# **Bank of England Quarterly Bulletin**



# February 1996

Volume 36 Number 1

# **Bank of England Quarterly Bulletin**

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Volume 36

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# **Bank of England publications**

#### **Quarterly Bulletin and Inflation Report**

Copies of the *Bulletin* and *Inflation Report* may be obtained from the Bank as a **combined** package; the *Inflation Report* is also available separately. The **1996** prices are as follows:

	Quarterly Bulletin andInflation Report packageAnnualSinglesubscriptioncopies		Inflation only Annual subscription	Report Single copies (1)
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Prices for copies from **1991–94** can be obtained from Publications Group at the address given below.

The concessionary rates for the combined *Bulletin/Inflation Report* package, the separate *Inflation Report* are noted above in *italics* and are available to **students in the United Kingdom** and also to **secondary schools in the United Kingdom**. 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.

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The *Bulletin* is also available on microfilm: enquiries from customers in Japan and North and South America should be addressed to University Microfilms International, 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.

Bound volumes of the *Bulletin* for the period 1960 to 1985 (in reprint form for the period 1960 to 1980) can be obtained from Schmidt Periodicals GmbH, Dettendorf, D-83075 Bad Feilnbach 2, Germany, at a price of DM 180.00 per volume or DM 4,100.00 per set.

In addition, there is now a general charge for the *Statistical Abstract*. It comes in two parts each priced at £10.00 (including postage) to all destinations. A concessionary price of £5.00 per part is available for students in the United Kingdom. Part 1 contains a range of banking and other financial data; Part 2 provides longer runs of monetary statistics and related items. For further details please see page 100.

#### The gilt market

'Gilts and the Gilt Market: review 1994–5' outlines the main events in the gilt market in the year to March 1995 and also covers current and future developments. It updates information provided in 'British Government Securities: the market in gilt-edged securities', intended for those with a professional interest in gilts and the gilt market. 'Investing in Gilts: a guide for the small investor' provides basic information for small investors. These publications may be obtained free from the Bank of England, PO Box 96, Gloucester, GL1 1YB.

#### **Working Papers**

The following *Working Papers* have been published in the last six months:

<u>No</u>	Title	Author
37	Wage interactions: comparisons or fall-back options	Jennifer Smith
38	The microstructure of the UK gilt market	James Proudman
39	Valuation of underwriting agreements for UK rights issues: evidence from the traded option market	Francis Breedon Ian Twinn
40	Rules, discretion and the United Kingdom's new monetary framework	Andrew G Haldane
41	Optimal commitment in an open economy: credibility vs flexibility	Sylvester Eijffinger Eric Schaling
42	Bidding information: evidence from gilt-edged auctions	Francis Breedon Joe Ganley

43 International bank lending to LDCs—an Prasanna Gai information-based approach

Issued by the Inflation Report Division, Bank of England, London, EC2R 8AH. Telephone: 0171-601 4030; email: dh95@cityscape.co.uk; and letters: marked 'for the attention of the Publications Group'. General enquiries by telephone should be made to 0171-601 4444. The Bank's Internet pages are at http://www.coi.gov.uk/coi/depts/GBE/GBE.html.

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# **The Quarterly Bulletin and Inflation Report**

*Inflation Report* (published separately)

*The operation of monetary policy* (pages 5–14)

*The international environment* (pages 15–21)

*Financial market developments* (pages 22–29)

**Research and analysis** (pages 30–78)

*Reports* (pages 79–90)

The *Inflation Report* analyses recent developments in the UK economy and assesses the outlook for inflation over the next two years. Retail price inflation fell in the final quarter of 1995 and producer prices showed signs of slowing. Average earnings growth remained stable; output grew more slowly than most estimates of the long-run trend, but unemployment continued to fall. Money and credit continued to expand rapidly.

This article reviews developments in the last quarter of 1995. Official interest rates were reduced by 25 basis points on 13 December. Sterling fell around 2% over the quarter. Gilt yields continued their downward trend. Total gilt sales were £8.0 billion.

The international environment for UK exports weakened in the second half of 1995, mainly because of slower growth in Germany and France. Inflation in the G7 economies remained flat in the third quarter of 1995. Official interest rates were cut in Europe and the United States in December 1995.

International bond issues fell in the fourth quarter of 1995, although the rally in prices continued in most major bond markets. Turnover in the major derivative exchanges was generally lower in the fourth quarter.

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

*The over-the-counter derivatives markets in the United Kingdom* (by the Derivatives Markets Survey Team in Markets & Systems Division). The survey of this market in the United Kingdom (part of a wider Bank for International Settlements exercise) provides useful information on derivatives markets and shows London to be the most active centre.

*Can we explain the shift in M0 velocity? Some time-series and cross-section evidence* (by Norbert Janssen of Monetary Assessment & Strategy Division). The steady upward trend in narrow money velocity in the United Kingdom slowed in the 1990s, coinciding with fewer cash-saving financial innovations and lower inflation.

*Saving, investment and real interest rates* (by Nigel Jenkinson of the Bank's Structural Economic Analysis Division). The G10 finance ministries and central banks published, in October 1995, a report of a study of savings, investment and real interest rates. This report describes the study's conclusions and policy recommendations. It also outlines the Bank of England's work supporting the study.

*Central bank independence and accountability: theory and evidence* (by Clive Briault, Andrew Haldane and Mervyn King, of the Monetary Analysis Divisions). Accountability and transparency can help reduce the inflation bias that might otherwise result from discretionary policy-making. Accountability can serve as a partial substitute for reputation among central banks whose monetary frameworks have yet to establish themselves fully.

*Trade with newly industrialised economies* (by Alistair McGiven of Structural Economic Analysis Division). In the past 25 years, trade between the OECD and the newly industrialised economies (NIEs) has risen significantly, presenting both opportunities and challenges for producers in the OECD countries.

*The gilt-edged market: developments in 1995.* Numerous gilt market reforms were announced in 1995. This annual article describes these reforms and reviews primary and secondary market developments in the gilt market during the year, highlighting key statistics on stocks issued, stocks outstanding and turnover.

*Changeover to the single currency* (by John Townend, a Deputy Director of the Bank). The European Monetary Institute document on the introduction of a single European currency is set in a UK context, with an account of the Bank's actions.

# The operation of monetary policy

Decisions on monetary policy are based on a wide range of evidence. The Bank's current assessment is given in the February Inflation Report. This article reviews the operation of monetary policy in the final quarter of 1995.

# **Overview**

In the November *Inflation Report*, the Bank's medium-term projection was that the RPIX inflation rate in two years' time was likely to remain just above  $2^{1}/_{2}\%$ . The *Inflation Report* added that the uncertainties surrounding the central projection had increased since the August issue and that the range of possible outcomes had become wider. Developments since the November *Report* suggest that the chances of inflation being below  $2^{1}/_{2}\%$  in two years' time have improved, and this made possible a modest easing in official interest rates, consistent with meeting the Government's inflation target of  $2^{1}/_{2}\%$  or less.

Among the data released during the quarter, current retail price inflation on the targeted RPIX measure fell to 2.9% in October and remained at this level in November. Seasonal food prices fell after the drought-induced increases in the summer. But more long-lasting factors were at work as well, particularly increased competition, while cost pressures were much less than earlier in the year. The producers' input price index fell in both October and November, bringing the twelve-month rate of increase down to  $6^{1/2}$ % from a peak of 12% earlier in the year. And surveys continued to confirm the reduction in input price pressures. There were few signs of increased wage pressure in the quarter. Underlying earnings growth remained at 3<sup>1</sup>/<sub>4</sub>% and settlements (employment-weighted median), remained at 3% in the three months to November despite the fall of nearly 50,000 in unemployment over the same period. The figures showed GDP growth tending to slow (to 0.4% in the third quarter, or 0.3% excluding oil and gas). Growth in Q3 was driven by consumption and stock-building; fixed investment and external trade made negative contributions. The build-up in stocks in Q3 was spread evenly between finished goods, materials and work-in-progress, but some adjustment of stocks still seemed likely, adding to the possibility of a pause in output growth. The fall in investment mainly reflected weakness in construction (particularly housing), but investment in plant and machinery was also less buoyant than in previous recoveries. Both M0 and M4 were growing above their monitoring ranges by the end of the quarter. There are reasons why the relationship between nominal demand and money (both narrow and broad) might have changed. But a continuation of strong monetary growth might lead to higher inflation in the future.

# **Money markets**

Official interest rates were reduced by 25 basis points late in the quarter (13 December), the first reduction since February 1994.

#### UK interest rates



(a) Three-month Libor in March 1996 implied by short-sterling futures contract.

#### Short-sterling futures curves(a)



High and low overnight interest rates



Interest rates, gilt yields and exchange rates; selected dates<sup>(a)</sup>

The move followed increases of 50 basis points in September and December 1994 and February 1995. In the third quarter the market expected a possible reduction in official rates towards the end of the year and this view strengthened as the fourth quarter progressed. There was no expectation of a change in rates arising from the Monetary Meetings held on 29 September and 1 November; expectations were focused on the 28 November Budget and the subsequent Monetary Meeting (13 December).

Early in the period money-market rates tightened sharply. Confidence that a slowing economy and moderating price pressures would result in a reduction in interest rates was shaken by the data releases for September. These showed some recovery in industrial output (6 October) and stronger producer price pressures (9 October). But significantly worse-than-expected RPI figures on 12 October did most to dent confidence; and money-market rates reached their highest levels since late August when sterling fell to a low (DM 2.1855) during 23 October, as a strengthening DM revived tensions in the ERM. From early October to 23 October, the three-month rate implied by the December short-sterling futures contract rose by 25 basis points, from 6.53% to 6.78%, and similar or slightly greater changes were seen along the futures curve as far as March 1997.

Aided initially by a strengthening exchange rate and statistical releases covering October, the money market recovered in November. The RPI figures for October, released on 16 November, took the December short-sterling contract to record highs and, although a recurrence of exchange rate weakness towards the end of the month slowed the market's progress, growing expectations that the Bundesbank and Federal Reserve might soon lower their key rates helped to push the market on. The publication of the Bank's *Inflation Report* on 8 November (its contents being broadly interpreted as moving cautiously towards the market's improved view of the inflationary outlook) also played a part in sustaining the market's expectations. By the time of the Budget on 28 November, a 25 basis-point reduction in three-month rates by the expiry of the December short-sterling contract on 20 December (one week after the Monetary Meeting) had been fully priced in.

The market saw the approaching Budget as a significant determinant of the likelihood of interest rate reductions, and occasional speculation during November of a substantial fiscal stimulus unsettled the market at times. As the Budget was

	Interest rates (per cent per annum)					Gilt yields (b) (per cent per annum)				Exchange rates		
	Sterling interbank rates (c)			Short sterling future (d)	Conventionals			Index-linked				
1995	1 month	3 months	6 months	12 months	<u>12 months</u> <u>3 months</u>	Short	Medium	Long	Long	ERI	\$/£	DM/£
2 October	623/32	6 <sup>23</sup> / <sub>32</sub>	6 <sup>23</sup> / <sub>32</sub>	6 <sup>23</sup> / <sub>32</sub>	6.47	7.50	8.04	8.24	3.71	85.2	1.5885	2.2696
23 October	6 <sup>21</sup> / <sub>32</sub>	63/4	613/16	67/8	6.70	7.65	8.21	8.36	3.77	83.5	1.5808	2.1899
20 November	6 <sup>13</sup> /16	6 <sup>21</sup> /32	69/16	6 <sup>17</sup> /32	6.37	7.16	7.76	7.93	3.59	82.2	1.5460	2.1834
12 December	6 <sup>19</sup> / <sub>32</sub>	61/2	63/8	65/16	6.20	6.86	7.44	7.67	3.55	82.8	1.5315	2.2184
13 December	6 <sup>1</sup> / <sub>2</sub>	615/32	611/32	<b>6</b> <sup>1</sup> / <sub>4</sub>	6.19	6.83	7.42	7.66	3.55	83.0	1.5327	2.2221
29 December	6 <sup>1</sup> /2	6 <sup>1</sup> / <sub>2</sub>	611/32	65/16	6.25	6.79	7.41	7.66	3.56	83.1	1.5492	2.2200

Close-of-business rates in Londor

Cross-redustries nates in London. Gross redemption yield. Representative stocks: short—8% Treasury 2000; medium—81/2% Treasury 2005; long—8% Treasury 2015; index-linked—21/3% Index-Linked Treasury 2016 (real yield assuming 5% inflation).

Middle-market rates. Implied future rate: March 1996 contract.

(d)

**Table A** 

#### UK, US and German three-month cash rates and rates implied for March 96



(a) Three-month rates implied by March 1996 futures contracts

#### **Table B** Influences on the cash position of the money market

£ billions; not seasonally adjusted Increase in bankers' balances (+)

	1995/96	1995		
	AprSept.	Oct.	Nov.	Dec.
Factors affecting the				
market's cash position				
Under/overfunding (+/-) (a)	9.0	-5.5	2.9	-2.6
Other public sector net				
borrowing from banks and				
building societies (-) (b)	0.8	-0.3	0.7	-0.5
of which, local authorities'				
deposits with banks and buil	ding			
societies (+)	0.5	-0.3	0.5	0.1
Currency circulation (-)	-1.0	1.3	-0.8	-2.6
Other	4.1	1.3	-4.2	4.1
	12.0		10	1.6
Total	13.0	-3.2	-1.3	-1.6
Increase (+) in the stock of				
assistance	-12	29	-11	16
Increase (-) in £ Treasury	1.2	2.7	1.1	1.0
bills outstanding (c)	11.5	-0.3	-2.2	
Increase in bankers'				
balances at the Bank	0.2	-	-0.1	

Central government net debt sales to banks and building societies are included (a) in funding. Banks' and building societies' transactions in local authorities' and public

(b) corporations' listed sterling stocks and bonds are included in funding. Other than those held outright by the Bank and government accounts but including those purchased by the Bank on a repurchase basis. (c)

interpreted as broadly neutral and the Chancellor's forecast for GDP growth in 1996 was considered ambitious, an early interest rate reduction was regarded by the market as both likely and appropriate—although expectations of a 50 basis-point reduction quickly faded. On the morning of 13 December, when the Monetary Meeting was held, the December short-sterling contract implied a rate of  $6^{1/2}$ % and the three-month interbank rate also traded at that level. With a 25 basis-point reduction in rates fully discounted and the Chancellor and Governor in agreement about the conditions which warranted a cut, there was little immediate movement in rates at the front of either the short-sterling or cash market curves. But the robust performance of the exchange rate in the wake of the UK cut, and the reduction in German rates the following day, helped make the curve still steeper. From the day before the Budget to the middle of December, the mid-1996 area of the short-sterling curve eased by around 25 basis points, to just under 6%. The rate implied by the December 1996 contract eased by around 40 basis points to a little above 6% over the same period. However, after mid-December the market weakened against the background of considerable uncertainty about the outcome of the US budget issue and, after the turn of the year, the re-emergence of concerns about the Conservative Party's slender Parliamentary majority. Over the quarter as a whole, market expectations of future short-term rates fell-the falls increased with the maturity of the period to which they related.

The Bank's daily money-market operations during the quarter were consistently directed towards maintaining the general level of short-term interest rates around the prevailing level of the base rate. To this end, the Bank continued to scale back bill offers and to require the market to meet part of each day's shortage via its late lending operations, although there was less need to do so as December progressed on account of seasonal pressures. For much of the quarter, interbank rates as far as the three-month maturity traded relatively close to base rate. As the market grew more bullish in November, however, the negative slope to the yield curve steepened. By the time of the Budget, three-month rates had slipped to  $6^{1/2}$ % against  $6^{3/4}$ % at the start of the quarter, and one-year rates had fallen to  $6^{11}/_{32}$ %.

With short-dated interest rates generally trading a little above the Bank's money-market intervention levels, interest in the twice-monthly gilt repo facility continued to increase. On only one occasion during the quarter (on 24 October) were applications allotted in full. By the first week of January total participation had risen to £4.9 billion, compared with only £0.5 billion at the end of the second quarter and £1.1 billion at the end of the third. Early in the quarter, bids were mainly for longer maturity (four-week) money, but as the market's interest-rate expectations developed during the quarter, the two week option was increasingly favoured. On 6 December, one week before interest rates were cut, 99% of bids were for the shorter maturity. Allotments of money in the gilt repo facility during the period were aimed at a steady increase in its use, while maintaining appropriate money-market conditions.

# **Foreign exchange markets**

The Deutsche Mark was at the centre of foreign exchange market developments during the fourth quarter. The combination of dollar weakness and Deutsche Mark appreciation against other European currencies was again apparent during much of October. Similarly,

#### **Dollar exchange rates**



an easing of tensions within the Exchange Rate Mechanism was associated with the dollar's recovery against the Deutsche Mark during November.

The tensions which had developed within the ERM in the second half of September continued for much of October. Market attention was focused on the prospects for EMU and the ability of EU members to meet the convergence criteria. The Bank of France responded on 9 October by replacing its 5–10 day repo facility with an overnight repo facility at a rate 110 basis points higher at 7.25%. The French franc rallied subsequently, but then fell back after the cut in French overnight rates on 16 October. It fell as low as FFr 3.54 on 23 October, before stabilising ahead of the Franco-German summit. Official statements reaffirming commitment to meeting the fiscal criteria of the Maastricht Treaty also reassured the market. The lira, which had also fallen sharply against the Deutsche Mark, gained 17 points to Lit 1,143 on 26 October on the news that the Italian opposition's no-confidence motion had failed.

The dollar drifted lower against the strong Deutsche Mark during October, as tensions within the ERM mounted. It fell as low as DM 1.3830 on 23 October as those tensions reached their peak. Other developments which coincided with the dollar's fall were Canadian dollar weakness ahead of Quebec's referendum on sovereignty, and sharp falls in the value of the Mexican peso. But the dollar recovered and rose above DM 1.40 on 25 October as ERM tensions eased, helped by a statement by a German official that the Bundesbank was preparing to co-operate on exchange rates. The subsequent release of stronger-than-expected figures for US GDP growth in Q3 and the 'no' vote in the Quebec referendum underpinned the dollar's recovery. The dollar ended October at DM 1.4068, compared with September's closing level of DM 1.4248.

The Deutsche Mark's appreciation against the yen continued until the German currency encountered strong technical resistance at the \$73 level at the beginning of November. The dollar traded in a narrow range against the yen ahead of the G7 summit, which was held on 7–8 October. The G7 communiqué welcomed the orderly reversal in the movements of the major currencies which had begun in April, and stated that a continuation of these trends would be consistent with economic fundamentals. After the communiqué was released the dollar continued to trade above \$100 level in thin markets.

Sterling's close link with the dollar, evident for much of the year, was maintained during October. Indeed the link appeared to strengthen: implied volatilities on options fell to low levels, and sterling traded in a narrow range against the dollar—around \$1.58. Consequently, with UK monetary policy considered to be on hold until the Budget, sterling's performance against the Deutsche Mark in October mirrored that of the dollar. Sterling fell to DM 2.1855 on 23 October, within a pfennig of its historic low. But it subsequently recovered with the dollar and ended October at DM 2.2240, compared with September's closing figure of DM 2.2547.

During the first half of November, the French franc's recovery continued: it appreciated by 2% against the Deutsche Mark ahead

#### Movements in the exchange rate mechanism, July–December 1995



UK and US effective exchange rates



of the French mini-budget, which was delivered on 16 November. Although the Deutsche Mark was also weaker against other European currencies, it held up against the dollar, which was weighed down by concerns about the US budget impasse. These concerns diminished after agreement was reached on the framework for further talks on 18–19 November. The dollar strengthened above DM 1.44 ahead of the Bundesbank Council meeting on 30 November. Even though the Council decided to leave its Discount and Lombard rates unchanged, the market expected cuts in due course. As a result the dollar continued to trade in a firm manner against the Deutsche Mark; it reached DM 1.4497 on 30 November (a ten-week high).

Sterling experienced a period of independent weakness in November as the market focused on the prospects for fiscal and monetary policy. In particular, speculation that tax cuts in the Budget could be substantial began to mount after 9 November. The subsequent release of better-than-expected RPI figures for October switched market attention to the prospects of an interest rate cut; the currency weakened further to historic lows. (Sterling fell as low as DM 2.1740 in London trading on 17 November and 82.2 on the effective exchange rate index on 20 November.) In the week before the Budget, sterling recovered against the Deutsche Mark, reaching DM 2.2376 on 27 November; this stemmed, in part, from an expectation that the Bundesbank would soon lower its key interest rates. But an episode of renewed weakness began on Budget day itself. Although the Budget was broadly neutral, it confirmed the market in its belief that UK interest rates would be reduced in December and sterling fell back to 82.2 on an effective basis on 29 November. The combination of the dollar's rally against the Deutsche Mark on 30 November, and strong technical support around the \$1.53 level then helped to underpin sterling. It finished November at DM 2.2094.

Trading over the next two weeks was dominated by market expectations of policy action by the Bundesbank and the Federal Reserve—with sterling moving back towards the sidelines. The Bundesbank's long-awaited decision to lower its Lombard and Discount rates on 14 December was received positively by the market: the dollar fell back against the Deutsche Mark towards DM 1.44. On 18 December, renewed fears about the implications of the US budget impasse for monetary policy (the funding resolution expired on 15 December) caused both US bond prices and the dollar to fall sharply. In the event, the Federal Reserve lowered its target federal funds rate from 5.75% to 5.50% the following day and the dollar rose above DM 1.44 on 20 December. Although adverse interest differentials moved in the yen's favour during December the yen failed to benefit, partly as a result of renewed concern about financial fragility in Japan. The dollar finished December at ¥103.08.

Sterling traded in a narrow range against both the dollar and Deutsche Mark in the first half of December, ahead of the monthly Monetary Meeting between the Chancellor and the Governor. Sterling wavered momentarily following the <sup>1</sup>/<sub>4</sub> percentage point reduction in UK official rates. But it gained 0.2 points on the index by the end of the day, as the market quickly took heart from the clear evidence that there was full agreement between the Chancellor and Governor. In the final few days of December,

#### Par yields on British government stocks





### Implied forward inflation rates two and ten years ahead



sterling moved higher against the dollar in thin markets helped by corporate buying. As a result, sterling finished December at 83.1 in effective terms, a rise of 0.6 points over the month. But it was down by 1.6 points over the fourth quarter as a whole.

# **Gilt-edged market**

Gilt yields continued their downward trend in the fourth quarter, reaching their lowest levels since spring 1994. All benchmark gilts finished the quarter with yields comfortably below 8%. Five-year yields closed under 7%: they dipped to 6.74% following the interest rate cuts in mid December. International spreads narrowed at ten years and the yield curve continued to steepen, with the spread between the five and 20-year benchmarks increasing by 13 basis points to 87 basis points. Inflation expectations implied by the gilt-yield curve reduced across the curve, but particularly so at the short end. Marginal (six-month) rates at the two-year maturity came down by more than 80 basis points over the quarter, to just over 3%, while the fall at ten years was just over 30 basis points to 4.7%. Real yields came down only slightly but this may, in part, have reflected the supply of index-linked gilts over the quarter; £1 billion was brought in taps. Volatility implied by options on gilt futures contracts rose slightly at the beginning of October, but declined thereafter.

Gilts had been hit at the end of the third quarter by the first uncovered auction and by the currency turbulence surrounding the Majorca summit. The fourth quarter started on a more optimistic note. The UK purchasing managers' index fell slightly, the US equivalent was weaker than expected and the German repo rate was cut from 4.08% to 4.05%. These combined to push ten-year gilt yields back under 8%. The US long bond yield fell to 6.043%, the lowest since February 1994.

However, further domestic data releases in October-in particular, the manufacturing component in September's industrial production and the September price data-were stronger than expected, and served to dampen the market. There were also further political concerns as the Government's majority was reduced. Ten-year gilt yields reached the quarter's high of 8.18% on 24 October. International spreads widened to hit a high of 219 basis points against the United States on 17 October and 178 basis points against bunds on 24 October. This was reversed towards the end of the month, however. Spreads were dramatically reduced, particularly against the United States on concerns about the stalled Budget talks. Spreads narrowed by twelve basis points against both the United States and Germany on 25 October, when an auction of £3 billion of the strippable 8% 2015 gilt was all but twice covered. Sentiment had also been helped the previous day by a CBI Survey which indicated slower manufacturing growth. Ten-year yields were back under 8% by the end of October.

Data releases at the beginning of November encouraged the market; the October Purchasing Managers' Index was the lowest since November 1993; and the October industrial production figures, although slightly higher than expected, had a significantly weaker manufacturing component. The market reaction to the *Inflation Report* on 8 November focused on the slight shading down of the Bank's inflation forecast. Other factors also encouraged the market. The Bundesbank's repo rate had been gradually shaved to 3.98%;

### **Table C Issues of gilt-edged stock**

	Amount issued (£ millions)	Date announced	Date issued	Method of issue	Price at issue (per £100 stock)	Details of payment	Yield (a) at issue	Yield (a) when exhausted (b)	Date exhausted (b)
8% Treasury 2015 'A'	3,000	17.10.95	26.10.95	Auction	£96.78125 (c)	Fully paid	8.33		
Floating Rate Treasury 1999	500	26.10.95	26.10.95	Tap	£100.33000	Fully paid			27.10.95
Floating Rate Treasury 1999	100	26.10.95	26.10.95	TO CRND		~			
2 <sup>1</sup> / <sub>2</sub> % Index-Linked 2003	100	26.10.95	26.10.95	Тар	£172.00000	Fully paid	3.65 (d)	3.64 (d)	26.10.95
2 <sup>1</sup> / <sub>2</sub> % Index-Linked 2011	150	26.10.95	26.10.95	Tap	£168.68750	Fully paid	3.68 (d)	3.68 (d)	26.10.95
7% Treasury 2001	250	30.10.95	30.10.95	Tap	£97.06250	Fully paid	7.61	7.60	31.10.95
2% Index-Linked 2006	100	30.10.95	30.10.95	Tap	£180.68750	Fully paid	3.63 (d)	3.63 (d)	2.11.95
21/2% Index-Linked 2024	150	30.10.95	30.10.95	Tap	£118.37500	Fully paid	3.70 (d)	3.70 (d)	1.11.95
8% Treasury 2003	250	9.11.95	9.11.95	Tap	£102.12500	Fully paid	7.62	7.61	14.11.95
21/2% Index-Linked 2009	150	9.11.95	9.11.95	Tap	£165.12500	Fully paid	3.57 (d)	3.50 (d)	24.11.95
2 <sup>1</sup> / <sub>2</sub> % Index-Linked 2016	100	9.11.95	9.11.95	Tap	£150.37500	Fully paid	3.62 (d)	3.58 (d)	24.11.95
7 <sup>1</sup> / <sub>2</sub> % Treasury 2006	3.000	29.11.95	7.12.95	Auction	£99,50000 (e)	Fully paid	7.56		
21/2% Index-Linked 2011	150	11.12.95	11.12.95	Tap	£172.68750	Fully paid	3.48 (d)	3.50 (d)	18.1.96
21/2% Index-Linked 2020	100	11.12.95	11.12.95	Тар	£145.81250	Fully paid	3.56 (d)	3.58 (d)	18.1.96

not applicable.

