F and Doyle, P (1998), 'From inflation to growth: eight years of transition', *IMF Working Paper WP/98/100*.
- Cottarelli, C and Giannini, C (1997), 'Credibility without rules? Monetary frameworks in the post-Bretton Woods era', *IMF Occasional Paper*, No 154.
- Cottarelli, C and Giannini, C (1998), 'Inflation, credibility, and the role of the International Monetary Fund', *IMF Paper PPAA/98/12*.
- Crockett, A (1999), 'Monetary policy objectives in the light of the East Asian crisis', paper presented at workshop on Choice of Intermediate Monetary Policy Targets, Bank of England, November 1998, Centre for Central Banking Studies.
- Cufer, U, Mahadeva, L and Sterne, G (1998), 'Specifying an inflation target: the case of administered prices and other possible exclusions', paper presented at conference on Intermediate Monetary Policy Targets, Bank of England, December 1998, Centre for Central Banking Studies.
- Cukierman, A (1995), 'Towards a systematic comparison between inflation targets and monetary targets', in Leiderman and Svensson (ed), *Inflation Targets*, CEPR, London.
- Friedman, M (1960), 'A programme for monetary stability', New York: Fordham University Press.
- Fry, M J, Goodhart, C A E and Almeida, A (1996), 'Central banking in developing countries: objectives, activities and independence', London: Routledge, (1996).
- Fry, M J, Julius, D, Mahadeva, L, Roger, S and Sterne, G, 'Key issues in the choice of monetary policy frameworks in Industrial, Transitional and Developing Economies', in Mahadeva, L and Sterne, G (ed), *Monetary Policy Frameworks in a Global Context*, London: Routledge, forthcoming.
- Goodhart, C A E (1999), 'Some aspects of the operation of a Monetary Policy Committee', paper presented at workshop on Choice of Intermediate Monetary Policy Targets, Bank of England, November 1998, Centre for Central Banking Studies.
- Guitian, M (1994), 'Rules or discretion in monetary policy: national and international perspectives', in *Frameworks for monetary stability*, IMF.
- Haldane, A G (ed) (1995), Targeting Inflation, Bank of England.
- Haldane, A G and Salmon, C K (1995), 'Three issues on inflation targets', in Haldane (ed), *Targeting Inflation*, Bank of England.

- Hrnčíř, M, and Šmidkova, K (1998), 'Inflation targets in the Czech Republic', paper presented at workshop on Choice of Intermediate Monetary Policy Targets, Bank of England, November 1998, Centre for Central Banking Studies.
- **Issing, O (1997)**, 'Monetary targeting in Germany: the stability of monetary policy and of the monetary system', *Journal of Monetary Economics*, Vol 39 (1), pages 67–79.
- King, M A (1996), 'How should central banks reduce inflation?—conceptual issues', *Bank of England Quarterly Bulletin*, Vol 36(4), pages 434–48.
- McNees, S K (1987), 'Prospective nominal GNP targeting: an alternative framework for monetary policy', *New England Economic Review*, September/October 1987, pages 3–9.
- Poole, W (1970), 'Optimal choice of monetary policy instruments in a simple stochastic macro model', *Quarterly Journal of Economics 84*, May, pages 197–216.
- Simons, H C (1936), 'Rules versus authorities in monetary policy', *Journal of Political Economy*, Vol 44, February, pages 1–30, reprinted in his Economic Policy for a free Society, (Chicago: University of Chicago Press, 1948).

# **Financial sector preparations for the Year 2000**

# By the Year 2000 team of the Bank's Market Infrastructure Division.

Since early in 1998, the Bank of England has been publishing regular progress reports on the preparations of the UK financial sector for the Year 2000. Since these reports began, awareness of the technical and business issues relating to the Year 2000 problem has grown significantly, and most technical remediation and testing work in the UK financial sector has been completed. There is a high level of confidence within the sector that it will be 'business as usual' over the year-end. The Bank's most recent report therefore focused on other topics: preparations in other financial centres; the impact of the Millennium date change on financial market behaviour; and contingency planning and risk mitigation work.

In February 1998, the Bank of England published the first in a series of publications entitled 'Financial sector preparations for the Year 2000', commonly known as the Blue Book.<sup>(1)</sup> The series had three original objectives: to raise awareness of the Year 2000 problem<sup>(2)</sup> within the financial sector; to ensure that information about the specific initiatives of the financial sector is readily available; and to encourage the co-ordination of Year 2000 planning, especially by UK financial infrastructure providers, through this transparent process. Since the series began, awareness of the issues has increased considerably in all sectors and extensive preparations have been made. The principal objective has now increasingly become to build informed confidence about the United Kingdom's preparations, by explaining what has been done and what is planned. The Blue Book series, complemented by a Symposium on the topic held jointly by the Bank of England and the Financial Services Authority (FSA) in May, has reported widely<sup>(3)</sup> on these developments-both within the UK financial sector and overseas.

Some of the key issues covered in the most recent (fifth) issue of the *Blue Book*<sup>(4)</sup> are summarised below.

# **UK payment systems and banknotes**

The FSA has been monitoring the preparations of individual regulated institutions (which include exchanges, clearing houses and settlement systems), and reports regularly and publicly on aggregate levels of preparedness. The Bank monitors, and reports on, the preparations of some key sections of the UK financial infrastructure not directly regulated by the FSA, including payment systems and major payment card schemes. In addition, as the issuer of banknotes in England and Wales, the Bank takes a direct interest in the supply and distribution of its banknotes, and also reports on the preparations in Scotland and Northern Ireland.

The Bank has had a close involvement in the work undertaken on the main retail and wholesale payment systems (CHAPS, BACS and the cheque and credit clearing systems), both as a member and as the provider of central settlement accounts. Remediation of these systems, and testing the amended versions for correct operation in a Year 2000 environment, was completed by the end of 1998.

The Bank has also made arrangements to ensure that there will be an ample supply of banknotes to meet the needs over the Millennium period: it is expected that the normal seasonal peak will be higher than usual because of the extra bank holiday and expenditure related to the celebrations. More particularly, the Bank is working with banks, building societies, the Post Office and industry bodies to ensure that this supply will be available in the right place at the right time. The extra supply will be located where it is most likely to be demanded, and the banks are carefully monitoring local demand.

The Bank is not directly involved in the operation of payment cards, but has asked each of the major schemes in the United Kingdom to give details and documentary evidence of its Year 2000 preparations to be summarised in the Blue Book. Scheme preparations are now well advanced, with at least 90% of internal and member testing completed by 1 July.

Issues of 'Financial sector preparations for the Year 2000' have been published by the Bank in February 1998, May 1998, October 1998, March 1999 and July 1999. Each of these issues can be seen on the Bank's web site at www.bankofengland.co.uk. To be added to the mailing list for future issues (free of charge), send full contact details to: Bank of England 2000 Admin, Leycol Printers Ltd, 5 Hancock Road, London E3 3DA, United Kingdom, or fax them to 020-8880 6001.
 (2) The 'Year 2000 problem' can be summarised as concerns about the ability of computers to process dates correctly due to the Millennium date change and the leap year in 2000, and the implications should a key system fail to do so. For fuller details on the nature of the Year 2000 problem, please refer to the first issue of the *Blue Book*.
 (3) The mailing list for the *Blue Book* includes more than 30,000 names.
 (4) Published in July 1999.

The British Bankers Association, the Building Societies Association and the Association for Payment Clearing Services are distributing a leaflet that they produced jointly, aimed at reassuring bank and building societies customers that it will be business as usual over the Millennium including at ATMs.

# **Financial market behaviour**

Most market participants expect the financial markets to operate essentially as normal during the Millennium period, though activity may be reduced, as indeed is usual at year-ends. But participants are planning their operations over the Millennium period with care, because of the residual risk of system problems, or more particularly because of behavioural changes by counterparties, customers or suppliers. One indicator of concerns about the risk of year-end market effects is the Millennium 'spike' in the short-term futures market, which shows the amount by which the interest rate implied by the December 1999 contract differs from the average of the September 1999 and March 2000 contracts. The sterling spike fell steadily from its peak of more than 40 basis points in December 1998, to less than 5 basis points in June 1999. It picked up somewhat in all major financial centres as the year-end came within the six-month trading period, but it remains relatively small at 9 basis points on 22 July, considerably smaller than its peak in December 1998. This suggests that the markets still expect a smooth transition to the new Millennium.

The Bank has made it clear that it will, as always, ensure an adequate supply of liquidity in the sterling money markets during the Millennium period. To help plan its operations, the Bank has discussed with a range of market participants, both individually and via market associations, their own plans. Firms' planning covers liquidity management, collateral holdings, credit limits, relationships with counterparties and clients, and business activity over the period. Firms are reviewing credit relationships to satisfy themselves about the compliance of customers and clients, and are planning their liquidity and business activities to enable them to work through the date change in an orderly way. Subject to these constraints, they intend to maintain business as usual as far as possible over the year-end. Among the constraints that firms face in their planning is the availability of securities eligible for use as collateral in repo operations with the Bank. To ensure adequate availability, the Bank has taken steps to extend the list of eligible securities to include a wide range of euro-denominated securities issued by central governments in the European Economic Area, as well as certain other securities issued by the major international financial institutions. As a result of this process, from 31 August the pool of eligible securities will be enlarged by some £2 trillion, greatly easing collateral constraints.<sup>(1)</sup> Market mechanisms should therefore ensure that liquidity is distributed normally over the Millennium period to those who have made reasonable preparations and who disclose sufficient evidence of those preparations.

At present, the prospect remains one of orderly markets over the period. However, market participants still need to complete their own preparations and business continuity planning to help ensure this outcome. The Bank will continue to monitor the market closely, and is refining its own contingency preparations so that it can move quickly, if needed, to forestall any market strains.

# **International preparations**

The principal focus of the *Blue Book* is UK financial sector preparations. But there is also much interest in international preparations. The *Blue Book* series has reported on collective efforts by international organisations such as the Joint Year 2000 Council—a body composed of representatives of central banks and supervisors in most major regions of the world, and Global 2000—a group consisting of various members of the global financial community, who have joined forces to address the Year 2000 problem. The most recent issue also reports on preparations in twelve major financial centres.

Although the level of preparedness varies from country to country, those with major financial centres have tended to be among the best prepared. In practice there are relatively few direct connections between different countries' infrastructures, but there are a small number of critical pieces of international infrastructure on which there are separate reports in the Blue Book. In addition, countries are linked via common market participants, whose own systems are in many cases connected. A global test of payment systems on 12-13 June provided an opportunity for firms with international operations to test their systems simultaneously on a cross-border basis. None of the systems offering facilities to join this test experienced any problems, and participants reported the exercise to be useful in demonstrating cross-border compliance of their own systems.

# **Contingency planning**

The emphasis of financial sector preparations for the Millennium is now on contingency planning. Although the risks of material disruption are—as a result of extensive testing—now generally considered to be small, it is prudent both for individual firms and infrastructure providers to plan how to maintain business as usual, in case there are glitches in internal systems or knock-on problems from an external source. Contingency planning includes both risk mitigation, to reduce the chances or consequences of something going wrong, and a containment strategy to respond to any difficulties encountered.

Contingency planning for the Year 2000 need not necessarily be done from scratch. Firms can obtain good general advice from a variety of sources, and many firms already have contingency plans in place for other emergency situations, which makes full planning easier. But the unique nature of the Year 2000 problem means that existing plans must be scrutinised carefully, and not simply assumed to be sufficient. In practice, contingency plans cannot include detailed responses for all conceivable eventualities. They can, however, cover the main possible risks to the institution's critical processes, and a range of options available in different circumstances to deal with them.

One clear conclusion of current planning is that there needs to be a precise decision-making structure of appropriately senior and qualified people available promptly at critical periods, including over the Millennium weekend itself. In addition there should be computing staff on standby over the whole period. The planning process therefore needs to cover not only the action to be taken if problems occur, but also the resources that will need to be available.

A second clear conclusion is that communication is crucial. An agreed process is needed for sharing both routine and exception information, particularly around the key dates. There will be many parties involved in this process, with different interests and responsibilities. In the financial sector, both the Bank and the FSA will act as hubs for receiving information to carry out their own responsibilities. The Bank will be involved in testing payments systems and will, in particular, seek information from other infrastructure providers and from operational counterparties. The FSA will receive reports from regulated institutions. Both the Bank and the FSA will maintain direct contact with other bodies, such as governments and international sources of information. The detailed mechanisms for exchanging relevant information are still under discussion in various forums, including with the Cabinet Office in the United Kingdom and internationally under the auspices of the Bank for International Settlements in Basel.

There is clearly more work to be completed on contingency planning, and on the logistics of the Millennium weekend in particular. The Bank and the FSA will be working together to encourage information-sharing and the development of a consensus on best practice in this area.

# Conclusion

The UK financial sector started to prepare early for the Year 2000, and most testing and remediation work is now complete. With much work already undertaken on planning for the Millennium weekend itself, and on contingency arrangements to ensure continued operation of the financial infrastructure in the unlikely event of any major problems, there is now a high level of confidence within the sector that it will be able to maintain 'business as usual'. But it is important not to relax efforts to plan for the Millennium, and the extent of continuing work in the sector suggests that this is well understood. All financial sector infrastructure providers and participants are, to a greater or lesser extent, dependent on the preparedness of others, both inside and outside the sector, in the United Kingdom and abroad. This is a major aspect of risk mitigation and contingency planning work, and reinforces the need for good communication between individual firms, public and private sector bodies, and the public. It is important that this work continues and that vigilance does not slip, in the knowledge of all the work that has already been done.

# The Asian crisis: lessons for crisis management and prevention

In this speech,<sup>(1)</sup> Professor Brealey, special adviser to the Governor on financial stability issues,<sup>(2)</sup> discusses the succession of financial crises that swept through Asia, Russia and Latin America in 1997 and 1998, and the resulting considerable debate about both the role of the IMF and possible actions to limit further crises. Some have argued that international financial markets do not function well and are subject to periodic contagious panics that can be stemmed by an international lender of last resort. Professor Brealey argues that the IMF has neither the resources nor the superior information to fulfil such a role. However, there may be a need for an international financial institution that can use its leverage to secure policy changes in the affected countries. Professor Brealey also takes issue with the view that the IMF is simply bailing out imprudent international banks and that measures are needed to bail them back in again. He argues that the source of the Asian crisis lay in the real economy, but the effect of the crisis was greatly exacerbated by the financial structure of the affected countries. In particular, much of the risk was borne by domestic banks which borrowed dollars in the short-term interbank market and made longer-term loans in the local currency. Public policy needs to be directed to ensuring that the risks in emerging markets are distributed efficiently across foreign and domestic investors. That involves greater use of equity finance and structured debt.

# Introduction

Woody Allen in a graduation day speech remarked:

'More than any other time in history, mankind faces a crossroads. One path leads to despair and utter hopelessness. The other to total extinction. Let us pray we have the wisdom to choose correctly'.

The international financial institutions must have felt that they confronted a similar predicament when faced by the successive financial crises in Asia, Russia and Brazil. These events have prompted renewed debate about crisis prevention and resolution. In particular, it has been argued that the IMF should serve as an international equivalent of the domestic lender of last resort that can assist countries hit by a creditor panic or currency flight. The difficulties for the IMF in fulfilling this role are its relative lack of resources and the problem of distinguishing between the illiquid and the insolvent borrower. Moreover, as is shown later, the response of asset prices to the announcement of IMF assistance provides little encouragement for the view that the IMF's intervention helps countries to resolve a problem of financial panics. An alternative role for the IMF is to use its leverage to enforce policy changes on affected countries. This role does not assume that a country's creditors are subject to contagious panics, and the form and quantity of assistance that is needed to impose conditions are not the same as are required to stem a creditor panic.

The fact that IMF support has been a response to the withdrawal of funds by international banks (and capital flight by domestic investors) has led to concern that the IMF is simply bailing out the banks, and thus to calls for a redistribution of the burden. This view seems to be coloured by the assumption that international banking is not a competitive activity, so that the banks are able to collect economic rents from the IMF's assistance. Proposals for burden-sharing also assume that the form of private sector lending would be unaffected by attempts to 'bail in' the private sector. A related concern is that the prospect of IMF assistance to troubled countries leads to a moral hazard problem on the part of both lenders and borrowers. This moral hazard argument does not sit well with the huge losses that have been made by foreign investors in the affected countries, nor with the extreme reluctance on the part of borrowers to seek IMF assistance.

The strong limitations on the international community to resolve a major international financial crisis suggest that the focus of public policy should be on crisis prevention rather than resolution. It is foolish to look for a single panacea. Debate has focused inter alia on alternative exchange rate systems, the structure of banking and bank supervision in emerging markets, and on the systems of corporate governance and control ('crony capitalism'). Rather less attention has been paid to the issues of capital structure. It is clear, however, that the capital structures of governments, financial institutions and corporations contributed to the

This paper was originally published in the *Journal of International Finance* (1999), Vol 2:2, pages 249–72. Earlier versions of the paper were presented at an IFA Donor seminar at the London Business School and at the 1998 Capital Markets Conference in Stockholm. I am grateful for comments from Xavier Freixas, Andrew Haldane, Costas Kaplanis, Mervyn King, and Oren Sussman. The views expressed in the paper are, nevertheless, personal views and do not necessarily represent the views of the Bank of England.
 (2) Also of London Business School.

severity of the crises in the affected countries. In particular, the high levels of bank borrowing and the maturity and currency mismatches incurred by the banks endangered their solvency, and limited the policy responses of governments.