Gross redemption yield, per cent. Taps are exhausted when the issue is no longer operating as a tranchette; the equivalent date for stocks sold at auction is the issue date. (b)

(d)

Real rate of return, assuming 5% inflation. Lowest-accepted price for competitive bids, and non-competitive allotment price. Real rate of return, assuming 5% inflation.

UK retail sales in October fell marginally, against market expectations; and the October RPI change of -0.5% and a PSBR surplus also surprised the market. Yields fell and international spreads continued to narrow. The rally was little affected by the fall in the currency, which hit an all time low of DM 2.1740 on 17 November.

Towards the end of November, gilts were helped by pre-Budget optimism. Most market participants expected to see any tax cuts fully offset by public spending cuts. The day before the Budget, the December gilt contract closed above 110, the highest level since March 1994. The yield on the five-year benchmark closed below 7%. Although initial market reaction to the Budget focused on the upward revisions to the PSBR, the adverse reaction was largely reversed the next day, helped by cuts in mortgage rates from three large mortgage lenders.

The December auction of the strippable 7<sup>1</sup>/<sub>2</sub>% 2006 stock was covered 1.12 times, with an eleven-basis point tail (the longest ever). Despite the long tail, the market moved up in high trading volumes: the future was up a point on the day with over 102,000 contracts traded. Sentiment continued to be positive, as expectations of an interest rate cut gathered. The yield curve steepened. The 25 basis point reduction in official rates on 13 December was followed by cuts in clearing bank base rates and further cuts in mortgage rates. An announcement on the following day that the electricity rebate would not be included in the RPI caused short index-linked prices to rise-up to ten ticks at best at the very short end.

The market rallied on the Bundesbank decision (14 December) to cut both the Lombard and Discount rates by 50 basis points; Austria, Denmark, Belgium and the Netherlands followed suit. The market was given a further boost in the afternoon by the flat US CPI; gilts closed ten ticks up on the day at 110-28. The rally continued and the March contract reached a new high of 111-14 on 15 December. Although concerns over US budget talks in mid-December caused a slip in US bonds, which also affected European markets, the 25 basis point cut by the FOMC to  $5^{1/2}$ % on 19 December helped to reverse the fall, particularly at the short end.

# The eligible bill market

Eligible bank bills and Treasury bills are the assets accepted by the Bank in the open market operations which it conducts to implement monetary policy. The Bank normally invites offers of eligible bank bills and Treasury bills for outright sale. If the daily shortage in the money market is large, the Bank may also invite repos of eligible bank bills or Treasury bills (in which bills are sold to the Bank with an agreement for their subsequent repurchase).

Eligible bank bills are issued ('drawn') by an industrial or commercial borrower and are accepted by an eligible bank. They meet a number of criteria which relate to the purpose for which the bill is drawn and the clausing and maturity of the bill. Sterling Treasury bills are government paper, payable on or after a certain date.

# Chart 1





Both eligible bank bills and Treasury bills are issued and traded at a discount to face value.

The size of the market in eligible bank bills depends on the activities of the accepting banks and the attractiveness of the instrument to drawers: in recent years corporates have been offered a wider range of financing instruments. The market in eligible bank bills fell from an outstanding stock of £21.8 billion in 1993 (average of end-months) to £16.8 billion in 1995.

The Bank does not impose any direct limit for monetary control purposes on the volume of acceptance business undertaken by eligible institutions. However, since the current money market system was introduced in 1981, for reasons of equity and prudence it has set limits on the proportion of the market which any individual bank's acceptances may represent.



Gilt-market volumes in the final two weeks of the year were relatively low. The US long bond dipped below 6% after Christmas and closed the year at 5.94%, but this had little effect on the gilt market.

### Index-linked gilts

The Bank announced on 14 December that, following the September conference on developing the index-linked market, it was consulting the market in detail on the merits and practicalities of establishing a separate list of index-linked market-makers and of holding a pilot series of auctions of index-linked gilts in the coming financial year. The Bank also announced that there were no immediate plans to introduce limited price indexed (LPI) gilts or earnings-related gilts; the scale of demand was very uncertain and there would be a risk of fragmenting the liquidity of the index-linked market. The Bank also announced that there were no plans to amend the eight-month indexation lag; the market had indicated that it was not seeking a change and that the level of demand was not affected by the lag.

#### Chart 3

#### Size of eligible bank bill market and differential between bills and cash



#### Chart 4

### Three-month interbank vs three-month eligible bill rates



### Table D Official transactions in gilt-edged stocks

£ billions: not seasonally adjusted

	<u>1995/96 (a)</u> Apr.–Sept.	<u>1995</u> Oct.	Nov.	Dec.
Gross official sales (+) (a) Redemptions and net	12.3	3.8	1.1	3.0
within a year of maturity(-)	2.6	_	0.8	
Net official sales (b) of which net purchases by:	9.8	3.8	0.2	3.0
Banks (b)	0.2	0.2	1.3	1.9
Building societies (b)	-0.3	-0.1	-0.4	0.1
Overseas sector	3.7	0.9	-0.7	0.2
M4 private sector (b)	6.1	2.9	0.1	0.8

(a) Gross official sales of gilt-edged stocks are defined as official sales of stock with over one year to maturity net of official purchases of stock with over one year to maturity apart from transactions under purchase and resale agreements.
 (b) Excluding transactions under purchase and resale agreements.

Decisions on the size of Treasury bill issues are part of the process of money-market management. If the cash position of the market is forecast to become easier-for example, because of seasonal disbursements by Government-more Treasury bills can be issued to drain liquidity from the market, and so keep it dependent on the Bank's operations.

The weekly tender, having been increased in mid-1995 to £1,500 million, has since been reduced to £800 million over the tax season (which drains cash from the market). The total stock of bills in market hands (eligible bank bills plus Treasury bills) rose from £17.8 billion in December 1994 to £32.7 billion in December 1995.

Past experience suggested that when the Bank's holdings were relatively high, the scarcity of eligible bank bills in market hands made them a relatively attractive source of finance for drawers, and the bill market expanded. (Chart 2 shows the size of the eligible bank bill market compared with the level of the Bank's holding.) But over the past year the outstanding stock of eligible bank bills has risen, despite continued low holdings by the Bank.

Chart 3 shows the differential between eligible bill and interbank rates. As the differential becomes more positive (bills become cheaper), the bill market is seen to expand.

Chart 4 plots interbank rates against eligible bank bill rates. The differential line is also plotted. From the peaks in the differential there is some evidence that interbank rates 'follow' eligible bill rates. To the extent that this is so, drawings of eligible bills may be relatively unattractive when interest rates generally are tending to rise.

### Funding

Total gilt sales of £8.0 billion were made during the quarter, bringing the total for the financial year to £20.3 billion. This left  $\pounds 10.8$  billion to be sold in the final quarter of the financial year, on the basis of the Budget forecast for the full-year gilt sales requirement. The M4 private sector (which excludes banks and building societies but includes large institutional investors) continued to make large net purchases during the fourth quarter of 1996, at rate similar to that of the previous six months. Banks, which had made only modest net purchases of gilts earlier in the financial year, also made substantial net purchases in the fourth quarter.

On the day after the Budget, a revised remit for funding in 1995/96 was announced in the light of the Government's higher forecast of the PSBR and funding requirement: an extra auction would be held on 28 February 1996, bringing the total for the year to nine. It was announced on 28 December that the January and March auctions would each be for stock in the maturity range 2000-2002 and that

the February auction would be for stock with a maturity of 2020 or longer.

# The international environment

This article considers economic developments in the European Union, North America and Japan since the November 1995 Quarterly Bulletin. These countries account for about half of world GDP, according to IMF figures, but three quarters of UK external trade. The effect of fiscal consolidation on world growth is considered in detail in a box.

- The international environment for UK exports weakened in the second half of 1995, mainly because of slower growth in Germany and France. Growth was surprisingly strong in the United States in the third quarter. In Japan, the foundations appear to be in place for a recovery in activity in 1996.
- Inflation in the G7 economies remained flat on average at under 2<sup>1</sup>/<sub>2</sub>% per year in the third quarter of 1995. Italy was the outlier, with inflation sticking at around 6%.
- Reflecting weaker growth and improved inflation prospects, official interest rates were cut in Europe and the United States in December 1995. Bond yields fell further in the fourth quarter, except in Japan.

#### Table A GDP growth

Percentage change over previous year

	United States	Canada	Japan	Germany	France	Italy	Major six
1992	2.3	0.8	1.0	1.8	1.3	0.7	1.7
1993	3.1	2.2	0.1	-1.2	-1.5	-1.2	1.0
1994	4.1	4.6	0.5	3.0	2.9	2.2	2.9
1995 Q1	4.0	4.4	0.1	2.7	4.2	4.2	3.0
Q2	3.3	2.7	0.3	2.5	2.9	3.1	2.4
Q3	3.3	1.9	-0.2	1.9	2.0	3.4	2.2

# Chart 1 Business and consumer confidence



Source: European Commission.

#### Overview

The third quarter of 1995 saw a further slowdown in growth in the major six (M6) overseas economies (the United States, Canada, Japan, Germany, France and Italy), largely reflecting events in Germany and France (Table A). GDP was flat in Germany over the quarter, and grew by only 0.2% in France. This slowdown seems likely to have continued in the fourth quarter. France and Germany between them account for almost one quarter of UK exports. There is a risk of the slowdown spreading to other countries in the European Union such as Italy, Spain and Sweden (which grew more strongly in the third quarter of 1995). A key issue is whether the confidence of European consumers and businesses will recover in 1996, in the face of continuing high unemployment and fiscal consolidation (see Chart 1).

In the United States, growth was surprisingly strong in the third quarter, but appears likely to have slowed to a more sustainable pace in the fourth quarter, as consumer spending moderated.

In Japan, GDP remained weak in the third quarter. There are early indications that business confidence in the fourth quarter was responding to earlier policies to stimulate the economy, and to the more competitive yen. The conditions for a recovery in 1996 now seem to be in place.

Inflationary trends have largely remained favourable, reflecting the anti-inflationary monetary policies in place in the major industrial countries. Recent news has generally been better than expected, reflecting weaker activity and lower commodity price inflation. In the European Union, consumer price inflation remained at around 3% during 1995 and may fall a little further as falls in producer price inflation feed through (see Chart 2). Interest rates were cut in most European countries, but not in Italy, where inflation remained around 6%.

# Chart 2 Consumer price inflation in the major economies











# Chart 4 United States GDP growth



In mid-1995, inflation of  $3\%-3^{1/2}\%$  had been expected in the United States during 1995, but in the year to November consumer price inflation was only 2.6%. Lower inflationary pressure was the reason given by the Chairman of the Federal Reserve Board for the 25 basis point cut in the target federal funds rate on 19 December.

Bond yields fell further in the fourth quarter (see Chart 3), except in Japan. In the United States, this may have reflected a fall in inflationary expectations.

Equity markets performed strongly in the fourth quarter, with the Dow-Jones index in particular reaching new highs, driven by technology and financial stocks.

#### Detail

Forecasts of M6 growth in 1995 and 1996 were revised down over the final quarter of the year, to under  $2^{1/2}$ % on average, mainly reflecting a slowdown in Europe. North America was still expected to grow around trend.

In the United States, GDP data for the third quarter of 1995 supported the notion that the economy had largely recovered from the inventory correction seen earlier in the year. Real GDP grew by 0.8% over the quarter, with consumption particularly robust. Activity data for October and November were more mixed, confirming the impression of an economy slowing towards its trend rate of growth. US retail sales fell in October, and pre-Christmas shopping was reported to be restrained, possibly reflecting the high levels of consumer indebtedness.

In the second half of the year, manufacturing employment and business confidence were relatively weak, while the housing market was particularly strong.

The best estimate of the trend rate of growth has fallen, following a change in the basis of measuring GDP from a fixed to a chain-weighted index (see Chart 4). The new index more accurately allows for developments in high-technology products, which have been characterised by high output growth and falling prices. They were overweighted in the fixed-weighted index, biasing estimated growth upwards and estimated inflation downwards.

#### Growth has slowed in Germany and France

GDP in Germany is provisionally estimated to have grown by 1.9% year-on-year in 1995, while French GDP is likely to have grown by around  $2^{1/2}$ %, compared with forecasts of  $2^{1/2}$ %–3% in mid-1995. German exports were affected by the appreciation of the Deutsche Mark, and employment weakness depressed domestic demand. The phasing out of subsidies hit the construction sector. Despite this, unemployment continued to fall in eastern Germany in the third quarter (the latest for which data are available), though in western Germany, unemployment began to rise from August.

A particular puzzle, however, is the apparent discrepancy in Germany between GDP and other data for the third quarter of 1995. Official real GDP data show no growth between the second and third quarters. But these data have been less reliable following

### Chart 5 Employment in Germany



# Chart 6 Changes in European industrial production



Chart 7 Unemployment rates



changes in the measurement of industrial production. Other data show that capacity utilisation in the non-durables sector rose in the third quarter, and there was no marked downturn in the investment-goods sector. The weakness of investment in the national accounts data is also hard to reconcile with the strong M3 lending over the summer. Also, surveys do not corroborate the suggestion in the GDP data that stockbuilding was the main source of demand growth. None of the evidence, however, contradicts the impression that growth slowed in the second half of 1995.

In France activity data pointed to a weak fourth quarter in 1995. Household consumption fell by 1.1% in December, giving a year-on-year fall of 0.8%. Industrial production in November was 0.7% lower than its level a year earlier, despite being boosted by energy production related to the cold weather.

The slowdown in Germany and France is likely to have affected the export sectors in other European countries. Data for the fourth quarter suggest that industrial production weakened across most of Europe (see Chart 6). Higher-than-desired stocks are likely to have held down production, and strikes in France—particularly in the transport sector—are likely to have depressed output in December (although this effect would have been partly reversed in January).

An upturn in production in Europe will depend largely on business and consumer confidence. Unemployment continues to hold back the latter; it is currently around eleven million, or 11% of the workforce, in the European Union, and there is little near-term prospect of any significant reduction (see Chart 7). In Japan, too, unemployment has restrained economic recovery, rising to a historically high rate of 3.4% in November. Even in the United States, where unemployment is lower than in Europe, fear of redundancy seems to be acting as a brake on both wage pressures and spending.

# The conditions are in place for a recovery in Japan

The Bank of Japan's November Tankan survey showed that business had become less pessimistic in both the manufacturing and non-manufacturing sectors. This followed a recovery in equity prices and a stabilisation of the exchange rate at a lower level. Consumer confidence remains depressed, however, and the survey did not reveal a turnaround in actual business conditions; the balance of large manufacturers reporting excess stocks of finished goods increased further. Nonetheless, in October construction starts and contracts increased, which may indicate that the fiscal stimulus announced in September was beginning to have an effect.

While the signs of actual economic recovery are therefore very limited, and the possibility remains that the stock cycle and weak world growth will continue to hold back output, the earlier policy easings, the recovery in business confidence and the more competitive yen should be conducive to a recovery in output in 1996. Growth may be around  $2^{1}/_{2}\%$  or more, compared with around  $\frac{1}{2}\%$  in 1995.

### Inflation remains flat

Inflation in M6 countries remained subdued in the third quarter of 1995 and most forecasters expect it to remain low during 1996 and 1997.

# Chart 8 Producer price inflation



Chart 9 Official interest rates



# Table BThree-month interest rates(a) expected inJune 1996

Per cent

	1995 30 June	29 Sept.	29 Dec.
US dollar	5.77	5.82	5.08
Deutsche Mark	5.17	4.08	3.46
Yen	1.04	0.61	0.76
Sterling	7.93	6.75	6.07

Producer price inflation in Europe weakened considerably (see Chart 8), because of falling commodity prices, slower growth and inventory adjustments. Consumer price inflation was 1.8% in the year to December in Germany, and only a little higher in France. Finland had the lowest inflation in Europe, at 0.3% per year, reflecting lower food prices since its entry into the European Union and the appreciation of the markka. The Finnish unemployment rate, however, is among the highest in Europe at almost 20%. In Spain, core inflation declined from its peak of 5.2% in July to 4.8% in December, and further falls are likely while domestic demand remains soft. Headline inflation is lower, and looks likely to be within the inflation target of 3.5%–4% in the first few months of 1996.

In Italy, consumer price inflation remained around  $5^{3}_{4}\%-6\%$  in the last five months of 1995; slower wholesale and producer-price inflation in the fourth quarter should, however, feed through in 1996. The very early signs in the 1996–97 wage round—for instance, a settlement in the chemicals industry well below headline inflation—are encouraging. Although the current strength of activity may prevent inflation falling much in 1996, it is possible that the slowdown in Germany and France will have a knock-on effect on Italy.

The summer drought which pushed up food prices in Europe in the autumn had a similar effect in the United States, but there it was offset by lower energy prices. Consequently US consumer prices were flat in November, and their annual rate of increase fell to 2.6%. In Japan, fresh-food prices fell by around 14% in November, taking twelve-month consumer price inflation to -0.7%, its lowest rate since February 1987. Export prices, on the other hand, rose sharply in November, suggesting that exporters were taking advantage of the weaker yen to rebuild margins.

Most forecasters expect inflation to remain subdued in 1996. But, in addition to external shocks, there are risks: wage pressures, particularly in the United States, where unemployment may have been below its natural rate for a while, but also in Europe, where workers may increase their pay demands in response to continued fiscal and wage restraint, especially in sectors where profitability has recovered. Fiscal slippage is a further risk to the inflation outlook, as is currency weakness. But the activity risks to the inflation outlook are on both sides, and there is a downside risk from greater price competition.

### Policy

Although world growth and inflation in 1995 were lower than had been expected in the middle of the year, it is unlikely that the pause will turn into a recession, not least because interest rates have been cut (see Chart 9). The Bundesbank cut the discount and Lombard rates by 50 basis points each on 14 December, to 3% and 5% respectively. The cumulative reduction in the repo rate during 1995 was 110 basis points. Interest rate cuts followed in Austria, Belgium, Denmark, Ireland, the Netherlands, Portugal, Spain and Switzerland (this took the discount rate in Switzerland to 1.5%). France cut its intervention rate by 25 basis points to 4.45%. The United Kingdom had already cut base rates by <sup>1</sup>/<sub>4</sub>% to 6.5% on 13 December. In January, the United Kingdom, France and Spain trimmed official interest rates by a further 25 basis points.

International environment

Chart 10 Long-term real interest rates<sup>(a)</sup>



Chart 11 Short-term real interest rates<sup>(a)</sup>



### Chart 12 Broad money and nominal GDP growth



On 19 December the Federal Reserve Bank cut the target federal funds rate by 25 basis points to 5.5%, citing an improvement in inflation prospects. The Bank of Canada followed suit, cutting the Bank rate by 16 basis points to 6.06%. As of mid-January, Canadian interest rates are still significantly above those in the United States, in the wake of the Quebec referendum, although inflation and growth are considerably lower. Table B shows that further cuts in interest rates are expected in the first half of 1996.

Assessing the stance of monetary policy is not straightforward. Charts 10 and 11 show that long-term real interest rates in Germany are relatively high, but short-term rates, as in Japan, are relatively low, at least according to the measures chosen. (To the extent that actual inflation and inflation expectations are lower than recorded inflation in Japan, real rates are overstated.) In the United States, by contrast, long-term real rates appear to be lower than they have been for most of the past ten years, but short-term real rates have risen sharply since 1993. The yield curve has therefore flattened in the United States, mainly as a result of falling long rates, while yield curves have been historically steep in Germany and Japan, as short rates have been cut. One explanation may be that long rates incorporate risk premia related to the longer-term fiscal outlook in Japan, and uncertainty in Germany about a single European currency. In the United States, ten-year bond yields fell by more than 50 basis points in the fourth quarter, despite uncertainties about fiscal policy.

Monetary aggregates are even harder to interpret. Both broad and narrow-money growth rates have displayed considerable volatility in the main overseas economies in recent years. Financial deregulation, technological change, changes in inflation regimes, and problems in one part of the financial sector can all distort the usual relationship between money growth and nominal GDP.<sup>(1)</sup>

In the United States and Canada, for example, the growth of narrow money continued to fall in the period under review, reflecting the continuing proliferation of sweep accounts. By contrast, the three-month annualised growth rate of German currency in circulation more than doubled to 8.5% in Q3. Narrow-money growth in Japan was boosted as a result of the Bank of Japan's diversification of monetary policy tools from repo agreements to outright purchases of government bonds and certificates of deposit.

Broad-money growth in the G7 continued on an upward trend; annual growth was 4.1% for October, compared with 2.1% at the start of 1995. In the United States, the acceleration of M2 during 1995 is likely to have reflected in part a switch from money-market mutual funds, where investors sustained losses in 1994, to retail bank deposits. Consumer credit growth, however, slowed down in Q3. Japanese broad-money growth had slowed earlier in the year. It picked up in November, following sluggish lending by financial institutions in the third quarter (see Chart 12).

In Germany, broad-money growth in 1995 undershot the 4%-6% target range, reflecting very weak growth in the first five months of the year, particularly in January and February. The Bundesbank announced the new target for monetary growth in 1996 of 4%-7%.

<sup>(1)</sup> See Janssen, N 'Can we explain the shift in M0 velocity? Some time-series and cross section-evidence' on pages 39–50.

# The impact of European fiscal consolidation on growth

The aggregate structural deficit of the 15 European Union countries was reduced from 5% of GDP in 1992 to a projected 3.9% in 1995. The OECD expect a further reduction by 1.2 percentage points over the next two



years. This would result in the largest and most sustained decline on record. This box assesses the impact of fiscal consolidation on growth in Europe.

There is no consensus on the implications for aggregate demand, either theoretically or empirically. The hypothesis of Ricardian equivalence is that agents realise that the present value of government expenditure and debt cannot exceed the present value of government revenues-the government, like individuals, faces a budget constraint. This implies that a cut in the fiscal deficit will have no effect on aggregate demand. It will mean lower taxation in future. Consumers know this and will simply save less than they otherwise would have done to compensate. The two effects will exactly offset each other. This hypothesis assumes that individuals face the same interest rates as government, and that they take the whole of the future into account when they make their spending plans, and are not credit constrained. If either is not the case, a temporary adverse effect on growth is likely. At the same time, smaller public deficits should reduce real interest rates, and this may increase long-run productive potential.

There are also efficiency arguments. If private investment is more effective than public, a switch from public to private spending will, in itself, boost economic growth. The form the government spending takes, and therefore the form of the consolidation, is crucial. Because the EU is such a closely integrated trading bloc, synchronised consolidations are likely to have a mutually reinforcing effect.

The table summarises the results from an IMF simulation of industrial economies. They assume forward-looking

# Industrial countries: simulation of balanced government budgets in five years<sup>(a)</sup>

	1996–97	1998-99	2000-01	Long-run
General government				
balance (percentage of				
GDP)	0.8	1.9	3.4	0.9
Government debt/GDP	-1.7	-4.5	-9.3	-17.9
Real GDP	-0.4	1.5	1.2	2.3
Inflation (GDP deflator)	0.5	-0.5	-1.0	

(a) Deviation from base in percentage points

consumer behaviour and emphasise the crowding-out effects of public spending. This implies more positive effects on output than alternative models would suggest. Results are derived under the assumption that the fiscal tightening includes measures which result in less labour-market rigidity, raising long-run productive potential by 1%. Lower real interest rates are expected to increase output by a further 1.3%. Other models, however, suggest that the long-run effects are less positive and the short-run effects are more negative.

As Chart B shows, it is possible to have a period of fiscal consolidation at the same time as fast growth. However, previous periods of consolidation were shorter lived, and it is impossible to say what growth would have been had they lasted longer. Budgetary reforms have had a limited effect on long-run interest rates thus far, but this could be due to a lack of credibility of the convergence programmes. It does not rule out significantly lower real interest rates if the consolidations continue: recently, however, a number of revenue projections have been thwarted by weaker-than-expected activity.

### Chart B EU15 structural deficit and GDP growth



The upper limit for M3 growth has been raised, in part because of greater uncertainty about short-term movements in the demand for broad money.

The Banque de France reaffirmed its objective to keep inflation below 2% in 1996 and in the medium term.

The Japanese authorities announced a mildly expansionary budget for the fiscal year 1996/97. However there may be supplementary budgets during the year, so the overall fiscal outlook is uncertain. Low growth and fiscal stimuli during the 1990s have resulted in an increasing Japanese debt/GDP ratio. The OECD forecasts that the ratio will have risen to 97.3% by 1997, from around 75% in 1994.

# **Financial market developments**

- International bond issues fell in the fourth quarter, although the rally in prices continued in most major bond markets.
- In the second half of 1995 international dollar-denominated issuance rose by 41% compared with the first half of the year.
- Turnover on the major derivatives exchanges was generally lower in the fourth quarter, possibly reflecting lower volatility in the underlying markets.

# Background

Prices in most major bond markets rallied during the fourth quarter. This was despite potential risks to the outlook. In the United States, these were associated with delays in agreeing a new government budget and in Europe with questions about the progress towards EMU and the implications arising from it. In Japan, where yields rose sharply towards the end of the quarter, there were concerns about financial stability.

Optimism about the outlook for inflation dominated the US Treasury market in the fourth quarter: ten-year bond yields, which had peaked at 6.6% on 11 August, fell to a low of 5.6% on 4 December. The refusal by Congress to increase the debt ceiling—until agreement is reached on the budget—raised the possibility that the US government might fail to make interest payments on its debt and so might technically default. But the bond markets reacted calmly during the fourth quarter to this still fairly remote possibility.

Bond prices in the fourth quarter were comparable with the highs of 1993. But current economic circumstances are substantially different from those of the period preceding the bond market correction in 1994. In particular, rather weaker G7 growth expectations in the fourth quarter suggested the inflation outlook was now more benign. This view was supported by the Federal Reserve's 25 basis point cut on 19 December of its target intervention rate. Futures rates at the end of the quarter suggested the markets expected further cuts in US interest rates of around 25 basis points by the middle of 1996.

In September and October, some market commentators identified the possibility of a 'Japan risk premium' on certain assets, based on information suggesting a heightened risk of financial instability. Ten-year Japanese government bond yields rose from a low point of 2.7% on 4 October to reach 3.1% by the end of the fourth quarter. A number of measures to address financial fragility in Japan were announced towards the end of the year. Some markets in Europe were affected during the quarter by uncertainty about the currency into which bonds might be redeemed after 1999—the planned date for introducing a single European currency.

Official interest rates were cut in most EU economies in December. Over the fourth quarter, ten-year implied nominal forward interest rates fell in the United Kingdom, the United States, Germany and France, but rose in Japan (see Chart 1). In the United Kingdom and the United States, spreads in government bond yields against Germany were little changed during the quarter; while they fell in France and Italy by, respectively, 23 basis points and 35 basis points. Over the same period the spread between Swedish and German ten-year bonds narrowed by 29 basis points, while the Spanish/German spread narrowed by 65 basis points, continuing the declines observed in the third quarter.

### Chart 1 Nominal implied forward interest rates 29 December 1995



The spreads between corporate and government debt have fallen in most eurobond sectors over the course of 1995. Corporate US dollar bond spreads tightened considerably over the year, with some large corporates trading below the equivalent Treasury security for short periods. Euro-Deutsche Mark AAA spreads against the equivalent government bond, on the other hand, widened by 10 basis points in the fourth quarter compared with the third. In eurosterling, corporate spreads typically fell by 10 to 20 basis points against the equivalent government bond, although there was again evidence of widening spreads in the fourth quarter. Bank and financial bond spreads in particular tightened, but utility bonds performed poorly.