This paper is set out as follows. The first section provides a brief background to the Asian crisis and the events that led up to it. The next section discusses the role of the IMF and the related issues of burden-sharing and moral hazard. The third section turns to the topic of crisis prevention, and discusses the role of capital structure in reallocating the real risks in emerging market economies. The fourth section briefly reviews some of the policy implications, and the final section concludes.

# The Asian financial crisis

### The onset of the Asian financial crisis

The float of the Thai baht in July 1997 was the first step in a series of financial crises that first swept through Thailand, the Phillippines, Malaysia, Indonesia and Korea, and subsequently spread to Russia and on to Brazil. In each of the affected Asian countries, there was a substantial flight of capital, both by domestic and international investors. Foreign exchange reserves, which had been growing rapidly, were depleted even more rapidly, with Korea losing \$25 billion in usable reserves in just over a month. Throughout the region governments attempted with little success to stem this pressure on reserves by increasing short-term interest rates; rates in Indonesia rose to over 80%. The capital flight resulted in a remarkable period of turbulence in the foreign exchange markets. Volatility in the rupiah, which had been a fraction of 1% per day under the crawling peg, reached 12% per day,(1) roughly the annual volatility of most Western equity markets. By its low point in 1998, the rupiah had lost 80% of its value in nominal terms and about 70% in real terms. Each of the other affected Asian currencies depreciated by more than 38%.

Many of the crisis countries found themselves in a debt trap, where the cost of rolling over loans forced them into spiralling debt levels and public sector deficits. In such cases, the reduction in wealth which would be needed to escape from such a trap was politically infeasible. Raising interest rates to protect the currency increased the burden of servicing domestic government debt and drove the government into yet larger deficits, while allowing the currency to depreciate increased the cost of foreign currency debt and threatened the solvency of the banking system through which much of the debt was channelled.

Concerns over possible defaults caused the spread over US Treasuries to widen to between 8% and 18% for the affected Asian countries. Each country also experienced a run on the banks. Since the second half of 1997, several

hundred financial institutions have been closed down, suspended or nationalised, and recapitalisation needs are estimated to range between 18%-34% of GDP for the crisis countries.

The consequences for all the affected countries have been severe. In 1998 GDP fell by 14% in Indonesia and by an average of more than 7% in the five affected Asian countries, although income per head was still substantially higher than at the start of the decade. Around \$120 billion of capital has left these countries. Would-be borrowers in many developing countries have been effectively cut off from access to the capital markets, while liquidity has been severely affected and spreads have increased. The losses to foreign creditors and equity investors in East Asia and Russia amount to an estimated \$350 billion.<sup>(2)</sup>

The East Asian story has since been more or less repeated in the other crisis countries. In each case, capital flight has put pressure on reserves, which the government has attempted to fight with very high domestic interest rates and fiscal restraint. The depth of the problem in Russia and the reluctance of the government to pass needed reforms has resulted in a debt moratorium and *de facto* default.

#### The seeds of the crisis

What was so surprising about these events at the time was that many of the countries had seemed to be models of economic success. In the words of one commentator, 'From 1945 to 1997 the Asian economic miracle fueled the greatest expansion of wealth, for the largest number of persons, in the history of mankind'.<sup>(3)</sup> In the affected Asian countries, growth in real GDP had averaged 7% a year since 1990, with relatively little pressure on consumer prices. Brazilian real GDP grew at an annual rate of 4.5% between 1993 and 1996, while in five years inflation fell from 2,500% to less than 3%. Even Russia appeared to be making progress. Inflation in 1997 was below 15%, compared with nearly 900% five years earlier. The rouble had stabilised, and GDP grew slightly in 1997 after declining in each of the previous five years.

However, it is easy with hindsight to see that the seeds of the emerging market crisis of 1997-98 were sown earlier in the 1990s, when improvements in the access to financial markets and apparent high returns on investments caused a surge of capital inflows into many emerging markets. By 1996, the total net private capital inflow to the affected Asian countries had reached \$73 billion dollars, up from just \$25 billion six years earlier.

The risks involved in this huge capital inflow to Asian emerging markets were exacerbated by the fact that most of it was in the form of bank debt. In 1996, the year preceding the Asian crisis, 61% of the capital flows to the affected countries consisted of bank lending.<sup>(4)</sup> Most of the external

International Monetary Fund (1998a). Institute of International Finance, press release April 13, 1999. Jackson (1999). Institute of International Finance (1999a).

debt was contracted by the private sector and, except in Indonesia, the money was largely channelled through local banks that relent the money to local businesses. Net interbank borrowing by banks in the five most troubled Asian countries amounted to about \$43 billion annually during 1995 and 1996. Most of this lending was denominated in dollars. Foreign bank debt amounted to 45% of GDP in Thailand, 35% in Indonesia and 25% in Korea. This debt generally had a maturity of less than one year.<sup>(1)</sup> In contrast, the average maturity of the loans made to local companies by the banks was longer than a year and the loans were commonly denominated in the local currency. Thus banks assumed both a maturity mismatch and a currency mismatch. In Thailand, where there are restrictions on the open foreign exchange positions of banks, the banks limited their currency risk by relending in dollars. However, since their clients did not have the foreign currency earnings to repay these debts, the banks simply traded a currency risk for a credit risk.

During the 1990s, bank credit in most Asian countries grew rapidly, by between 12%-18% per annum in real terms. In many countries, this resulted in large exposures to particular sectors, notably property,(2) and to overconcentration of lending to single borrowers. In Korea, the average book debt-to-equity ratio of the corporate sector reached nearly 200% and the top 30 chaebols had a debt-equity ratio of more than 400%. This is despite the fact that even before the onset of the crisis these chaebols were barely profitable.<sup>(3)</sup> The weakness in the banking system was (as so often) hidden by the gap between the book and market value of the loans. Moody's has estimated that in Indonesia, the proportion of loans that are non-performing could be as high as 75%. In Korea, non-performing loans may amount to 150 trillion won.

Most currencies were pegged principally against the dollar, despite the fact that a high and increasing proportion of external trade was with countries in the Asian region. These currency pegs had the effect of disguising the risks involved in the foreign currency loans, and offered apparent low-risk profits on investment in local fixed interest markets. Thus the capital inflow partly reflected 'arbitrage' activity by banks and investors, who were able to borrow dollars and relend in the local currency at a profit, as long as the peg to the dollar was maintained. The currency peg also meant that the risk was largely a jump risk, where the high probability of a small profit disguised the smaller chance of a substantial loss. Thus, when the currencies began to depreciate, there was little opportunity for banks to take corrective action by lifting their positions.

What made the currency pegs unsustainable was the sharp fall in the growth in exports from the region. This stemmed from a combination of an appreciation in the real exchange rates, particularly relative to the yen, together with the weak Japanese economy, increasing competition in export markets from China and Mexico, and excess capacity in many exporting industries such as the semiconductor, petrochemical and automobile industries. By 1996 the current account deficit in the five Asian countries had reached \$55 billion.

## The international response to financial crises

The events of 1997-98 have prompted increased debate about the international response to such financial crises. This section considers the role of international institutions in crisis prevention and management. Specifically, it seeks to answer the following questions:

- What is the role of the IMF?
- Who benefits from IMF assistance?
- How should the burden be shared?
- How serious is the problem of moral hazard?
- How can the IMF help with crisis prevention?

#### What is the role of the IMF?

The IMF was established in 1947 to buttress the Bretton Woods's system of fixed exchange rates, and was intended to provide temporary assistance in the event of destabilising speculation and consequent balance of payments difficulties. But its role has changed to one of engineering major structural reforms and providing assistance in the face of possible default on international loans.

Much of the debate on the effectiveness of the IMF in the recent international crises has centred on the appropriateness of its programmes. But there have also been more fundamental questions about its role in crisis management and prevention. Why would the private sector not be prepared to lend to affected countries at 'fair market rates'-is there an imperfection in the private capital markets that justifies the existence of an international lender of last resort? Are there multiple equilibria in financial markets, so that a simple nudge from an international financial institution could transport us safely from a bad equilibrium to a good one? Unless these questions can be answered, we do not know whether an IMF is needed at all, or in what circumstances and in what form it should provide assistance.

The following quotations illustrate the sharp divergence of opinion over these issues:

'The crises have brought home the absolute indispensability of the IMF as the core provider of emergency, conditioned international support to countries in financial difficulty.... Without the IMF, even those countries that are committed to reform might face default... which could have devastating effects on their own economies and significantly raise the risks of contagion in other markets.' Larry Summers (1998).

<sup>(1)</sup> In a probit analysis of financial crises in emerging markets, Radelet and Sachs (1998) find that the ratio of short-term debt to reserves is strongly

In 1996, property lending as a percentage of total lending was 25% in Malaysia, 20% in Indonesia, and 18% in Thailand (International Monetary Fund, 1998b).
 Fund, 1998b).

<sup>(3)</sup> For example, in early 1997 six chaebols filed for bankruptcy (International Monetary Fund, 1998b)

'... the question is whether there is a need for an agency that will act as lender of last resort for countries facing a crisis. There is such a need: it arises both because international capital flows are not only extremely volatile but also contagious, exhibiting the classic signs of financial panics, and because an international lender of last resort can help mitigate the effects of this instability, and perhaps the instability itself.... I will argue not only that the international system needs a lender of last resort, but also that the IMF is increasingly playing that role and that changes in the international system now under consideration will make it possible for it to exercise that function more effectively.' Stanley Fischer (1999).

'IMF resources have been used to 'bail out insolvent emerging market banks and international bank lenders'. The costs have been (1) undesirable redistributions of wealth from taxpayers to politically influential oligarchs in developing economies; (2) the promotion of excessive risk-taking and inefficient investment; (3) the undermining of the natural process of deregulation and economic and political reform which global competition would otherwise promote.' Charles Calomiris (1998).

'The role of a lender of last resort is not to bail out failed banks. Its job is to assure that solvent financial institutions do not fail because of lack of liquidity.... Since 1971, the IMF has been looking for new things to do. It has now solved its problem by creating moral hazard, allowing international banks to avoid the risks they undertake by imprudent lending. The IMF encourages the behavior that creates the problems.' Alan Meltzer (1998).

In common with most advocates of active IMF involvement. both Summers and Fischer emphasise the danger of 'panics' in financial markets and of consequent 'contagion.' By contrast, Calomiris and Meltzer place more weight on the dangers of moral hazard that result from the prospect of an IMF 'bail-out.'

One of the roles envisaged for the IMF, and suggested in Stanley Fischer's 1999 paper, is as an international equivalent of the domestic lender of last resort.<sup>(1)</sup> The function of the domestic lender of last resort is to prevent destabilising runs on the banking system. One way that this could arise is from a liquidity mismatch. For example, a bank may be solvent as long as all depositors agree to maintain their investment, but subject to a run if each depositor is concerned that others are about to withdraw their cash. This possibility stems from the fact that depositors cannot coordinate their actions. One solution is to establish a benevolent lender of last resort, that can prevent such runs simply by standing ready to provide whatever liquidity is needed.<sup>(2)</sup>

In practice, pure liquidity panics are rare and bank runs are more often motivated by insolvency worries. Here also

problems may arise because depositors are unable to coordinate their actions or pool their information. For example, each depositor may rationally draw inferences about the bank's solvency from the actions of the other depositors. So a small initial loss of deposits can lead to a cascade of withdrawals.<sup>(3)</sup> If a lender of last resort has superior information or can pool the information available to individual depositors, it may be able to distinguish a bad cascade from a good cascade and nudge the market towards the appropriate outcome.<sup>(4)</sup>

The liberalisation of the world's capital markets in the last twenty years has led to large capital flows into and out of emerging markets. While this is not necessarily a cause for concern, it may leave countries exposed to the type of liquidity or information-motivated panics that are used to justify a domestic lender of last resort. An international lender of last resort is clearly not necessary to protect a country's banking system against runs on its domestic book, but may, for example, be needed where banks have large foreign currency books.

This view, that there is an important role for an international lender of last resort, relies heavily on the view that financial markets are prone to bubbles, panics and contagion. However, while models of rational multiple equilibria that produce bubbles and panics may be fun to construct, it is not clear that they work better than simpler models. For example, surveys of bank runs suggest that these runs generally reflect shared and justified worries about the bank's solvency, and that well-capitalised banks are not subject to runs (see, for example, Kaufman (1994)). If financial markets do function well most of the time and aggregate information efficiently, then the capital withdrawals that have been experienced in a number of emerging markets are more likely to indicate basic structural weaknesses in the country's banking and exchange rate system than a failure of coordination between lenders. Thus the case for an international lender of last resort depends heavily on the lender's access to superior information on the solvency of the country's banking system.

Unlike a domestic lender of last resort, the IMF's ability to respond to a liquidity run is limited by its lack of resources. For example, between 1992 and 1996 the net amount disbursed by the IMF under the Standby Arrangements and Extended Fund Facilities was about \$18 billion. During the same period the total net private capital flows to emerging markets was more than \$1 trillion. The events of 1997-98 led to an increase of two thirds in the IMF's net lending. Nevertheless, at the end of January 1999 the total amount owing to the IMF under Standby Arrangements and Extended Fund Facilities was still only \$41 billion, far smaller than the amount of private capital that has been withdrawn from emerging markets.

<sup>(1)</sup> (2)

See also Sachs (1995). The role of a lender of last resort in preventing liquidity runs was first suggested by Thornton (1802) and developed by Bagehot (1873). A formal model of bank runs is provided by Diamond and Dybvig (1983). For early models of rational cascades, see Banerjee (1992) and Welch (1992). It is also sometimes argued that an international lender of last resort is needed to counter attempts at market manipulation, or irrational speculation that leads to excess volatility in asset prices.

This lack of resources may be less crucial in the case of a solvency run. If the IMF does have superior information that allows it to distinguish between solvent and insolvent countries, then its willingness to put its money where its mouth is could serve as an important signal to the private sector. Such a signal could bring large welfare gains to the country in the form of reduced costs of further private sector credit (and an unrecoverable windfall gain to the value of existing loans by private sector banks).

Unfortunately, the signals provided by the IMF's involvement are likely to be mixed. Recourse to the IMF generally occurs only when the patient is in need of intensive care. As Radelet and Sachs (1998) suggest, the 'arrival of the IMF gives all the confidence of seeing an ambulance outside one's door.' So news that the IMF is willing to provide assistance may be overshadowed by the news that the country needs it. Moreover, even if the IMF is particularly well qualified to assess country prospects, it is often under strong political pressure to extend assistance to borrowers, such as Russia, where there are clear doubts about the country's ability to service its debts. This muddies the signal provided by IMF assistance.

An alternative rationale for the IMF is that while private sector lenders may wish to impose conditions on the local government, they find it difficult to do so. Thus the IMF may be able to attach conditions that would be impossible for the private sector.<sup>(1)</sup> If this is the case, there could be an overall welfare gain. Of course, this raises the question as to why the government could not voluntarily bind itself to the same courses of action at the time that the loan is needed. The answer may lie partly in the difficulty of specifying these actions ex ante (hence the use of staged IMF lending), or in the fact that a populist government may find it easier to justify to its citizens conditions that have been imposed by an external body. The fact that the required reforms are packaged with IMF lending both allows the IMF to exert leverage and provides an incentive for it to monitor the implementation of the reforms. However, the gains in this case may be linked only weakly with the extent of the support.

These two models of the IMF's role do not sit happily together and have different implications for the form of its assistance. For example, there is little place for staged lending or conditionality for a lender of last resort, whose function is to stem a panic resulting from liquidity or solvency concerns. On the other hand, staged lending is an essential tool for enforcing policy changes.

#### Who benefits from IMF assistance?

It is not easy to measure the effect of IMF programs, and more often than not the debate is liable to get mired in counterfactual speculation about what might have happened in the absence of support. An alternative approach is to focus on changes in asset values at the time of the announcement of IMF assistance. In some ongoing research with Evi Kaplanis of LBS I have been looking at the relative performance of equities, bonds and currencies in the weeks surrounding the announcement of IMF support.<sup>(2)</sup> The results are preliminary, but they suggest three things:

- (1) During the two years preceding the announcement of support, there is a sharp relative fall in equity prices in the affected countries. Bond prices and exchange rates also decline sharply, though this fall is over a shorter period.
- (2) In the days immediately following the announcement of IMF support, there is no statistically significant change in the value of each asset class.
- (3) In the months following the announcement of IMF support, asset prices show little abnormal movement. This is exactly what any believer in efficient markets would predict, but it does not support those who believe that markets are seized by irrational panics that cause them to overshoot.

If these results stand up to further analysis, then it is difficult to argue that the IMF decision to provide assistance is an important signal as to the health of the beneficiary, or that it provides information to the markets about the recipient's willingness to accept desirable reforms. However, the tests are insufficiently powerful to determine whether there is a gain in asset values that exceeds the very limited degree of subsidy in the IMF assistance.

# How should the burden be shared?

IMF assistance is typically a response to a flight of private capital from the affected country. Often the cash helps the country to repay maturing debts. This has prompted concern that the IMF is simply bailing out the international lending banks and that there should be some form of burden-sharing.

It seems unlikely that IMF aid simply goes into the pockets of the international lending banks. International banking is a highly competitive activity and the prospect that IMF support may be available in the event of difficulties is likely to be reflected in the interest rates that banks charge. Of course, in this case IMF assistance would be simply a form of aid, the benefits of which are shared between the fortunate countries that do not subsequently require assistance and the unfortunate ones that do.

If IMF assistance enables countries to repay maturing bank debts, any unanticipated announcement of assistance would result in an increase in the value of the equity of lending banks. In practice, there do not appear to be any abnormal returns in equity prices of international banks, which may

<sup>(1)</sup> The IMF's experience in dealing with crisis situations may also give it an important consultancy role in determining the appropriate policy response.

Returns are measured relative to returns on similar assets in a sample of emerging markets. The results of the exercise are similar regardless of whether the announcement date is defined either by a news or press release by the IMF, or by press comment that may precede such a release.

suggest either that the IMF assistance is regarded as an automatic response to a balance of payments crisis and is therefore fully anticipated, or (more likely) that the news of IMF assistance percolates slowly and the amount of the subsidy is too small to observe.

If IMF support does result in an increase in the value of private sector debt, the IMF could try to recapture some of these value enhancements by arranging, for example, a moratorium on private sector debt. Certainly, the IMF may have a coordinating role between private lenders, in cases where they have a common interest in renewing their lines. This is the crisis manager role that has been described by Stanley Fischer (1999). However, the suggestion of compulsion would not sit well with the arguments that have been made for an international lender of last resort. If private sector lenders are reluctant to continue to lend even when the IMF has offered assistance, there is a message that one would do well to heed.

If some form of enforced 'burden-sharing' was anticipated, it would be reflected in higher interest rates on developing country debt. It is also dangerous to assume that the structure of private sector lending would be independent of attempts to recapture any value enhancement. In particular, lenders would have an incentive to structure the debt to make it easier to exit before the imposition of a moratorium. This is exactly the opposite of the financial structures that one would like to see in developing countries.

#### How serious is the problem of moral hazard?

Critics of the IMF's role commonly contend that the prospect of IMF assistance leads to a moral hazard problem. International banks, it is suggested, are tempted to lend recklessly to emerging markets, and the governments and banks in these countries are tempted to borrow excessively. The first point to make is that this does not necessarily reduce social welfare; it is arguable that, given the underdeveloped equity markets in developing economies, these countries have suffered from a shortage of risk capital rather than an excess. While this suggests the need to encourage the supply of equity capital, the existence of an international financial institution that partially underwrites the risk of the lending banks may serve as a second-best solution to the shortage of risk capital.

There is little doubt that the prospect of IMF assistance creates a potential moral hazard, but, while it is difficult to provide convincing evidence, it seems likely that the danger is often overstated. The subsidy in IMF loans is negligible compared with the losses that have been suffered by investors in East Asia, Russia and Brazil. Neither the promised yields nor volatility of emerging market debt is consistent with the notion that investors regarded these loans as low risk. Nor does the rapid capital outflow at the onset of a crisis suggest that investors were confident of being bailed out if they maintained their positions. Given the heavy losses that investors have taken on their emerging market books, their caution was right.<sup>(1)</sup>

Nor is it clear that the debtors take much comfort in the prospect of IMF assistance. Not only are governments generally reluctant to call on IMF help, but the financial crises in these markets typically impose considerable costs on all the country's citizens. In almost all cases, the appeal for IMF assistance has led to considerable domestic unrest, a fall in the government, and a change in the governor of the central bank. It is difficult therefore to believe that politicians and business people are tempted to pursue reckless policies in the belief that they will not suffer the consequences.

# The role of the IMF in crisis prevention

Financial crises have resulted in large wealth losses, but there is relatively little that the IMF can do to replace this lost wealth. Despite the popular image of huge bailouts, the subsidy provided by the IMF (or 'burden', in the eyes of its critics) is negligible compared with the wealth losses that the borrowing countries have experienced. This suggests that prevention of international crises should take precedence over cure.

An interesting issue is how far the IMF can play a role beyond that of an experienced consultant. One problem for the IMF has been that countries are reluctant to seek assistance and do so only as a last resort. This shows up in the preceding asset returns. For example, over the two years before a country seeks IMF support, equity prices on average experience a relative decline of 35%. In the case of bank stocks the relative decline is about 40%. It is possible, therefore, that the need for IMF assistance would be reduced if countries could be encouraged to make earlier policy changes. This seems to be the motive behind President Clinton's proposal for contingent credit lines.

Unfortunately, it has proved difficult to devise a scheme that maximises the Fund's ability to influence economic policies without at the same time risking excessive strain on the Fund's resources. Suppose, for example, that the IMF offered a committed line of credit that would be rolled over as long as the country continues to follow IMF-approved policies. A country that entered into such an arrangement would be induced to follow the agreed policies because it wished both to maintain the insurance of the line of credit and to avoid the negative signal associated with a refusal to renew the line. However, such a scheme would also leave the IMF with a potentially large open liability. It is probably for this reason that the agreed facility does not involve a firm commitment on the part of the Fund. Instead, loans under the facility will depend on the health of the IMF's resources,<sup>(2)</sup> evidence that the country is the victim of 'contagion' that is largely outside its control, and the country's willingness to pursue a further agreed set of policies. By seeking to retain leverage at the time that the

Share prices of banks with large exposures to emerging markets have also reflected investor concern about potential losses.
 The agreed contingent credit line scheme envisages that a country will normally have access to between 300% and 500% of its Fund quota.

funds are released, the IMF is giving up most of the leverage at the time that the facility is entered into and is reducing the incentives for any country to apply for the facility. Thus, in the trade-off between exerting leverage and retaining flexibility, the Fund has placed almost exclusive emphasis on flexibility.

# Crisis prevention and the lessons from the Asian crisis

We argued above that there are strong limitations to the ability of any international financial institution to resolve a major financial crisis, and that the focus of public policy should be on prevention rather than cure.

Debate about possible policy responses has focused on a number of issues. First, part of the blame for recent financial crises has been laid at the door of pegged exchange rates and this has led to the view that countries need to choose between freely floating currencies on the one hand and currency boards or enlarged currency areas on the other.<sup>(1)</sup> Second, the substantial capital flows to and from the affected countries have prompted concern about excessive speculation and raised the question of whether governments should throw sand into the speculative works in the form of a Tobin tax or capital controls.<sup>(2)</sup> A third set of issues centres on corporate ownership and governance in the affected countries, as it has been argued that discipline has been weakened by the degree of conglomeration in corporate structures and the close relationships between non-financial corporations and banks.(3)

This paper bypasses these issues and focuses instead on the role of capital structure in the recent financial crises.

#### Capital structure and the distribution of risk

One of the main lessons of recent events centres on the distribution of risk. The Asian crisis occurred first in the real economy, where huge overcapacity and increasing costs led to a sharp fall in profitability. The crisis in the real economy showed up in the financial sector in the form of large capital outflows, falling asset prices and insolvencies in financial institutions. There are always likely to be shocks in the real economy, but countries and their institutions can adopt financial structures which ensure that the consequences of these shocks are distributed efficiently. Two features of the financial structure in the affected Asian countries were a particular source of difficulty:

Many of the banks borrowed dollars and reinvested in domestic currency loans. Their willingness to do so

was enhanced by their belief that the governments were committed to maintaining the currency pegs. Some banks believed that they had hedged the currency risk by also making dollar loans to local companies. But, since the borrowers had no dollar income with which to repay these loans, the banks found that they had merely substituted credit risk for currency risk.

The currency mismatch was also accompanied by a maturity mismatch, with banks funding in the short-term interbank market and then relending at longer maturities. Thus banks faced a problem of rolling over existing loans as they matured, and could do so only on very unfavourable terms. Governments also funded themselves with very short-term debt, so that they too were faced with the problem of rolling over maturing loans at very high rates. This created a conflict between the need to reduce the government deficit and the need to raise interest rates to protect the currency and thus the cost of foreign currency debt, much of which was incurred by the banking system.

The choice of financial structure is largely a problem of risk distribution. Capital can be provided either in the form of equity or of debt. The heavy reliance on debt finance by many East Asian companies meant that only a small reduction in profitability was needed to produce financial distress and default, the costs of which were borne largely by local banks. This points to the need to improve the supply of equity in these countries. This is particularly important in the case of capital inflows. Since developing economies are often relatively undiversified, foreign equity ownership has the advantage of spreading risk more widely.

Foreign equity investment can be either in the form of portfolio investment or direct investment. Portfolio investment is more easily reversed than direct investment. Thus heavy net purchases of East Asian equities by foreign investors were replaced by modest net sales in 1997.<sup>(4)</sup> Although these sales were necessarily taken up by domestic investors, many of the foreigners who sold their stock converted the proceeds to dollars and this contributed to the pressure on exchange rates. In contrast to portfolio investment in equities, foreign direct investment in the affected Asian countries declined only modestly, while for Asia as a whole it actually increased.<sup>(5)</sup>

Unlike equity, debt brings with it the risk of default, but debt instruments may differ in a number of ways that affect the allocation of risk:

Currency. The recent financial crises have highlighted the risks for governments, banks and industrial

If financial crises are a consequence of fixed exchange rates, then it is arguable that the IMF should abandon its traditional role of providing funds to countries to defend a currency peg. This view was expressed forcefully by Robert Rubin (1999).
 For a discussion of the role of capital controls see, for example, Dooley (1996) and Eichengreen, Mussa, et al (1998).
 For discussion of the role of capital controls see, for example, Dooley (1996) and Eichengreen, Mussa, et al (1998).
 For discussion of the role of capital controls developed and Zingales (1998).
 Institute of International Finance (1999b).
 While foreign direct investment accounted for about half of private capital inflows into all emerging Asian markets before the crisis, it accounted for only about one sixth of the private flows to the affected countries. This difference between the liquidity of direct and portfolio investment may go some way towards explaining why some countries were relatively insulated from the shocks that affected other parts of the region. For example, while China shared the problems of a chronically weak banking system, an ovegeared corporate sector, excess capacity in many industries, and a sharp expansion of domestic credit, the ratio of foreign direct investment to financial investment in China was substantially higher than in the most affected countries (Lardy 1999). As a result, China did not experience the capital outflows of its neighbours.

companies of unmatched foreign currency borrowing. Clearly, loans between different currency zones must always involve a currency risk for some party, but it is undesirable that these risks should be concentrated in the developing country, and particularly in its banking system.

- Maturity. Borrowers that finance with a succession of short-term loans must roll over their loans at rates that reflect their changing credit risk. As the debt maturity is lengthened, more of that default risk is passed to the lender. Thus long-term debt effectively provides the borrower with insurance against a rise in the default premium. Of course, such insurance does not come free, for the lenders will charge a higher rate of interest on long-term risky loans (Merton 1974).(1)
- Guaranteed lines of credit. A related mechanism for risk-shifting involves guaranteed lines of credit. For example, a group of foreign banks have entered into a firm commitment (ie without a 'material adverse change' clause) to lend Argentina up to \$7 billion against collateral at 200 basis points above Libor. Similarly, Mexico has arranged a simple overdraft facility for about \$3 billion. In both cases the governments paid a commitment fee and in exchange the banks took on the risk of movements in the default premium.
- Interest rate. Long-term variable-rate debt shifts the risk of changes in the default premium from the borrower to the lender. With long-term fixed-rate debt, both the default premium and the risk-free interest rate are fixed. In the case of corporate debt, the impact on risk depends on the effect of interest rate changes on the value of the firm's assets. However, since major financial crises typically involve both a sharp rise in real interest rates and a fall in the nominal value of corporate assets, the issue of fixed-rate debt avoids the prospect of an increase in debt-servicing costs at a time of declining profits.

Since increases in the domestic short-term interest rate are a common response to a financial crisis, long-term fixed-rate government debt frees the government from the conflict between raising interest rates to protect the currency and holding down its borrowing costs. Governments have a further reason to prefer the issue of fixed-rate, long-term debt, since it plays a role for governments similar to that of equity. Governments have uncertain income. If there is an unanticipated fall in the real value of this income stream, then the government can seek to recover the deficit from its citizens in the form of higher taxes or poorer services. However, particularly in developing countries, it may be infeasible to require the citizens to bear all the risk

of the government's activities, so that the bondholders may need to take on part of that risk. The interest rates adjustment that is needed to enforce real wealth losses on the bondholders is much smaller if the government is financed largely by long-term nominal debt denominated in its domestic currency.

- Call provision. Call provisions on bonds may have both a signalling and an incentive effect, since a borrower that is prepared to pay a premium for the right to repay early has an incentive to maintain the value of its debt, and credibly signals its confidence that it can do so.
- Structured debt. Structured debt makes it possible to tailor debt service more closely to the borrower's ability to pay. This may be particularly important for sovereign governments that cannot issue equity directly. One possible response, suggested by the insurance industry, is to issue catastrophe or 'forgiveness' bonds, the payments on which are reduced in the event of a defined catastrophe. An alternative is to index the debt service to some measure of economic output. Thus Mexico has issued oil-linked bonds, while Bulgaria has issued GDP-indexed bonds. A somewhat simpler solution is to combine an issue of straight debt with simultaneous commodity or equity swaps. For example, a government could gain considerable protection against the effects of an economic crisis by entering into an equity swap whose payments are linked to the level of its domestic equity index.(2)
- Debt conversion. Debt brings with it the risk of default, and in countries where the bankruptcy code is undeveloped or its application unpredictable, this may raise the cost of debt. A somewhat unconventional solution might be to develop debt that converts automatically to equity as the value of the borrower's assets declines. Since the role of bankruptcy codes is to ensure the orderly transfer of ownership to the debt-holders in the event of default, such a security would build the bankruptcy mechanism directly into the debt contract and would therefore substitute for local bankruptcy law.
- Securitisation. The Asian crisis highlighted the problems caused by domestic banks which acted as intermediaries between international lending banks and local corporate borrowers. The cost of financial distress in the corporate sector therefore fell first on the local banking system. This could be avoided if the debt was securitised or was raised directly from the overseas banks.

We have argued that the financial crisis in Asia was exacerbated by the countries' financial structure, notably the

Note that this does *not* imply that longer-term debt raises the cost of capital for emerging markets. Capital structure irrelevance propositions are not violated simply by changes in debt maturity.
 An alternative which would largely eliminate the possibility of moral hazard would be to link payments to a regional equity index.

high degree of corporate leverage, the dominance of local bank financing and the currency and maturity mismatch of this bank lending. The result was that risk was poorly diversified and unduly concentrated on the country's banking system. There is no single optimal capital structure for either corporations or governments. We cannot say, for example, that local currency debt is always less risky than foreign currency debt, or that fixed-rate debt is preferable to variable-rate debt. Our discussion, however, illustrates the importance of both the level and design of debt in allocating risk.

Notice that changes in capital structure redistribute risk, and can therefore mitigate the consequences of future wealth losses. But the time to redistribute risk is before losing all your wealth. The bankrupt gains little by resolving never to go to the casino again. Once the losses have occurred, they cannot be recovered by voluntary debt restructuring. Voluntary restructuring can shift the time pattern of cash flows and their risk; it cannot affect value. It is part of crisis prevention; it has little role to play in crisis resolution.

# **Policy implications**

In this section we sketch some of the policy implications for developing countries, most of which flow fairly directly from our analysis of the issues. We begin with the role of foreign capital.

Since a high proportion of foreign investment in developing countries has been in the form of short-term debt, it has provided little risk pooling and has led to substantial capital outflows with an associated pressure on reserves. Policy, therefore, needs to be aimed at increasing the proportion of foreign capital that is in the form of foreign direct investment or equity portfolio investment. In particular, liberalisation of foreign direct investment or inward equity portfolio investment needs to be undertaken in parallel with that of short-term banking flows.

There are some encouraging indications that an increasing proportion of foreign capital in emerging markets is of a long-term nature. For example, foreign direct investment in emerging markets has increased by 30% a year since 1990, and by 1997 had reached nearly 50% of private capital inflows to emerging markets (though it remained relatively unimportant in South East Asia).<sup>(1)</sup> Foreign direct investment depends partly on the absence of government constraints that are often designed to protect particular local industries, but it is also heavily dependent on a benign political, legal and institutional infrastructure.

Since 1980 an increasing fraction of the indirect investment in emerging markets has been securitised, with the result that both equity and bond investment have grown at the

expense of bank lending. This has had two advantages. While these portfolio flows have been more volatile than direct investment, they are at least more stable than short-term banking flows. Also, proportionately more of the risk has been borne by foreigners and thereby pooled. In some countries, the growth in foreign equity investment has been hampered by direct restrictions on ownership. For example, before May 1997 foreign equity investment in Korea was inhibited by the fact that investors as a group were not permitted to hold more than 20% of the shares of any Korean firm.<sup>(2)</sup> But, even where there have been no such formal constraints on foreign equity holdings, investment has been restricted by the costs of accessing overseas markets. There are various actions that may help to cut these access costs. For example, trading costs could be reduced by making it easier for firms to list on overseas exchanges and by deregulating the domestic exchanges. Other (and potentially much larger) costs arise from the difficulties of acquiring information about an overseas market and therefore depend, among other things, on the quality of accounting data and the regulation of trading activity. The growth of specialist country funds suggests that investing through such funds may have helped to economise on the costs of collecting information.(3)

We have stressed the role of short-term bank loans in the Asian crisis. Such short-term loans shift risk from the lender to the borrower, who must take on the uncertainty about the default premium when the loans are rolled over. Therefore, contrary to some recent suggestions, the regulatory authorities who are responsible for the solvency of the *lending* banks have no reason to encourage them to increase the maturity of their interbank loans. However, the regulators for the *borrowing* banks do need to be concerned about both the maturity and currency mismatch of the bank portfolios. Moreover, the heavy sectoral concentration of these loan portfolios and the very high leverage of many corporate borrowers emphasise the need for much stronger supervision of the lending practices of the local banks and of the valuation of their loans.