# **Primary bond markets**

#### International issues

Total international bond issues fell 11.2% in value compared with the exceptionally strong third quarter, but remained 11.4% higher than the same period a year earlier (see Table A). Equity-related issuance fell in the fourth quarter, but was also higher than in the last quarter of 1994.

# Table A

# Total financing activity:<sup>(a)</sup> international markets by sector

\$ billions

	1994			1995							
	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
International bond	issues										
Straights	68.6	75.0	75.6	81.7	82.7	92.3	85.8				
Equity-related of which:	5.7	4.0	2.8	2.3	4.6	6.7	4.6				
Warrants	0.8	0.7	1.1	0.9	0.5	1.2	3.2				
Convertibles	4.9	3.3	1.7	1.4	4.1	5.5	1.4				
Floating-rate notes	17.8	17.9	18.3	14.2	16.6	22.2	17.3				
Bonds with non-equ warrants	ity	_	_	_	_	_	_				
Total	92.1	96.9	96.7	98.2	103.9	121.2	107.6				
Credit facilities (an	Credit facilities (announcements)										
Euronote facilities (t	o) 46.0	40.2	71.4	54.9	62.8	75.9	78.7				
CP	15.4	10.9	6.2	6.8	8.9	6.4	28.2				
MTNs	30.6	29.3	65.2	48.1	53.9	69.5	50.5				
Syndicated credits	64.5	59.3	72.8	101.6	74.9	72.1	85.2				
Total	110.5	99.9	145.8	156.5	137.7	148.0	163.9				
Memo: amounts ou All international	tstanding	5									
Bonds (c)	1,947.7	2,020.8	2,036.3	2,188.5	2,225.3	2,199.7	2,224.9				
Euronotes (b)	330.3	378.7	406.1	461.6	517.1	555.8	595.2				
of which, EMTNs	216.5	259.4	292.0	347.1	397.5	426.4	461.0				
(a) Maturities of one y placements. Issues add to totals becau	year and o s which re use of roun	ver. The ta package ex ding. Bond	ble include isting bond d total inclu	s euro and issues are ides issues	foreign issu not include from MTN	es and pub d. Figures programes	licised may not				
<ul> <li>(b) Sourced directly fr</li> <li>(c) BIS-adjusted figur</li> <li>floating rate notes</li> </ul>	es, includi	ng currenc	y adjustmer	nt. Include	s issues of f	fixed-rate b	onds and				

Warrants and convertibles together accounted for 4.3% of new international issues in the fourth quarter. Almost 74% of new eurobond issues were denominated in the G3 currencies in 1995, compared with an average of 60% since 1990 (see Table B).

During 1995, the ratio of floating-rate notes (FRNs) to fixed-rate bonds fell compared with the previous year. In the fourth quarter of 1995 the ratio was 0.20 compared to 0.23 in the same period a year earlier. International dollar-denominated issues rose in the second half of 1995 by 41% compared with the first half of the year. The mean maturity of all new international issues lengthened in 1995, giving an indication of market confidence over the year. It rose to 6.2 years in the fourth quarter compared with

# Table BCurrency composition of international bond issues

\$ billions

Currency denomination	1993	1994			1995			
	Year	Year	Q3	Q4	Q1	<u>Q2</u>	Q3	Q4
US dollar	175.6	147.3	30.6	37.3	30.6	32.8	46.4	43.1
Yen	58.7	77.8	23.9	22.1	13.6	25.4	23.5	17.6
Deutsche Mark	56.4	39.8	8.5	9.2	14.3	20.1	15.8	18.6
Sterling	42.6	29.5	5.3	4.1	6.5	4.5	4.9	4.8
French franc	42.3	28.7	3.1	3.5	4.8	3.2	2.5	2.8
Swiss franc	27.5	20.8	6.2	4.3	5.7	6.8	9.3	6.3
Italian lira	12.3	17.1	4.6	2.7	5.9	1.7	2.0	2.7
Ecu	11.4	7.6	1.5	0.9	2.9	0.2	2.7	0.2
Other	58.2	53.3	13.2	12.3	14.0	9.2	14.0	11.7
Total	485.0	421.9	96.9	96.4	98.2	103.9	121.1	107.6
Source: Bank of England ICMS database.								

5.2 years at the end of 1994, and an average of 7.2 years since 1980.

The banks' share of international borrowing increased sharply in the fourth quarter to 33.4%. The main counterparts to this were a decline in central governments' share to 9.8% and in that of financial institutions to 13.0%. At 26.8%, companies' share of borrowing rose slightly in the fourth quarter but remained well below the average of 36.1% over the past 15 years.

#### Emerging markets

International emerging market issuance fell sharply after the Mexican peso crisis at the end of 1994. In the fourth quarter of 1994, total emerging market issuance amounted to \$13.6 billion. By the first quarter of 1995, it had fallen to \$5.3 billion. But sentiment about emerging markets reversed over the course of 1995 and, by the middle of the year, investors had again become receptive to emerging market debt, although international investors may now be differentiating more carefully between these diverse markets. The recovery since mid-1995 in emerging market international bond issuance continued into the fourth quarter, which saw \$12.1 billion of new issues, compared to a record total of \$22.9 billion in the final quarter of 1993. Sovereign Mexican debt returned to international markets and this is reflected in the Salomon Brothers Brady bond index which rose 9.3% in the fourth quarter, and 26.7% during 1995 as a whole. Mexican Brady bonds rose 26.2% over the year. Although Latin American debt remained the largest sector, there were notable issues by North African and East European borrowers, including the former Yugoslavian republics.

#### Issuance currencies

The proportion of international bond issues denominated in dollars increased over the year, from 31.1% in the first quarter of 1995 to 40.1% in the last. Concern about the possible 'debt ceiling' problems of the US government did not seem to affect the dollar bond markets. The first half of 1995 saw the same level of gross domestic issuance in the United States as in the first half of 1994.

The international yen-denominated sector continued to grow in the fourth quarter. The Samurai sector in particular saw a revival during 1995, with issuance reaching a record \$5.4 billion in the fourth quarter.<sup>(1)</sup> This compares with an average level of quarterly issuance of \$1.6 billion since 1980. International issues by Japanese banks fell to \$642 million in the fourth quarter from \$1.3 billion the quarter before. But issuance has been erratic since the start of 1994.

The French franc's share of international bond issuance has fallen sharply. In the first quarter of 1994, the French franc accounted for 9.9% of all issues, but by the end of 1995 for only 2.6% because of political and exchange rate uncertainties.

# Sterling issues

Announcements of new sterling bond issues in the quarter totalled £3,980 million. £1,925 million of this issuance was in fixed-rate eurosterling form, with only £450 million of this issued by overseas companies. A further £250 million of fixed-rate paper was privately placed in the quarter. Unusually, longer-dated, fixed-rate eurosterling instruments dominated issuance, with three 25-year or 30-year corporate issues totalling £600 million, and a further £350 million of perpetual issues by banking institutions, compared with £575 million of issues around ten years and £400 million of issues of between five and seven years' maturity. One of the bank perpetuals is exchangeable into sterling preference shares at the issuer's option at a fixed premium over gilts; the other two perpetuals allow the issuer to call the bonds after ten years; or an alternative option of a coupon step-up to five year gilt yields plus 270 basis points. In the quarter,  $\pounds 817$  million of floating-rate eurosterling issuance was announced, the bulk of this (£627 million) was to fund the acquisition of one of the regional electricity companies. The other floating-rate notes were issued by banks or building societies.

There were a number of asset-backed, floating-rate issues over the quarter, totalling £723 million. Two of these involved mortgage-backed securities; another was the first issue made in the United Kingdom that was secured on revolving personal credits originated by a UK bank. The last was a two-tranche issue with FRNs and inverse FRNs, which together were designed to provide effective fixed-rate funds. The issue was secured on a portfolio of pubs and the bonds are redeemed as the pub portfolio is sold.

The domestic market saw three small debenture issues totalling £85 million, although the main interest in the domestic bond market was the return of two local authorities. The City of Coventry raised £100 million and the City of Salford raised £80 million through issues with 30 and 35 years' maturity respectively. Salford's issue is partly-paid, the remainder due in July 1996, with 20% amortising in each of its last five years. The local authority bond market was relaunched in January 1994 by three separate councils, including Salford. Since then one council has issued and there has been a club deal involving several local authorities.

Total outstanding sterling commercial paper fell by  $\pounds 157$  million over the fourth quarter to  $\pounds 6.8$  billion. Outstanding sterling medium-term notes rose by  $\pounds 534$  million over the quarter to stand at  $\pounds 16.0$  billion at the end of December.

The fourth quarter saw a marked reversal of spreads, following the steady tightening in the first nine months of the year, with those beyond 15 years giving back most of the earlier gains. This reflected takeovers, regulatory risk and various ratings downgrades in the utilities sector, as credit risk factors again came to the fore. Shorter maturities also saw spreads fall back, although the earlier gains made from the anticipation of PEP demand for short and medium term issues remained substantially in place.

### Ecu issues

In the United Kingdom, regular monthly tenders of ECU 1 billion of Ecu Treasury bills continued during the fourth quarter, comprising ECU 200 million of one-month, ECU 500 million of three-month and ECU 300 million of six-month bills. The tenders continued to be strongly oversubscribed, with issues being covered by an average of 2.7 times the amount on offer, compared with an average of 2.3 times during the first three quarters of the year. Bids were accepted at yields up to 20 basis points below the Ecu Libid rate of the appropriate maturity. There are currently ECU 3.5 billion of Treasury bills outstanding which have been sold to the public. Secondary market turnover in the fourth quarter averaged ECU 1.9 billion per month; turnover for 1995 as a whole averaged ECU 2.2 billion per month, which was very similar to the average levels in 1993 and 1994.

On 17 October, the Bank reopened the Ecu Treasury note maturing in 1998 with a further tender for ECU 250 million. This raised the amount outstanding with the public to ECU 2.0 billion, and thus exactly refinanced the Ecu note which had matured in January 1995. Under the UK note programme, the total notes held by the public thus rose from ECU 6.25 billion to ECU 6.5 billion over the quarter, returning to the level outstanding at the end of 1994. The October tender was heavily oversubscribed, with cover being 7.0 times the amount on offer. Accepted bids were all at a yield of 6.2%. Secondary market turnover in the notes continued to be higher than in 1994.

The French government issued ECU 0.5 billion of bonds and notes during the fourth quarter, taking its outstanding debt up from ECU 20.8 billion to ECU 21.2 billion (excluding stock bought back or held for repo purposes). The Italian government redeemed ECU 0.8 billion of notes in the quarter, and the total outstanding fell from ECU 23.4 billion to ECU 22.6 billion over the quarter. In

<sup>(1)</sup> A Samurai bond is a yen-denominated bond issued in the Japanese domestic market by a foreign issuer.

addition, the total of Italian government Ecu eurobonds outstanding was ECU 7.4 billion. There were few other Ecu issues in the fourth quarter.

#### International syndicated credits

International syndicated credit activity rose by 18.2% in the fourth quarter of 1995 to \$85.2 billion. There is little evidence of the market becoming less attractive to borrowers: the maturity of credits is increasing and the spreads on them remain low. Loans as long as seven years are increasingly common, suggesting that lenders are taking on more so-called 'term risk'. Participation in the market by lenders is also broadening, with, for example, the IFC arm of the World Bank participating in 1995 in more than twice as many syndications than in the previous year.

Although syndicated credit activity remains healthy, there is some evidence that borrowers are also setting up their own bilateral deals to raise funds. The strong capitalisation of banks worldwide has enhanced their ability to enter into larger bilateral lending agreements. This loan activity remains international though, as domestic markets do not generally have the capacity to lend the required funds. BIS figures provide some support for this view: cross-border bank loans (both syndicated and bilateral) increased by \$99.4 billion in the second quarter of 1995, compared with a net repayment of \$24 billion in the same period a year earlier.

### **Equity markets**

#### Prices

Equity prices rose in the fourth quarter, with US and UK indices climbing to record highs. In the United States, the Standard & Poor's 500 index rose by 5.4% during the fourth quarter, bringing the year-on-year gain to over 34%. The index attained an all-time high of 621.69 on 13 December (see Chart 2). The United Kingdom saw the FT-SE 100 index rise by 5.2% over the quarter, giving a year-on-year rise of 20.4%. The high-point for the quarter-another

#### Chart 2 Equity indices(a)



<sup>(</sup>a) End-week prices; data to 29 December 1995

all-time record—occurred on 29 December, when the index reached 3689.3. The price rises in the United Kingdom and the United States have been linked to changing interest rate expectations and takeover speculation in a variety of sectors. The UK budget on 28 November had little apparent impact on equity prices.

The other main European markets experienced mixed fortunes. In Germany, the FAZ index gained only 1.5% during the quarter, with the continuing strength of the Deutsche Mark against the US dollar seen to be potentially damaging to companies' export margins. Political tension in France, a result of proposed budgetary reforms, restrained French equity prices for much of the quarter. But confidence in the government's resolve returned in the latter half of December and the CAC 40 index recorded a rise of 4.7% over the three months. With a backdrop of an uncertain political environment, the Italian equity market, as measured by the Comit index, fell by 4.5% over the quarter; as a result, the index was down 6.8% over the year as a whole. The Nikkei 225 index rose 10.9% over the quarter. After falling from 19,700 early in 1995 to 14,500 mid-year—a decline of 26%—the Japanese index recovered strongly in the second half to pass 20,000 on 27 December. Although some uncertainty regarding Japanese financial stability remained in the fourth quarter, the strong market on Wall Street and foreign investors' demand for Japanese stocks supported Japanese equity prices.

#### Turnover

Equity turnover on all the major exchanges in the third quarter of 1995 was higher than in the corresponding quarter of 1994 (see Chart 3). Volumes reported to the London Stock Exchange were 20% higher, with foreign equity business in London showing a particularly strong rise of





26%. The increase in turnover was even more striking in the United States: compared to the same period a year

# The Alternative Investment Market (AIM): a comparison with the Unlisted Securities Market (USM)

In the six months since the Alternative Investment Market (AIM) went live, on 19 June last year, the number of companies traded on it has increased from 10 to 121. Its predecessor, the Unlisted Securities Market (USM) was launched with 12 companies quoted, but had achieved only 50 quotations by the end of its second quarter and did not-as AIM has done-achieve a critical mass of quoted companies for nearly two years (see the chart). At least two thirds of these AIM companies were previously traded on Rule 4.2-the Stock Exchange's occasional deal facility, which was closed in September 1995—and the USM did not enjoy this advantage of a ready-made pool of potential companies. But the high proportion of transfers from the occasional dealing facility has meant that, initially, AIM entrants tended to be non-capital raising introductions. There is, though, some evidence that in the run-up to AIM, the number of Rule 4.2 companies increased significantly in anticipation of transferring to AIM. So some of the companies transferring from Rule 4.2 were young, start-ups as well as more established companies.

Comparison of companies trading on USM and AIM



earlier 35% more equities were traded on the New York Stock Exchange in the third quarter of 1995. And, turnover on the NASDAQ market more than doubled. In both cases, the intervening quarters have shown a steady rise. Turnover on the Tokyo Stock Exchange was 37% up on the corresponding period of 1994, in line with the strong recovery in prices and foreign investor demand. Turnover of equities in Europe increased strongly, particularly in Switzerland, which saw a rise of 78% compared with the third quarter of 1994.

#### Equity issues

In the UK equity market, £831 million was raised in rights issues by UK and Irish companies in the fourth quarter.

Since AIM was established, 17 companies have raised capital of £69.5 million on entry: £18.6 million in the first quarter of trading and £50.9 million in the second quarter. Although this is somewhat less than the £81 million (adjusted for inflation since 1980) raised on the USM in its first six months, a significant amount of the capital raised on AIM—£34.1 million—was raised in December, suggesting that capital-raising activity on the market is increasing. In terms of secondary market activity, between October and December the value of turnover on AIM increased by 110%, compared to an increase in market capitalisation of 55%.

An additional factor relevant to the comparison of these markets is that the USM and AIM were launched at different stages in the economic cycle. Although there were other relevant factors, for example regulatory changes, the fortunes of the USM were very clearly linked to the cycle, with the market reaching its peak (in terms of new entrants, companies trading and money raised) when GDP growth peaked in 1988/89, but declining from 1990 onwards as GDP growth slowed. It is too early to say with certainty that AIM is any better equipped to deal with a downturn in the economy, or a bear run in the market, than was the USM.

AIM's first six months therefore look promising, but these comparisons suggest that it is too early to say whether it will be a long-term success. In its early stages, the high level of transfers from the Rule 4.2 facility may disguise the true level of new activity generated by the market; but they have given it a valuable momentum that looks likely to continue. The next twelve months will be a truer test of the market particularly if growth in the economy continues to slow. It should then become clearer whether AIM is to be more successful than USM at attracting start-ups and whether it is a suitable mechanism for such companies to raise equity capital.

This compares with £2 billion issued in the third quarter, although the third-quarter data were erratically high—more than two thirds of the total was accounted for by two issues: North West Water Group and RMC Group. Equity issuance by new companies recovered in the final quarter of the year: 38 companies joined the Official List, of which 29 raised capital of £909 million. The balance were non-capital raising introductions.

Issues of equity with an international tranche increased by approximately 25% from the second quarter to the third quarter of 1995. At \$22.4 billion, however, international equity issues in the first three quarters of 1995 were lower than expected, particularly in comparison with the

\$35.2 billion issued in the same period in 1994. This decline is linked to privatisations, which almost halved in value; equity offerings by firms in developing countries were also much lower. This trend may have continued into the fourth quarter after shares in the largest deal of the year—ENI, the Italian oil, gas and chemicals group—began trading at only just above the issue price. The performance of this \$3.96 billion (Lit 6,300 billion) issue may determine the timetable for the remainder of the Italian government's privatisation programme.

In December, shares in Pechiney, the French aluminium and packing group, started trading at 6% below their issue price. The timing of the sale had been questioned, given the weak French stock market and the disappointment of investors in the performance of Usinor Sacilor, the steel firm privatised last summer. The French government also pointed to the 2% fall in the CAC on the day of the issue and the uncertainty created by the public sector strikes.

New issues in the international equity market are expected to be dominated by Europe in 1996 because of large privatisations—most notably of Deutsche Telekom, which is set to be the world's largest initial public offering. It is scheduled for the end of the year.

# **Derivatives markets**

Turnover on the major derivatives exchanges in the final quarter of 1995 was generally lower than in the previous quarter. On some exchanges, notably the London International Financial Futures and Options Exchange (LIFFE) and the Chicago Mercantile Exchange (CME), it was lower than in the same period in 1994—in part reflecting lower volatility in the underlying markets. However, 1994 was an exceptionally active year and business in the fourth quarter of 1995 was still higher than 1993 levels. For example, LIFFE's total volume in the fourth quarter amounted to 30.0 million contracts, lower than the quarterly average of 38.3 million contracts in 1994, but higher than the 25.4 million contracts in 1993. A similar picture emerges on other leading exchanges (see Chart 4).

#### Chart 4 Quarterly turnover on major derivatives exchanges



Turnover on LIFFE fell by 5.3% in the fourth quarter, while open interest fell by 2.5%. The fall in LIFFE turnover in 1995 should be seen in the context of the sharp rise observed in 1994, 50% up on the previous year. This was the sharpest rise in total turnover on the three leading exchanges-Chicago Board of Trade (CBOT), CME and LIFFE—and was linked to the exceptional levels of volatility observed in bond markets at that time. The implied volatility of LIFFE's long-gilt contract increased by as much as 126% during 1994, while that of the comparable CBOT contract on the US Treasury bond increased by 81.3%. But in 1995, volatility of the LIFFE contract fell by proportionately more that of the CBOT contract. This may go some way to explain the larger decline in LIFFE's total 1995 turnover of 13.3%, compared with 11.4% on CME and 4.0% on CBOT.

Against this background of lower levels of activity, one noteworthy development in the futures markets has been the continued moves to forge contract linkages with other exchanges. For example, in November, LIFFE, the London Clearing House and the Tokyo International Financial Futures Exchange (TIFFE) signed a formal 'Link Agreement' that will permit LIFFE to list a three-month euroyen futures contract identical to TIFFE's existing contract. It is envisaged that the link will come into effect in April 1996.

Elsewhere, turnover on the Deutsche Terminborse (DTB) fell 3.1% during the quarter, whilst volumes on Marché à Terme International de France (MATIF) rose by 22.8%. However, over 1995 as a whole, volumes on MATIF fell by 23.9% with the number of contracts traded marginally lower than in 1993. In November, a letter of intent was signed by MATIF, MONEP (the French equity options exchange), Deutsche Borse AG (the umbrella organisation for the DTB and the Frankfurt Borse) and Société de Bourses Françaises in a bid to take forward the co-operation of the French and German markets. The participants have agreed to come to a final decision on the creation of a Franco-German trading platform by 31 March 1996. This is the deadline by which two MATIF contracts are to be chosen to be transferred to the Tradeus electronic trading link with the DTB.

In the United States over the quarter, volumes on CME and the CBOT fell by 7.3% and 3.4% respectively. On both of these exchanges the performance of non-financial contracts was stronger than that of financial contracts. In the Far East, volumes on TIFFE, Japan's largest derivatives exchange, were down 36.9%.

Turnover in the CBOT'S US Treasury bond future fell 7.0% during the quarter, but it became the world's most actively traded contract, as the CME's eurodollar futures contract saw a larger decline. Following the CME's decision to list contracts based on Brady Bonds, the CBOT submitted three Brady Bond futures and options to the Commodity Futures Trading Commission (CFTC) for approval. The introduction of new contracts on this exchange and elsewhere may partly

# UK asset price volatility over the last 50 years

Over the last few years, policy-makers and market commentators around the world have increasingly focused on the issue of asset price volatility. This increase in interest has not only given the impression that asset price volatility is a problem but also that it has increased recently. However, as Charts A and B show, volatility in both the bond and equity markets in the United Kingdom has over the last 15 years or so been on a generally declining trend, barring some extreme events like the 1987 stock market crash. There is a similar pattern in Treasury bill returns and the sterling-dollar exchange rate.

However, the charts<sup>(1)</sup> also show that despite recent declines, asset price volatility is still generally higher than it was in the 1950s and 1960s. What accounts for its dramatic rise in the 1970s? Unfortunately, the determinants of asset price volatility are not clearly understood and so it is not possible to make definitive statements about its causes. Instead a simple statistical analysis was undertaken to look at variables that might be related to trends in volatility.<sup>(2)</sup> This analysis indicated a strong relationship between measures of macroeconomic volatility (volatility of inflation and output) and asset price volatility. This suggests that asset price volatility in the 1970s was related to high and variable inflation and sharp swings in output—principally because of the two oil price shocks. Since then both the macroeconomic environment and asset prices have become more stable. Interestingly, the statistical analysis could find no relationship between measures to liberalise or restrict financial markets and asset price volatility. Also, it found that the introduction of



derivatives contracts has, if anything, been associated with reductions in price volatility of the corresponding asset.

(1) In the charts, asset price volatility is measured as the monthly conditional volatility of holding period returns on the FT ordinary share index for stocks and on ten-year gilts for bonds. Estimates of conditional volatility were derived as the fitted values,  $\tilde{\sigma}_{t}$  from the following regression equation:

$$\hat{\sigma}_t = \sum_{i=1}^{12} \beta_i \, \hat{\sigma}_{t-i} + v_i$$

where  $\hat{\sigma}_t$  is the unconditional volatility in month t. For stocks the unconditional volatility was estimated using daily data as

$$\hat{\sigma}_t^2 = \sum_{i=1}^{N_t} (r_{it} - \bar{r}_t)^2$$

where N<sub>t</sub> is the number of days in the month and ī<sub>t</sub> is the average holding period return in the month. For bonds daily data back to 1946 were not available so an estimate using monthly data was used. Full details are in the BIS paper quoted below.
(2) Based on 'UK asset price volatility over the last 50 years', by N Anderson and F Breedon given at the BIS economists' meeting, autumn 1995.

be linked to the decline in volumes observed in 1995 compared with 1994 and possibly to the lack of growth potential in some existing contracts.

Turnover in the CME's eurodollar futures contract fell by 11.4% during the fourth quarter, although its open interest

ended the quarter up 6.1%. The exchange membership voted to create a new division, entitled the Growth and Emerging Markets Division, to trade futures contracts on the currencies, debt, and stock markets of emerging market currencies. The CME has launched futures and options on the Brazilian real.

Chart 5 Quarterly turnover of futures by type<sup>(a)</sup>



In the over-the-counter (OTC) markets, the International Swaps and Derivatives Association (ISDA) reported an increase of 8.7% in the volume of new business in swaps and other privately negotiated derivatives, from \$3,919 billion in the first half of 1994 to \$4,258 billion in the first half of 1995. Earlier this year, the Bank of England surveyed the UK OTC market as part of the first comprehensive central bank survey of derivatives markets. It was co-ordinated by the Bank for International Settlements. An analysis of the results of the survey may be found on pages 30–38 of this *Bulletin*.

# Other exchange developments

The Boards of LIFFE and the London Commodity Exchange (LCE) reached agreement in November to enter into detailed negotiations to merge the two exchanges. By merging they hope to maximise the opportunities created by pooling resources. LIFFE's name will be retained for the new exchange. It is hoped that the transition will be concluded by mid-1996.

In November, LIFFE launched APT Plus, a new system that will allow its members to trade options electronically. It was expected that the system would be available for dealing in LIFFE's Bund option contract from February 1996.

# The over-the-counter derivatives markets in the United **Kingdom**

# By the Derivatives Markets Survey Team in Markets and Systems Division.

- Average daily over-the-counter (OTC) derivatives<sup>(1)</sup> turnover in the United Kingdom during April 1995 was \$74 billion.<sup>(2)</sup> The main components were forward rate agreements (FRAs, 47%), interest rate swaps (25%) and currency options (18%). In addition, average daily turnover of outright foreign exchange (FX) forwards and swaps in the United Kingdom was \$278 billion.<sup>(3)</sup>
- The United Kingdom had a 27% share of the \$270 billion average daily worldwide turnover in OTC derivatives contracts and a 31% share of the \$892 billion turnover in outright FX forwards and swaps. The next most active trading locations for OTC derivatives contracts were the United States (20%) and Japan (12%).
- The notional (or face) value of outstanding OTC derivatives contracts booked in the United Kingdom was \$12.1 trillion at end-March 1995. The main components were interest rate swaps (55%), FRAs (21%), interest rate options (9%), currency swaps (7%) and currency options (5%). UK reporters' current credit exposure in OTC derivatives was \$320 billion, 2.2% of their gross notional outstandings.
- Though the results of the survey show the OTC derivatives markets to be somewhat larger than previous estimates, they are also less concentrated than has sometimes been thought and the bulk of activity is in 'plain vanilla'—rather than exotic—products. The relationship between notional values and current credit exposure is in line with expectations.