While there are dangers in abrupt increases in competition, there is a strong case in many developing economies for reducing barriers to entry by foreign banks, which would facilitate direct loans from these banks to corporates, rather than by way of the interbank market. Such competition is also likely to be the best antidote to uncommercial lending practices by domestic banks.

Corporations in the crisis countries had not only expanded productive capacity with little regard for prospective returns, but they had financed this expansion largely by borrowing. Thus a relatively small decline in economic activity led to widespread defaults, the cost of which was borne by the banking system. This suggests three further policy aims.

<sup>(1)</sup> 

<sup>(2)</sup> 

As a result of the capital outflow in 1998 from crisis countries, direct investment rose in that year to 84% of net private flows to emerging markets (Institute of International Finance, 1999a). This proportion was increased progressively to 50% in December 1997. Restrictions on foreign investment in long-term Korean corporate bonds have been even more severe. Between 1990 and 1995 the number of US country funds increased about fivefold and the assets under management increased from \$12 billion to (3) \$109 billion (Serra (1999)). For evidence that country funds economise on information costs, see J A Frankel and S L Schmukler, (1997)

The first is to promote greater use of equity finance. Deregulation of the underwriting market can help to reduce the costs of issuing equity, while the supply of equity finance can be enhanced by encouraging foreign equity ownership and by increasing domestic institutional ownership.<sup>(1)</sup> The second policy aim should be to reduce the cost of default by improved bankruptcy procedures. The third is to reduce the *probability* of default by encouraging more efficient hedging. In some cases efficient hedging instruments already exist. For example, the development of the swap market has provided borrowers with a low-cost way to separate the currency of the loan from their exposure to that currency. The problem therefore was not that the means for hedging were absent, but that Asian corporations and banks were confident that the currency pegs would be maintained and were content to take on the risks of foreign currency borrowing. But currency fluctuations are not the only macro risks that threaten corporations and governments in developing countries. Particularly for governments, which are unable to issue equity explicitly, there is a clear need for them to design debt structures that hedge against the principal risks. There is much talk about involving the private sector in crisis prevention.<sup>(2)</sup> The greatest potential contribution of commercial and investment banks to crisis prevention would be to devise and market efficient hedging instruments to corporations and governments.

### Conclusion

Underlying public policy towards international crises is the view that markets are subject to a succession of contagious bubbles and panics, which the authorities can, and should, intervene to ameliorate. However, significant progress in developing policy will be made only when it is recognised that financial markets generally function well, and that international financial institutions have neither the resources nor the superior information to stem the wealth losses that these crises cause. Thus the principal function of the IMF is not to counteract supposed failures of financial markets by acting as a lender of last resort, but instead the IMF should use its ability to impose conditions that would be difficult for private institutions to require.

There has been considerable concern that the primary beneficiaries of IMF assistance are the major international banks, which have been able to avoid the consequences of their imprudent lending and have therefore little reason to be any more prudent in the future. These concerns are almost certainly misplaced. International banking is a competitive activity and there is no reason to suppose that the banks have been able to appropriate to themselves the (very small) subsidy in IMF loans. Nor does the yield and volatility of developing country debt suggest that lenders regard that debt as underwritten by the IMF. Moves to 'bail in' private lenders by (say) a moratorium on debt service are likely to be counterproductive, since they are likely to increase the cost of private sector debt and induce banks to exit even more rapidly.

The emphasis of public policy should be on crisis prevention rather than resolution. The Asian crisis was prompted by huge industrial overcapacity and increasing costs, which led to a sharp fall in profitability. This crisis in the real economy showed up in the financial sector in the form of large capital outflows and considerable strains on the domestic banking system. This suggests the need to develop financial structures that can distribute risks in the real economy more efficiently.

A large proportion of foreign capital was in the form of short-term, foreign currency interbank loans. This capital inflow was not only easily reversed, but the risks were concentrated in the developing countries' banking systems. Where capital consisted of foreign direct investment or equity portfolio investment, capital flows were much more stable and the risk was efficiently pooled with foreign investors.

Unlike equity, debt brings with it the risk of default. This risk, however, is influenced by the structure of the debt. For example, we noted how the risk of changes in the default premium can be reduced by an extension in debt maturities, and we showed how structured debt can be used to reduce the risk of default. It is also undesirable that default risk should be borne solely by domestic banks. The pool of lenders can be widened, both by encouraging the entry of foreign banks and by securitisation of corporate debt. There are some encouraging signs that some of these changes in financial structure have already been taking place. For example, an increasing proportion of capital inflows into emerging markets has been in the form of foreign direct investment, and more of the indirect investment has consisted of bond and equity investment rather than bank loans. Nevertheless there are a number of possible institutional reforms that could help to accelerate these processes.

This is frequently associated with the development of private pension schemes.
 See, for example, International Monetary Fund (1999) and Institute of International Finance (1999b).

# References

Bagehot, W (1873), Lombard Street, London: Kegan Paul.

- Banerjee, A V (1992), 'A simple model of herding behavior', *Quarterly Journal of Economics*, Vol 107, pages 797–818, August.
- Calomiris, C W (1998), 'The IMF's Imprudent Role as Lender of Last Resort', The Cato Journal, Vol 17, winter.
- **Diamond, D and Dybvig, P (1983)**, 'Bank runs, liquidity, and deposit insurance', *Journal of Political Economy*, Vol 91, pages 401–19.
- Dooley, M P (1996), 'A survey of literature on controls over international capital transactions', *IMF Staff Papers*, Vol 43, pages 639–87, December.
- Eichengreen, B, Mussa M et al (1998), 'Capital account liberalization: theoretical and practical aspects', *IMF Occasional Paper*, No 172.
- Fischer, S (1999), 'On the need for an international lender of last resort', International Monetary Fund, January.
- **Frankel, J A and Schmukler, S L (1997)** 'Country funds and asymmetric information', Working Paper, Center for International and Development Economics, University of California, Berkeley, May 1997.
- Institute of International Finance (1999a), Capital Flows to Emerging Market Economies, Washington, DC, April.
- Institute of International Finance (1999b), Involving the Private Sector in the Resolution of Financial Crises in Emerging Markets, Washington, DC, 12 April.
- International Monetary Fund (1998a), International Capital Markets: Developments, Prospects and Key Policy Issues, Washington, DC, September.
- International Monetary Fund (1998b), *The World Economic Outlook: Financial Turbulence and the World Economy*, Washington, DC, October.
- International Monetary Fund (1999), Involving the Private Sector in Forestalling and Resolving Financial Crises, Washington, DC, March.
- Jackson, K D (1999), 'Introduction: the roots of the crisis', in Jackson, K D (ed), Asian Contagion: The Causes and Consequences of a Financial Crisis, Boulder, Colorado: Westview Press.
- Kaufman, G (1994), 'Bank contagion: a review of the theory and evidence', *Journal of Financial Services Research*, Vol 8, pages 123–50, April.
- Lardy, N (1999), 'China and the Asian financial contagion', in Jackson, K D (ed), Asian Contagion: The Causes and Consequences of a Financial Crisis, Boulder, Colorado: Westview Press.
- Merton, R (1974), 'On the pricing of corporate debt: the risk structure of interest rates', *Journal of Finance*, Vol 29, pages 449–70.
- Meltzer, A H (1998) 'Asian problems and the IMF', The Cato Journal, Vol 17, winter.
- Myers, S C (1998), 'Financial architecture', European Financial Management, Vol 5.
- Radelet, S and Sachs, J (1998), 'The East Asian financial crisis: diagnosis, remedies, prospects', unpublished paper, Harvard Institute for International Development, 20 April.

- Rajan, R G and Zingales, L (1998), 'Which capitalism? lessons from the East Asian crisis', unpublished paper, University of Chicago, September.
- Rubin, R E (1999), 'Remarks on reform of the international financial architecture to the School of Advanced International Studies', 21 April.

Sachs, J (1995), 'Do we need an international lender of last resort?', Frank Graham Memorial Lecture, Princeton University.

- Serra, A P (1999), 'Tests of international capital market integration: evidence from emerging markets', PhD dissertation, London Business School.
- Summers, L (1998) 'Opportunities out of crises: lessons from Asia', Remarks to the Overseas Development Council, 19 March.
- Thornton, H (1802), An Enquiry into the Nature and Effects of Paper Credit of Great Britain, reprinted, New York: August Kelley.

Welch, I (1992), 'Sequential sales, learning and cascades', Journal of Finance, Vol 47, pages 695–732, June.

# The MPC two years on

In this speech, (1) Mervyn King, Deputy Governor, looks back over the first two years of the Monetary Policy Committee. He notes that it is too early to judge the Committee's performance against the recent history of inflation. The key achievement of the MPC has been to reduce inflation expectations towards the target of  $2^{1/2}$ %, causing a one-off increase in national income, which Mr King terms a 'credibility' windfall'. Mr King goes on to discuss the many challenges facing the Committee in the future. He focuses in particular on the need to build a 'constituency for low inflation' through initiatives to encourage support and understanding of the case for price stability.<sup>(2)</sup>

# Present at the creation

Two years ago, when it announced that the Bank of England would be granted independence, the n(N)ew Labour Government surprised everyone, not least the Bank of England. Since then, decisions on interest rates have been taken, not by the Chancellor but by the Monetary Policy Committee. Much has followed from that single bold decision to take interest rates out of day-to-day politics. The transfer of the operational responsibility for setting interest rates to a new Monetary Policy Committee was a major policy, indeed constitutional, innovation. The excitement of being involved in the construction of a new monetary institution for the United Kingdom has both motivated and rewarded the extraordinary efforts of the Bank staff who have made the new process work, and I want publicly to thank them for that. In the words of Dean Acheson, to be 'present at the creation' is an experience which few involved in policy are ever privileged to share.

Inevitably there have been changes to the Bank. It has had to redirect its resources to focus on achieving and maintaining monetary stability in this country. Responsibility for banking supervision has been transferred from the Bank to the new Financial Services Authority. The job of managing public sector debt has passed to a new Debt Management Office. And the Treasury, relieved of its responsibility for setting interest rates, can now focus on fiscal policy and measures to raise the long-run growth rate of the UK economy, as well as ensure that the fruits of that growth are distributed fairly. Each body now has clearer responsibilities.

Of course, not all of our present monetary framework dates from 1997. It was following our exit from the ERM in September 1992 that monetary policy was first directed to achieving an explicit inflation target, initially a range of 1%-4%, and subsequently  $2^{1}/_{2}\%$  or less. With a floating exchange rate, any anchor for the price level had to be based on a domestic nominal target. The move from secrecy to transparency in the conduct of policy also dates back to 1992, when the then Chancellor asked the Bank to produce a regular independent Inflation Report in order 'to make the formation of policy more transparent and our decisions more accountable'. The first Inflation Report appeared in February 1993. Those changes led to a significant improvement in our macroeconomic performance.

But many, especially elsewhere in Europe, doubted the United Kingdom's commitment to monetary stability, in the absence of a willingness to remove operational decisions on interest rates from the political arena. Long-term interest rates contained a risk premium to reflect the possibility that the timing and magnitude of interest rate changes might reflect political considerations. The 'Ken and Eddie' show was probably nearing the end of its run. And both principals needed their own show.

So when Gordon Brown announced radical changes to the Bank of England and the monetary policy framework two years ago, they were widely welcomed because they offered the basis for a durable commitment to price stability.

What, then, is the substance of the main reforms announced in May 1997? First, there is a clear and unambiguous objective for monetary policy-an inflation target of 21/2%set by the Government, with inflation defined as the increase in retail prices, excluding mortgage interest payments, over the previous twelve months-RPIX inflation. Second, decisions on interest rates are taken by a Monetary Policy Committee, or MPC, comprised of nine individuals with expertise in monetary policy-five executive members of the Bank and four non-executives-who operate on the basis of one person, one vote. Third, the process is characterised by a high degree of transparency and accountability, both to provide the public with explanations of the MPC's actions and to hold members of the MPC individually accountable for their decisions. Have these reforms made a difference to the UK economy? My aim this evening is to pose and begin to answer three questions about the MPC two years on.

- (1)What is the track record of the MPC after two years?
- What has the MPC learnt during that period? (2)
- What are the challenges for the next two years? (3)

Given at the Queen's University, Belfast, on 17 May 1999.
 I am indebted to Mark Cornelius, Spencer Dale and Anthony Yates for invaluable assistance in the preparation of this lecture, and to Andrew Bailey, Paul Fisher and Nigel Jenkinson for helpful comments on an earlier draft.

# What is the MPC's track record?

Because of the infamous 'long and variable' lags between changes in interest rates and their impact on inflation, the MPC does not yet have much of a track record in terms of inflation out-turns. But since the target given to the MPC is for inflation, let me start there. Between June 1997 and March 1999 (the latest month for which inflation has been published), RPIX inflation averaged 2.7%. During that period, inflation ranged from a low of 2.4% to a high of 3.2%. Over the past nine months it has remained within 0.2 percentage points of the target, a remarkable degree of stability. It is most unlikely that inflation can remain, month by month, as close to the target as that. Unexpected movements in the exchange rate, oil or other commodity prices, indirect tax rates or a multitude of other influences, could all lead to divergences of inflation from target. Because of the lags I mentioned earlier, it would take the MPC some time to bring inflation back to the target level. What matters, however, is not relatively small month-to-month movements in the inflation rate, but the expectation that inflation will average 21/2% over a number of years.

As part of the arrangements for accountability, the Governor, on behalf of the MPC, is required to write an open letter to the Chancellor whenever inflation deviates by more than 1 percentage point from the target. At the outset, the fan charts published in the *Inflation Report* showed that the odds on writing such a letter during the following two years were 3 to 1 on. In the event, no letter was required. Although the probability of writing such a letter has diminished, it remains high. The latest *Inflation Report*, published last Wednesday, implies that the odds on our having to write a letter over the next two years are 2 to 1 against, or one in three.

Thirty years ago, the United Kingdom embarked on an inflationary journey, and what a roller-coaster ride it turned out to be. During the 1970s inflation averaged no less than 13% a year, with a peak of more than 27% in August 1975. During the 1980s inflation averaged 7% a year, and it has fallen to 4% during the 1990s. That period also contained two of the deepest recessions experienced by any major industrial country in the post-war period. Since the inflation target was adopted in October 1992, inflation has averaged 2.8%. The improvement in inflation performance during the 1990s can be seen in Chart 1. Inflation has been remarkably stable during the six years since the inflation target was introduced. Indeed, it has been more stable than in any period since monthly RPI figures were first collected in 1947.

Moreover, the adoption of a monetary regime which produced low and stable inflation has not damaged growth in output and employment. Since the end of 1992, output has grown at an average annual rate of 2.8%, well above the post-war average. More significantly, growth was more stable, with a standard deviation less than one half that of output growth in earlier post-war decades. And





unemployment, as measured by the Labour Force Survey, has fallen from 10.7% at its peak in 1993 to its current level of 6.3%.

So since the inflation target was adopted, inflation has been lower, and growth as high, as in any post-war decade, and both have been more stable. And total output in the economy has now increased for 27 consecutive quarters, the longest period of uninterrupted growth since the Second World War.

Part of the credit for this improvement in UK macroeconomic performance belongs to the policy framework (both pre and post-MPC), and part was the result of favourable economic circumstances. From 1992 to 1996, the ability to grow at above-trend rates without an increase in inflationary pressure was made possible by using up the margin of spare capacity created by the deep recession of the early 1990s. After 1996, inflationary pressures were contained by lower commodity and other world prices, and the impact of a sharp appreciation of sterling. These developments have had a significant impact on inflation. And they were largely unpredicted. So although monetary policy has faced some difficult choices over the past two years, it has benefited from an unexpected downward movement in imported inflation. These external influences have offset a much higher level of domestically generated inflation. Despite that, inflation has been above the target more often than it has been below-in fact, it has been below the target in only one month so far since the MPC was set up. As the benign effects of those temporary external influences on inflation start to wear off, the challenges facing the MPC will become, if anything, even greater than those in its first two years.

If the time lags in the monetary transmission process mean that it is too early to judge the MPC on its inflation track record, then what other criteria for assessing its performance might be relevant? One measure would be expectations of future inflation. Following Gordon Brown's announcement of Bank independence on 6 May 1997, inflation expectations in financial markets fell sharply. Chart 2 shows the expected inflation rate at different horizons implied by yields on conventional and index-linked government bonds. These expectations fell by about 0.5 percentage points on the day of the announcement. Since then, inflation expectations have fallen further. Chart 3 shows the way in which two particular measures of inflation expectations have evolved since May 1997. The first of these measures is the expectation of inflation ten years ahead implied by bond market yields. The second is a Consensus Economics average of the expectations of inflation five years ahead held by economic forecasters. Since 1997, inflation expectations on both measures have steadily fallen towards the target, and the economic forecasters' expectation has now become firmly anchored on the target. The bond market measure has risen somewhat in recent months, although this reflects unusually low real yields on index-linked debt following the introduction of the minimum funding requirement for UK pension funds.



Chart 3 Expected inflation<sup>(a)</sup> May 1997–May 1999



Does this fall in inflation expectations matter? The simple answer is yes. If the MPC can anchor inflation expectations on the target, then unexpected movements in inflation will not immediately lead wage-bargainers or price-setters to change their view of where inflation is headed, and hence will help to make less likely the inflationary spirals of the past. Both inflation and output should be less volatile as a result.

But there is also another, albeit one-off, benefit from the new-found credibility of policy and the subsequent reduction in inflation expectations. Over the past two years, inflation has been close to 2.5%. If inflation expectations themselves had not converged on the target, then inflation would have been lower than expected. Why does this matter? Suppose wage bargains are struck on the assumption that inflation will be 3%, but prices in fact rise by 2.5%. Real wages will be higher than either employers and employees expect, and employment-the demand for labour—will fall. An unexpected fall in inflation lowers both output and employment. So by bringing inflation expectations down towards actual inflation, the new monetary policy framework has probably led to higher output and lower unemployment than might otherwise have occurred. We might call these benefits a 'credibility windfall'. It is extremely difficult, if not impossible, to know how large that windfall might have been. But even a windfall of 0.1 percentage points of GDP is a sizable amount. Of course, somebody might very well point out that we could have reaped this same 'windfall' by allowing inflation to rise to match the higher inflation expectations. But that would be inconsistent with aiming to hit the inflation target, and might well have led to a further ratcheting-up of inflation expectations. It would have lost us all the benefits that low and stable inflation brings.

# What has the MPC learnt in the past two years?

The first two years of the MPC has been a learning process for all concerned, both the members of the MPC and those outside who observe and comment on its actions. We have learnt from experience and made changes where necessary. For example, the minutes of MPC meetings are now published after two weeks, rather than after six weeks. The additional delay created unnecessary speculation about the issues on the minds of MPC members, and made it difficult for us to explain our actions—for example, to the Treasury Select Committee—when our decisions had moved on from those described in the most recent minutes. So we decided to accelerate publication.

I would like to focus on two main lessons from the first two years. The first is the crucial importance of a symmetric inflation target. The second concerns how to manage a process in which the group has a common objective, but in which individual members are held personally accountable for their decisions.

#### Symmetry of the target

The inflation target which the Chancellor has given to the MPC is a simple point target for RPIX inflation of 2<sup>1</sup>/<sub>2</sub>%. Prior to May 1997, the inflation target was 2<sup>1</sup>/<sub>2</sub>% or less. The meaning of those words 'or less' was never entirely clear. Rarely in the history of economic policy have so few words caused so much confusion to so many economic commentators. Moving to a symmetric point target has removed any ambiguity as to the objectives of the MPC. That is important, because the rationale for handing operational responsibility for setting interest rates to the MPC is that it is better qualified to make those decisions than elected politicians, whereas elected politicians have the democratic legitimacy to choose the target.

A symmetric inflation target should also make it easier for people to understand how the MPC is likely to react to the different types of shock that may hit the economy from time to time. In more technical language, the MPC's policy reaction function should be predictable. When an unexpected shock moves inflation away from the target, it may not always be sensible, or indeed feasible, for the MPC to return inflation to the target level immediately. Shocks stay in the twelve-month increase of the RPIX index for at least twelve months. To offset the impact of a shock on RPIX inflation in less than a year or so might imply undesirable volatility in output.

Hence the MPC has been given 'constrained discretion' concerning the horizon over which it tries to bring inflation back to the target level. The appropriate horizon depends, in general, on the type and persistence of the shock. There is no simple rule to determine the appropriate horizon. It depends on the nature of the shocks. That is why the MPC spends so much time trying to unravel recent economic history. On average, since shocks may take several months to have their full effect, a horizon of about two years is a reasonable one over which to bring inflation back to its target. But if shocks are sufficiently large-in either direction-then it may be sensible to aim to bring inflation back to the target level over a somewhat different horizon. In such circumstances the MPC would make that clear, both in the minutes of its meetings and in the Inflation Report, and, if required, in an open letter to the Chancellor.

#### Common objectives versus individual accountability

During its first two years, the MPC has had to develop a *modus vivendi*, to manage the potential tension between operating as a team with a common objective on the one hand, and the requirement for individual accountability of its members on the other. The Committee as a whole needs to explain its view of where the economy is heading. The *Inflation Report* has been the main vehicle for expressing the collective view of the Committee. Together with the minutes of the monthly meetings, it provides an explanation of past actions, which should enable others to understand how we are likely to behave in the future.

At the same time, the voting records of individual members of the MPC are in the public domain. That disclosure improves the quality of decisions, as well as the accountability of Committee members, because there is no better incentive to cast one's vote for the policy most likely to hit the inflation target than the prospect of having to defend that voting record in public. Of course, all members of the MPC are well aware that there is no certainty about the precise level of interest rates which is desirable in any given month. That is why we discuss with each other at great length the appropriate course of action, before each member makes up his or her own mind. For such a system to work, it is crucial that MPC members give their best judgment and do not try to reach an artificial consensus. How, then, should we balance the need to give a clear view about how the Committee sees economic developments with the requirement of individual accountability?

There have been two main criticisms of the MPC in this respect. First, that the MPC has been too open about differences within it. Second, that the Committee has been not open enough. Let me start with the first criticism. From its first meeting in June 1997 to the end of that year, the Committee were unanimous on all six occasions. Output appeared to be above trend, the labour market was continuing to tighten, and there was a need to slow the growth of domestic demand in order to reduce pressure on supply capacity. Interest rates were raised at each meeting between June and August, and again in November. At that point the Committee was accused of acting like a 'politburo'. But in January 1998 the first disagreement occurred. The Committee voted by five votes to three (the ninth member, John Vickers, did not join the MPC until June of last year) to hold interest rates constant. In February and March the Committee was evenly divided, and the Governor used his casting vote in favour of an unchanged level of interest rates. Disagreements continued and in June the Committee voted 8 to 1 to raise interest rates for, as it turned out, the last time in that interest rate cycle. By now, many commentators were disillusioned with the evidence of disagreements within the Committee. If I single out Philip Stephens from The Financial Times, it is only because his description, written in July 1998, of unhappiness with the Committee was more vivid and articulate than most. He wrote:

'The Committee has thus far lacked both leadership and predictability. ... On the evidence of the previous six months, the MPC bears a closer resemblance to a post-graduate seminar than to a forum for strategic decision-making. ... To put [several] economists in the same room is to invite what one commentator has called paralysis by analysis. As a result the Committee's conclusions are entirely unpredictable.'

Since the beginning of 1998, the Committee has been unanimous at only one out of sixteen meetings. That was in July of last year, when the Committee voted to hold interest rates constant at 7.5%. Disagreements have become the norm, and are much less remarked upon by the press than they were before. Moreover, disagreement is now more widely accepted as natural. It would be strange if the uncertainties facing the Committee were not reflected in small differences of opinion. And views of the appropriate level of rates have never differed by more than 0.5 percentage points. Nor have these technical disagreements led to 'paralysis by analysis'. Indeed, the Committee has reduced interest rates by 2<sup>1</sup>/<sub>4</sub> percentage points since October of last year. It was precisely the analysis that led to the action.

The willingness of the MPC to change interest rates, either up or down, in order to meet the symmetric inflation target has altered commentator's perceptions of the Committee itself. Early in its history, commentators were unable to resist labelling members of the Committee as either 'hawks' or 'doves'. I argued then that it made no sense to use these descriptions, because each member of the Committee had the same objective. Members of the MPC cannot entertain closet views about their desired inflation rate, because they will be held personally accountable for their judgments about the level of interest rates necessary to meet the inflation target. No matter. A good argument will never beat a good headline. Hawks and doves it was, though there were also references to ostriches, foxes and hedgehogs, and headless chickens. No doubt there were even less flattering comparisons made in private. Still, unlike England football managers, we have not-yet-been compared with root vegetables. And we have made progress. As Chart 4 shows, press references to 'hawks' and 'doves' reached a peak in mid 1998 and have declined markedly since. As I predicted in a speech in May last year, 'as circumstances change, it is easy to imagine that the 'hawks' shall be 'doves' and the 'doves' shall be 'hawks".

## Chart 4 Press references to 'hawks and doves'



But we were also criticised for not being open enough about differences of view. The early minutes were thought to be too bland, and to conceal expressions of individual points of view. Much of that criticism was indeed fair. And we have tried to respond by making the minutes a more accurate expression of the range of points of view that are expressed at the meeting. But I should stress that the discussion of the MPC focuses on the relative merits of different possible explanations of what is happening in the economy, in a spirit of mutual enquiry, rather than an exchange of fixed and conflicting views. A second criticism, made by the IMF team during the recent Article IV consultation, was that, whereas the minutes explained in some detail differences of view among Committee members, the *Inflation Report* contained only a single projection for the inflation outlook. Again, there was some justice in this criticism, and we have responded to it. In fact, in three out of the past four *Inflation Reports*, there have been explicit descriptions of differences of view among Committee members about the prospects for inflation.

### What are the challenges for the next two years?

If monetary stability is to be a permanent feature of British economic life, the MPC will have to overcome several challenges in the years ahead. Two of these I would like to discuss briefly. First, how will the Committee deal with expectations that have been raised by the remarkable stability of inflation during its first two years? Second, how can the MPC build a constituency for low inflation?

Despite the openness and transparency of the new monetary framework, the British, indeed the world, economy often moves in mysterious ways. Monetary policy is decision-making under uncertainty. That is why MPC projections are published as fan charts, not as point estimates. The lags between a change in interest rates and its effects on output, demand and, ultimately, inflation mean that rough weather and occasional storms in the world economy are likely to blow us off course, at least for a time. A true test of the MPC is not whether it hits the target when the sea is calm, but how it reacts to the storms, or economic shocks, that will inevitably arise.

The most immediate challenge for the MPC is that, although inflation may fall below the target over the next year, before long the inflation prospect further ahead will depend more on domestic inflationary pressures than it has over the past year or so, when external factors made a major contribution to holding down retail price inflation. Lags mean that the MPC needs to look ahead. The test of the MPC will be how it responds to the inflation prospect.

Even in the absence of unexpected shocks there are major uncertainties. Trying to understand changes in the way the economy behaves is a crucial part of the MPC's work. In recent years we have seen a combination of lower inflation, lower earnings growth and faster output growth than previous relationships would have led us to expect. The reasons for this benign combination of growth with low inflation are not easy to diagnose. Some have talked about a new era or a 'new paradigm' in which productivity growth has permanently risen. We should be cautious about those who speak of new paradigms. Paradigm is a word too often used by those who would like to have a new idea but cannot think of one.

Optimism about growth rates has been greatest in the United States, which is hardly surprising given the recent performance of the US economy. But wiser heads counsel caution. Alan Greenspan has argued that, although there is evidence of a structural shift in the level of productivity, the laws of supply and demand have not been repealed. Eventually the old relationships will return.

If the UK economy moves in mysterious ways, it does not always perform wonders. A comparison between the United States and the United Kingdom is instructive. In both countries, earnings growth has been lower, given the level of unemployment, than would have been predicted on the basis of past relationships. Inflation has not picked up, despite a tight labour market. In the United States one explanation for this benign outcome is that costs have been held down by an increase in productivity growth. Over the past three years, labour productivity (output per person hour) in the United States has grown at an average annual rate of around  $2^{1/2}$ %, well above the average rate of  $1\%-1^{1/2}\%$  over the past 30 years; and over the past year, productivity growth rose to an annualised rate of 3% or more. Over the same three years, productivity growth in the United Kingdom has been  $1^{1/2}$ % a year, well below the thirty-year average of  $2\% - 2^{1/2}\%$  a year. In the United States the application of new technology, especially information technology, is often held responsible for this improved performance. Such explanations should, in principle, apply to most industrialised countries, at least to some degree. But, whatever similarities there are in the recent economic performance of the United States and United Kingdom, productivity growth is not one of them. Indeed, since 1990, UK productivity growth has been exactly in line with the 30-year average. So it would be premature at this stage to suppose that there has been a permanent shift in productivity behaviour in the United Kingdom, although further study of the recent differences in productivity growth across countries and how they might relate to differences in the way information technology has affected working practices is important.

If not productivity, what other changes might help to explain the recent benign behaviour of inflation? A more plausible explanation for the lower-than-expected growth rates of earnings, and hence prices, is, in my view, a fall in inflation expectations. If that is the case, then part of the improved performance of the last two or three years can be attributed to a combination of the 'credibility windfall' resulting from the new monetary policy framework, and the benign impact on inflation of the higher exchange rate and lower commodity and import prices.

In order to assess whether economic relationships have changed, it is vital that the MPC has access to timely and accurate information. Official statistics comprise the bulk of information available to the MPC. Following the recent review of data on average earnings, it has been decided to

put the relationship between the Bank and the Office for National Statistics on a more formal basis with a Service Level Agreement between the two organisations. Good progress has been made on drafting that Agreement. But the MPC cannot live by official statistics alone, nor even on a diet of business and household surveys. In addition, the Bank has a network of twelve regional Agents. Their main task is to ask local people how they view the current state of the economy. Each year the Bank's Agents make, in total, around 7,000 visits to business contacts across the country. The attraction of this information is that it is timely and is focused on the Committee's needs. Other data are often published with a considerable lag. And there are frequently gaps and puzzles in those data, which the Agents can help to resolve. Each month the MPC decides on a 'question of the month', which the Agents then put to their contacts. Recent questions have covered trends in employment, the behaviour of earnings, the reaction of exports to the rise in sterling, and the likely effects of the Millennium on investment expenditure. Within a couple of weeks the responses from a sample of about 150 companies are available to the MPC. More generally, the views of businesses around the country about the state of trade are passed directly to the MPC through the intermediary of the regional Agents who attend the monthly pre-MPC briefing meetings. This may not be quite 'One 2 One', but it is rapid and direct communication.

The Bank of England has never had an Agency office in Northern Ireland. It is time to put that right. I am very pleased, therefore, to announce that in January next year the Bank of England will open an Agency in Belfast. It will increase our contacts with, and knowledge of, the economy and people of Northern Ireland. Nigel Falls, one of our most experienced Agents, will be the first Agent for Northern Ireland. He is here tonight, and you will be seeing a great deal of him in future.

The second challenge for the future is to build a constituency for low inflation. There is, I believe, a good deal of support in this country for monetary stability. Those who experienced the high and unpredictable rates of inflation of the 1970s and 1980s-the 'inflation generation'-have ensured that all major political parties are now committed to stability. But there have been times in the past when low and stable inflation was abandoned by those who succumbed to the temptations of monetary laxity. Some of you here tonight are, I hope, taking a break from revision for your final examinations. Thirty years ago this month I was in your position. As part of my revision, I studied the inflation rates since the Second World War for several different measures of inflation. They were all at or very close to 3% a year. No one in Cambridge at that time-and certainly not the students that were to become part of the inflation generation-heeded the late Richard Kahn's warning that creeping inflation was about to accelerate. The rest, as they say, is monetary history. I would like those of you revising for your final exams this month to be able to look back in 30 years time and recall that the year in which you graduated was when we finally laid to rest the idea that the United Kingdom was an

inflation-prone economy. Inflation was the norm for most of my adult life. It should not be for yours.

Why then, you may ask, do we need to build a constituency for low inflation? There are two reasons. First, it is important that support for low inflation does not wane as the experience of high and unstable inflation of the past recedes. It would be a counsel of despair to believe that the inflationary excesses of the recent past would have to be repeated in order to retain support for low inflation. Yet, in a recent survey of households in Germany, Robert Shiller(1) found that support for stability was much higher among those who had experienced hyperinflation. Of those born before 1940, as many as 90% agreed with the statement that 'the control of inflation is one of the most important missions of German economic policy', whereas only 51% of those born after 1950 agreed with the statement. Those who value health most are often those who have experienced sickness. There is a lesson here. The past decade has been good for central banks and central bankers. But that success should not blind us to the realisation that if public acceptance of price stability is based on no more than recent experience of the opposite, then the democratic legitimacy of central banks requires a more solid foundation.

So how can we build the constituency for low inflation? Openness and transparency of the MPC, and explanations of our actions, are an essential part of our task. But we can do more. Over the past few months I have been chairing a working party in the Bank designed to answer the question of how we can build the constituency for low inflation. We have been exploring possible educational initiatives to increase public understanding of the benefits of monetary stability. And we have also been considering the way in which public opinion polls might be used to tell us about the degree of public understanding of the inflation target, the role of the MPC in achieving it, and, more generally, about the inflation process itself. I hope we shall be able to announce the results of those deliberations before long. The aim is to ensure that the inflation generation is replaced by a new generation, a generation for whom economic success will depend more on their own efforts than on the accidental consequences of high and unstable inflation for the distribution of wealth-whether in housing, pensions or financial savings.

## Conclusions

So what should we make of the Monetary Policy Committee after two years? As all parents know, second birthdays are often the prelude to a difficult period: the 'terrible twos'. But I am confident that, whatever difficulties lie ahead, the Chancellor will be able to take some pride in his offspring. Philip Ziegler has described the British constitution as an accumulation of 'instantly invented precedents'. Indeed, there is a tradition in the United Kingdom of making radical reforms in such a way that it is impossible, after a few years, to imagine that things were done any other way. That, I predict, will be true of the MPC.

The whole monetary policy process today is systematic and professional in a way that was unimaginable less than ten years ago. Then, meetings between the Chancellor and Governor to discuss interest rates were often called at only a few hours notice. Now, analysis, meetings of the MPC and the publication of both the decision and the reasons for it, proceed on a pre-announced timetable. The change has significantly reduced the uncertainty facing financial markets and enhanced the quality of the decisions themselves. It is a massive improvement, and one which has earned the United Kingdom a good deal of respect on the international stage, as judged by the Article IV reports from the IMF and the convergence reports of the European Union.

Shortly after Robert Rubin last week announced his impending departure as US Treasury Secretary, he gave the Commencement Address at New York University. In it he stated the four principles for decision-making that had guided him during his career. They encapsulate exactly the philosophy of the MPC. First, the only certainty is that there is no certainty. Second, every decision is a matter of weighing probabilities, or the balance of risks, as we say. Third, despite uncertainty we have to decide and act. Fourth, decisions should be judged not only on the results but also on how they were made. The first three principles guide every meeting of the MPC. And the fourth is one I commend to all those who wish to make their own judgment about the MPC two years on.