# **Background**

In 1993, under Bank for International Settlements (BIS) auspices, the Group of Ten (G10) central banks commissioned work on a range of issues related to OTC derivatives.<sup>(4)</sup> As part of this, the Euro-currency Standing Committee established a Working Group-chaired by Jan Brockmeijer of the Netherlands Central Bank-to identify central banks' requirements for information on global derivatives markets.<sup>(5)</sup> The data then available on OTC derivatives markets focused largely on notional amounts rather than market values; their coverage was incomplete in terms of both products and active market participants; and they did not provide information on the structure of participation and activity in derivatives markets. Since the data were not comparable, global aggregation was difficult. The Working Group was asked to develop

measurement concepts and monitoring techniques that would address central banks' need for comprehensive and internationally comparable data.

The Brockmeijer Report<sup>(6)</sup> was submitted to the G10 Governors early in 1994, endorsed by them in May 1994 and published in February 1995. One of its recommendations was a comprehensive survey of derivatives markets activity. It was decided that this survey should be carried out under BIS auspices at the same time as the well-established triennial central bank survey of the foreign exchange market.<sup>(7)</sup>

The Brockmeijer Report included a questionnaire for the survey drawn up by the Working Group, which was used for consulting market participants. As a result, a number of changes were made; and countries were free to add items to

For the purposes of this article, the term 'OTC derivatives' encompasses the following instruments: currency swaps and options; FRAs; interest rate swaps; options on traded securities; interest rate options (including caps, floors, collars and swaptions); equity forwards, swaps and options; Categories for 'other products' were also included. The term *excludes* spot and forward foreign exchange transactions. All instruments are defined in the annex.
 The data reported in this article are generally adjusted for local double-counting (net-gross) though some are—for comparability purposes—quoted without adjustment for double-counting (gross) or are also adjusted for cross-border double-counting (net-net). Figures are net-gross unless otherwise stated. The annex defines these and other terms more fully.
 In addition, average daily turnover in the FX spot market in London was \$186 billion. The results of the 1995 foreign exchange market survey were presented in a article in the November edition of the Quarterly Bulletin, 'The foreign exchange market in London', pages 361–69.
 Other work was published in two further BIS papers: 'A Discussion Paper on Public Disclosure of Market and Credit Risks by Financial Intermediaries' (The Fisher Report) September 1994; and 'Macroeconomic and Monetary Policy Issues Raised by the Growth of Derivatives Markets' (The Hannoun Report) November 1994.
 An article in the May 1995 issue of the Quarterly Bulletin' Statistical information about derivatives markets', pages 185–91, outlined other developments in this area.

An allock in the first state of the guartery burrent statistical information adout derivatives markets, pages 105–21, outlined outer developments in this area. Entitled 'Issues of Measurement Related to Market Size and Macroprudential Risks in Derivatives Markets'. Which, as already mentioned, was carried out in April 1995 and discussed in an article in the November 1995 edition of the *Quarterly Bulletin*, 'The foreign exchange market in London'. (7)

the resultant 'core' survey return if they felt they would be useful. All the G10 central banks, and a further 16 countries, participated in the survey, achieving effective worldwide coverage of these markets.

# The survey

# **Participants**

The Bank of England asked the following entities to participate in the survey: banks active in the United Kingdom and some non-bank, financial firms believed to be active in OTC derivatives markets here. The selection of banks was made largely on the basis of information already available to the Bank; the Securities and Futures Authority (SFA) helped identify appropriate securities houses. A total of 396 banks and securities houses participated in the UK part of the derivatives markets survey. Of these, 127 submitted nil returns, suggesting that the survey achieved a comprehensive coverage: little if any OTC business is thought to take place directly between non-financial firms.

#### Data coverage

Data were collected on nominal turnover during April 1995 and on nominal outstandings, gross positive and gross negative market values at end-March 1995. Instruments were categorised broadly in terms of their risk exposureinterest rate, foreign exchange, equity and commodity-and in a variety of currencies. Within these categories, products were broken down into swaps (interest rate and currency); FRAs;<sup>(1)</sup> OTC options;<sup>(2)</sup> and 'other products'.<sup>(3)</sup> In addition, information was sought on survey respondents' activities in exchange-traded futures and options-though no attempt was made to survey these markets in their entirety, since such data are already available from the exchanges concerned. Data on foreign exchange futures and options, which were previously included in the foreign exchange survey, were on this occasion collected as part of the derivatives markets survey. The Bank also sought a small amount of qualitative information, for example the extent to which activity in April was typical and firms' reasons for using OTC derivatives.

#### **Quality of response**

Various statistical checks were applied to the survey returns, taking as their basis relationships calculated from existing data sources, such as prudential returns and the International Swaps and Derivatives Association (ISDA) survey. These disclosed a number of cases of possible mis-reporting which were followed up with the firms concerned. Differences in approach to the calculation of gross market values caused most problems. The BIS produced an aide memoire which gave a step-by-step guide to this calculation for the purposes of this survey. Where firms could not complete the survey form, they were encouraged to provide estimates. In the

few cases where this was not possible, market averages were applied.

This survey—unlike the ISDA survey, which focuses largely on interest rate swaps—sought to include arms-length internal transactions (that is, transactions between entities in the same group which arise in the normal course of business, rather than for internal accounting or risk management). Turnover data were reported by location of trade (that is, where transactions were initially conducted), whereas amounts outstanding (both notional amounts and gross market values) were reported by book location (that is, where the deals were processed and the risk managed). The reason for this was essentially practical: companies sometimes book transactions in a different location from where the deals are initially done, so it can be difficult to identify after the event where a deal was originated.

#### **Results**<sup>(4)</sup>

The information from the survey responses forms a large dataset. In this article, it is only possible to provide an overview<sup>(5)</sup>: aggregate data are shown in Table A. The data published in this section-unless stated otherwise-are for

#### **Table A**

#### Aggregate data by instrument

\$ billions	Turnover	Outstandings	Gross marl	ket value
OTC derivatives			+	-
Foreign currency Currency swaps Currency options	<b>271</b> 26 245	<b>1,429</b> 822 596	<b>115</b> 104 8	<b>122</b> 109 8
Interest rate FRAs Interest rate swaps Interest rate options on traded securities Other interest rate options.	<b>1,058</b> 626 334 31	<b>10,382</b> 2,590 6,692 126 910	<b>176</b> 5 153 2	<b>166</b> 5 142 2 17
Equity Forwards and swaps Options	05	<b>347</b> 42 305	<b>24</b> 2 22	<b>23</b> 2 21
<b>Commodities</b> Forwards and swaps Options		<b>62</b> 43 19	<b>5</b> 	<b>4</b> 4
OTC total	1,329	12,220	320	315
Exchange traded derivati	ves			
Foreign currency Futures Options	<b>77</b> 73 4	<b>14</b> 1 13		
Interest rates Futures up to one year Futures over one year Options	<b>2,138</b> 1,531 304 303	<b>4,074</b> 2,529 687 859		
<b>Equity</b> Futures Options		<b>134</b> 52 82		
<b>Commodities</b> Futures Options		<b>59</b> 45 14		
Exchange traded total	2,215	4,281		

Figures for OTC derivatives are adjusted for local double-counting. Turnover figures for exchange traded instruments have been halved to adjust approximately for double-counting and to make them comparable to data from the exchanges. Sum totals may differ from their constituent parts because the category 'other products' has been excluded.

Including equity and commodity forwards.
 Including caps, collars, floors, warrants, swaptions and options on traded securities.
 These were defined as: 'Any instrument where (i) the transaction is highly leveraged and/or the notional amount is variable and (ii) a decomposition into individual 'plain vanilla' components is impractical or impossible'.
 Pie charts only include categories that account for a significant share of the market. Sum totals may differ from their constituent parts because of the market.

Full copies of the UK data—with some suppressions to protect the confidentiality of individual reporters' figures —are available on request from the Bank of England (0171–601–3191). (5)

the United Kingdom only. The BIS intend to publish an analysis of the global results later this year.

#### **Turnover**

#### By instrument

Turnover (for definition see the annex) was dominated by trading in short-term instruments, notably FRAs-which accounted for 47% of total turnover<sup>(1)</sup> (see Chart 1). Interest rate swaps (25%) and currency options (18%) accounted for the bulk of the remaining turnover.<sup>(2)</sup>



Total turnover in the United Kingdom in April 1995: \$1,329 billion

FRAs accounted for 55% of sterling turnover. FRAs arelargely for historical reasons-more actively traded in the United Kingdom than in other centres. Interest rate swaps accounted for 23% of sterling turnover; currency options for 14%; interest rate options for 7%; and currency swaps for 1%.

#### By currency

About a quarter of FRAs and interest rate swaps transacted in the United Kingdom in April were dollar-denominated. Of the remainder, the main European currencies (sterling, Deutsche Mark and French franc) accounted for 40% of turnover in both instruments. For currency derivatives, the dollar was the dominant currency, with 83% of currency swaps and 77% of currency options having a dollar leg.<sup>(3)</sup> The Deutsche Mark had a significantly larger share of currency options (54%) than of currency swaps (24%). In contrast, the shares accounted for by yen (28% of turnover in currency swaps and 29% in currency options) and sterling (10% and 12% respectively) were similar in both instruments.

#### Market concentration

In terms of turnover, activity in the UK OTC market seems to be quite widely dispersed (see Chart 2): 21 firms each had 1% or more of total turnover in April; and of these, 16 each had 2% or more. The top ten firms had a combined

# Chart 2 **Concentration of total turnover**



share of 52%; and the top 20 had 74%. These figures suggest that the OTC markets are only slightly more concentrated than the foreign exchange market.

Activity in individual sectors of the OTC market is inevitably more concentrated than the aggregate figures suggest, and the degree of concentration varies markedly across sectors. In some sectors activity is not very concentrated, notably interest rate swaps and FRAs, where the top ten firms accounted for 61% of total turnover in both instruments. In contrast, in some more specialised sectors, the number of active participants is much lower, for example options on traded securities (85%) and interest rate options (86%).

### By nationality of firm

US-owned firms dominated turnover in OTC derivatives in the United Kingdom in April: they accounted for 40% of turnover in foreign exchange derivatives and 37% in interest rate derivatives (see Table B). Among other European firms, Swiss entities were the most active (7% and 18%), followed by French firms (4% and 7%).

# **Table B**

### Gross turnover by nationality of firm

\$ billions: percentages in italic

	Interest rate derivatives	Foreign exchange derivatives
\$ billions	1,381	304
of which:		
United States	37	40
United Kingdom	30	20
Rest of Europe	17	24
Japan	9	8
Other	7	7

Gross turnover in the United Kingdom in April 1995

#### *Counterparties: location and type*

While turnover in interest rate derivatives was evenly split between local (51%) and cross-border (49%) business, most

This was also reflected in the on-exchange futures data: in nominal terms 83% of interest rate futures relate to short-term interest rates.
 Some respondents suggested that turnover in currency options may have been unusually high in April because of increased volatility in the yen-dollar exchange rate; almost a quarter of OTC currency options were ¥/S denominated, although the \$\SiDM\$ because of arger.
 Percentages add up to more than 100% because currency swaps and currency options have legs denominated in two different currencies.

# Table CMaturity breakdown of OTC derivatives

\$ billions: percentages in italic

	Foreign exchange derivatives		Interest rates derivatives				Equity derivatives	Commodity derivatives
	Currency swaps	Currency options	Swaps	FRAs	Options on traded securities	Other options		
<pre>\$ billions of which, maturity;</pre>	822	596	6,692	2,590	126	910	347	62
Under 1 year	26	93	34	86	82	34	59	70
1–5 years	51	6	51	16	12	53	39	28
Over 5 years	23	1	15	_	6	13	2	2
Figures are adjusted for	local double-counting.							1

foreign exchange derivatives' turnover was cross-border (74%). As expected, sterling turnover tended to be local (68% in interest rate derivatives).

In terms of type of counterparty, most turnover was between reporters (that is, between banks and securities firms): 79% of foreign exchange derivatives turnover and 83% of interest rate derivatives turnover was of this type, including 90% of FRAs. End-users (corporates and other financial intermediaries such as insurance companies and pension funds) account for a relatively small share of market activity: UK end-users accounted for only 2% of total turnover.

### **Outstandings**

### By instrument and maturity

As one might expect, in comparison with turnover, outstandings (see the annex for definition) are dominated by longer-maturity instruments (see Table C). These longer-maturity instruments—interest rate swaps and options (excluding options on traded securities) and currency swaps—accounted for 70% of outstandings (see Chart 3). Two thirds of these instruments had an outstanding maturity of over one year. Short-maturity instruments—FRAs, currency options and options on traded securities—accounted for 27% of outstandings, much less than their share of turnover.

### Chart 3 Outstandings (split by instrument)



Total outstandings in the United Kingdom as at end-March 1995: \$12,220 billion

Thus despite the preponderance of FRAs in *turnover*, interest rate swaps accounted for the bulk of OTC outstandings at end-March 1995. Equity options made up almost 2% of total outstandings, but other equity derivatives (forwards and swaps) accounted for negligible proportions of the total market, as did commodity derivatives.

The breakdown for sterling-denominated outstandings by instrument type is similar to that of overall outstandings: interest rate swaps accounted for 59%, FRAs for 21%, interest rate options for 10%, currency swaps for 5%, and currency options for 5%.

### By currency

The major currency for interest rate derivatives booked in the United Kingdom is the US dollar: 28% of FRAs and 26% of interest rate swaps were dollar-denominated (see Table D). The major European currencies (Deutsche Mark, sterling and French franc) together accounted for 38% of both FRAs and interest rate swaps.

# Table DCurrency breakdown of outstandings in interest ratederivatives

\$ billions	\$	¥	DM	£	FFr	Other	Total
Interest rat	te						
swaps	1,714	1,309	1,071	1,069	433	1,096	6,692
FRAs	734	285	450	386	155	580	2.590
Interest rat	te						
options	312	108	273	188	69	86	1,036
Total	2,760	1,702	1,794	1,643	657	1,762	10,318
Figures for (	OTC deriva	tives are adju	sted for local	double cour	ting.		

In addition, 72% of outstanding currency swaps had a dollar leg; one third had a yen leg, 20% had a Deutsche Mark leg and just 11% had a sterling leg.<sup>(1)</sup> Similarly, 74% of currency options had a dollar leg. In comparison with currency swaps, more (47%) currency options had a Deutsche Mark leg. In contrast, the shares accounted for by yen (33% of outstandings in currency swaps and 30% in currency options) and sterling (11% and 14% respectively)

### Concentration

Outstandings at end-March were fairly widely dispersed (see Chart 4): 20 firms each had 1% or more of total outstandings; and, of these, twelve had 2% or more. The top ten had a combined share of 60%; and the top twenty

were broadly similar in both instruments.

(1) Percentages add up to more than 100% because currency swaps and currency options have legs denominated in two different currencies.

# Chart 4 Concentration of total outstandings



had 76%. As with turnover, outstandings in some sectors were not very concentrated—notably interest rate swaps (where the top ten firms accounted for 67% of total outstandings) and FRAs (64%). However, in some more specialised sectors—for example, commodity derivatives (93%)—the number of participants was much lower.

#### Gross market values

Notional outstandings can give an exaggerated impression of the amounts at risk in derivatives activities because they are calculated on a nominal (that is, face value) basis which often does not directly measure the payment obligations of the parties. They are however relevant in assessing the risk to which firms might be exposed by price changes in the underlying markets. But to measure that risk correctly information is also needed on other positions—for example, in cash instruments—which were outside the scope of the survey. Cash positions typically form part of firms' overall portfolios, and may hedge some or all of the market risks to which their derivatives activities might—considered in isolation—appear to expose them.

Nor do notional outstandings reflect the amounts at risk from counterparty default. This is better measured by gross market values, data on which are accordingly reported below. Credit exposures will in practice be further reduced by netting (for example, under ISDA master agreements) and by collateral agreements between counterparties.

Current credit exposure (as measured by gross positive market value—see the annex for definition) was, at \$320 billion, 2.2% of reporters' total gross notional outstandings in the UK OTC markets at end-March. In addition, banks and securities houses' gross negative market value to non-reporters (that is, end-users' exposure to reporters—see Annex for definition) was \$108 billion. Aggregate market value therefore totalled \$428 billion.

Most of this aggregate market value was accounted for by 'plain vanilla' instruments: interest rate swaps and currency

# Chart 5 Aggregate market value (split by instrument)



swaps between them accounted for 81% of the total (see Chart 5). Currency swaps accounted for a greater share of aggregate market value than they did of outstandings. This is because the nature of the product (in particular, the exchange of principal at maturity and its long maturity) generally means that its market value is more sensitive than other products to price changes in underlying markets.<sup>(1)</sup> The reverse is true of FRAs, which accounted for a smaller share of aggregate market value than they did of outstandings, primarily because of their short maturity.

Because the value of derivative instruments partly reflects the value of the underlying instrument, another way of seeing the effect of different products' sensitivity to underlying price changes is to look at positive market value as a percentage of notional outstandings: for the same reasons as those given above, currency swaps (at 12.7%) had the highest percentage and FRAs (0.2%) the lowest.

Current credit exposure was more concentrated than outstandings: 18 firms each accounted for 1% or more of total positive gross market value and nine of these each had 2% or more. The top ten had 71% and the top twenty had 84%. Current credit exposure is more concentrated than outstandings across all sectors. However, some are still not very concentrated, for example, the top ten firms using FRAs accounted for 67% of positive gross market value. Equally, some more specialised sectors—such as equity derivatives (90%) and commodity derivatives (98%)—were highly concentrated.

Individual firms, generally speaking, have outstandings in individual product types with roughly comparable gross positive market values and gross negative market values. This is consistent with them principally acting as intermediaries, entering into transactions which pass the market risks on to others—ultimately, to end-users of the markets with different desired risk profiles. Reporters do not as a rule seem to be using OTC derivatives to take open positions which might expose them to large market risks.

The share of aggregate market value accounted for by currency swaps may have been unusually high because of sharp movements in some key exchange rates before and during the survey period.

#### **Qualitative information**

The Bank of England also sought qualitative information on a variety of matters. Of those surveyed, 53% thought turnover in April was normal and 30% thought it was below normal; only 8% thought it was above normal (the remainder expressed no opinion). As many as 88% of respondents said that their transactions carried out in the United Kingdom are also booked in the United Kingdom. Finally, 43% of firms said that they used derivatives for both trading and hedging, 32% for hedging alone and 14% for trading, hedging and as market-makers. Results from the major firms differed only slightly from the average, although they did reflect their greater activity in making markets in OTC derivatives.

# **Comparison with other markets**

Data on the OTC derivatives markets have, as do those on other financial markets, magnitudes which are difficult to comprehend in everyday terms. It is therefore helpful to provide some perspective by comparing different markets. For example, turnover in the OTC derivatives markets in London is, on the basis of this survey, 16% of that in the foreign exchange market; and reporters' current credit exposure (as measured by positive gross market values on their OTC contracts, and not taking into account any reductions achieved by netting or collateralisation) is on average 2.2% of their gross notional outstandings.<sup>(1)</sup> To take a different comparison, this current credit exposure is some 15% of the credit risk to which they are exposed in their lending activities.

#### **Exchange traded derivatives**

In addition to the data collected on OTC derivatives, the survey also covered reporters' activity in exchange traded derivatives. However, as already noted, the survey did not attempt to collect comprehensive data on exchange traded derivatives; this is available from exchanges themselves and is summarised in Table E.

Average daily turnover in futures and exchange traded options by OTC market participants in the United Kingdom was \$123 billion,<sup>(2)</sup> 66% higher than these firms' OTC business. This compares with average daily turnover of \$962 billion worldwide in the 15 major exchange traded contracts in the first six months of 1995. OTC reporters' outstandings in futures and exchange traded options were \$4.3 trillion<sup>(3)</sup> at end-March. Almost all of turnover (83%) and outstandings (75%) in exchange traded instruments was accounted for by interest rate futures: the eurodollar contracts (with 21% of turnover and 32% of outstandings), euromark (26% and 17%) and short sterling (20% and 17%) were the most used by reporters.<sup>(4)</sup> In discussions with some

# **Table E Exchange traded derivatives**

\$ billions

Contract	Exchange (a)	Average daily turnover (b)	of which: OTC reporters in the United Kingdom (c)						
Three-month interest rate contracts									
Euro\$ Sterling Euromark PIBOR Euroyen	CME LIFFE LIFFE MATIF TIFFE	337.2 39.2 65.1 52.2 231.3	18.1 17.3 21.7 7.5 11.2						
Government bond futures									
US T-bond Bund Notionnel <b>Total</b>	CBOT { DTB LIFFE MATIF	32.4 7.5 19.2 11.9 <b>796.0</b>	4.0 4.5 1.2 <b>85.5</b>						
(a) The Exch	mana noformad to one on fal	lawa, Chiasaa Manaantila l	Evolution (CME), London						

The Exchanges referred to are as follows: Chicago Mercantile Exchange (CME); London International Financial Futures and Options Exchange (LIFFE); Marché à Terme International de France (MATIF); Tokyo International Financial Futures Exchange (TIFFE); Chicago Board of Trade (CBOT); and Deutsche Terminborse (DTB). Exchanges' figures are derived from FIA statistics on number of contracts traded and are averages for April, calculated on an 18-day trading basis.

(b) Survey figures are based on turnover in April and are calculated on an 18-day trading basis.

(c) They have been halved to adjust approximately for double-counting and to make them comparable to data from the exchanges

of the main reporters, the view received was that exchange traded positions were used primarily to hedge OTC positions.

# **Global figures**

UK reporters accounted for a significant share of the global totals, particularly in some products (see Table F). As mentioned earlier, the BIS intend to publish an analysis of the global results later this year.

#### **Table F**

#### **Comparison of UK and global data**

\$ billions

Instrument	Global	United Kingdom	UK percentage share	
Outstandings				
Currency swaps	8 741	822	9	
Currency options	1.968	596	30	
FRAs	4.588	2.590	56	
Interest rate swaps	18.265	6.692	37	
Interest rate options	3.548	1.036	29	
Equity derivatives (OTC)	805	347	43	
Commodity derivatives (OTC	389	62	16	
OTC total	38.304	12.220	32	
Exchange-traded derivatives	16,581	4,281	26	
Average daily turnover				
Currency swaps	4	1	25	
Currency options	40	14	35	
FRAs	65	35	54	
Interest rate swaps	63	19	30	
Interest rate options	21	5	24	
OTC total	193	74	38	
Exchange-traded derivatives	1 136	246	22	

All global figures are from the BIS. For both turnover and outstandings in OTC derivatives, global figures are adjusted for local and cross-border double counting; UK figures are adjusted for local double-counting; these comparisons of UK 'net' figures to global 'net-net' figures give an exaggerated estimate of UK reporters' share of the global totals. Turnover figures for exchange traded instruments have been halved to adjust approximately for double counting and to make them comparable to data from the exchanges. Sum totals will differ from their constituent parts because the category 'other products' base been excluded. has been excluded.

This measure of the amounts of risk in the event of counterparty default is not out of line with earlier estimates (for example that of the ISDA

survey). Turnover figures for exchange traded derivatives have been halved to adjust approximately for double counting and to make them comparable to (2)

Ada from the exchange. As open interest into each interest into a plant approximately for a dealer comming and to make the comparative to data from the exchanges. As open interest: for an individual trade, outstandings include both counterparties' positions (long and short) whereas open interest includes one counterparty's position (long or short). Open interest may also be calculated on a net basis. The eurodollar contract is traded on the Chicago Mercantile Exchange (CME) and the Singapore International Monetary Exchange (SIMEX). The (3)

<sup>(4)</sup> Exchange (SIMEX). The euromark and short sterling contracts are traded on the London International Financial Futures and Options Exchange (LIFFE).

# **Future reporting**

One recommendation of the Brockmeijer report was that as a follow-up to this survey—the G10 central banks should consider proposals for collecting and publishing information on derivatives markets on a more regular basis. It was envisaged that this information would be collected from a smaller population, largely comprising the firms most active in these markets. Another working group under BIS auspices—chaired by Shinichi Yoshikuni of the Bank of Japan—has been established to address these issues and it is likely that their discussions will lead to proposals, which will take the form of a consultative paper.

# Conclusions

This survey provides the first comprehensive data on the international OTC derivatives markets—one of the needs identified by the Brockmeijer report. The market is, on the basis of the aggregate results compiled by the BIS, somewhat larger than previous data suggested. But it is not so substantially larger as to cast doubt on previous

assessments of the significance of OTC derivatives activity. Indeed, part of the additional turnover is accounted for by intra-group transactions, which were excluded from other surveys.

This survey is revealing in a number of other respects. First, it shows that the bulk of OTC activity is in well-established, 'plain vanilla' products like interest rate swaps and FRAs rather than the more complex, exotic products. Second, the market is less concentrated than is sometimes suggested-differing little from the foreign exchange market. Third, the survey confirms that OTC activity is smaller than exchange traded business. Fourth, it suggests that the relationship between current credit exposure and notional principal is very much in line with earlier information. Finally, the survey results—in terms of positive and negative gross market values-are consistent with banks and securities houses acting principally as intermediaries, offsetting risks within their OTC derivatives activities rather than building up open positions in OTC derivatives which might expose them to large risks.
# Annex

# **Definition of technical terms**

#### Turnover

Turnover data were used to measure market activity. Turnover was defined as the gross value of all new deals entered into during April 1995. The basis for reporting was the location of the trade (that is, where transactions were initially conducted). It was measured in terms of nominal (or notional) amounts for forward, swap and futures contracts; and, for option contracts, in terms of nominal (or notional) amounts *and* premia. The gross value of each transaction was recorded once by each reporter (so if it was a deal between two survey participants, it appears twice in the *gross* data). Netting and offsets were ignored.

#### **Outstandings**

Outstandings, in nominal or notional amounts, were used to provide a rough measure of the potential transfer of price risk in derivatives markets. Outstandings were measured as at end-March 1995. The basis for reporting was the book location (that is, where deals were processed and risk managed). For transactions with variable nominal or notional principal amounts, the basis for reporting was the nominal or notional principal amounts at the time of reporting.

#### Gross positive/negative market value

Gross market value is a measure of the gross sums of all open contracts with positive or negative (as appropriate) replacement values evaluated at market prices prevailing at end-March 1995. Thus, the gross *positive* market value of a firm's outstanding contracts is the sum of the replacement values of all contracts that show a profit to the reporter at current market prices (and which therefore, if they were immediately settled, would represent claims on counterparties). The gross *negative* market value is the sum of the values of all contracts that have a negative value on the reporting date (that is, those that are in a current loss position and which, if they were immediately settled, would represent liabilities of the firm to its counterparties).

#### Aggregate market value

The aggregate market value figure is calculated as the sum of:

- the gross positive market value of contracts between reporting firms.
- the gross positive market value of contracts with non-reporting firms.
- the gross negative market value of contracts with non-reporting firms (which is an approximation of the positive market value of the same contracts held by non-reporters).

#### **Current credit exposure**

The term *current credit exposure* used in the article refers to the sum of the gross positive market values. It takes no account of netting or collateral agreements. It is also distinct from potential credit exposure and from credit equivalent amount; the latter is normally defined as the sum of current and potential credit exposure.