Institutions matter. The Bank of England is an old institution. But its success has been based on its willingness to change and adapt. In its 300-year history probably no change has been as significant as operational independence and the creation of the Monetary Policy Committee. The Bank aims to be at the forefront of the theory and practice of monetary policy. But we cannot rest on our laurels. There is still much to learn and to change. Economic theory moves forward and economic behaviour is never constant. The practice of monetary policy must keep up. But what we will not change is our commitment to monetary stability and to the achievement of the Government's inflation target. It is that commitment which can deliver economic stability to this country.
# **Price stability in the United Kingdom**

In this speech, (1) John Vickers, Executive Director and Chief Economist at the Bank of England, sets out the economic benefits of price stability, and assesses the record of price stability in the UK economy.<sup>(2)</sup>

# Price stability revisited

In Pride and Prejudice, Mr Collins concluded his marriage proposal to Elizabeth Bennet as follows:

'To fortune I am perfectly indifferent, and shall make no demand of that nature on your father, since I am well aware that it could not be complied with; and that one thousand pounds in the 4 per cents, which will not be yours till after your mother's decease, is all that you may ever be entitled to. On that head, therefore, I shall be uniformly silent; and you may assure yourself that no ungenerous reproach shall ever pass my lips when we are married.'

Happily, Elizabeth instead married Mr Darcy-a man of many virtues, including a vast amount in the 4 per cents.

Four per cent, or thereabouts, was the long-term interest rate for years and years. In the words of David Landes in The Wealth and Poverty of Nations:

'Investors trusted the word of Britain and bought consols at 4 per cent, and Britain never let them down ... until the twentieth century, when war and deficits undermined the purchasing power of the pound and killed the gold standard. Is inflation a kind of impersonal lie?'

Interesting question. As a result of that inflation, a thousand pounds now is worth about a fortieth of its value in Jane Austen's day. But, remarkably enough, the yield on long-term British government bonds has recently been back in the region of 4%.<sup>(3)</sup> The reason is that inflation has become subdued.

# Is inflation dead or sleeping?

Chart 1 shows the path of the price level in Britain over the three hundred years since 1700. Two facts are immediately striking. The first is that, although prices sometimes moved sharply in the short run, long-run price stability prevailed until the last third of this century. Indeed, the price level, as best we can measure it, increased only seven-fold from 1700 to 1967, an average annual inflation rate of well under 1%.

The second striking fact is the steep take-off in the price level over the past generation. In the quarter century

# Chart 1 UK price level<sup>(a)</sup>



between the devaluation of sterling in 1967 and sterling's exit from the ERM in 1992, the UK price level increased more than eight-fold, an average annual inflation rate of 9%. At this rate of price increase, charts of the price level are not very illuminating, and nowadays they are rarely seen, except in lectures by central bankers on price stability. It makes more sense to plot inflation-the rate of change of the price level—as in Chart 2.



Given as the Glasgow Trades House Lecture at Strathclyde University, on 26 May 1999.
 I am grateful to Andrew Bailey, Spencer Dale, Paul Fisher, Nigel Jenkinson, Tony Yates, and especially Jo Paisley for helpful comments on a draft of this paper.
 For example, the redemption yield on the long gilt (6% of 2028) was below 4.25% for a period earlier this year.

But if we zoom in on the period since 1992, during which monetary policy has been based on inflation targets, we see a rather different picture—as in Chart 3. Inflation has been moderate, at about 2.7% on average. No doubt this, like much else, would have shocked the Victorians, but it is more than respectable, even by the standards of the 1950s.

#### Chart 3 RPIX inflation



Moreover, inflation over the past six years has been remarkably stable, especially in view of the swings that have occurred in the foreign exchange value of sterling. In no month since the start of 1993 has annual inflation (on the RPIX measure) been lower than 2% or higher than 3.5%.

Though the United Kingdom's post-war inflation performance has generally been worse than that of other developed countries, similar profiles are observed internationally, with inflation peaking in the 1970s and relatively quiescent in the 1990s. Indeed, the protracted recession in Japan and tumbling commodity prices have made deflation—negative inflation—an important subject of current debate.

So is inflation dead or sleeping? The view that inflation is dead sees the inflation generation (mid 1960s to early 1990s) as the exception to the historical norm of price stability. On this view, the makers of monetary (and fiscal) policy temporarily lost discipline, for example when confronted with policy dilemmas arising from oil price hikes that are unlikely to recur. And they succumbed to the temptation of thinking that they could engineer lower unemployment on a lasting basis by allowing higher inflation. Now we know better.

The view that inflation is sleeping disputes that price stability is the historical norm for the relatively modern era of 'paper money', which is not convertible into gold (or some such). With two interruptions, Britain was on the gold standard from early in the eighteenth century until 1931. The two periods of suspension (1797–1819 and 1914–25) were both related to war, and both saw considerable inflation, followed by deflation after resumption of the gold standard at the original parity. So, while long-run price stability reigned in the gold standard period, the British record for paper money years is rather mixed. And widespread international experience, most recently in Brazil, shows that achieving and maintaining an anchor of price stability certainly cannot be taken for granted.

The question, then, is whether inflation stays sleeping. The answer depends, above all, on the framework and practice of monetary policy. The state of the public finances is important too, for history teaches that sound money and unsound public finance are at odds. The United Kingdom, and of course the euro area, have quite new monetary policy frameworks. But they are based on the long-standing principle that the primary objective of monetary policy should be price stability. I shall discuss the UK framework shortly. But first we must ask why price stability matters.

# Why does price stability matter?

Price stability—by which I mean low and stable inflation rather than high and volatile inflation—matters for a number of reasons that can be grouped under three headings:

- Inflation would be bad even if it were perfectly anticipated.
- Uncertainty about inflation, which increases with inflation, is bad.
- Unanchored inflation expectations are bad for macroeconomic performance.

Let me take these points in turn.

#### Costs of expected inflation

Imagine a hypothetical economy with a steady and predictable 10% inflation rate. Why would this be worse than, or indeed different from, an economy with steady and predictable 2.5% inflation?

The first reason is tax. Inflation, among other things, is a tax on money holdings that bear no interest: inflation erodes the purchasing power of money. So a higher rate of inflation means, in effect, a higher rate of tax on cash balances. Money in the bank earns interest; money in the pocket does not. So when inflation and interest rates are high, rather than getting £100 from the cash machine once a week, it might be better, despite the cost in terms of time and shoe-leather, to get £50 twice a week.

Since paper money costs so little (in relation to value) to create, such efforts to economise on cash balances are inefficient for the economy. Hence Milton Friedman's famous proposition that efficiency requires the nominal interest rate (the effective cost of holding money) to be close to zero. Only then would the inflation tax distortion go away. For the real rate of interest to be positive, a zero nominal interest rate would actually mean a negative inflation rate.

But this is too quick. Governments need tax revenues, and taxes inevitably cause inefficiency. Why should money holdings be altogether exempt from tax? Reasons can be

advanced, but let me not get into those. Suffice it to say that it would be hard to justify in economic terms a high tax rate on money holdings.

There is another, perhaps more important, link between inflation and tax. The tax system is not fully indexed to inflation, so higher inflation means higher effective rates of tax. Consider the return to saving. Suppose that the pre-tax nominal rate of interest in the 10%-inflation economy is 12.5%—that is, inflation plus a real (ie after inflation) interest rate of 2.5%. Tax is based on income at the nominal interest rate of 12.5%, rather than the real interest rate of 2.5%. After tax at the 23% basic rate, the saver gets a return below 10%—ie negative in real terms. But if the interest rate is correspondingly 5% in the economy with 2.5% inflation, there is a clearly positive post-tax return to saving. The incentive to save and invest for the future is higher—and less distorted—in the lower-inflation economy.

Perfectly anticipated inflation has other costs too. Price changes are a hassle for sellers and, if frequent, potentially confusing for buyers, but they must happen more often with higher inflation. And there is the sheer inconvenience. Money is a yardstick. As Mankiw (1997) observes, it would be very inconvenient if a yard got an inch shorter each year—though I personally would benefit by being six feet tall next year. Erosion by inflation of the monetary yardstick is in some ways analogous.

What do these costs add up to? A Bank of England study by Bakhshi *et al* (1997), following Feldstein's analysis of the US economy, estimated that lowering the (perfectly anticipated) inflation rate in the United Kingdom by 2 percentage points could generate benefits worth the equivalent of 0.2% of GDP in perpetuity. These are serious costs of inflation, but there is much more to come.

So why not go the whole hog and aim for zero inflation—or less, as with the Friedman proposal mentioned above? (Of course this is a question for the Chancellor, who sets the inflation target, not for the MPC, whose job is to achieve the target set.) First, measured inflation might slightly exceed true inflation, for example because price index measurement does not fully reflect new products and quality improvement. Aiming for zero true inflation then implies aiming for slightly positive measured inflation.

Second, it may be a fact of life that some prices and wages are inflexible downwards in money terms. (But if so, this may be more a symptom of a high-inflation culture than in the nature of things.) Inflation allows such prices to be flexible downwards in real terms, which could help to reduce inefficient resource use and even unemployment.<sup>(1)</sup>

Third, nominal interest rates cannot practically go below zero (they are virtually at that floor today in Japan). So modest inflation might provide a useful cushion in case of an extreme economic situation that required negative real interest rates.  $^{\left( 2\right) }$ 

Finally, the best is the enemy of the good. Even if an economy with zero inflation was better than one with, say, 2.5% inflation, it is unlikely to be hugely better, and inflation at more or less 2.5% is low and stable inflation, which is what matters.

## Costs of uncertain inflation

While perfectly anticipated inflation is more easily found in economics textbooks than in reality, uncertain inflation, and the costs it has brought over the past generation, are all too familiar.

Anyone who bought an annuity upon retirement in 1967, when long-term government bond yields were around 6.5%, would have seen the value of their annuity retirement income in real terms largely eaten up by inflation over the next 25 years, which averaged 9%.

And consider the dilemma, which many of us have faced, confronting a new mortgage borrower in an economy with uncertain inflation prospects. Suppose, for example, that there is an even chance that inflation will be high or low over the life of the mortgage, and that the nominal interest rate tends to move in line with inflation. Suppose too that long-term fixed-rate mortgages are available at an intermediate rate of interest. What sort of mortgage should the new borrower opt for? Inflation uncertainty creates drawbacks for each kind of mortgage.

The fixed-rate mortgage, in this hypothetical example, involves a large gamble on how inflation will turn out. The stake in this gamble is a sizable proportion of the borrower's lifetime net wealth. High inflation erodes the size in real terms of the borrower's mortgage debt liability (just as high inflation has eroded the value of government debt on occasions in the past). The borrower is laughing all the way from the bank. But with low inflation, the cost in real terms of servicing fixed-rate mortgage debt is very high. Fixed-rate debt plus large inflation uncertainty equals large uncertainty about household net wealth, and that is obviously undesirable.

Insofar as nominal interest rates tend to move in line with inflation, floating-rate mortgages offer an imperfect way of reducing such uncertainty about household net wealth. But they involve considerable interest rate uncertainty, which inflation uncertainty exacerbates. Interest rate uncertainty means residual income uncertainty—ie uncertainty about household income after tax and mortgage payments. That too is clearly undesirable.

If, by contrast, inflation is reasonably stable and predictable, the real wealth uncertainty of the fixed-rate mortgage is much reduced. So too is the residual income uncertainty of

See Akerlof *et al* (1996).
 Krugman (1998) argues that negative real interest rates are needed in Japan.

the floating-rate mortgage if interest rates are more stable when inflation is more stable.

Chart 4 shows the official short-term interest rate over the period since 1967. Comparison with Chart 2 above indicates that interest rates indeed tend to be more stable when inflation is more stable. For example, in the period of stable inflation since the start of 1993, the interest rate has varied only between 7.5% and 5.25%. In the previous six years of more volatile inflation, interest rates ranged from 7% to 15%. The positive correlation between interest rate volatility and inflation volatility over the past 50 years can be seen more systematically in Chart 5.

#### Chart 4 Official interest rates



Chart 5 Volatility of inflation and interest rates<sup>(a)</sup>



To sum up, mortgages—large transactions that span many years—exemplify the large financial risks created by inflation uncertainty. The point is a general one, which could be illustrated by many other cases, including pensions and corporate finance. Price stability cannot banish financial risks, but it can substantially reduce them, and that is well worth doing.

#### High inflation is uncertain inflation

At this point you might be thinking that the costs of uncertain inflation seem much more serious and compelling than the costs of perfectly anticipated inflation discussed earlier, and that stable inflation of, say, 10% would not be much worse than stable inflation of 2.5%.

It might well be that the inflation uncertainty is especially damaging, but the conclusion that 10% inflation would be okay does not follow. First, the quantitative estimates reported earlier imply that 10% inflation, even if perfectly anticipated, would be substantially worse than 2.5% inflation. Second, stable inflation at 10% is simply not a practical option. All experience shows that high inflation is volatile inflation, and that volatile inflation is uncertain inflation—see Chart 6 and the analysis by Joyce (1997).

#### Chart 6 Standard deviation and average level of RPIX inflation<sup>(a)</sup>



Why does high inflation mean uncertain inflation? There are many possible reasons. One is that in episodes of high inflation, *expectations* about inflation lack an anchor and start to drift.

#### The importance of anchored inflation expectations

A regime of price stability has not only low and stable inflation out-turns but also low and stable inflation expectations. To see why this is important for macroeconomic performance, consider the following example. Suppose that demand in the economy turns out to be unexpectedly strong. In that case it is likely that output will rise temporarily above its potential level, and that inflation will turn out higher than expected.

If the economy lacks a credible commitment to price stability, inflation expectations are likely to rise as a result. Then there is a familiar policy dilemma. If policy expands to accommodate the new inflation expectations, the economy is left with higher inflation. If, on the other hand, policy is tightened to bring inflation back down, the likely consequence is a period of output below potential, until inflation expectations adjust. Disinflation is costly—the more so if inflation expectations resist decline.

Suppose, by contrast, that there is a credible commitment to price stability, so that inflation expectations are reasonably well anchored. Then the unexpected strength of demand and the temporary rise in inflation will be seen as just that, and expectations of future inflation will not rise correspondingly. Output will inevitably return to its potential level, but need not fall below it in order to bring inflation expectations back down. They are down already, thanks to the credible commitment to price stability. Disinflation will then be relatively costless.

It follows that price stability—in particular stability of inflation expectations—is good for output stability. The international and domestic shocks hitting any economy mean that significant variation in inflation out-turns, and significant volatility of output relative to potential, are inevitable. But with well-anchored inflation expectations, such volatility is likely to be substantially lower than if inflation expectations are adrift.

In sum, low and stable inflation expectations are a key part of a regime of price stability. They contribute to greater stability of inflation out-turns, and to greater stability of output relative to its potential level. It is possible, moreover, that the prospect of greater stability of output and inflation might enhance the level of potential output over time—for example by reducing elements of investment uncertainty. In any event, greater macroeconomic stability is a major goal in its own right.

# The UK framework for price stability

Soon after the 1997 general election, a new constitution for UK monetary policy was established, when responsibility for making interest rate decisions was transferred from the Chancellor of the Exchequer to the Monetary Policy Committee (MPC) of the Bank of England. The goals of monetary policy are now laid down by statute. The primary objective that the MPC must pursue is price stability, and, subject to that, the other objectives of government policy, including growth and employment.

The operational meaning of the price stability objective is set by the Chancellor's remit to the MPC. Price stability is defined by the 2<sup>1</sup>/<sub>2</sub>% target for inflation on the RPIX measure—that is, inflation of the retail price index excluding mortgage interest payments. That is the target at all times, but the remit recognises that, confronted with shocks to the economy, striving to be at the target in all circumstances might cause undesirable volatility of output. The target is symmetric: the MPC responds just as vigorously to prospective undershoots of the target as to prospective overshoots. If the target is missed by more than 1 percentage point on either side, the Governor of the Bank, as Chairman of the MPC, must write an open letter to the Chancellor explaining why, and what is being done to rectify the situation.

Transparency and accountability are central to the system. Minutes of the monthly MPC policy meetings are now published within two weeks of each meeting. They give a full and frank account of the policy discussion, and record the individual votes of the nine Committee members. The Bank's quarterly Inflation Report gives a comprehensive analysis of the UK economy and explains the factors underlying policy decisions. Last month, the MPC also published a paper setting out its view of the channels through which official interest rate decisions affect inflation and output, and the Bank published a book describing the economic modelling tools that help the MPC in its work. Committee members regularly give evidence before parliamentary committees in Westminster, and we look forward to building constructive dialogues with the Scottish Parliament and the Welsh Assembly in due course. In gatherings of various kinds throughout the United Kingdom, we speak and listen and do our best to answer questions.

So as well as producing a single number each month—the interest rate decision—the MPC produces a large number of words—words that seek to explain in clear terms how the MPC is pursuing the clear primary objective of  $2^{1}/_{2}\%$  inflation.

# Price stability: recent evidence

As we saw earlier, the UK record of price stability over the past six-and-a-half years of inflation targeting has been unusually good by post-war standards. And in each of the last ten months, inflation has been within just 0.2% of the  $2^{1}/_{2}$ % target level.

Inflation will not generally be so close to target in future. The shocks and disturbances affecting any economy mean that bigger deviations are bound to happen sooner or later. But the symmetrical nature of the inflation target means that they are equally likely to be upwards as downwards. If the MPC sets policy right given the existing target, inflation will be about 2.5% on average.

Is this what people in fact expect? Inflation expectations are extremely important—for example in pay bargaining—but they are hard to measure. There are two main methods of measurement. One is simply to ask people. The table shows the results from the Barclays Basix Survey of inflation expectations. Two points stand out. First, apart from the general public, the reported inflation expectations of all groups—trade unions, finance directors, business

#### Survey-based inflation expectations<sup>(a)</sup>

	1998				1999
	Q1	<u>Q2</u>	Q3	Q4	Q1
General public	5.1	5.1	5.1	4.7	4.6
Trade unions	3.9	3.8	3.6	3.2	2.8
Finance directors	3.3	3.2	2.9	2.9	2.5
Business economists	2.9	2.9	2.4	2.3	2.5
Investment analysts	3.3	3.3	3.1	3.0	2.7
Academic economists	3.1	3.1	3.0	2.7	2.6

Source: Barclays Basix Survey.

(a) Expectations of inflation rate 12 to 24 months ahead. RPI inflation, except for General public, for which the measure of inflation is not specified.

economists, investment analysts and academic economists are currently quite close to 2.5%. Second, for all the groups, expected inflation has fallen substantially over the past year.

Measures of inflation expectations can also be inferred from the bond market. Chart 7 shows the ten-year real and nominal forward interest rates derived from index-linked and conventional government bonds, respectively. Also plotted is the difference between them—the 'break-even' inflation rate, which measures expected inflation (plus any inflation 'risk premium'). As recently as the mid 1990s, the nominal rate was about 8.5%, the real rate was around 3.5%, and the break-even inflation rate around 5%. The nominal rate is now around 4.5%, the real rate has fallen below 2%, and the break-even inflation rate is somewhat above 2.5%. Expected inflation, and perhaps also the inflation risk premium, has fallen very substantially. So too has the cost of borrowing for government, firms and households.

#### Chart 7

**Ten-year forward interest rates** 



Of course this is not all due to the new framework for monetary policy. There is low inflation in industrialised countries generally, partly because of the crises that have affected a number of emerging market economies over the past two years and the weakness of the Japanese economy. The appreciation of sterling that began in 1996 has further subdued UK inflation. Still, the new regime has surely played some part in bringing down inflation expectations, and, if the MPC does its job, it promises to lock in the substantial declines that have recently occurred.

#### **Born lucky?**

So has the United Kingdom's new monetary regime been fortunate and caught a fair wind of benign global inflation and a strong pound? Yes and no. Those forces have had the benefit of allowing more time for domestic inflationary pressures—for example in the labour market—to ease back towards a level consistent with the inflation target. The moderation of inflation expectations has been an important part of this process. And while output growth has clearly slowed—otherwise there would have been overheating—a contraction of aggregate UK output has probably been avoided—if only just—despite considerable turbulence in the global economy.

In other respects, however, those international forces have been far from benign, as many UK manufacturers and agricultural producers know all too well. For them, and for those competing in the internationally traded goods sectors generally, it has been an ill wind. The contrast over the past year or so between the decline in manufacturing and the quite steady growth in the more domestically oriented service sector has been sharp.

The MPC is acutely aware of that contrast, and the consequences for prospective inflation of exchange rate movements are central to interest rate decision-making. It would however be misleading to manufacturing industries to say that a monetary policy that had (unlawfully) aimed to overshoot the inflation target would have removed the difficulties that they face. It is possible that sterling would then have been weaker, though, as we have seen clearly in recent months, lower interest rates do not always mean a lower exchange rate. But the sure consequence of such a policy would have been greater cost pressure on firms across the whole economy, including in manufacturing. The United Kingdom has been down that road before.

Moreover, the exchange rate is just one of many factors that affect prospective inflation. The MPC's job involves watching all of them. While sterling and external forces can have a substantial impact on inflation in the short term, it is a home truth that inflationary pressures in domestic labour and product markets are what matter for monetary policy in the longer run.

#### Conclusion

Monetary policy requires determined flexibility—the determined pursuit of price stability by setting interest rates flexibly in response to economic developments. The MPC has just had its second birthday. I hope that the Committee has demonstrated that, compared with other two-year olds, it is equally determined but rather more flexible. The basis for the determination is that price stability, which it is for monetary policy to secure, is a key condition for economic success. The United Kingdom is not just revisiting price stability—we mean to stay.

# References

Akerlof, G, Dickens, W and Perry, G (1996), 'The macroeconomics of low inflation', *Brookings Papers on Economic Activity*, Vol 1, pages 1–76.

Bakhshi, H, Haldane, A and Hatch, N (1997), 'Quantifying some benefits of price stability', *Bank of England Quarterly Bulletin*, Vol 37(3), pages 274–84.

Joyce, M (1997), 'Inflation and inflation uncertainty' Bank of England Quarterly Bulletin, Vol 37(3), pages 285–91.

Krugman, P (1998), 'It's baaack: Japan's slump and the return of the liquidity trap', *Brookings Papers on Economic Activity*, Vol 2, pages 137–205.

Mankiw, G (1997), Macroeconomics, third edition, Harvard University, Worth Publishers.

# The impact of the international environment on recent monetary policy

In his annual speech at the Mansion House, (1) the **Governor** reviews recent developments in the world economy and the exchange rate, and their impact on the United Kingdom. Financial crises overseas in mid 1998 led to renewed pressures on the externally exposed sectors of the United Kingdom, prompting cuts in interest rates to as low as they have been since the mid 1960s. Similar pressures have been seen across all the industrialised economies, in particular dampening demand growth and business confidence in the euro area. While recognising the problems for particular sectors, the MPC continues to pursue stability for the economy as a whole through the inflation target.

My Lord Mayor, Mr Chancellor, My Lords, Aldermen, Mr Recorder, Sheriffs, Ladies and Gentlemen.

When we were last here for this splendid occasion, I suggested that we were living in a dangerous international financial and economic environment. These were strong words for a central banker—but perhaps not strong enough. That environment rapidly became worse through the autumn, so that by around the time of the IMF Annual Meetings in October there was a good deal of talk about global financial meltdown and impending world recession—which was not simply journalistic hyperbole.

Since that low point things have certainly improved. The hectic scramble for financial asset quality and liquidity following Russia's default and the near-collapse of LTCMan exceptionally highly geared hedge fund-failed to uncover fatal weaknesses elsewhere in the financial system, and lenders and investors have gradually regained some of their appetite for risk. Fears of a general credit crunch in major industrial countries quickly receded; and sentiment towards the emerging markets has improved, with growing evidence of recovery in the original Asian crisis countries and a better-than-expected outcome in Brazil. Among the industrial countries, Japan made stronger efforts to bring its long recession to an end-through macroeconomic stimulus and by strengthening its domestic banking system-and there are now signs that those efforts are beginning to be rewarded. Meanwhile, the world economy has been effectively underpinned by continuing abnormally strong domestic demand growth in the United States.

But despite these developments, we still have a long way to go. If the immediate danger of global financial instability has receded, we are still stuck with slow growth in the world economy, currently at around  $2^{1/2}$ %, which is not much more than half the estimated trend growth rate. And we are stuck, too, with massive international imbalances, both between the emerging and industrial countries on the one hand, and among the major industrial countries on the other. Without a stronger resumption of capital inflows to the emerging markets, the industrial countries will need to accommodate an export-led recovery in those markets. That implies stronger domestic demand growth, and hence import growth, in the G7 countries, if the world economy as a whole is to get back on trend in the reasonably near term. And the immediate challenge in this situation is to try to ensure that, as domestic demand growth in the United States slows—as it probably must, by one means or another demand picks up sufficiently elsewhere, especially in Europe and Japan, to take up the running. That in turn will largely determine how successfully we can achieve an orderly unwinding of the present imbalances.

This wider international context is, inevitably, having a profound—and continuing—effect on the pattern of interest rates and exchange rates, and on economic developments, both within the euro area and here in the United Kingdom, to an extent that is still perhaps not fully appreciated.

A year ago, when the historic decision to go ahead with a broadly based euro was taken in Brussels, the prospect was for a steady pick-up in overall demand and output across the euro area. It was a helpful environment for the introduction of the new currency. And the constituent currencies of the euro strengthened in the second half of last year on the back of that.

The introduction of the euro at the beginning of this year was a technical triumph—within the euro area, but also notably here in the City, which has clearly established itself from the outset as a vital contributor to the development of broad and liquid euro-denominated wholesale financial markets.

But the growing impact of the global economic setback last autumn was to dampen external demand and business confidence in the euro area—as it did elsewhere apparently affecting some of the participating countries more than others. In contrast to the United States, slower

(1) Given at the Lord Mayor's Dinner for Bankers and Merchants of the City of London on 10 June 1999

growth of external demand was not sufficiently offset by stronger domestic demand growth in the euro area, so that, instead of the expected pick-up in overall output growth, activity in fact increased progressively more slowly. Largely as a result, the euro has depreciated in the foreign exchange market, and economic performance in individual participating countries has diverged more than might have been expected. This has been a disappointment to some proponents of the euro, and has been seized upon by euro-sceptics as evidence of its risks. We need to be cautious, in my view, in interpreting this initial experience in the present unusually difficult global economic environment. As demand strengthens in the euro area-and the latest indicators from Germany are more encouraging-the likelihood is that the euro will recover and some of the present tensions ease. It has always been clear that there are potential risks of economic divergence within the euro area, to be weighed against the more obvious potential economic benefits of the single currency. The question has been just how significant those risks are likely to be. That will, ultimately, always be a matter of judgment. But it would be premature, in my view, to reach that judgment based on today's abnormal circumstances.

Now we, in this country, have of course been battered about, like everyone else, by the global turbulence. There is no way that we could have avoided its impact—either through fiscal or monetary policy. We are an integral part of the global economy.

And we had particular problems of our own. In our case, in marked contrast to the euro area, and despite the dampening effect of an already exaggeratedly strong exchange rate, we were confronted, in the early part of last year, with the prospect of excess demand and accelerating inflation, and policy had been tightened to head that off. But we, like others, were then hit in the autumn by the renewed turmoil in the global economy. That caused a sharper fall in external demand, but it also caused both business and consumer confidence to plummet—so that the prospect of moderate overall slowdown that we had been deliberately trying to engineer quite suddenly threatened to turn into an unnecessarily sharp downturn, with the risk that the rate of inflation would fall significantly below the Government's  $2^{1}/_{2}$ % inflation target.

So we promptly reversed gear, cutting interest rates very sharply—by 2<sup>1</sup>/<sub>2</sub>%, to as low as they have been since the mid 1960s. That has helped both business and consumer confidence to recover—from very low levels—and the prospect now is that, after a pretty flat economic performance either side of the year-end, overall demand and output growth will pick up steadily to around trend by the middle of next year. But, despite these interest rate cuts, the pound has actually strengthened—notably against the euro—partly, as I suggested earlier, because of weaker overall demand pressure in Europe. So we are again impaled on the horns of our earlier dilemma, arising from continuing imbalance between the stronger domestic and weaker

externally exposed sectors of the economy. Believe me—it is not a comfortable place to be.

The question is what to do?

The suffering sectors—most of agriculture, large parts of manufacturing industry, and some services—are in no doubt. Cut interest rates again—they say—and again and again. They are still twice as high as interest rates in Europe—and, they may just as well add, they are over 150 times as high as interest rates in Japan! The many more net savers—including pensioners living off the interest on their savings—take the opposite view, although they do of course benefit from the low-inflation environment, through the protection it gives to the real value of their assets.

What we have to try to do is to maintain stability in the economy as a whole, by keeping overall demand continuously broadly in line with the supply-side capacity of the economy as a whole. The inflation target is not some abstract end in itself—it is the measure, or barometer if you like, of how successfully we are managing to maintain macroeconomic stability in the economy as a whole in this much wider sense. The reason that our interest rates remain higher than those in the euro area is that, despite the recent slowdown, our economy is operating closer to capacity than theirs. That is partly why our rate of unemployment is almost half theirs—though the greater structural flexibility of the British economy is even more important in this context.

The MPC sets interest rates to achieve the inflation target. We have made it clear by our actions that we are just as vigorous in relaxing policy when the risks to inflation are on the downside as we are in tightening policy when the risks to inflation are on the upside. That is the best help that we can give through monetary policy.

It does not mean that we ignore the external pressures. In assessing the prospects for the overall economy, and for inflation, we take full account of the impact of world demand and of the exchange rate, just as we take full account of all the domestic factors bearing on inflation prospects. When, as now, the external influences are having a powerful disinflationary effect, monetary policy is of course easier, and interest rates lower, than they would otherwise be. That does not-and cannot-mean that we are able to pursue any particular objective with regard to the exchange rate-or that we respond, Pavlov-like, to exchange rate fluctuations. But we can, and do, aim to offset the impact of persistent external influences on the prospects for inflation, so that inflation in the economy as a whole stays on track to meet the inflation target given to us by the Chancellor. That is what we have been doing—and that is the context of our further move today.

No one, my Lord Mayor, is more conscious than I am of the limits to what we can hope to achieve through monetary

policy. But by operating within those limits we have been able to achieve greater macroeconomic stability, and consistently lower inflation, than we have seen for a generation. And that stability, together with the improved supply-side flexibility of the economy, has delivered our highest-ever level of employment, and a rate of unemployment in the economy as a whole that is close to its lowest for almost 20 years.

# Contents of recent Quarterly Bulletins

The articles and speeches which have been published recently in the Quarterly Bulletin are listed below:

# Articles and speeches (indicated S)

## February 1996

The over-the-counter derivatives markets in the United Kingdom Can we explain the shift in M0 velocity? Saving, investment and real interest rates Central bank independence and accountability: theory and evidence Trade with newly industrialised economies The gilt-edged market: developments in 1995 Changeover to the single currency The Bank of England: how the pieces fit together (S) Finance for small firms (S) *May 1996* Understanding broad money

How do UK companies set prices? The valuation of sub-underwriting agreements for UK rights issues

Bank of England Agents' summary of business conditions G7 yield curves

Seasonal adjustment of UK monetary aggregates EMU—considerations for British membership (S) Some thoughts on financial regulation (S) Industrial investment—can the market respond? (S) International regulatory co-operation post-Barings (S) The London Approach and trading in distressed debt (S)

#### August 1996

Simple monetary policy rules The industrial impact of monetary policy Probability distributions of future asset prices implied by option prices Expected interest rate convergence Payment and settlement strategy Practical issues arising from the single currency Economic growth and employment through stability (S) EMU—a British perspective (S) The economics of equal opportunity (S) Gilt repo—and beyond (S)

## November 1996

Interpreting sterling exchange rate movements

The demand for Divisia money by the personal sector and by industrial and commercial companies

International monetary policy co-ordination: some lessons from the literature

The external balance sheet of the United Kingdom: recent developments

Public sector debt: end March 1996

How should central banks reduce inflation?-conceptual issues

November 1996 (continued) Developing voluntary domestic markets for government debt Financial Stability Review—a profile of the new publication Research and policy at the Bank of England (S) Practical issues arising from the introduction of the euro (S) Economic policy approaches—some reflections (S) Risk reduction in payment and settlement systems (S)

#### February 1997

Recent yield curve behaviour—an analysis Increasingly weightless economies Monetary policy implementation in EMU The gilt-edged market: developments in 1996 New arrangements for issuing banknotes The financing of technology-based small firms Britain's regional economies: how different are they, and how should those differences affect monetary policy? (S) Monetary stability: rhyme or reason? (S) Evolution of the monetary framework (S) Prospects for monetary stability and the economics of EMU (S) Financial regulation: why, how and by whom? (S) Are banks still special? (S)

#### May 1997

Comparing the monetary transmission mechanism in France, Germany and the United Kingdom: some issues and results Economic models and policy-making The information in money Features of a successful contract: financial futures on LIFFE The first year of the gilt repo market The gilt-edged market: the Bank of England's relationship with the gilt-edged market makers and inter-dealer brokers The Bank of England's operations in the sterling money markets Executive summary of the single monetary policy in Stage 3 The financing of technology-based small firms: an update International regulatory structure: a UK perspective (S) Bond yields and macroeconomic behaviour (S)

Monetary policy and the exchange rate (S)

European central banking-East and West: where next? (S)

#### August 1997

Changes at the Bank of England Quantifying some benefits of price stability Inflation and inflation uncertainty

#### August 1997 (continued)

Quantifying survey data

The evolving role of the IMF in the light of the 1994/95 Mexican crisis

- The euro area from the perspective of an EU central bank (S)
- Reforms to the UK monetary policy framework and financial services regulation (S)

Monetary policy in Britain and Europe (S)

#### November 1997

- Public sector debt: end March 1997
- The external balance sheet of the United Kingdom: recent developments
- Decomposing exchange rate movements according to the uncovered interest rate parity condition
- The relationship between openness and growth in the United Kingdom: a summary of the Bank of England Openness and Growth Project
- Rationalisation of European equity and derivative exchanges
- Implied exchange rate correlations and market perceptions of European Monetary Union
- The Bank's regional Agencies
- The Bank's Centre for Central Banking Studies—an update Prospects for the City—in or out of EMU (S) The inflation terrest five years on (S)

The inflation target five years on (S)

## February 1998

The *Inflation Report* projections: understanding the fan chart

Investment in this recovery: an assessment

- Macroeconomic policy and economic performance in developing countries
- Gilt-edged and sterling money markets: developments in 1997