#### **Arms-length transactions**

An *arms-length* transaction was defined as one where the dealer was indifferent as to the counterparty. In other words, deals within the same institution should have been included if the trader was equally willing to conclude the deal in question with a third party. So internal transactions should only have been reported if they were driven by a genuine business need, rather than internal accounting or risk allocation and management considerations.

#### Gross

Figures that have *not* been adjusted for either local or cross-border double-counting between reporters (ie banks and securities firms).

#### **Net-gross (or net)**

Figures that have been adjusted for local, but not cross-border double-counting between reporters (ie banks and securities firms).

#### Net-net

Figures that have been adjusted for local and cross-border double-counting between reporters (ie banks and securities firms).

#### **Currency swap**

Contract which commits two counterparties to exchange streams of fixed interest payments in *different* currencies for an agreed period of time *and* to exchange principal amounts in *different* currencies at an agreed exchange rate at the end of the period.

#### **Currency option**

Option contract that gives the right to buy or sell a currency with another currency at a specified exchange rate during a specified period.

#### Forward rate agreement (FRA)

Interest rate forward contract in which the rate to be paid or received on a specific obligation, is determined at contract initiation for a set period of time, beginning at a future date.

#### Interest rate swap

Agreement to exchange periodic payments related to interest rates on a *single* currency.

#### **Interest rate option**

Provision to pay or receive a specific interest rate on a predetermined principal for a set period of time. Including:

- **Option on traded securities**—OTC option on an interest bearing underlying security.
- Interest rate cap—OTC option that pays the difference between a floating interest rate and the cap rate.
- Interest rate floor—OTC option that pays the difference between the floor rate and the floating interest rate.
- Interest rate collar—combination of cap and floor.
- Interest rate swaption—OTC option to enter into an interest rate swap contract, purchasing the right to pay or receive a certain fixed rate.
- Interest rate warrants—OTC option, long-dated (over one year) interest rate option.

#### **Equity forward**

Contract to exchange an equity or equity basket at a set price at a future date.

#### **Equity swap**

Contract in which one or both payments are linked to the performance of equities or an equity index.

#### **Equity option**

Provision to deliver or receive a specific equity or equity basket or equity index at an agreed price at an agreed time in the future.

#### **Commodity forward**

Forward contract to exchange a commodity or commodity index at a set price at a future date.

#### **Commodity swap**

Contract with one or both payments linked to the performance of a commodity price or a commodity index.

#### **Commodity option**

OTC option to deliver or receive a specific commodity or commodity index at an agreed price at a future date.

#### **FX** spot transactions

*Single* transactions which are delivered for cash settlement *not more* than two business days after the transactions are contracted.

#### **FX** forward transactions

Include:

- **Outright forwards**—delivered for cash settlement *more* than two business days after the transactions are contracted.
- Swaps—simultaneous spot sales/purchases and forward purchases/sales of a single currency.

# Can we explain the shift in M0 velocity? Some time-series and cross-section evidence

### By Norbert Janssen of the Bank's Monetary Assessment and Strategy Division.

- Narrow money velocity<sup>(1)</sup> has increased in the United Kingdom since the Second World War. This can be explained largely by innovations in the payments system. But in the 1990s narrow money velocity growth slowed sharply and recently became negative.
- Detailed analysis reveals a slowdown in cash-saving financial innovations in recent years.
- The recent shift in narrow money velocity may also be related to the move to lower inflation in the United Kingdom in the 1990s. A cross-country comparison of the relation between narrow money velocity and inflation indicates that falling velocity in the United Kingdom is not exceptional by international standards. However, shifts in inflation have not been the only reason for movements in narrow money velocity in other countries.
- It remains uncertain whether the recent emergence of negative narrow money velocity growth in the United Kingdom will prove to be permanent or temporary. Further financial innovations are likely to make a positive contribution to narrow money velocity growth.

# **Overview**

Until the early 1990s, narrow money<sup>(2)</sup> velocity in the United Kingdom had followed an almost uninterrupted upward trend since the Second World War (see Chart 1). This trend has usually been explained by progress in payments technology. The increased use of alternative means of payment has caused the proportion of expenditure financed by cash to fall almost continuously over this period, even during the low-inflation episodes of the 1950s and 1960s.

### Chart 1



Since 1990, however, this pattern has changed. Narrow money velocity became flat, and has fallen over the past two years. During 1994 and 1995, narrow money growth-at an annual rate of 6%-7%-exceeded the growth rate of nominal income by around one percentage point.(3)

Does this recent strength in M0 relative to nominal spending represent a permanent or temporary change in the behaviour of narrow money velocity? A closer look at the longer-run behaviour of currency velocity in the United Kingdom, and in some overseas economies, may provide useful insights into the underlying causes of the currently strong demand for M0.

One explanation for M0's strength may be a slowdown in the pace of innovation in payments technology. Another may be that the shift to a low-inflation environment in the United Kingdom in the 1990s has led agents to hold voluntarily a higher proportion of their portfolios in cash. Growth of narrow money velocity in periods of low inflation (as in the 1950s and 1960s) could, however, be consistent with the latter effect, if the introduction of substitutes for cash dominated the low-inflation effect. This article considers both explanations.

The first section of this article looks at the effect of financial innovation on the demand for cash in the United Kingdom and the evidence for a slowdown in the pace of change in

Velocity is defined here as nominal income divided by nominal money balances. Thus an increase in narrow money velocity represents a reduction in cash in circulation per unit of national income.
 This article uses the terms M0, narrow money, currency and cash interchangeably. M0 consists of notes and coin in circulation, with a value of £23.3 billion at the end of December 1995, and bankers' operational balances at the Bank of England, which amounted to £443 million. Individuals and businesses hold about £20 billion of notes and coin, the rest being held by the public sector and the overseas sector.
 Part of the strength in M0 may be related to spending on the National Lottery.

recent years. The second section focuses on the move to a low inflation environment as a possible reason for the shift in currency velocity in the United Kingdom in the 1990s. The third section considers evidence from OECD countries on the long-run behaviour of currency velocity, to explore whether downward shifts in the velocity of currency in some other countries have been associated with a shift to a lower inflation regime. Some econometric results on the relation between the demand for M0 and inflation in the United Kingdom are reported in the annex.

#### **Effects of financial innovation**(1)

The effect of financial innovation on the demand for narrow money can be examined by using direct or indirect methods. In most econometric work, financial innovation has been proxied in an indirect way. Econometric explanations developed in the Bank for the demand for M0 have usually accounted for the upward trend in M0 velocity by including a cumulative interest rate term, as a proxy for developments in transactions technology.<sup>(2)</sup> A cumulative interest rate term can incorporate two distinct interest rate effects. First, a rise in interest rates leads to a fall in narrow money demand (an increase in the velocity of cash) for a given transactions technology. Second, it creates an incentive for financial institutions to invest in, and for people to use, cash-economising technology and payments systems. The cumulative interest rate term treats such innovations as irreversible<sup>(3)</sup> because of the large fixed costs involved. This implies that financial innovation follows a trend determined by the level of interest rates.

The variable costs associated with innovations in payments technology may also be important in determining the pace of financial innovation from the supply side. The current annual cost to the financial services industry of providing cash to customers through automated teller machines (ATMs) and across branch counters, and of collecting cash from retailers, is about £2 billion according to estimates by the Association for Payment Clearing Services (APACS). By comparison, the annual interest cost of holding the total stock of M0 is only half this amount at current interest rates. These interest costs are opportunity costs for people holding cash-the demand side of the market. Since total costs of the use of cash in the payments system are probably higher for the financial services industry than for the demand side of the market, financial innovation may be determined mainly by the supply side.

More direct evidence on advances in payments technology can be obtained by considering four important innovations in the UK payments system:(4)

- the switch away from salaries being paid in cash;
- better access to cash from financial institutions;

- the increase in the proportion of the population with bank or building society accounts; and
- the introduction of non-cash payment mechanisms that guarantee payment (cheque guarantee cards, credit and debit cards).

Developments in these innovations may indicate whether a slowdown in the pace of financial innovation can explain the recent slowdown in narrow money velocity growth.

#### Switch away from salaries being paid in cash

There has been a well established trend away from cash payment for salaries for many years. In the late 1970s, 50% of employees were paid in cash; by 1994 this had fallen to less than 20% (see Chart 2). Since the late 1980s, the rate of progress has been slower, even though the proportion remains high relative to some other countries. Nearly all those still paid in cash in the United Kingdom are paid weekly or fortnightly-only 2% of employees paid on a monthly basis are still paid in cash.

#### Chart 2 Percentage of employees paid in cash



Source: APACS/IBRO

#### Improved access to cash from financial institutions

The fall in the proportion of employees being paid in cash has been accompanied by a rise in the amount of cash obtained from bank and building society accounts, mainly through ATMs (see Charts 3 and 4). ATMs were the source of only 6% of the total amount of cash accessed from accounts in 1981. But this share had risen to 44% in 1990 and 49% in 1994. While 'cashback'(5) is growing fast, it accounted for only a small proportion of the total amount of cash obtained by the public in 1994.

In theory, the widespread availability of cash via ATMs could have two effects on the demand for M0. First, easier access to cash may increase its use. For many small purchases the use of cash is convenient: it saves time and

<sup>(1)</sup> 

<sup>(4)</sup> (5)

The detailed analysis in this section on recent trends in financial innovation and the effects on cash holdings is based on work by Marcus Manuel in HM Treasury, but the views expressed are not necessarily those of HM Treasury. Examples include Hall *et al* (1989), Brookse *et al* (1991), Hoggarth and Pill (1992) and Breedon and Fisher (1993)—see page 48 of this *Bulletin*. Since the cumulative interest rate term will not decline unless nominal interest rates become negative. The data used in this section were provided by APACS. A cashback facility enables debit-card holders to use their card to obtain extra cash in, for example, supermarkets and petrol stations, by having their and their data debited for a better then dwar our target house metatheir card debited for a larger amount than they actually purchase



Chart 4





avoids bank charges. Second, ATMs enable individuals to operate with smaller average holdings of cash. Theory would also suggest that the marginal impact of an extra ATM could vary substantially from the first introduction to eventual saturation. The effect may decrease as a further rise in the number of ATMs could imply that the average use of each individual ATM falls. But there may also be a more constant marginal effect arising from developments such as the shift from first to second generation machines, the introduction of shared facilities, and the move to more convenient sites away from banks. These developments may enable agents to hold smaller average cash balances because it is easier to obtain smaller amounts of cash more frequently.

Cashback facilities are likely to have a more direct negative impact on the demand for M0 than ATMs. Cashback facilities are an incentive for customers to use debit cards to pay for relatively small purchases which had previously been bought with cash.

#### Improved access to bank accounts

The proportion of the population with access to a current account with a cheque book facility at a bank or building society rose from 44% in 1976 to 80% in 1994 (see Chart 5), with the fastest growth in the late 1970s. While 20% of the adult population still has no access to a current account, only 7% has no access to any form of bank or building society account.





Increased availability of non-cash methods of guaranteed payment

The cheque-guarantee card was the first easy way for people to guarantee non-cash payment; it is still the most widespread. By 1994, there was nearly one card for each adult in the population. While some adults may hold more than one cheque card, this part of the market seems close to saturation (see Chart 6). But there is likely to be further growth in the use of other types of plastic card, such as credit and debit cards, although increased use of these cards



may lead to a move away from the use of cheques, rather than a move away from the use of cash (as discussed in Trundle, 1982). These considerations are partly supported by recent data, which show that the spread of credit and debit cards has increased at a time when the demand for cash has also grown rapidly.

#### Future pace of innovation

All of the major financial innovations discussed above share two common features. First, they are taking a long time to reach full market coverage. Second, their pace of change slowed significantly in the past five to ten years. There remains scope for even wider coverage, but this is limited and may well continue to spread only slowly. For example, international comparisons suggest that the proportion of adults being paid in cash could fall further. And access to current account facilities is still not uniform across all sections of the population. But even in the case of ATM withdrawals—which are expected to grow significantly there has been a marked slowdown in the pace of growth in recent years.

More recent smaller-scale innovations in the payments system may have some impact on the demand for cash, such as banks' moves to reduce holdings of cash in ATMs and the easing of restrictions on non-cash payments in some retail outlets. However, many new proposals, such as electronic money, are unlikely to have much effect in the near future.

#### Effects of financial innovation on cash holdings

The effects of financial innovation have been significant over the past 50 years. Most individuals no longer receive their income in cash, and most invest part of their savings in a bank or building society account. Most individuals can now obtain easy access to the cash they need and most have access to alternative, guaranteed forms of payment. So there is now much less need to hold transactions and precautionary balances in the form of cash.

It is possible to make an estimate of the personal sector's transactions holdings of cash using data from APACS which obtains information from banks, building societies, and its own consumer surveys.

- APACS estimates that total recorded cash receipts by the personal sector were some £220 billion in 1994.
- Two thirds of this cash was obtained by withdrawals from bank and building society accounts. The total number of cash withdrawals each year corresponds to each adult making around one withdrawal a week.
- More detailed survey data on the use of ATMs in 1994 showed that users made a withdrawal of £50 on average at least once a week.
- The two other major sources of cash—payments by employers and state benefits (mainly pensions)—are also usually made weekly.

These observations suggest that most households refresh their stock of cash at least once a week and can adjust their cash holdings at least at the same frequency. If the personal sector on average adjusts its balances every week, then the estimated annual flow of £220 billion could be supported by turning over a stock of around £4 billion each week. This would imply that each adult held on average around £100 of cash for transactions purposes. This implies that just one fifth of the total M0 stock would be sufficient to finance individuals' cash transactions. The rest may be held by businesses (although survey evidence suggests this is a relatively small amount), held overseas, hoarded or used in the black economy.

Innovations in transactions technology have therefore probably slowed in the past few years. However, this could explain only a flattening of narrow money velocity. It could explain negative velocity growth—as has occurred in the United Kingdom over the past two years—only if technological progress had been reversed, not just reached a saturation point.

#### Time-series evidence on narrow money velocity

Although the flattening and subsequent fall in M0 velocity in the 1990s seems difficult to reconcile with continuing progress in payments methods, it might be explained in part by structural shifts in agents' behaviour following the move of the UK economy from relatively high inflation rates in the 1970s and the first half of the 1980s to lower inflation.

The effect of inflation is already incorporated indirectly in traditional demand for M0 equations by using nominal interest rates. According to the Fisher effect, the nominal interest rate and the expected inflation rate should move together, so that nominal interest rates are equal to real interest rates plus expected inflation. Investors want to be compensated for expected inflation because inflation erodes the real return on their assets. So persistently lower inflation may have led to an increase in the demand for cash by reducing the opportunity cost of holding it. And, at low interest rates a one percentage point change in interest rates has a larger proportional effect on interest receipts and payments than at high rates. If the income effects of interest rate changes alter the demand for narrow money, then a shift to lower inflation and lower nominal interest rates might be expected to show up in traditional money demand equations as a rise in the interest elasticity of the demand for M0.

Inflation may also have an impact on the demand for narrow money through factors other than nominal interest rates. First, if real cash balances and physical goods (or assets) are substitutes, then inflation may affect the demand for cash, because it proxies the return on real goods or assets relative to the return on cash. Inflation may reduce the demand for real cash balances because higher inflation, and hence higher returns on physical goods, induces economic agents to invest in real assets which are thought to offer better protection against inflation. In the 1970s and much of the 1980s, when inflation in the United Kingdom was high, this inflation effect may have contributed to a lower demand for real money balances. Lower inflation since then may be an important reason for the subsequent shift in the path of narrow money velocity.

Second, the lower variability of inflation that usually accompanies a fall in the inflation rate<sup>(1)</sup> may affect the demand for M0. Lower inflation variability reduces the perceived risk of an adverse inflation surprise affecting the opportunity cost of agents' cash holdings. Because risk-averse agents want to be compensated for bearing this uncertainty, and to invest their wealth in interest-bearing assets if uncertainty is high, less uncertainty may imply that people voluntarily hold a relatively larger share of their wealth in non-interest-bearing assets, like cash.

A period of low inflation, low inflation variability and low interest rates (compared with the 1970s and 1980s) may have led to an acceleration in the demand for narrow money in the United Kingdom in the 1990s and a downward shift in its velocity. It is, however, unclear in theory whether such a change in inflation performance should cause a temporary or a permanent shift in the rate of change of agents' demand for cash and thus in the growth rate of narrow money velocity. A switch to a lower inflation environment may reduce incentives to financial innovation and lead to less use of existing alternatives to cash, because the opportunity costs of holding cash have fallen below some threshold level. This may then affect the trend growth rate of narrow money velocity, which would amount to a permanent behavioural shift.

There are, however, also reasons why the lower inflation profile of the 1990s should have affected only the level of M0 velocity, and not its trend growth rate. On the demand side, the improvement in inflation performance is likely to induce a once-and-for-all increase in desired holdings of cash balances. In that case, the recent fall in M0 velocity would be temporary. But the fall in velocity may occur only gradually, with a slow portfolio adjustment to the increase in desired holdings of cash balances, because agents do not adjust their inflation expectations down until they consider the shift to lower inflation permanent. Cash balances, and the level of velocity, may therefore take time to reach their new equilibrium, with narrow money velocity declining-or at least growing less fast—throughout this period. Eventually, however, narrow money velocity may resume its positive trend growth path, since the opportunity costs of holding cash will remain positive in equilibrium and the incentives for financial innovation from both the demand and the supply side will continue.

Time-series evidence for the United Kingdom seems to be consistent with temporary rather than permanent effects on currency velocity from lower inflation. During the 1950s and the first half of the 1960s inflation was relatively low, while the velocity of currency grew steadily at an annual rate of around 2.3%. This growth of narrow money velocity is not inconsistent with the hypothesis that narrow money

velocity could fall as a result of a shift to low inflation following a period of relatively high inflation. In the 1950s and 1960s, the dominant influence on currency velocity was probably the introduction of substitutes for the use of cashin particular, the growing availability of current accounts with a cheque book facility.

The rise of narrow money velocity growth during the 1970s and 1980s—to an annual average rate of 4.3%—might have reflected the combined effect of higher and more variable inflation rates and the continuing rapid pace of financial innovation. But during the 1990s narrow money velocity has flattened and fallen, which may be explained in part by lower inflation. Narrow money velocity growth in the United Kingdom may therefore have been influenced throughout the post-war period by both the inflation regime and the pace of financial innovation.

Econometric work undertaken in the Bank suggests that the shift in inflation performance in the United Kingdom may provide a partial explanation for the recent fall in currency velocity. But the effects of interest rates and inflation on the demand for cash cannot easily be identified separately. This problem may be resolved partly by the inclusion of terms representing both inflation and inflation variability in the demand for narrow money equation. Inflation variability may be less correlated with nominal interest rates than is inflation itself, for example if inflation variability and interest rates respond at different speeds to changes in inflation. The results for the United Kingdom, reported in the annex, indicate that the demand for M0 can be explained reasonably well with an equation including inflation and inflation variability, although this is not the only possible specification of agents' behaviour.

### **Cross-section evidence on currency velocity**

It is useful to compare UK narrow money experience with evidence from other OECD countries. Cross-country evidence may indicate whether common factors can explain the relations between narrow money velocity and inflation overseas. Charts 7 to 19 show the behaviour of the velocity of currency and inflation<sup>(2)</sup> in 13 OECD countries. These charts suggest that the switch to a low-inflation environment might have generated sizable and persistent effects on narrow money velocity in some countries, although they do not resolve the question of whether the shift in velocity growth is permanent or not. The profiles of currency velocity in a number of countries exhibit clear similarities, although their timing differs.

First, velocity trended upward over the early part of the sample period in all countries (except Japan) when inflation, and inflation variability, was rising. Second, this was followed by a period of flat velocity in eight countries (notably Canada, the Netherlands and Spain) and, most recently, by a period in which velocity growth was negative-strongly so in seven of the countries and usually

See Joyce (1995). Full references for sources quoted in this article are on page 48. For these countries velocity is calculated as quarterly nominal GDP divided by the measure of currency held outside the banking system (source: *International Financial Statistics*, row 14a). The inflation measure used is the annual change in the GDP deflator.





# Chart 10

Per cent

France: velocity of currency and inflation



Chart 8 Canada: velocity of currency and inflation



Chart 11 Germany: velocity of currency and inflation







# Chart 12

### Ireland: velocity of currency and inflation



#### Chart 13 Italy: velocity of currency and inflation



### Chart 16 New Zealand: velocity of currency and inflation



Chart 14 Japan: velocity of currency and inflation



Chart 17 Spain: velocity of currency and inflation Ratio



Chart 15 Netherlands: velocity of currency and inflation



# Chart 18

#### Switzerland: velocity of currency and inflation







for several years. Most of these shifts in velocity coincided with downward shifts in inflation.

Third, in most countries velocity growth slowed sharply in the 1990s, and in several it was negative, while inflation was significantly lower than in the 1980s. In Germany, the Netherlands and Switzerland, inflation rose sharply in the late 1980s, which seems consistent with the pickup in their velocity growth rates, although the rise was only temporary for some. But in Belgium and France velocity has continued on a steady upward path, independently of changes in the inflation profile. So the link between inflation and narrow money velocity may be weaker in some countries than in others, and differences in financial innovation may also be important (see Boeschoten, 1992, for some cross-country evidence).

Fourth, although inflation rates in most overseas economies peaked in the early 1980s and have fallen since, currency velocity growth did not generally begin to fall until the early 1990s. This suggests a lagged, and perhaps non-linear, response in the demand for cash-inflation may have to fall and remain below a critical level for some time before velocity falls. For many countries, the charts suggest that currency velocity begins to decline once inflation has fallen below about 5%; the correlation between currency velocity and inflation then becomes stronger. This is consistent with the UK experience of negative narrow money velocity growth in the 1990s once inflation had fallen decisively below 5%. Overall, these cross-country comparisons suggest that the recent UK experience of flat or falling currency velocity is not unusual, nor is the apparent link with low inflation. Based on cross-section estimates, Boeschoten (1992) shows that the differences in national currency demand can be explained partly by differences in average rates of inflation, which makes a similar point.

#### Country-specific evidence

A more detailed analysis of the available cross-country evidence shows that the following country-specific factors<sup>(1)</sup>

may also explain the relation between the velocity of currency and inflation.

- Although the flattening and subsequent fall in narrow money velocity in Germany and the United States (see Charts 11 and 19) coincided with shifts to lower inflation, it might also be explained partly by shifts in the amounts of currency circulating abroad. Therefore German and US evidence should be treated cautiously. The share of US dollar currency held by non-residents has increased since the early 1980s and was about two thirds of the total in 1993 (estimates reported in Porter, 1993). About 40% of Deutsche Mark notes and coin were held abroad in 1994 (see Deutsche Bundesbank, 1995). Currency velocity in Germany, however, began to fall in the second half of the 1970s, in line with lower inflation and the introduction of the Bundesbank's monetary targeting strategy in December 1974. In the first half of the 1980s velocity was flat, and in the 1990s it fell again, roughly corresponding to a move to lower inflation. Inflation in Germany has been below 8% throughout the period shown in the chart. This, together with the relatively slow trend in financial innovation, probably account for much of the pattern of currency velocity in Germany, despite effects from currency held abroad.
- The charts for Canada (Chart 8), Ireland (Chart 12),<sup>(2)</sup> the Netherlands (Chart 15) and Spain (Chart 17) suggest a relatively high correlation between inflation and the velocity of currency. Empirical research in the Bank of Canada (Lafléche, 1994, and Hyland, 1994) suggests that the rise in currency velocity until the late 1980s was primarily because of increasing use of cheques and credit cards. But the decline in interest rates since 1990, which was triggered by a fall in inflation, was a significant factor in the decline in the velocity of currency in the 1990s. In addition, the growth of the black economy, which is likely to be mostly cash-financed, may provide another explanation for the increased use of cash in the 1990s. Estimates of the size of the black economy in Canada range from 4%–15% of GDP. Larger denomination notes have increased as a proportion of total notes and coin in circulation, which may also be related to growth of the underground economy.
- The Netherlands' experience is similar to that of Canada. Boeschoten (1992) examines the effects of guaranteed cheque transactions, the number of chequeable deposits (which appears to be related to the small proportion of employees being paid in cash) and inflation on the demand for real cash balances in the Netherlands. The financial innovation variables affect the demand for cash significantly, but inflation does not. There is, however, also evidence of an increasing use of currency as a store of value, or for hoarding purposes, despite rising interest rates in the 1970s. As

Most of these factors have been suggested and analysed by national central banks.
 Retail sales are used as the scale variable for Ireland.

in Canada, the share of large denomination notes in total circulation has increased and may explain the fall in velocity over the 1980s (Bos, 1994). The widespread introduction of cash dispensers since the late 1980s explains part of the subsequent increase in velocity (Boeschoten, 1995).

- Hoarding might also explain the decline in currency velocity in Denmark since 1985 (Chart 9). There has been a considerable rise in the demand for 1,000 kroner notes, with more than 50% estimated to be hoarded. Again, this may be partly related to the black economy. Widespread use of credit and debit cards has not depressed the demand for currency sufficiently to affect this.
- The rise in currency velocity in Spain in the 1970s was mainly because of innovations in the payments system. Although inflation in Spain has fallen since the late 1970s, velocity started to decline only in the late 1980s. From the Spanish experience it seems that inflation must first fall to a critical level before the velocity of currency begins to fall.
- Until 1985, New Zealand (Chart 16) experienced rising currency velocity. Since then, velocity has flattened off as inflation has fallen sharply. The profile of currency velocity in New Zealand is similar to that in the United Kingdom. Only the timing differs; in New Zealand velocity growth flattened earlier than in the United Kingdom. Siklos (1995) estimates demand for M1 equations, including proxies for inflation expectations, credit card billings and the number of electronic-funds-transfer-at-the-point-of-sales (EFTPOS) terminals. The demand for various monetary aggregates in New Zealand appears to be stable once these factors are taken into account. Inflation expectations affect the demand for M1 negatively, which is consistent with a positive relation between currency velocity and inflation. The New Zealand experience, with the rapid growth in EFTPOS transactions, ATMs and cashback facilities, is that technological progress has had an ambiguous effect on cash balances. The introduction of flat rate bank transactions charges may also have created incentives for the public to make more payments in cash.
- The countries without breaks in the velocity of currency—France, Belgium and, to a lesser extent, Switzerland—show a velocity profile which closely resembles that of the United Kingdom until 1990, with an upward trend over most of the sample. In France (Chart 10), the steady rise in velocity is largely the result of progress in payments technology, though the introduction of cash dispenser cards is not thought to have affected the demand for cash much. Cash is mainly used for small transactions up to FFr 100, with cheques traditionally being used for larger payments.

The financial innovation effect also seems to have dominated any depressing effect of low inflation on currency velocity in Belgium (Chart 7), where velocity has risen since the late 1970s. Between 1984 and 1989, however, velocity was broadly flat, coinciding with significantly lower inflation. After this period, currency velocity in Belgium continued its earlier upward trend. This suggests that the switch to low inflation may have had temporary rather than permanent effects on velocity in Belgium. In Switzerland (Chart 18), estimates of demand equations for individual denomination notes (Peytrignet, 1995) suggest that parameter instabilityobserved since 1989-is also related to innovations in transactions technology, such as the increased use of credit cards and ATMs. There too, the profile of currency velocity seems to have been determined mainly by financial innovations.

Overall, several velocity patterns can be distinguished in these OECD countries. First, the rise in velocity in most countries over the early part of the sample, caused mainly by innovations in payments technologies and by high and variable interest and inflation rates in many of the countries. Second, the flattening-off and subsequent fall in currency velocity in a number of countries, which may have been the result of a shift to lower inflation. Third, the switch to a low inflation environment has not been the only explanatory factor in currency velocity; country-specific developments have also been important.

#### Summary and conclusions

There was until recently a steady upward trend in narrow money velocity in the United Kingdom since the Second World War, which could be explained partly by innovations in the payments system. But in the 1990s velocity growth slowed sharply. Detailed analysis of trends in cash-saving financial innovation in the United Kingdom reveals a slowdown in the pace of change. But the analysis also suggests that the personal sector's transactions demand for cash may now account for only around a fifth of the total stock, making estimates of the impact of any further innovation uncertain.

The shift in M0's velocity may also be related to the move of the UK economy to lower inflation. The recent strength in M0 in the United Kingdom can be explained relatively well with a demand for M0 equation that attempts to capture some of the effects of this low-inflation regime. A cross-country comparison of the relation between currency velocity and inflation indicates that falling velocity in the United Kingdom is not exceptional by international standards, although changes in inflation profile have not been the only reason for shifts in currency velocity overseas.

It remains uncertain whether negative velocity growth in the United Kingdom will be permanent or temporary. The potential for further financial innovation is likely to make a positive contribution to future narrow money velocity growth.

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# The relation between the demand for M0 and inflation in the United Kingdom ---some econometric results(1)

The econometric work presented here differs in four ways from traditional demand for narrow money specifications. First, short and long interest rates are used as opportunity cost variables that proxy the rates of return on alternative short-term assets, such as bank deposits, and bonds, respectively. Second, a financial wealth variable is included to capture the precautionary and speculative demand for cash. Third, it takes into account separately the effects of inflation and inflation variability on the demand for cash, in addition to any effect from long and short interest rates.

Fourth, the switch in currency velocity after the shift in inflation regime in the United Kingdom might be picked up by an increase in the interest elasticity of narrow money demand at low rates of inflation and interest rates. This potential change in behaviour is approximated here by the use of a logarithmic specification for interest rates in the demand for M0 function, as opposed to the usual semilog interest rate specification. The difference between these specifications is that the interest elasticity is higher at lower interest rates using the logarithmic specification.

For example, in a traditional semilog interest rate representation, all variables, except interest rates, are expressed in natural logarithms. The response of the demand for M0 to interest rate changes is then a semi-elasticity; it indicates the *percentage* change in cash holdings as a result of a one percentage point change in interest rates. The logarithmic (or log-log) specification used here adopts natural logarithm expressions for all variables. The elasticity of the demand for M0 with respect to interest rates is then a full elasticity; it shows the percentage change in the demand for M0 in response to a 1% change in interest rates. Under a semilog specification, agents respond to *absolute* changes in interest rates, whereas they respond to *relative* or *proportional* changes under the log specification. For example, at 5% interest rates, a 1% increase amounts to a rise of 0.05 percentage points to 5.05%, whereas a one percentage point increase would increase rates to 6%.

Why might agents respond to relative, rather than absolute, interest rate changes? One possibility is that they are sensitive to the income effects of interest rate changes. A one percentage point change in interest rates has a larger proportional effect on interest income at low interest rates than at high rates. If interest rate elasticities are stronger at low rates of inflation, then the use of the logarithmic interest rate specification may go some way towards capturing the recent growth of narrow money in the United Kingdom.

In the long-run equation for real cash balances, imposition of the theoretically correct sign on several coefficients could not be rejected by a Chi-squared test.<sup>(2)</sup> Real cash balances are homogenous in permanent income (proxied here by current income plus wealth), which is theoretically possible. The coefficient of 0.05 on net wealth may indicate economies of scale in cash holdings in a financially sophisticated economy. The long-run elasticity of real money balances with respect to the long interest rate is much smaller than the short interest rate elasticity, as expected if short-term assets are a closer substitute for cash than long-term assets.

The dynamic M0 equation is parsimonious and shows quite a satisfactory fit.<sup>(3)</sup> All variables that enter the dynamics have the 'correct' signs theoretically; in particular, inflation and changes in inflation variability affect growth in the demand for M0 significantly and negatively. The small coefficient on the lagged residual from the long-run equation indicates that adjustment to long-run equilibrium takes place slowly. This suggests that falling narrow money velocity could last for some years before velocity resumes its former trend growth profile.

Re-estimating the above dynamic equation over the sample 1972 Q2-1990 Q4, and using these estimates to obtain dynamic out-of-sample forecasts of quarterly real narrow money growth over the period 1991 Q1-1995 Q2, Chart A shows that there is no consistent under or overprediction of money growth over most of the out-of-sample period. And

where M0/P refers to real M0 balances, y is the volume of retail sales, w represents real net private sector financial wealth (all in natural logarithms), t is a linear time trend that proxies financial innovation, rs represents the log of short interest rates, rl is the log of long interest rates and  $\sigma$  denotes inflation variability (calculated as the moving 20-quarter standard deviation of inflation). Estimated over the sample 1972 (22–1995 Q2 the dynamic error-correction form of the equation for the demand for M0 is (where D refers to first (3)

```
D(M0/P) = 0.04 + 0.26 Dy - 0.18 \neq -1.99 D
(3.87) (4.15) (-2.86) (-2.28)
```

 $R^2 = 0.64$ , SE = 0.008, DW = 2.30AR = 1.47 [0.21] ARCH = 2.82 [ 0.03]\*\* Normality = 2.50 [0.29] Heteroskedasticity = 2.67 [ 0.01]\*\*\* Reset = 0.77 [0.38]

The variables d74Q4 and d76Q4 are dummies for outliers in the residuals of the equation. *t*-statistics are shown in parentheses. Probability values are shown in square brackets. \*\* significant at 5% level; \*\*\* significant at 1% level.

More detailed publication of these results will follow. The long-run equation uses the logarithmic interest rate specification in a portfolio framework of narrow money demand, over the sample 1972 Q1–1995 Q2 (applying Johansen's maximum likelihood estimation method for cointegrating vectors):

 $M0/P = 0.95 \text{ y} + 0.05 \text{ w} - 0.01 \text{ t} - 0.2 \text{ rs} - 0.05 \text{ rl} - 0.01 \sigma$ 

#### **Chart A**





all forecasts are within the error variance bands, suggesting forecast errors are not statistically significant.

Overall, the results for the United Kingdom indicate that the demand for M0 can be explained reasonably well with the above dynamic equation. This is not the only possible specification of narrow money demand; it is meant only to be illustrative of how separate inflation effects might be encompassed within a M0 specification. And, in this respect, it is striking how significant a role they seem potentially to play, and the implications this has for understanding narrow money behaviour.

For example, Chart B shows a comparison of simulations of the effects of a one percentage point increase in short-term

#### **Chart B**

Interest rate simulations: response of quarterly real money growth to interest rate shocks (assuming 5% average interest rates)



interest rates on real M0 balances, under a semilog and a logarithmic specification on the assumption that average interest rates are 5%. At these average interest rates, the response of real M0 is around twice as high under the logarithmic specification as under the semilog function (although the profiles are similar in qualitative terms). In the logarithmic model, the demand for real cash balances falls by about 0.3% after one quarter and then gradually returns to its initial equilibrium. But, at higher interest rates (10%), both specifications lead to similar interest elasticities, because 10% is the average interest rate over the sample period.

# Saving, investment and real interest rates

# By Nigel Jenkinson of the Bank's Structural Economic Analysis Division.

Since the 1960s, gross national saving rates in the major industrial countries have fallen by nearly five percentage points of GDP. Long-term real interest rates have increased by about one percentage point to around 4%. Real rates rose quite sharply in 1994, returning to the high levels of the 1980s. What are the main reasons for these developments? Are high real rates likely to persist? What are the implications for economic growth and welfare? Should economic policy change as a result?

These issues prompted the Chancellor of the Exchequer to propose a comprehensive study of saving, investment and real interest rates by the G10 finance ministries and central banks. The Chancellor's proposal was agreed in late 1994 and the G10 Deputies were charged with the task. The Deputies' report was published in October 1995.<sup>(1)</sup> The Bank of England played a full part in the study. Mervyn King, the Bank's Chief Economist, chaired a working group which drew together the analytical material underpinning the report. In addition, three research papers which formed part of this analytical base were produced in the Bank.<sup>(2)</sup>

This article describes the main conclusions of the G10 Deputies' study and the supporting research conducted in the Bank of England. The first part summarises the study itself and highlights the policy recommendations. Bank research is described in the second half, placing particular emphasis on the links to the Deputies' report.

### The G10 Deputies' report

#### **Real interest rates**

Real interest rates equate the desired level of saving to the planned level of investment. From a policy perspective, there is a great difference between a rise in real rates because of a fall in desired saving and a rise following an increase in planned investment. The Deputies' report attempts to distinguish between these alternatives by examining the movements in savings, investment and real interest rates over the past 35 years and analysing the various influences on them.

The G10 study focuses particularly on long-term interest rates on central government bonds. Long rates are generally considered to have a greater influence than short rates on the saving and investment decisions of firms and households. Long rates are also less affected by changes in monetary policy in response to cyclical fluctuations. It is difficult, however, to measure long-term real interest rates in most countries (the nominal yields on long-dated government bonds adjusted for expected inflation over the life of the bond) because there is no particularly satisfactory measure of long-run inflationary expectations. Alternative indicators of short-run inflationary expectations, such as the

expected rate over the following two years, or the actual rate over the previous two years, are often used as proxies. The emergence of markets for index-linked government debt, in the United Kingdom in 1981 and more recently in other countries such as Canada, Sweden and Australia, provides a direct measure of long-term real rates and enables long-term inflationary expectations to be inferred. As Chart 1 shows, the proxy for real interest rates based on short-run inflationary expectations may be misleading. For the United Kingdom, the direct measure of long-term real rates provided by index-linked yields is less variable than the proxy measure.<sup>(3)</sup> Moreover, the index-linked yield tends to be below the proxy when current inflation is relatively low by historical standards, and above the proxy when inflation is relatively high. This suggests that long-term inflationary expectations are relatively slow to respond to current inflation outturns. Evidence from other G10 countries presented in the report supports this view. As a consequence, countries with a history of high inflation may pay a significant inflation premium in nominal bond yields until market participants are convinced that price stability has been achieved on a durable basis.

The problems with inflation proxies suggest a need for caution in interpreting and analysing secular movements in

<sup>&#</sup>x27;Saving, investment and real interest rates', Group of Ten: A study for the Ministers and Governors by the Group of Deputies, October 1995, 'Real interest rates, saving and investment', Jennifer Smith; 'A decomposition of stock and index-linked bond returns in the United Kingdom', Jo Paisley; 'Real interest rate linkages: testing for common trends and cycles', Darren Pain and Ryland Thomas. These papers will be published shortly. Full references for sources quoted in this article are on page 62. Calculated in this example and in the G10 study as a ten-year government bond yield less a two-year backward moving average of RPIX inflation. (2)

<sup>(3)</sup> 

#### Chart 1

Comparison of long-term real interest rate proxy<sup>(a)</sup> and index-linked gilt yields in the United Kingdom (annual data)



measured long-term real rates. Nonetheless, the evidence presented in the study suggests that there has been a trend rise of around 100 basis points over the past 35 years from rates varying around 3% to rates closer to 4% (Charts 1 and 2). Although not large in comparison with the movements in nominal bond yields from year to year, this is a

#### Chart 2

Long-term real interest rate proxy in G10 (weighted average measure)<sup>(a)(b)</sup>



significant rise in economic terms. It implies a one-third increase in the real rate of return on a substantial proportion of financial assets. Moreover, the increase in real rates has been common to most G10 countries. As barriers to capital mobility have been removed, financial markets have become increasingly integrated. The level of real interest rates is now largely determined by movements in global saving and investment. As a result, national economic policies can have significant effects on other countries through this channel.

#### **National saving**

The Deputies conclude that the main factor behind the secular rise in real interest rates is a decline in the aggregate national saving rate. This has outweighed a reduction in desired investment. In the G10 countries, taken as a group, gross national saving rates have fallen by almost five percentage points since the 1960s to under 20% on average (Chart 3). Although rates of national saving continue to





vary widely (Chart 4), the secular fall is quite widespread across industrial countries. And while the aggregate saving rate in developing countries has risen since 1970 at least, fuelled by a strong increase in Asia, the trend in industrial





countries has dominated global developments (Chart 5). Over the longer term, low saving at the global level constrains investment, employment and economic growth. And over a shorter horizon, low saving provides less of a buffer in the event of adverse economic shocks.

Chart 5 World gross national saving



A fall in the rate of public sector saving is the main reason for the decline in national saving rates in the G10 countries, and accounts arithmetically for three quarters of the overall decline in national saving since the late 1960s (Chart 6). Private saving rates have also fallen in most countries, although the United Kingdom is an exception. In practice, the levels of public and private saving are interlinked. If fiscal policy is loosened and government borrowing rises,



households and firms may save more to pay for an expected increase in taxation in the future. Although difficult to estimate with precision, the weight of empirical evidence suggests an offset of about one half. In other words, national saving falls by 50% of any fall in public saving. But even taking this offset into account, and recognising the role of other factors which account for the widespread fall in private saving, the decline in public saving is the most important single cause of the decline in national saving.

The cumulative impact of looser fiscal policy may also have had an impact on the level of long-term interest rates in the G10 countries. Net public debt relative to GDP in 1994 was more than double the level of the 1970s (Chart 7). Recent evidence from the IMF,<sup>(1)</sup> supported by research in the Bank by Jennifer Smith, suggests a clear link between the level of public debt in the major industrial countries as a group and the global real interest rate.

#### Chart 7 G10 net public sector debt(a)



(a) Countries weighted together using fixed GDP weights

A recent study by the IMF<sup>(2)</sup> examined the main influences on rates of private saving since 1970. Factors which tend to raise private saving are: widening fiscal deficits; falling dependency ratios (which will shortly start to be reversed as populations begin to age); and higher rates of depreciation on physical capital. However, factors pushing in the opposite direction have dominated in most countries. Slower economic growth and rising wealth tend to lower private saving rates. Greater provision of social insurance against ill health or loss of work may also have reduced precautionary saving, while the promise of a public retirement pension may have been an additional dampening factor. Financial liberalisation will have been a further influence. Improving access to credit and insurance markets leads to greater reliance on the use of credit, as opposed to savings, to smooth desired consumer spending over the life cycle. History suggests that the consequent fall in the aggregate private saving rate is largely temporary. There may, however, be a small permanent effect given the greater opportunity for households to diversify risks in financial markets, lessening the need for savings as a result.

#### Investment

As noted above, fixed investment has also declined as a share of GDP over a long period. Since the 1960s, the average investment share has fallen by about three percentage points of GDP in the G10 countries (Chart 8). The fall has been concentrated in private investment. The

Ford and Laxton (1995) and Helbling and Wescott (1995).
 Masson, Bayoumi and Samiei (1995).

Chart 8 G10 gross fixed investment<sup>(a)</sup>



main reasons for the decline are slowdowns in the growth rates of total factor productivity and the labour force. Total factor productivity is a measure of the combined productivity of capital and labour. According to OECD estimates, total factor productivity growth in OECD member countries slowed from 2.9% per annum in 1960-73 to 0.8% in 1979-94. Changes in total factor productivity are determined by technological progress and changes in economic efficiency. Structural economic policies have generally favoured a rise in economic efficiency over this period. Trade and financial markets have been liberalised and competition has also been strengthened by deregulation and privatisation. But the favourable impact has been outweighed by a slower rate of technical progress. This is not easy to explain, but may in part be connected to the completion of post-war reconstruction in Europe and Japan.

While the Deputies' report concludes that the dominant factor behind the secular rise in real rates over the past 35 years has been a decline in saving, in particular public saving, it also presents some tentative evidence which suggests that a rise in desired investment might have played a part in the increase in real interest rates recently. Research undertaken in the Bank by Jo Paisley, described in more detail below, shows that equity markets outperformed index-linked bond markets in 1993 and 1994 by more than historical experience would suggest. Although it is difficult to control for changes in risk, this may indicate that investment opportunities had improved. A second strand of evidence is the rise in the return on capital since the 1980s. This too should be viewed cautiously. It may not reflect higher desired investment but simply the effects of the crowding out of investment making capital scarcer.

The sharp rebound in real rates in 1994 may also partly reflect changing expectations of global growth prospects. Real rates fell temporarily in 1993 as economic conditions were generally weaker than expected. The fall was then reversed during 1994 as growth was unexpectedly strong.<sup>(1)</sup>

As global growth slowed during 1995, real rates edged down from peak levels.

#### **External demand for capital**

Rising demand for capital from emerging economies and those which had been centrally planned and are now in transition is not viewed as a great influence on the secular increase in global real rates. Most of the rise in investment in the emerging economies in Asia has been financed by higher domestic saving. Indeed, there is evidence of a virtuous circle. Higher growth leads to higher saving which in turn finances the higher investment which fuels the continued high growth. Predictions of huge demands for external capital from transition economies have so far been exaggerated. Although there has been an increase in the flow of capital to developing countries in recent years, in proportion to GDP it has only returned to the levels of the early 1970s. Moreover, the flow is quite small. The net external financing needs of developing countries represented only about 4% of private saving in the G10 countries between 1992 and 1994. In comparison, public sector deficits within the G10 absorbed 16% of private saving.

#### **Prospects**

The ageing of the population in industrial countries is likely to have a profound impact on global saving and investment trends. Saving rates are likely to rise in the next 10 to 20 years and then fall faster than investment. The average dependency ratio<sup>(2)</sup> in the industrial countries is likely to rise by around ten percentage points in the next 30 years

#### Chart 9 Dependency ratios



(Chart 9). Over this horizon this increase will push private saving rates down sharply. Investment demand may also fall back, as desired investment should be lower with fewer workers. The net effect of demographic changes is likely to favour saving over the next 10 to 20 years, as the baby-boom generation enters the highest-saving years of the

Ganley and Noblet (1995).
 The ratio of dependent children and the retired to the population of working age.

life cycle. Thereafter, saving is likely to fall much faster than investment as the retirement boom commences. This is expected around 2005 in Japan and 2015 in Europe and the United States (Chart 10). The trend of an ageing population

#### Chart 10 Elderly dependency ratios in the G7, 1990–2070



in the industrial countries may be offset somewhat at the global level as the dependency ratio is likely to continue to fall in developing countries. This should help to sustain global saving, although the IMF warns that projections of saving in developing countries are particularly sensitive to the assumption that high growth and high saving continue in China.

Public pensions, health care and spending on education will be most affected by the prospective change in the dependency ratio in industrial countries. Pensions are a particularly acute problem. At present, pensions are largely organised on a pay-as-you-go basis in G10 countries. Under such a scheme, the contributions of current workers finance the payments to the current retired. As the demographic balance tilts, raising the ratio of the retired to the working population, such a system comes under increasing stress.

Recent projections by the OECD illustrate the possible effects of demographic changes on government finances.<sup>(1)</sup> Under relatively neutral assumptions, there will be a major deterioration in general government finances between 2000 and 2030 (ranging between 4% and 9% of GDP in terms of the primary balance in each of the G7 countries-except in the United Kingdom, where the outlook is comparatively less pessimistic). This emphasises the need for reform. The G10 study recommends an urgent move to more fully-funded pension systems, together with action to dampen the trend towards early retirement. Under a fully-funded system, beneficiaries receive a pension consistent with their contribution, accrued interest on the contribution and their life expectancy after retirement. Such a system would adapt automatically to changing demography. It would also raise national saving. The main disadvantage of starting a fully-funded system is that today's workers would have to pay twice (for themselves and their parents, who have not built up any funds because they paid in turn for their parents). In addition, it may be difficult to guarantee a minimum retirement standard for the poor. Remedial action to resolve the pensions problem may lead to considerable transfers of wealth between generations. The Deputies emphasise the importance of ensuring that steps taken are broadly endorsed and credible.

# Policy recommendations

The Deputies conclude that the solution to the problem of high real rates and low national saving can be found in three key policy areas:

- *Fiscal consolidation*. Reducing fiscal deficits is the key to raising national saving. Public debt levels are too high and should be reduced to a more acceptable level. Thereafter, a prudent medium-term rule is to aim for a steadily falling debt-to-GDP ratio in normal circumstances.
- *Inflation control.* Countries with a history of high inflation pay a premium in the form of higher nominal interest rates. An unfailing commitment to policies of non-inflationary growth is the single most important way to reduce expectations of long-term inflation and to eliminate this premium.
- *Pensions reform.* It is essential to take timely action to minimise the adjustment costs. Countries should promote a move to more fully-funded pension schemes. While there are no general rules for the degree of public involvement, the Deputies note that a case can be made for a system of basic benefits in a public scheme which allows for supplemental benefits from private or public fully-funded pension schemes.

A major theme of the report is that the emergence of a global market for capital implies that national economic policies have significant repercussions on other countries through their impact on saving, investment and the global real interest rate. This provides an increasing reason for countries to work together when confronted by economic policy challenges. Moreover, financial markets can exact sizable risk premia when they doubt the soundness of a country's economic policy strategy. The Deputies conclude that the pursuit of sound economic policies is not only consistent with national self-interest, but also best meets the interests of other countries.

# Bank of England research

The research undertaken in the Bank of England as background to the Deputies' study addressed three main questions:

• First, what are the main determinants of saving, investment and real interest rates at the national and

global levels according to standard econometric techniques?(1)

- Second, can financial market indicators shed light on the relative importance of alternative explanations of the recent movements in long-term real interest rates?<sup>(2)</sup>
- Third, can modern statistical techniques provide evidence on the degree of common movement in real interest rates which would in turn mark the extent of capital market integration?(3)

The three studies are summarised briefly below.

### Empirical determinants of real interest rates, saving and investment

Work undertaken by Jennifer Smith has extended Robert Barro's published work<sup>(4)</sup> which examines the empirical determinants of real interest rates. In a world of perfectly integrated capital markets, expected real interest rates are determined by the interaction of planned saving and investment. A system of equations is estimated where real interest rates equate desired saving and planned investment-the coefficients provide estimates of the importance of the various factors influencing saving and investment. Potential explanatory factors are discussed in turn.

The desired saving ratio will be affected by temporary fluctuations as well as permanent factors. For example, transitory shocks to income will temporarily affect the saving ratio. One of the most important factors causing such fluctuations in income in recent decades has been the price of oil. The proportion of national income spent on oil is included in the econometric equations to capture this effect.

Government policy-both fiscal and monetary-can also affect the national saving rate. Three fiscal variables are included. Blanchard (1985) showed that private saving should depend on expected future liabilities, namely future public debt. Empirically, this may be proxied by current debt. It is also possible that current fiscal deficits might help to predict future government indebtedness, particularly if variations in deficits due to purely cyclical factors are removed. Fiscal policy can also affect national saving if the private sector does not perfectly compensate for changes in government saving. As noted above, the balance of econometric evidence suggests that perfect compensation is unlikely. In this case, government current expenditure also has an influence on the national saving rate.

If prices are sticky in the short run, monetary policy may have a temporary effect on saving and hence on real interest rates. For example, in recessions, policy-makers are likely to loosen the monetary stance by reducing nominal rates. This could lower real rates in the short run as nominal rates fall faster than inflation. Saving will be discouraged by the lower real interest rate, but the income effect of higher output is likely to increase the volume of savings, even if the saving rate falls. Such an effect is likely to be much more important for short-term real interest rates than for long-term rates.

Planned investment is determined within Tobin's 'q' framework in Barro's model. In this framework, investment is stimulated whenever the market valuation of the profit stream on new capital is greater than the cost of installing it. The ratio of the market valuation of capital to the cost of replacing it is known as the valuation ratio or Tobin's 'q'. Based on this model, a country's investment rate may be linked empirically to the level of real share prices in that country, as a proxy for the valuation ratio.<sup>(5)</sup>

Assuming capital market integration, world real interest rates<sup>(6)</sup> will be determined by the factors affecting global investment and global saving. In Barro's framework, the global influences are defined as the analogue of the national variables: for example, world investment is linked to a weighted average of real share price movements.

Barro's original model focused on the determinants of short-term real rates (a three-month rate less expected inflation). Smith uses more recent data and has also extended the framework to examine movements in long-term real rates.<sup>(7)</sup> Because of the difficulties of measuring long-term inflation expectations and long-term real rates, the results should be interpreted with some caution.<sup>(8)</sup> The expected world real interest rate equations are estimated over the period 1959-92. In terms of short real rates, the particularly influential factors were: share prices; the ratio of world government debt to GDP; the global monetary stance (as measured by changes in narrow money); and the proportion of GDP spent on oil (the G10 countries are net oil importers). Movements in world government debt and world oil consumption were the prime determinants of movements in long real rates over the same period.

The influence of these factors are best illustrated in terms of the broad changes in real interest rates over the past three decades. The period between 1959 and 1992 can be divided into three 'regimes' (see Charts 11 and 12) defined by medium, low, and high global real interest rates. Similar patterns are apparent for both short and long rates. From 1959 to 1973 real rates were in the 'medium' regime (with short real rates averaging 2.4% and long rates 2.5%—see Table A). Real interest rates then fell, and indeed were

Updating the work of Barro and Sala-i-Martin (1990) and Barro (1992). See Smith (*ibid*). Drawing on the framework of Blanchard and Summers (1984), which has been extended using the approach of Campbell and Ammer (1993). See Paisley (*ibid*). Using the techniques of Vahid and Engle (1993). See Pain and Thomas (*ibid*). Barro and Sala-i-Martin (1990); Barro (1992). Since corporate equity is quoted primarily on domestic stock markets. The 'world' is taken to be the G10 excluding Switzerland in this model. Global variables are constructed using GDP weights. Smith has also extended the theoretically derived model of country rates. A two-year centred moving average of CPI inflation is used to proxy inflationary expectations in Smith's study.

#### Chart 11 World short real interest rates(a)



Source: Smith (forthcoming).

(a) Three-month interest rate less a quarterly ARMA forecast of CPI inflation.

# Chart 12



Source: Smith (forthcoming).

**Table B** 

(a) Government bond yields less a two-year centred moving average of CPI inflation.

negative at times in the 1974 to 1979 period. In the early 1980s, real rates rose to levels higher than in the previous two decades, and have remained relatively high ever since. Short real rates averaged 3.9% per annum between 1980 and 1992 and long real rates some 5.0% on this measure.

#### **Table A** Average level of world short and long real interest rates(a)

Per cent

'Regime'	Average value of world short real interest rate	Average value of world long real interest rate
Medium (1959-73)	2.4	2.5
Low (1974–79)	-0.3	_
High (1980–92)	3.9	5.0
(a) Source: Smith (forthe	coming).	

How much of these broad, inter-'regime' movements can be explained by the factors suggested by the theoretical framework? The empirical results suggest that movements in the level of world public sector debt and in equity markets made the biggest contributions to changes in average world short-term real interest rates during the past 30 years. Turning first to share prices, their weighted average for the ten major economies rose by an average of 5% a year between 1959 and 1973, fell almost 11% a year between 1974 and 1979, and rose on average over 9% a year between 1980 and 1992 (see the annex for data). Using these figures and the estimated coefficients, the fall in share prices between the first and second periods accounted for over 20% of the decline in short real interest rates (see Table B).<sup>(1)</sup> The increase in equity returns between the mid-1970s and the 1980s also contributed 20% to the subsequent increase.