Upgrading the Central Gilts Office

UK monetary framework and preparations for EMU (S) Recent problems in Asia (S)

#### May 1998

The Bank of England Act

Recent developments in financial markets

Growth in UK manufacturing between 1970–92

Competition and co-operation: developments in

cross-border securities settlement and derivatives clearing The financing and information needs of smaller exporters The New Lady of Threadneedle Street (S)

# Exchange rates: an intractable aspect of monetary policy (S)

#### August 1998

The UK personal and corporate sectors during the 1980s and 1990s: a comparison of key financial indicators Are prices and wages sticky downwards? Why has the female unemployment rate in Britain fallen? Testing value-at-risk approaches to capital adequacy The cyclicality of mark-ups and profit margins: some

evidence for manufacturing and services

#### August 1998 (continued)

Three views of macroeconomics (S) Trade and investment in the light of the Asian crisis (S) The UK economy and monetary policy—looking ahead (S) Recent economic developments and the MPC approach to monetary policy (S) Financial services into the year 2000 (S)

#### November 1998

Public sector debt: end March 1998 Inflation and growth in a service economy The foreign exchange and over-the-counter derivatives markets in the United Kingdom Recent changes to the national accounts, balance of payments and monetary statistics Inflation targeting in practice: the UK experience (S) The objectives and current state of monetary policy (S) Economic policy, with and without forecasts (S)

#### February 1999

Sterling wholesale markets: developments in 1998
The external balance sheet of the United Kingdom: recent developments
The impact of inflation news on financial markets
Monetary policy rules and inflation forecasts
The yen/dollar exchange rate in 1998: views from options markets
Risk, cost and liquidity in alternative payment systems
Monetary policy and the international economic environment (S)
Monetary policy and the labour market (S)
EMU: a view from next door (S)
Central bankers and uncertainty (S)

#### May 1999

The transmission mechanism of monetary policy Monetary policy and the yield curve The Bank's use of survey data Monetary policy and uncertainty An effective exchange rate index for the euro area The financing of small firms in the United Kingdom Structural changes in exchange-traded markets Developments in small business finance (S) Economic models and monetary policy (S) Inflation and growth in the services industries (S)

#### August 1999

What makes prices sticky? Some survey evidence for the United Kingdom

The use of explicit targets for monetary policy: practical experiences of 91 economies in the 1990s

Financial sector preparations for the Year 2000

The Asian crisis: lessons for crisis management and prevention (S)

The MPC two years on (S)

Price stability in the United Kingdom (S)

The impact of the international environment on recent monetary policy (S)

# **Bank of England publications**

## **Working Papers**

An up-to-date list of *Working Papers* is maintained on the Bank of England's Internet site at http://www.bankofengland.co.uk/. Abstracts of all *Papers* are also available. Papers released since January 1997 are available in full, in PDF format. The *Working Paper* series are available free of charge. A complete list of the *Working Papers* is available from the address below.

<u>No</u>	Title	Author
25	Potential credit exposure on interest rate swaps (August 1994)	Ian Bond Gareth Murphy Gary Robinson
26	New currencies in the Former Soviet Union: a recipe for hyperinflation or the path to price stability? ( <i>September 1994</i> )	C L Melliss M Cornelius
27	Inflation, inflation risks and asset returns (November 1994)	Jo Corkish David Miles
28	The construction of RPIY (February 1995)	R Beaton P G Fisher
29	Pricing deposit insurance in the United Kingdom (March 1995)	David Maude William Perraudin
30	Modelling UK inflation uncertainty: the impact of news and the relationship with inflation ( <i>April 1995</i> )	M A S Joyce
31	Measuring core inflation (April 1995)	Danny T Quah Shaun P Vahey
32	An assessment of the relative importance of real interest rates, inflation and term premia in determining the prices of real and nominal UK bonds ( <i>April 1995</i> )	David G Barr Bahram Pesaran
33	Granger causality in the presence of structural changes (May 1995)	Marco Bianchi
34	How cyclical is the PSBR? (May 1995)	Joanna Paisley Chris Salmon
35	Money as an indicator (May 1995)	Mark S Astley Andrew G Haldane
36	Testing for convergence: evidence from nonparametric multimodality tests (June 1995)	Marco Bianchi
37	Wage interactions: comparisons or fall-back options (August 1995)	Jennifer C Smith
38	The microstructure of the UK gilt market (September 1995)	James Proudman
39	Valuation of underwriting agreements for UK rights issues: evidence from the traded option market ( <i>September 1995</i> )	Francis Breedon Ian Twinn
40	Rules, discretion and the United Kingdom's new monetary framework (November 1995)	Andrew G Haldane
41	Optimal commitment in an open economy: credibility vs flexibility (December 1995)	Sylvester Eijffinger Eric Schaling
42	Bidding information: evidence from gilt-edged auctions (January 1996)	Francis Breedon Joe Ganley
43	International bank lending to LDCs—an information-based approach (January 1996)	Prasanna Gai
44	A comparison of methods for seasonal adjustment of the monetary aggregates (March 1996)	Marco Bianchi
45	Base money rules in the United Kingdom (March 1996)	Andrew G Haldane Bennett T McCallum Chris Salm
46	A market for intra-day funds: does it have implications for monetary policy? (March 1996)	Spencer Dale Marco Rossi

- 47 Measurement bias in price indices: an application to the UK's RPI (*March 1996*)
- 48 The construction of the Bank's new UK commodity price index (*March 1996*)
- 49 Independence and accountability (April 1996)
- 50 Unemployment persistence: does the size of the shock matter? (June 1996)
- 51 UK asset price volatility over the last 50 years (June 1996)
- 52 Feasible mechanisms for achieving monetary stability: a comparison of inflation targeting and the ERM (*July 1996*)
- 53 What determines the short-run output-inflation trade-off? (July 1996)
- 54 Monetary policy uncertainty and central bank accountability (*October 1996*)
- 55 The information content of the short end of the term structure of interest rates (*October 1996*)
- 56 Inflation forecast targeting: implementing and monitoring inflation targets (*November 1996*)
- 57 Why do the LIFFE and DTB bund futures contracts trade at different prices? (*December 1996*)
- 58 The determinants of the UK business cycles (January 1997)
- 59 Which inter-dealer market prevails? An analysis of inter-dealer trading in opaque markets (*March 1997*)
- 60 Testing the predictive power of dividend yields: non-parametric evidence from the G5 (*April 1997*)
- 61 The demand for M4: a sectoral analysis Part 1—the personal sector (June 1997)
- 62 The demand for M4: a sectoral analysis Part 2—the corporate sector (June 1997)
- 63 Is international openness associated with faster economic growth? (June 1997)
- 64 Persistence and mobility in international trade (June 1997)
- 65 Real interest rate linkages: testing for common trends and cycles (July 1997)
- 66 Implied risk-neutral probability density functions from option prices: theory and application (*July 1997*)
- 67 How do UK companies set prices? (July 1997)
- 68 The industrial impact of monetary policy shocks: some stylised facts (*September 1997*)

Alastair Cunningham

Andrew Logan Lucy O'Carroll

Clive B Briault Andrew G Haldane Mervyn A King

Marco Bianchi Gylfi Zoega

Nicola Anderson Francis Breedon

Matthew B Canzoneri Charles Nolan Anthony Yates

Anthony Yates Bryan Chapple

Charles Nolan Eric Schaling

Marco Rossi

Lars E O Svensson

Francis Breedon

Allison Holland Andrew Scott

Victoria Saporta

Francis Breedon Marco Bianchi Darren Sharma

Ryland Thomas

Ryland Thomas

James Proudman Stephen Redding Marco Bianchi

James Proudman Stephen Redding

Darren Pain Ryland Thomas

Bhupinder Bahra

Simon Hall Mark Walsh Anthony Yates

Joe Ganley Chris Salmon

69	Agency incentives and reputational distortions: a comparison of the effectiveness of value-at-risk and pre-commitment in regulating market risk ( <i>October 1997</i> )	Arupratan Daripa Simone Varotto
70	The determinants of successful financial innovation: an empirical analysis of futures innovation on LIFFE ( <i>October 1997</i> )	Jo Corkish Allison Holland Anne Fremault Vila
71	The effects of stamp duty on the level and volatility of UK equity prices (October 1997)	Victoria Saporta Kamhon Kan
72	The cyclicality of mark-ups and profit margins: some evidence for manufacturing and services ( <i>December 1997</i> )	Ian Small
73	Deconstructing growth in UK manufacturing (December 1997)	Gavin Cameron James Proudman Stephen Redding
74	Some issues in inflation targeting (December 1997)	Andrew G Haldane
75	The information content of the inflation term structure (December 1997)	Francis J Breedon Jagjit S Chadha
76	Electronic versus open outcry markets: the case of the Bund futures contract ( <i>January 1998</i> )	Francis J Breedon Allison Holland
77	Productivity convergence and international openness (March 1998)	Gavin Cameron James Proudman Stephen Redding
78	Some costs and benefits of price stability in the United Kingdom (March 1998)	Hasan Bakhshi Andrew G Haldane Neal Hatch
79	Bank capital and Value at Risk (May 1998)	Patricia Jackson David J Maude William Perraudin
80	Are there downward nominal rigidities in product markets? (June 1998)	Simon Hall Anthony Yates
81	Are UK inflation expectations rational? (July 1998)	Hasan Bakhshi Anthony Yates
82	Downward nominal rigidity and monetary policy (August 1998)	Anthony Yates
83	The demand for M0 in the United Kingdom reconsidered: some specification issues (August 1998)	Norbert Janssen
84	Averaging in a framework of zero requirements: implications for the operation of monetary policy ( <i>October 1998</i> )	Haydn Davies
85	Exchange rates and prices: sources of sterling real exchange rate fluctuations 1973–94 ( <i>October 1998</i> )	Mark S Astley Anthony Garrett
86	Shoe-leather costs reconsidered (October 1998)	Jagjit S Chadha Andrew G Haldane Norbert G J Janssen
87	Why has the female unemployment rate fallen so much in Britain? (October 1998)	Phil Evans
88	Incentive schemes for central bankers under uncertainty: inflation targets versus contracts ( <i>November 1998</i> )	Eric Schaling Marco Hoeberichts Sylvester Eijffinger
89	Optimal currency areas and customs unions: are they connected? (November 1998)	Marion Kohler
90	Bank capital and risk-taking (January 1999)	Alistair Milne A Elizabeth Whalley
91	Forward-looking rules for monetary policy (January 1999)	Nicoletta Batini Andrew G Haldane
92	Coalition formation in international monetary policy games (February 1999)	Marion Kohler

93	Business cycles and the labour market can theory fit the facts? (March 1999)	Stephen Millard Andrew Scott Marianne Sensier
94	Asset price reactions to RPI announcements (March 1999)	M A S Joyce V Read
95	Price formation and transparency on the London Stock Exchange (April 1999)	Victoria Saporta Giorgio Trebeschi Anne Vila
96	Uncertainty and simple monetary policy rules—An illustration for the United Kingdom ( <i>June 1999</i> )	Simon Hall Chris Salmon Tony Yates Nicoletta Batini
97	To trim or not to trim? An application of a trimmed mean inflation estimator to the United Kingdom ( <i>July 1999</i> )	Hasan Bakhshi Tony Yates
98	The non-linear Phillips curve and inflation forecast targeting (July 1999)	Eric Schaling

#### **Statistical Abstract**

The annual *Statistical Abstract* comes in two parts: Part 1 contains a range of banking and other financial data; Part 2 provides longer runs of monetary statistics and related items. For 1999, each part is priced at £20.00 (including postage) in the United Kingdom. A concessionary price of £15.00 per part is available to academics in the United Kingdom and £12.00 per part to students and secondary schools in the United Kingdom.

#### **Monetary and Financial Statistics**

A monthly publication, *Bank of England: Monetary and Financial Statistics (Bankstats)*, was launched in January 1997. This comprehensive publication (priced at £80.00 per annum in the United Kingdom for 1999) contains detailed data on money and lending, bank and building society balance sheets, international positions of banks operating in the United Kingdom, government financing and the money markets (including gilt repo and stock lending), issues of securities and short-term paper, interest and exchange rates and occasional background articles. If you would like more information, please contact Daxa Khilosia, Monetary and Financial Statistics Division HO-5, telephone 020–7601 5353.

#### **Targeting Inflation book**

In March 1995, the Bank hosted a conference of central banks currently adhering to inflation targets. This book, edited by Andrew Haldane, draws together contributions from each of the eight countries represented at the conference. It details cross-country experiences of this monetary framework and the key operational and theoretical issues it raises. The book is suitable for both academics and practitioners. The price of the book is  $\pounds 20.00$  plus postage and packaging.

#### **Index-linked debt book**

In September 1995, the Bank held a conference to discuss a broad range of theoretical and practical questions raised by index-linked debt in general, and the UK experience in particular. This book contains revised versions of the papers presented at the conference, as well as the papers that were circulated by the Bank ahead of the conference, setting out background information and key policy issues. The price of the book is £10.00 plus postage and packaging.

#### **Openness and Growth book**

The *Openness and Growth* book, published in October 1998, contains the proceedings of an academic conference held at the Bank of England in September 1997. The research described in the book investigates the link between productivity growth and the international openness of the UK economy. The price of the book is £10.00 plus postage and packaging.

#### Economic models at the Bank of England

The *Economic models at the Bank of England* book, published in April 1999, contains details of the economic modelling tools that help the Monetary Policy Committee in its work. The price of the book is £10.00 plus postage and packaging.

These publications are available from Publications Group, Bank of England, Threadneedle Street, London, EC2R 8AH; telephone 020–7601 4030; fax 020–7601 3298; email mapublications@bankofengland.co.uk.

# **Quarterly Bulletin and Inflation Report subscription details**

Copies of the Quarterly Bulletin and Inflation Report are available from the Bank as a combined package; the Inflation Report is also available separately. The prices are set out below:

Destination		1999			1998				
		<i>Quarterly Bulletin</i> and <i>Inflation Report</i> package		Inflation Report only (1)		Quarterly Bulletin and Inflation Report package		Inflation Report only (1)	
		Annual	Single	Annual	Single	Annual	Single	Annual	Single
United Kingdom by first-class mail (2)		£40.00	£10.00	£12.00	£3.00	£40.00	£10.00	£12.00	£3.00
Academics, <b>UK only</b> Students, <b>UK only</b>		£27.00 £14.00	£6.75 £3.50	£8.00 £4.50	£2.00 £1.50	£27.00 £14.00	£6.75 £3.50	£8.00 £4.50	£2.00 £1.50
European countries including the Republic of Ireland, by letter service		£48.00	£12.00	£14.00	£3.50	£48.00	£12.00	£14.00	£3.50
Countries outside Europe: Surface mail		£48.00	£12.00	£14.00	£3.50	£48.00	£12.00	£14.00	£3.50
Air mail:	Zone 1 (3)	£64.00	£16.00	£21.00	£5.25	£64.00	£16.00	£21.00	£5.25
	Zone 2 (4)	£66.00	£16.50	£22.00	£5.50	£66.00	£16.50	£22.00	£5.50

 There is a 25% discount if five copies or more of the same issue are purchased.
 Subscribers who wish to collect their copy(ies) of the *Bulletin* and/or *Inflation Report* may make arrangements to do so by writing to the address given below. Copies will be available to personal callers at the Bank from 10.30 am on the day of issue and from 8.30 am on the following day. (3) All countries other than those in Zone 2.

(4) Australasia, Japan, China, the Philippines and Korea

Readers who wish to become regular subscribers, or who wish to purchase single copies, should send to the Bank, at the address given below, the appropriate remittance, payable to the Bank of England, together with full address details, including the name or position of recipients in companies or institutions. If you wish to pay by Visa, Mastercard, Switch or Delta please telephone 020–7601 4030. Existing subscribers will be invited to renew their subscriptions automatically. Copies can also be obtained over the counter at the Bank's front entrance.

The concessionary rates for the combined Quarterly Bulletin/Inflation Report package and the separate Inflation Report are noted above in *italics*. Academics at UK institutions of further and higher education are entitled to a concessionary rate. They should apply on their institution's notepaper, giving details of their current post.

Students and secondary schools in the United Kingdom are also entitled to a concessionary rate. Requests for concessionary copies should be accompanied by an explanatory letter; students should provide details of their course and the institution at which they are studying.

The Quarterly Bulletin is also available from Bell & Howell Information and Learning: enquiries from customers in Japan and North and South America should be addressed to Bell & Howell Information and Learning, 300 North Zeeb Road, Ann Arbor, Michigan 48106, United States of America; customers from all other countries should apply to White Swan House, Godstone, Surrey, RH9 8LW, telephone 01444 445000.

An index of the *Quarterly Bulletin* is also available to customers free of charge from Publications Group at the address given below. It is produced annually, and lists alphabetically terms used in the *Quarterly Bulletin* and articles written by named authors.

Bound volumes of the *Quarterly Bulletin* for the period 1960–85 (in reprint form for the period 1960–80) can be obtained from Schmidt Periodicals GmbH, Dettendorf, D-83075 Bad Feilnbach 2, Germany, at a price of DM 190.00 per volume or DM 4,380.00 per set.

Contents pages for the *Quarterly Bulletin* can be viewed on the Internet with links to the articles in PDF format. The Bank's Internet pages are at http://www.bankofengland.co.uk.

Issued by Publications Group, Bank of England, Threadneedle Street, London, EC2R 8AH; telephone 020–7601 4030; fax 020-7601 3298; email mapublications@bankofengland.co.uk. General enquiries about the Bank of England should be made to 020-7601 4444.