Changes in the average government debt-GDP ratio for the ten countries had an even greater effect. Between the first and second periods, the reduction in debt from 33% of GDP (1959–73) to 28% (1974–79) contributed over 30% to the decline in real rates (see Table B). The rise in world government debt in later years to around 43% of GDP on average contributed over 60% of the rise in real short rates during that time.

The contribution of other aspects of fiscal policy can also be seen in Table B. Over the period as a whole, the effects of world government current expenditure and the world budget deficit on global short real rates were not significant. The

Contributions to changes in world short real interest rates <sup>(a)</sup>										
Proportionate contribution of:	Share prices	Oil consumption		Narrow money growth		Government consumption	Government debt	Government deficit		
	STOCK <sub>t-1</sub>	$\Delta OILCY_{t-1}$	OILCY <sub>t-1</sub>	$\Delta M_{t-1}$	$\Delta M1_{t-2}$	GCY <sub>t-1</sub>	RDEBTY <sub>t-1</sub>	RDEFY <sub>t-1</sub>	Proportion explained (b)	Proportion
'Regime' change:										
Medium-low (fall in rates)	0.23	0.05	-0.59	0.08	0.09	0.47	0.31	0.03	0.68	0.32
Low-high (rise in rates)	0.20	0.06	-0.04	0.05	0.03	-0.04	0.63	-0.03	0.86	0.14
Coefficient	0.042	-0.629	1.054	-0.174	-0.101	0.596	0.171	-0.252		
<i>t</i> -value	4.41	-1.37	1.86	-2.32	-1.66	1.16	2.30	-1.03		

Note: 'Regimes' are defined as follows: medium: 1959-73; low: 1974-79; high: 1980-92. For exact variable definitions see the annex. Coefficient estimates are for the full sample (1959-92).

Source: Smith (forthcoming). Components may not sum to the proportion explained because of rounding (b)

In relation to Table B, a positive number implies that the variable was responsible for part of the movement in real rates. A negative number suggests that the variable's effect was outweighed by other factors.

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Table C					
<b>Contributions t</b>	to changes	in world	long real	interest	rates(a)

Proportionate contribution of:	Share prices	Share prices	Oil consump	otion	Narrow mo growth	oney	Government consumption	Government debt	Government deficit	t	
	STOCK <sub>t-1</sub>	$\Delta OILCY_{t-1}$	$OILCY_{t-1}$	$\Delta M I_{t-1}$	$\Delta M1_{t-2}$	GCY <sub>t-1</sub>	RDEBTY <sub>t-1</sub>	RDEFY <sub>t-1</sub>	Proportion explained (b)	Proportion	
'Regime' change:									(i)		
Medium-low (fall in rates)	0.07	0.09	-0.66	0.02	_	0.65	0.50	0.03	0.72	0.28	
Low-high (rise in rates)	0.05	0.09	-0.03	0.01	_	-0.04	0.79	-0.03	0.84	0.16	
Coefficient	0.013	-1.023	1.123	-0.043	-0.005	0.797	0.261	-0.243			
t-value	1.45	-2.39	2.14	-0.61	-0.09	1.53	3.75	-1.06			

Note: 'Regimes' are defined as follows: medium: 1959-73; low: 1974-79; high: 1980-92. Coefficient estimates are for the full sample (1959-92).

(a) Source: Smith (forthcoming).(b) Components may not sum to the proportion explained because of rounding

government deficit<sup>(1)</sup> appears to have had very little effect on real interest rates. Indeed, as in Barro and Sala-i-Martin (1990) and Barro (1992), the estimated coefficient on the government deficit has the 'wrong' sign. These findings are not too surprising given that, empirically, the current budget deficit is a poor predictor of future deficits (Barro 1992) and Blanchard's (1985) theoretical contention that the current budget deficit matters only to the extent that it predicts a weighted sum of future budget deficits.

Chart 12 and Table A demonstrate that world long real rates followed a broadly similar pattern to short rates. Empirical results, summarised in Table C, suggest that, as for short rates, the level of aggregate government debt in relation to world income was very important in influencing long real rates. Indeed movements in public debt explain some 50%-80% of the movement in long rates between the different regimes. The other factor that appears to be vital for long rates is the movement of oil prices. Surprisingly, equity markets do not appear to be particularly important in this formulation.

The above results are in line with recent studies undertaken in the IMF<sup>(2)</sup> and OECD,<sup>(3)</sup> also referred to by the G10 Deputies, which suggest that global fiscal pressure has a significant impact on real interest rates. Earlier studies had examined the relationship between interest rates and fiscal variables at the national level and had not found strong support for a link. The relationship appears to be more powerful and easier to identify at a global level, as would be expected in an integrated global capital market. This supports the conclusion that spillovers are important and that countries have a common interest in pursuing sound fiscal policies.

#### A comparison of returns on stock and index-linked bonds in the United Kingdom

Blanchard and Summers (1984) noted that relative movements in equity and bond markets may help to distinguish the source of economic shocks. For example, a rise in the expected profitability of investment would lead to an increase in equity prices as well as to a rise in real interest rates. Conversely, while an adverse shift in national saving linked to an expansionary fiscal policy would also lead to a rise in real rates, this would tend to be associated with downward pressure on equity prices, at least in the longer run.(4)

A forthcoming paper by Jo Paisley looks in detail at the returns to holding equities and index-linked bonds in the United Kingdom, and analyses the possible sources of 'news' which may have led to the significant rise in long-term real rates during 1994.

UK data are particularly well-adapted to such a study. As already noted, the index-linked gilt market in the United Kingdom provides a direct measure of long-term real rates extending back to the early 1980s. An analysis of relative movements in UK equities and index-linked gilts consequently yields a relatively direct test of the source of shocks to real rates, while avoiding all the complications associated with the measurement and stability of inflation expectations. The basic principle used to try to distinguish shocks to investment from shocks to saving is that, in an efficient market, higher planned investment should be associated with a higher present discounted value of expected future dividends. An improvement in investment opportunities would consequently be reflected in a rise in the relative return to equity. This again is linked to Tobin's 'q' idea.

Experience in the mid-1980s provides a good example. There was a strong rise in equity prices in the United Kingdom in 1982-86, with the annual return on equities outstripping that on index-linked bonds by about 20% per annum. There was a further surge in early 1987, before the sharp correction in October which, however, only returned real equity prices<sup>(5)</sup> to their level at the start of the year. Although there is normally a significant premium for holding equities rather than index-linked gilts to compensate for the additional risk, and indeed this risk premium may

This is measured empirically as the (cyclically adjusted) change in the public debt Ford and Laxton (1995), Helbling and Westcott (1995).

 <sup>(3)</sup> Orr, Edey and Kennedy (1995).
 (4) There may be a temporary rise in the short run if the temporary increase in output and profits from the fiscal expansion outweighs the effects of higher interest rates. See Blanchard and Summers (1984).
 (5) Defined relative to the RPI.

vary over time, the returns in the mid-1980s were exceptional. This may be interpreted as an indication that investors were becoming increasingly optimistic about future profitability. Steady improvements in actual profitability may have reinforced these expectations. The mid to late 1980s saw a strong rise in fixed investment in the United Kingdom, in line with the earlier financial market signals.

Recent movements in the UK equity market have been less pronounced than in the mid-1980s. There was a substantial rise starting in late 1992 which by early 1994 had extended to some 50%. The increase was stronger than the rise in index-linked bond prices over the same period. The rise in equity prices was linked in part to the expectations of economic recovery, and actual profitability has recovered strongly from the recent cyclical trough in the United Kingdom as well as in several other G10 countries. These data are consistent with the view that an improvement in the outlook for profitability contributed to the rise in long-term real rates during 1994.

Corroborative evidence on the 'news' which led to the sharp rise in real long-term interest rates during 1994 may be obtained using the asset-pricing model of Campbell and Shiller (1988) and Campbell (1991). The broad idea is to identify separately the different elements of 'news' which may drive expected asset returns.

At the first stage, a statistical model linking current and past values of long-term asset returns, real interest rates and other variables is estimated. This is known as a vector autoregression model (VAR). The model is assumed to capture the information available to investors in each period. For each period, the model is run to generate two types of forecast: first, a one-period-ahead forecast, and second, forecasts of real interest rates, future dividends and future excess returns over longer horizons. The one-period-ahead errors, or differences between the observed result and the one-period forecast, can be interpreted as 'news' received by investors. Given the news about future returns and/or future cash flows, the longer-horizon rational-expectations forecasts of asset values are subsequently revised.

Excess returns are used in the analysis: these are holding-period returns relative to the return on a 'risk-free' rate (taken to be the one-month interbank interest rate). Paisley shows that revisions to the rational-expectations forecasts of excess real bond returns are accounted for by news about the risk-free rate<sup>(1)</sup> and future excess bond returns. The corresponding revisions for equity returns reflect news about the risk-free rate, future excess returns and future real dividends. Prices of stocks and real bonds should reflect the same news about the risk-free rate. So the difference between the expected returns on the two assets should provide information on whether there is news about

either their expected future relative riskiness<sup>(2)</sup> or expected future dividend growth.

On the assumption that the relative riskiness of equity and indexed-linked bonds did not change significantly in 1993 and 1994, Paisley's results provide some evidence of a rise in expected future dividends (see Chart 13). Over this period the multi-period forecast of equity returns relative to index-linked returns was being consistently revised upwards (the slope of the top line in the chart) in the light of news. At the same time, revisions to forecasts of dividend growth were positive (the slope of the bottom line). This gives further support for the view that, taking the two years together, a rise in expected profitability may have contributed to upward pressure on real rates.







The results from the UK analysis may have wider applicability if two conditions are satisfied: first, that UK index-linked bonds are a good proxy for movements in global real yields and, second, that at the same time UK equity yields have moved in line with global equity markets. In an integrated global capital market, the first condition is likely to hold: there are no strong grounds for expecting a major change in the UK default risk premium on government bonds in 1994. As for the second condition, equity markets do tend to respond to changes in news about national profitability trends and are likely to be rather less closely correlated internationally in the short run. The

This term enters purely because the analysis is done with excess returns. News about inflation also has an effect because UK index-linked bonds are not perfectly indexed.

This term enters purch occase the analysis is the interval are not perfectly indexed. This term is the difference between the expected future excess return on stocks and the expected future excess return on index-linked bonds or the 'index-linked' equity risk premium. This differs from the usual definition of the equity risk premium because in this case the bonds are indexed. (2)

recent changes in UK real equity prices are, however, fairly typical of the pattern in many G10 countries. In most countries, prices rose in late 1992 and 1993, but slipped back somewhat during 1994, although the equity market remained strong in the United States, which had a significant impact on the G10 weighted average.<sup>(1)</sup> For the G10 countries as a group, real equity prices rose by over 16% in 1993 and fell by only some 4% during 1994. This fall was less than the drop in index-linked bond prices.

The broad conclusion drawn by the G10 Deputies is that part of the increase in real rates during 1994 could have reflected an increase in the demand for capital, based on an increase in expected future profits. But the evidence should not be overstated. Equity and bond markets are very volatile and it is hard to distinguish between changes in news about investment opportunities and movements in the relative risk premia. Because of this volatility, the Deputies conclude that it is not possible to quantify the importance of a possible increase in investment demand with any precision.

#### **Capital market integration**

A range of evidence presented in the Deputies' report suggests that capital mobility increased in the 1980s and 1990s and that capital markets are becoming increasingly integrated. The analysis described above of the empirical determinants of saving, investment and real interest rates provides one source of information on the importance of global trends. Another approach is to examine statistically the degree of co-movement in real interest rates. In an environment of perfect mobility in goods and capital markets, not only should real interest rates move together in the long run, but they should show similar patterns across countries at similar stages in the business cycle. A recent study by Darren Pain and Ryland Thomas examines the degree of co-movement in real interest rates by testing for the existence of 'common trends' and 'common cycles' using co-integration techniques, which identify common long-run or trend movements, and the more recently developed common-feature analysis, which identifies common movements over economic cycles.<sup>(2)</sup>

Pain and Thomas analyse two systems of real interest rates. They first explore the linkages between short real rates in Germany, France and the United Kingdom and then examine long-term real interest rates<sup>(3)</sup> in the United States, Japan and Germany. European short rates exhibited considerable co-movement over the whole sample period from 1968 to 1994. The technique works less successfully for the long-rate system, but the results suggest that, while there is little evidence of common movement over the whole sample period (1968 to 1994), there was much greater linkage in the more recent period (from 1980 onwards) (see Chart 14). In this sub-period a common trend or 'world' real rate can be identified, again supporting the view that capital market integration has increased.





Source: Pain and Thomas (forthcoming).

(a) Government bond yields less a two-year centred moving average of CPI inflation.

GDP weights.
 Vahid and Engle (1993).

 <sup>(2)</sup> Valid and Engle (1995).
 (3) Proxied by ten-year government bond yields less a two-year centred moving average of CPI inflation

### Annex

### Average value of independent variables in world real interest rate equations<sup>(a)</sup>

'Regime'	STOCK <sub>t-1</sub>	$\Delta OILCY_{t-1}$	OILCY <sub>t-1</sub>	$\Delta Ml_{t-1}$	$\Delta M_{t-2}$	GCY <sub>t-1</sub>	RDEBTY <sub>t-1</sub>	RDEFY <sub>t-1</sub>
Medium	0.047		0.010	0.076	0.069	0.189	0.328	-0.003
Low	-0.107	0.002	0.026	0.089	0.092	0.167	0.278	—
High	0.093	-0.002	0.024	0.077	0.079	0.165	0.433	0.006
Note: 'Regimes' a	re defined as for	llows: medium:	1959–73; low	v: 1974–79; 1	nigh: 1980–92	2.		

(a) Source: Smith (forthcoming).

#### Variable definitions

Main source: International Financial Statistics (IFS) published by the IMF.

Short real interest rate	Short (three-month) real interest rate: Treasury bill rate where available (money market rate where not), less a quarterly ARMA(1,1) forecast of CPI inflation with deterministic seasonals.
Long real interest rate	Government bond rate, less a two-year centred moving average of CPI inflation.
STOCK	December-on-December changes in stock market prices less December-on-December changes in CPI.
OILCY	Oil consumption as a proportion of GDP.
<i>M1</i>	Narrow money.
GCY	Government current consumption as a proportion of GDP.
RDEBTY	Real government debt as a proportion of GDP.
RDEFY	Change in real debt (cyclically adjusted by regressing on lags of GDP) as a proportion of GDP.

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# **Central bank independence and accountability:** theory and evidence

Clive Briault, Andrew Haldane and Mervyn King discuss the importance of central bank accountability:(1) how it relates to central bank independence; why central banks should be accountable for their actions; and how accountability and transparency can help to reduce the inflation bias which might otherwise result from discretionary policy-making.

Over the last few years many central banks have made significant strides towards greater accountability and transparency. There has been a dilution of what Karl Brunner<sup>(2)</sup> once called the 'peculiar and protective political mystique' that has traditionally surrounded central banking. Central banks in countries which have recently adopted inflation targets have all become more open about the formulation and presentation of their monetary policies.<sup>(3)</sup> Similar moves have been evident among central banks recently granted greater independence through legislative changes-for example, in France. And in the United States there is active debate on the replacement of the Humphrey-Hawkins Act-and its multiple objectiveswith a single objective of price stability, and on the publication of the full transcripts of Federal Open Market Committee (FOMC) meetings.

How might we best explain this shift towards greater accountability and transparency? One answer is that greater accountability has run hand-in-hand with moves towards greater central bank independence: greater accountability is the government's quid pro quo for granting greater central bank autonomy. Why? Independence delegates responsibility for monetary policy to an ultimately unelected authority-the central bank. So making this authority accountable for its actions insures against a 'democratic deficit'.

But this argument scarcely explains existing central bank practices. The Bundesbank is strongly independent yet has relatively few burdens imposed upon it in terms of accountability and transparency. And it is striking, too, that the statutes of the embryonic European Central Bank follow a similar blueprint. At the other end of the spectrum, the Bank of England has little formal central bank independence. But the United Kingdom's new monetary framework is characterised by considerable transparency. New Zealand offers a different model again. Independence was granted in the context of a formal contract between the government and the Reserve Bank,

with accountability imposed through the threat of dismissal of the Governor.

It is clear from these examples that, in practice, the mappings between accountability and independence are far from straightforward. And, correspondingly, no one analytical model is able to account for all of them. But to begin to understand these mappings it is useful to consider a set of distinct models of monetary policy institutions. These models provide the organising framework for our discussion of central bank accountability and independence.

# Defining central bank independence and accountability

When considering *independence*, we follow Fischer's<sup>(4)</sup> dichotomy between central bank goal independence-the central bank setting its own targets (or at least determining how precisely these targets are specified)—and instrument independence-the central bank's ability to choose its own instrument settings. The difference between them is crucial in explaining why various monetary models may imply differing degrees of accountability.

Turning to *accountability*, the Oxford English Dictionary defines accountable as 'obliged to give a reckoning or explanation for one's actions; responsible'. In turn, it defines responsible as 'legally or morally obliged to take care of something or to carry out a duty; liable to be blamed for loss or failure'. So the natural context in which to consider accountability is within a principal-agent relationship. And, in a monetary policy context, these roles are typically taken by the government (as principal) and the central bank (as agent).

Within this principal-agent relationship, however, accountability might take a variety of forms. The simplest case to envisage is when there is a formal contract between the government and the central bank—a 'legal' obligation to carry out a duty, or *de jure* accountability. This contract

<sup>(1)</sup> 

This is a shortened version of a paper co-authored by Clive Briault, Andrew Haldane and Mervyn King which is forthcoming in 'Toward More Effective Monetary Policy', Kuroda, I (ed), proceedings of the Seventh International Conference sponsored by the Bank of Japan's Institute for Monetary and Economic Studies held on 26–27 October 1995, Macmillan Press. Copies of the paper are available on request from the authors. Brunner, K (1981), 'The art of central banking', Centre for Research in Government Policy and Business, *Working Paper No Gp B 81–6*, June. See Haldane, A G (1995), 'Introduction', in *Targeting Inflation*, Haldane, A G, (ed), Bank of England. Fischer, S (1994), 'Modern central banking', in *The future of Central Banking*, Capie, F, Fischer, S, Goodhart, C and Schnadt, N (eds), Cambridge University Press. University Press

might specify the areas over which the central bank exercises discretion (its 'duty'); what it is to be held accountable for (its 'responsibility'); what needs routinely to be monitored to ensure effective accountability (a 'reckoning' or 'explanation'); and what penalty will be imposed for non-compliance (apportioning the blame for 'loss or failure').

But, equally, it is possible to envisage more subtle forms of accountability or transparency. For example, even a non-independent central bank could perceive advantages in explaining its actions, intentions and objectives as a means of influencing public expectations-and thus lowering the costs of delivering the central bank's goals; in influencing the public's social welfare function-by educating them about the benefits of price stability; and in enhancing the reputation and credibility of the central bank-by providing a means for it to be judged against the coherence and persuasiveness of its analysis. All these examples might bring about greater central bank accountability-de facto if not de jure. Making the central bank's actions, intentions or analysis transparent subjects the central bank's reputation to a 'reckoning', for which it will suffer 'loss or failure' if it is found wanting. Such a set-up is thus qualitatively similar to a fully-specified legal contract between the government and the central bank.

# **Rules and discretion in monetary policy-making**

There has been considerable interest recently in the design of monetary policy institutions. The typical approach takes as its starting point the idea that there is an 'inflation bias' problem endemic in discretionary policy-making. This problem derives from the incentives of the policy-maker to spring inflation surprises on economic agents to secure short-term boosts to output and employment. But rational agents engage in pre-emptive nominal wage-bargaining in anticipation of these actions. And the authorities can then do no better than to justify these price expectations—hence the inflation bias.

If discretionary policy-making leads to an 'inflation bias', what are the alternatives? Interest initially focused on fixed (or non-contingent) rules for nominal variables such as the money supply.<sup>(1)</sup> Provided they were credibly adhered to, such rules tied the authorities' hands, thereby preventing monetary policy from pursuing short-term output objectives at the expense of longer-run inflation performance. But such simple rules are not costless. Tying the authorities' hands also inhibits their ability to respond to shocks, such as adverse oil price shocks or sudden losses of competitiveness, which may destabilise output and employment in the economy. This loss of flexibility is then costly if the public care about the costs of unemployment as well as inflation. Herein lies the rules versus discretion trade-off in policy-making. Rules have an inflation—or

*credibility*—benefit over discretion, but also impose a stabilisation—or *flexibility*—cost.

But what could a non-contingent rule tell us about the independence-accountability relationship? The imposition of a rule, by itself, involves no delegation of power to any agency, such as a central bank. Consequently, it need not be characterised by any central bank independence-whether goal or instrument independence-or accountability. Formally, there is no distinction between principal and agent under the rule and so nothing for an agent to be held accountable for. So a non-contingent rule, if it were observed in the real world, would thus tell us very little about independence-accountability mappings. This is not too much of a drawback. In practice it is difficult to pinpoint any real-world examples of a strict non-contingent rule having been adhered to by developed countries, at least over the post-Bretton Woods period. While many countries experimented with, for example, monetary targeting procedures in the 1970s and 1980s, in practice none of these frameworks worked in the rigidly inflexible fashion suggested by a fixed rule.

# Central bank independence and the Rogoff model

In a highly influential paper, Rogoff<sup>(2)</sup> showed that a welfare-improving point on the credibility/flexibility frontier (better than either the non-contingent rule or discretionary outcomes) could be secured by delegating monetary policy-making to an authority with greater inflation-aversion than society as a whole—a *conservative* central banker. Such a model probably comes closest to matching what many people would think of as central bank independence: delegation of monetary policy to an inflation-averse authority with instrument independence.

Under the Rogoff model, the conservative central banker trades off some loss of flexibility against some gain in credibility. But Rogoff showed that provided the degree of central bank conservatism (or inflation-aversion) was not too great, there is an improvement in society's overall welfare compared with the discretionary case. So the two most important implications of Rogoff's model are that an independent central bank should attenuate inflation biases (lower average inflation); and accentuate stabilisation biases (raise output variability).

Empirical evidence, using various indices of central bank independence, has attempted to shed light on these two predictions. It lends strong support to the first of them: in the cross-section, greater (goal and instrument) independence does tend to be associated with lower inflation, both in mean and (to a lesser extent) variance. Whether we can tell a causal story from these correlations is, of course, another matter. The second of the model's predictions has fared less well. Most empirical studies have

See, for example, Friedman, M (1959), 'A program for monetary stability', *Fordham University Press*, New York.
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Rogoff, K (1985), 'The optimal degree of commitment to an intermediate monetary target', *Quarterly Journal of Economics*, Novembu pages 1,169–90.

failed to find any significant link between independence and the mean or variability of output growth or employment. Taken by itself, this evidence would imply that central bank independence delivers a 'free lunch': an inflation gain, without any of the countervailing costs of output and employment variability.(1)

Because the Rogoff solution involves delegation of monetary policy responsibility to a non-government agency, it clearly raises questions of accountability. Formally, there is now a clear principal/agent relationship at work, in a way not true of the non-contingent rule. But the model also suggests there is no need for monitoring of the central bank or the imposition of ex-post penalties upon it for failure. Simply leaving an inflation-averse institution to its own devices is enough to ensure a preferred inflation outcome. So the Rogoff case can perhaps be characterised by (almost) complete goal and instrument independence and relatively little accountability.

Real-world examples of the Rogoff model could, in principle, be held to include any independent central bank. In practice, however, very few real-world institutions combine both high instrument and goal independence with little accountability in the strict way implied by the model. The Bundesbank offers one possible exception. It has complete instrument independence; its objectives are not very precisely specified, so it has a high degree of goal independence; and at the same time, the Bundesbank has relatively little formal accountability. Yet in practice the Bundesbank has been careful to reflect-perhaps even to cultivate—a public acceptance of the need for price stability.

By contrast, and despite having instrument independence, the US Federal Reserve system does not fit neatly within the Rogoff model. It is required to aim for the multiple objectives embodied in the Humphrey-Hawkins Act, which can be thought to dilute its 'conservatism' and goal independence; it is formally accountable to the United States government through the Chairman's twice-yearly appearances at Humphrey-Hawkins hearings and through frequent other testimonies to Congressional Committees; and the Chairman is formally appointed by the President.

This raises a question about the Rogoff model as a blueprint for an independent central bank. Independence without accountability might be interpreted as a dilution of democracy. Indeed, it was largely this concern that lay behind the Roll Committee's(2) recommendation that independence for the Bank of England should be accompanied by greater parliamentary accountability for its actions.

Lohmann<sup>(3)</sup> presents a hybrid of the Rogoff model, which does involve a form of accountability: the central bank is delegated responsibility for monetary policy but in the event of a significant shock this responsibility can be overridden by the government. This override clause, in turn, alters the central bank's behaviour, making it more aware of the output costs of its actions and thereby securing a welfare improvement. The Lohmann model has some clear real-world analogues. For example, the New Zealand Policy Targets Agreement has explicit exemptions in the event of 'significant' shocks to, for example, the terms of trade; and in the Netherlands and in Canada, the Minister of Finance has the right to issue an 'instruction' to the central bank on monetary policy.

### **Optimal contracts for central bankers**

In recent papers, Walsh<sup>(4)</sup> and Persson and Tabellini<sup>(5)</sup> have demonstrated that, in principle at least, resolution of the credibility/flexibility trade-off is remarkably straightforward. The solution takes the form of a contract between the government (the principal) and the central bank (the agent). The contract levies a linear tax on the central bank for any inflation outturn in excess of the inflation target, and pays a linear subsidy if inflation is below the target. In all other respects, the central bank is given complete discretion when setting policy. So the central bank has complete instrument independence but little goal independence, since inflation objectives are written into the terms of the contract drawn up by government.

A suitably-specified contract can be shown to offset fully the inflation bias, while at the same time leaving stabilisation policy unaffected: that is, a linear tax can resolve any trade-off between credibility and flexibility. This result derives from the fact that, in conventional models, the inflation bias is constant across states of nature: it depends only upon the authorities' liking for short-run output gains and their ability to achieve them, both of which are assumed to be fixed parameters. Raising the marginal cost of inflation by a fixed amount (through a linear tax on above-target inflation outcomes) thereby neutralises incentives to generate an inflation surprise. It is assumed here that the government can credibly pre-commit to enforcing a contract, even though the original argument for an independent central bank was that the government could not credibly pre-commit to a rule. As others have observed, the Walsh solution is therefore really a way of *relocating* the inflation bias problem rather than actually resolving it.

Recently, Svensson<sup>(6)</sup> has shown that the same optimal outcome can result from a suitably-specified inflation target. Specifically, if the central bank is charged with hitting an inflation target which is below the socially optimal inflation rate, then, by lowering the central banks' inflationary sights by a fixed amount, the inflation bias can be offset. The inflation bias can be offset fully-a first-best can be

<sup>(1)</sup> 

Fischer, S, op cit, offers some possible explanations for this. Roll Committee Report (1993), 'Independent and accountable: a new mandate for the Bank of England', CEPR. Lohmann, S (1992), 'Optimal commitment in monetary policy', American Economic Review, 82, pages 273–86. Walsh, C (1995), 'Optimal contracts for central bankers', American Economic Review, 85, pages 150–67. Persson, T and Tabellini, G (1993), 'Designing institutions for monetary stability', Carnegie-Rochester Conference Series on Public Policy, 39, pages 53–84. Svensson, L E O (1995), 'Optimal inflation targets, 'conservative' central banks and linear inflation contracts', mimeo, Institute for International (6) Economics, University of Stockholm

achieved—by setting the inflation target equal to the socially optimal rate of inflation minus the inflation bias.

What do these models tell us about the

independence-accountability relationship? Under the Walsh contract, there is a clear principal-agent relationship at work. The central bank clearly has something to be accountable for; it does not decide itself what it is to be judged against. The contract, in turn, uses this accountability to impose a constraint upon the central bank, penalising (or sometimes rewarding) it for target misses. This constraint (a linear tax) is clearly minimalist: it requires only that actual inflation outcomes are monitored, so that the tax can be levied on them. But with a clearly specified target and an appropriate set of penalties, the agent is provided with exactly the right incentives to 'do the right thing'. There is then no need for exhaustive monitoring of anything other than inflation itself, on which the tax is being levied.

To what extent is Walsh's optimal contract replicated in the real world? Many countries have announced clearly specified targets which might reasonably be interpreted as a performance contract of sorts. This would encompass countries with monetary and exchange rate, as well as inflation, targets. But few of these frameworks impose explicit pecuniary penalties for target misses—such as deductions from the governor's salary or the central bank's budget.

Another way of delivering the first-best, following Svensson, would be to give central banks inflation targets set below the socially optimal inflation rate. But in practice no countries appear to be targeting rates of inflation which are below the socially optimal rate. Moreover, it is questionable whether, under Svensson's inflation target, the central bank would want to be set an objective which it would rarely be seen to hit. This would surely be credibility-depleting over the longer run. It is difficult, then, to argue that the Svensson model has any counterparts in the real world, at least at the moment.

Taking these points together, the only country that perhaps comes close at present to the Walsh contract (or some variant of it) is New Zealand. There, the Policy Targets Agreement is an explicit, and precisely specified, contract between the government and the Reserve Bank. Explicit penalties are written into this contract, in that the Governor can be dismissed for failures to meet the target; he or she is held directly accountable for inflation target misses. Moreover, because the Reserve Bank's budget is fixed in nominal terms, this is also analogous to a linear inflation tax—even though, in practice, this constraint was devised with budgetary rather than monetary incentives in mind. This combination of targets, penalties and accountability thus seems to come reasonably close to matching the Walsh set-up. Other countries fare well on some features of Walsh's optimal contract, but fail to satisfy fully all the criteria that might deliver it. For example, the United Kingdom has a clearly specified inflation target, which allows simple monitoring. This target, in turn, is intended to impose embarrassment costs on the authorities in the event of the target being breached—so it is a performance contract of sorts, with non-pecuniary penalties. Similarly, moves elsewhere towards clear and quantitative price stability objectives-for example the inflation targets recently put in place in Australia, Canada, Finland, Israel, New Zealand, Sweden and Spain-are a step in the right direction. And the fact that these targets may not be set low enough to offset completely any inflation bias does not preclude them from pushing inflation in the direction of its socially optimal rate.

Moreover, the introduction of an inflation target is not the full extent of the recent changes in the United Kingdom's monetary framework. As important has been the move towards a more open and transparent system of monetary policy implementation. Such a move has been emulated in other countries. These developments go well beyond the accountability and transparency implied even by an optimal contract. It is reasonable to ask, then, what role accountability and transparency about monetary policy-making may play in a world of second-best or worse.

# Uncertainty and central bank accountability

In the models discussed above, the authorities' inflation preferences and the underlying model of the economy were assumed to be common knowledge to agents; there was no uncertainty about either of them. In practice, this is rarely the case. For example, the authorities' inflation preferences may be subject to short-run pressures which outside agents cannot observe. And these pressures may vary in their severity according to the state of the political and economic cycle. Even when monetary policy is delegated to an independent monetary authority, it is unlikely such an institution will have inflation preferences that are known with certainty, at least when reputation and credibility are initially low. The same is true of model uncertainty, where the monetary authorities may have superior knowledge to outside agents on the dynamics of the inflationary process. These agents will therefore be unsure quite how the monetary authorities will react to given events.

Private sector agents then face a problem at the time they enter into the wage-bargaining process. They are uncertain about the authorities' true inflation preferences and about how monetary policy will react each period. And, because they are risk-averse, agents require compensation for this uncertainty, to guard against an adverse inflation shock eroding their real wages. This insurance premium is factored into agents' nominal wage expectations: they bid up nominal wages to insulate their *real* wage from such inflation uncertainties.<sup>(1)</sup> As this occurs, actual inflation

<sup>(1)</sup> See the full version of the paper for a formal presentation of this and the other models discussed here.

rises and existing inflation bias problems are worsened. In such a setting, resolving these (model and preference) uncertainties will be unambiguously welfare-improving. So how can the authorities reduce these uncertainties? *Reputation*—or monetary policy credibility more generally—is one way. A good track-record reduces uncertainty about inflation outcomes, by revealing over time information on the distribution of the authorities' 'true' inflation preferences. This story has a potential read-across to a number of countries—perhaps Germany and Japan especially. For example, in Japan revealing information on the authorities' inflation preferences through stability-oriented policy actions has arguably been central in helping to maintain low inflation, in the absence of formal central bank independence.

Reputation amounts to revealing information by 'deeds'. Transparency, or de facto accountability, can be thought to do it by 'words'. There are a variety of forms these words might take: speeches, Press statements, appearances before Parliament, bulletins and inflation reports, and publication of the minutes of monetary policy council meetings. All of these reveal information on the authorities' reaction function-its actions, objectives and intentions-and thus on the distribution of the authorities' inflation preferences. They also reveal information on the authorities' preferred model of the economy when they set monetary policy. Hence the problem facing agents when entering the wage bargain is considerably simplified under a transparent monetary regime. Correspondingly, agents will demand less compensation for inflation uncertainty, and a lower inflation bias will obtain.

The United Kingdom provides a good case study of how this might work in practice. The Bank of England has no formal goal or instrument independence. But recently its advice has been made transparent. The three most important vehicles for this greater transparency in the United Kingdom have been the inflation target itself, which makes clear the authorities' medium-term price stability objectives; the published minutes of the Chancellor/Governor meetings, at which monetary policy decisions are made and discussed on the record each month; and the Inflation Report, which offers the Bank's own independent analysis of inflationary trends. It is interesting, too, that the countries which have become noticeably more transparent in recent years are those with low initial endowments of credibility. For example, it is striking how many inflation target countries-whose monetary regimes have no real track-record because of their newness-have also recently sought greater transparency.

Such a development would sit neatly with the discussion above. These low-credibility countries with new monetary frameworks cannot rely immediately on reputation ('actions') to reveal information on their inflation preferences. So instead they rely on 'words' to boost their credibility. Recent shifts towards greater transparency may be serving as a surrogate for reputation or credibility in countries whose monetary regimes have yet to establish cast-iron inflationary credentials. Openness can serve as a demonstration effect of a central bank's unwillingness to countenance inflation surprises for short-term output gain because it means voluntarily forgoing one means of camouflaging such surprises. That lowers inflation uncertainties and with it inflation itself.

# Some cross-section evidence on accountability, credibility and independence

Finally we turn to some empirical evidence on the relationship between central bank independence and accountability. To do this, we create an index of accountability for 14 developed countries, basing this on four criteria: (a) whether the central bank is subject to external monitoring by parliament (as, for example, in France, the United States and the United Kingdom); (b) whether the minutes of meetings to decide monetary policy are published (as in the United States and United Kingdom); (c) whether the central bank publishes an inflation or monetary policy report of some kind, in addition to standard central bank bulletins; and (d) whether there is a clause that allows the central bank to be overridden in the event of certain shocks. These are obviously simple proxies. Indeed, in certain circumstances, some might actually diminish the independence of a central bank through political interference; and they might not capture fully the extent to which some central banks have influenced and cultivated public opinion through other means. But they cover most of the main features of accountability, as defined earlier.

For goal independence we also use four criteria: (a) whether the statutes of the central bank make it independent of the government; (b) whether more than half the appointments to the central bank board are made independently of the government; (c) whether there are government officials on the board; and (d) whether the central bank does in practice set its own goals (for example, monetary or inflation targets).

Chart 1 plots central bank goal independence against our accountability index. The correlation is clearly negative. This is precisely the relationship the Rogoff and optimal contract models, when taken together, would predict. The greater is a central bank's goal independence, the less it is accountable for: setting your own objectives makes it difficult for you to be held accountable for them. But as goal independence lessens-government sets down the terms and conditions, for example through a contract then accountability rises. The negative correlation in Chart 1 is inconsistent with a purely democratic or political explanation of accountability, which would assert that independence and accountability should run in parallel. Instead it suggests that accountability and transparency may have served as (partial) substitutes for independence in some of these countries, rather than as complements.





Of course, there are many other factors at work when explaining such a correlation. And from the discussion above we know that monetary policy credibility—or reputation more generally—is one of the more important of them. High credibility countries have earned their counter-inflationary spurs by deeds, and so do not need to reveal further information on their preferences by words. Low credibility countries are in the opposite position.

Chart 2 plots the accountability index against the average level of bond yields over the past decade—a crude proxy

### Chart 2



for the inverse of credibility—for our 14 countries. The correlation is clearly positive. Again there is evidence of

accountability having been used as a surrogate, this time for monetary policy credibility or reputation. Indeed, Chart 2 could perhaps be characterised as two main clumps: good reputation/low accountability in the bottom left-hand corner; and poor reputation/high accountability in the top right. It is particularly striking to note how many inflation target countries lie in the second of these.

#### Conclusions

Making a central bank independent imposes a constraint on government interference in monetary policy; while making the central bank accountable imposes a constraint on how it exercises this independence. Both these constraints are generally viewed as desirable aspects of monetary policy-making.

We have tried to extend this conventional wisdom in three ways. First, we have formalised the role and potential value of accountability and transparency in its own right when designing a monetary policy framework. This does not imply that transparency by itself is necessarily sufficient for a monetary institution; merely that it could help that institution combat inflation bias, either by itself or in conjunction with central bank independence or even a formal central bank contract.

Second, we have considered the forms which accountability might take. And we have illustrated this by attempting to match each of the existing theoretical solutions to the inflation bias problem to existing real-world central banking institutions: for example, Rogoff's 'conservative' central banker and the Bundesbank; Walsh's optimal contract and New Zealand's Policy Targets Agreement; and a preference or model uncertainty model and the United Kingdom's new monetary framework.

Third, we have constructed a very preliminary and simple index of central bank accountability which can be compared with measures of central bank independence and with economic performance. Two features are striking here. First, cross-section correlations point towards an inverse relationship between accountability and independence consistent with accountability and transparency having served as partial substitutes for independence, rather than as complements. And second, countries with a good reputation for low inflation seem to be characterised by relatively low degrees of accountability, and conversely for countries with less respectable inflation track-records. This is consistent with accountability having also served as a partial substitute for reputation among central banks whose monetary frameworks have yet to establish themselves fully.

# Trade with newly industrialised economies

# By Alistair McGiven of the Bank's Structural Economic Analysis Division.

This article analyses the changing nature of trade between OECD economies and the newly industrialised economies (NIEs) and considers the opportunities and challenges that this presents. It begins by assessing the growth of this trade and its relationship to domestic changes in the NIEs. It then examines the possible effects on the United Kingdom and OECD economies of the growth of trade with the NIEs. The article concludes that the overall effects should be positive, resulting in increased specialisation and growth. While there is some evidence that trade with the NIEs may be having some impact on OECD countries' labour markets, most studies have found that this impact is relatively modest.

# Introduction

Over the past 25 years or so, developing countries' share of world output and trade has risen significantly. Between 1970 and 1994, their contribution to world output increased from 28.9% to 40.1%, at an average annual growth rate of 1.4%, while their share of total world trade rose from 18.3% to 26.1% over the same period. Their penetration of industrial countries' markets has also increased. In 1970, OECD<sup>(1)</sup> imports of manufactured goods from outside the area amounted to 0.6% of OECD GDP. By 1992, this figure had risen to 2.5%.

This increase in trade between the two groups of countries has primarily resulted from an increase in trade between the OECD and a fairly small number of newly industrialised economies (NIEs).

Different groupings of countries are identified as NIEs. The World Bank has identified a number of high-performing Asian economies, including 'The Four Tigers'-Hong Kong, the Republic of Korea, Singapore and Taiwan. These economies have been developing rapidly for a number of decades. Indonesia, Malaysia and Thailand are now also widely regarded as high-performing Asian economies, having had high growth rates for the past two decades or so. In addition, a third wave of Asian NIEs appears to be emerging, including India, China and the Philippines-large Asian countries which have more recently undertaken programmes of economic liberalisation. In this article, these groups are referred to, respectively, as the first, second and third generations of Asian NIEs.

As well as the Asian NIEs, a number of Eastern European<sup>(2)</sup> and Latin American economies are starting to increase their share of world trade. The three largest economies in each of these two regions-Mexico, Brazil and Argentina in Latin America and Hungary, Poland and the Czech Republic<sup>(3)</sup> in

Eastern Europe-are also examined below. The significance of this broadly defined group of NIEs is illustrated by the fact that their share of total non-OECD imports to the OECD has risen from 44.4% in 1970 to 80.5% in 1992.

# The relationship between industrial countries and the NIEs

This section aims to assess the nature of the relationship between industrial countries and the NIEs. Over the last 25 years or so, there have been some significant changes in the economic size and structure of many of the NIEs and this appears to have been reflected in the size and composition of their trade with OECD countries.

Table A presents some selected economic indicators for both OECD and non-OECD countries. It shows that the OECD countries generally have higher GDP per capita than the NIEs, but Hong Kong and Singapore have attained levels comparable to the OECD. Over the past decade or so, most of the Asian NIEs have had much faster growth in GNP per capita, investment and exports than the developed countries. They have also experienced faster growth of real earnings between 1980 and 1993, which perhaps suggests that convergence of wage rates is occurring. But hourly wage rates in manufacturing still remain significantly higher in the OECD countries. It is, in addition, possible to distinguish the first-generation from the other Asian NIEs, since they generally have higher GDP per capita and higher hourly wages. However, during the past decade or so, investment in the second generation Asian NIEs has grown faster.

The Latin American and Eastern European economies generally performed less well over the period since 1980, reflecting the debt problems faced by the Latin American economies in the 1980s and the fact that economic transition in Eastern Europe is so recent. These economies also generally suffered much higher rates of inflation over the

The Organisation for Economic Co-operation and Development consists of all the major industrial countries
 Outside the Former Soviet Union.
 Czechoslovakia prior to 1993.

#### **Table A** Selected economic indicators

	Avera annua grow (GNI per capita	age al th a)	GDP per capita (1993) (a)	Manuf- acturing hourly wage (US\$ 1992)	Manuf- acturing real average earnings per employee 1991	Average annual growth in investment	Average annual growth in exports	Average annual rate of inflation
	(1980	-93)	(US = 100)	(b)	(1980 = 100)	(1980–93)	(1980–93)	(1980–92)
	(c)		(c)		(c)	(c)	(c)	(c)
OECD			100.0					
United St	tates	1.7	100.0	11.45	103	2.5	5.1	3.8
Japan		3.4	84.3	18.96	122	5.5	4.2	1.5
Danada		1.4	81.8	12.80	105	3.0	5.0	3.9
Eromon		1.9	79.4	10.03	105	3.7	4.5	4.0
Italice		1.0	70.8	1.00	121	2.1	4.5	3.1
Italy		2.1	72.1	10 44 91	1/9	1.5	4.5	8.8
United	ids	1./	/0.0	10.44	138	2.7	4.7	1.7
Kingdor	m	2.3	69.6	10.56	128	4.0	4.0	5.6
Germany	(d)	2.1	68.1	14.41	119	2.4	4.2	2.8
First gen	eratio	on As	ian NIEs					
Hong Ko	ng	5.4 (	e) 87.1	3.28	157	5.0	15.8	7.9
Taiwan (f	)	_		5.31	_	_	10.0	4.4
Republic	of							
Korea		8.2	38.9	5.25	231	11.8	12.3	6.3
Singapore	e	6.1	78.9	5.31	187	5.7	12.7	2.5
Second g	genera	tion	Asian NIEs					
Thailand		6.4	25.3	0.67 91	173 90	11.4	15.5	4.3
Indonesia	ı	4.2	12.7	—	171	7.1	6.7	8.5
Malaysia		3.5	32.1	1.41 90	135	6.3	12.6	2.2
Third ge	nerat	ion A	sian NIEs					
Philippin	es	-0.6	10.8	0.48 91	180	-0.1	3.4	13.6
India		3.0	4.9	0.34 89	130	5.7	7.0	8.7
China		8.2	9.4	0.26	—	11.1	11.5	7.0
Latin An	nerica	n NI	Es					
Argentina	a	-0.5	33.3	—	69	-1.3	3.2	374.3
Brazil		0.3	21.7	1.82 88	80	-0.3	5.2	423.4
Mexico		-0.5	27.5	2.11	79	0.1	5.4	57.9
Eastern l	Europ	bean 1	NIEs	~ ~				
Czechosle	ovakia	a —	30.5	0.79 91		_	_	
Hungary		1.2	24.5	1.66	115	-1.6	2.3	12.8
Poland		0.4	20.2	1.12 91	78	-1.1	2.8	69.3

Based on purchasing-power parity. Source: ILO, Yearbook of Labour Statistics (1993). 1992 data unless otherwise specified. Source: World Bank, World Development Report (1995). Data refer to Federal Republic of Germany before unification. Average annual growth of GDP per capita. Source: Monthly Bulletin of Statistics of the Republic of China. (b)

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period, low or negative growth of investment, low growth of exports and low or negative growth of GNP per capita. But GDP per capita and hourly wages in these countries are broadly comparable to those of the second-generation Asian NIEs.

Having examined the industrial and newly industrialised economies, this article now turns to the trade between them. Chart 1 shows UK, OECD (Europe) and OECD (total) manufactured imports from the NIEs as a percentage of their total manufactured imports. Since 1970, manufactured imports from the NIEs have increased significantly as a percentage of the OECD's total manufactured imports. In addition, the chart suggests that this growth in import share has been most rapid for the three generations of Asian NIEs.<sup>(1)</sup> It is possible to distinguish the different generations of Asian NIEs, as the rate of growth in import share of the first generation of Asian NIEs has been overtaken in the last ten years by that of the second and third generations.

The Eastern European and Latin American countries have also started to make progress. Between 1980 and 1992, the share of total OECD manufactured imports accounted for by Brazil, Argentina and Mexico rose from 1.3% to 2.1%.

#### Chart 1 UK, OECD (Europe) and OECD (total) manufactured imports from the NIEs

Percentage of total manufactured imports -20





Although the share from Poland, the then Czechoslovakia and Hungary declined from 0.9% to 0.7% between 1980 and 1990, these economies are recovering quickly after their market reforms and by 1992 their share returned to 1.0%.

As well as an increase in OECD imports from the NIEs, there has also been a rise in OECD exports to the NIEs, as the rapid growth of these markets provides increasing opportunities for OECD producers. As Chart 2 shows, the Asian NIEs accounted for rising shares of UK, OECD

#### Chart 2 UK, OECD (Europe) and OECD (total) manufactured exports to the NIEs



(Europe) and OECD (total) manufactured exports between 1970 and 1992. If NIEs are defined more broadly to include the Latin American and Eastern European countries considered above as well as the Asian NIEs, their share of

(1) There is a very similar pattern in the growth of imports from these NIEs as a percentage of UK, OECD (Europe) and OECD (total) GDP.

the OECD's manufactured exports rose by around 50 per cent between 1970 and 1992. Over this period, the OECD as a whole had a higher share of manufactured exports to the NIEs than OECD (Europe), largely the result of a higher export share for Japan. The share of UK manufactured exports to the more broadly defined NIEs fell slightly between 1970 and 1990, although by 1992 it had increased to just above its 1980 level.

Charts 3 and 4 show the balance of trade in manufactures between the NIEs and the OECD and United Kingdom. Between 1980 and 1990, both UK and OECD trade with the

#### Chart 3





(a) Brazil, Argentina and Mexico.

(b) Hungary, Poland and the Czech Republic (Czechoslovakia prior to 1993).

Chart 4



# Balance of trade in manufactures between the OECD and NIEs

Asian NIEs shifted from surplus to deficit. The UK and OECD trade surplus with the Latin American countries also declined over the period. The United Kingdom recorded a small trade deficit with the three Eastern European economies in 1990 while the OECD trade surplus with these countries increased. In the early 1990s, both the OECD and the United Kingdom saw improvements in the balance of their trade in manufactured goods with the major Eastern European and Latin American economies.

Whereas the United Kingdom has a trade deficit with the Asian NIEs in manufactures, it has a trade surplus in services, as shown in Chart 5. Between 1988 and 1994, the

#### Chart 5 Balance of trade in services with Asian NIEs



first-generation Asian NIEs' share of UK service credits declined slightly from 4.1% to 3.9%. However, the ASEAN<sup>(1)</sup> countries' share rose from 3.0% to 3.4% over the period, as this market has grown rapidly. In addition, Chart 6 shows that, even though OECD imports of manufactures from the NIEs have grown rapidly, these countries have not accumulated large current account

#### Chart 6 Current account balances (1003)

#### Current account balances (1993)



(1) Indonesia, Thailand, Malaysia, Philippines, Brunei and Singapore. There is no data to show the United Kingdom's current account position with these countries individually.

surpluses and, in fact, all but the first-generation Asian NIEs had current account deficits in 1993. And, in 1994, the United Kingdom had current account surpluses with both the first generation Asian NIEs and the ASEAN countries.

The growth in OECD trade with the NIEs has coincided with a sharp decline in the costs of transport and communication and also with changes in the domestic policies of many NIEs, away from import substitution and towards export promotion. These policy changes have been reflected in a general increase in the outward orientation of these economies. According to a number of studies of the Republic of Korea, Malaysia, Indonesia and Thailand, protectionist measures were reduced during the 1970s and 1980s.<sup>(1)</sup> As a measure of the openness of OECD and newly industrialised economies, Table B provides the sum of their exports and imports as a percentage of total GDP. It reveals

#### **Table B Openness of economy**

Sum of exports and imports as a percentage of GDP

	1972	1982	1992					
OECD average (a) United Kingdom United States	40 32 9	52 40 15	48 39 17					
Asian NIEs								
Hong Kong	122	146	252					
Singapore	192	321	279					
Taiwan			71					
Republic of Korea	39	62	51					
Thailand	31	42	66					
Indonesia	29	41	48					
Malaysia	63	91	139					
Philippines	30	36	48					
India	7	13	16					
China	—	15	36					
Eastern Europe								
Hungary	67	77	61					
Poland		33	35					
Czechoslovakia	_	66	82					
Latin America								
Mexico	10	21	23					
Argentina	11	15	12					
Brazil	15	15	14					
Source: International Financial Statistics Yearbook 1994 and 1995.								

(a) Unweighted mean (excluding Turkey)

a similar pattern to the growth of OECD trade with the NIEs, which significantly increased first with the four Asian tigers and then, somewhat later, with the second-generation and, to a lesser extent, the third-generation Asian NIEs. The Eastern European economies appear to be more open than the Latin American economies, perhaps because they are generally smaller.

As well as an increase in trade between the OECD and the NIEs, the past 20 years or so has also seen a change in the nature of this trade. Whereas in 1970 around 42% of Asia's exported goods were manufactures, by 1990 this figure had risen to 74%.<sup>(2)</sup> These changes in the composition of trade are mirrored in the newly industrialised countries' domestic economies. As the NIEs have grown, the structure of their economies has evolved, with fewer resources being devoted to agriculture and more to manufacturing. For example, between 1965 and 1988, the share of agriculture in the output of East Asia fell from 41% to 22%.(1) The reasons for these changes are complex, but are likely to be linked to the acquisition of new capital, technology and skills, which have allowed the NIEs over time to move up the product chain, away from agriculture and towards manufacturing.

In general, one would expect that economies at similar stages of development would tend to trade in similar products. The Heckscher-Ohlin theory predicts that a region will specialise in and export those goods and services that make relatively intensive use of the factors of production with which it is relatively well endowed. However, as countries develop, they can invest in new factors of production, such as capital and skill, and so augment their initial endowments. So, countries at similar stages of development will generally have acquired similar proportions of the factors of production. This means that they will tend to specialise in the production of similar products so that trade between them will mainly take place in goods produced in broadly the same industries-the incentive to trade will be based on imperfect competition between them and on economies of scale. By contrast, trade between countries at different stages of development will be predominantly inter-industry, since the relative supplies of their factors of production will tend to differ, giving the countries a comparative advantage in specialising in different industrial sectors.

The facts appear to support this theory. Wage rates should increase as countries develop and their skill levels rise. Chart 7 plots estimated hourly wage rates for the NIEs and a number of OECD countries against an index—the Grubel-Lloyd index<sup>(3)</sup>—of the extent of intra-industry trade between each country and the United Kingdom. It shows that as wages rise towards UK levels, so does the proportion of trade with the United Kingdom that is intra-industry. Table C shows the Grubel-Lloyd index for the United Kingdom's trade with the OECD and with different groups of NIEs. It shows that, as expected, those NIEs which have been developing longest tend to trade more with the United Kingdom in broadly similar products, reflecting their acquisition of similar relative supplies of factors of production over time.

Source: The East Asian Miracle, World Bank, 1993. Source: World Economic Outlook, IMF, October 1995. The Grubel-Lloyd index measures the proportion of one country's trade (with one, a subset or all foreign countries) that is accounted for by trade in products within the same industry (ie intra-industry trade). It is calculated as:

 $<sup>\</sup>sum \left[ (x_i + m_i) - |x_i - m_i| \right]$ GLL  $\sum_{i=1}^{n} (x_i + m_i)$ 

where  $x_i$  and  $m_i$  are the total exports and imports between the United Kingdom and country or region *j* in industry *i* and where there are a total of *n* industries, measured here at the two digit Standard International Trade Classification (SITC) level. The index varies between 0 (no intra-industry trade) and 1 (only intra-industry trade).
#### Chart 7 Estimated hourly wages and the Grubel-Lloyd index (1992)



#### **Table C** Grubel-Lloyd index<sup>(a)</sup> for trade with the United Kingdom by region

Region	Grubel-Lloyd index
OECD	0.83
First generation Asian NIEs (b)	0.48
Second generation Asian NIEs (b)	0.37
Third generation Asian NIEs (b)	0.33
Eastern Europe 3	0.40
Latin America 3	0.33
<ul><li>(a) Defined in footnote (3) on page 72.</li><li>(b) Defined in the introduction.</li></ul>	

#### Human resources

Over time, the NIEs have not only switched resources from agriculture to manufacturing, but, to varying degrees, they have also gradually evolved from low-skilled manufacturing towards high-skilled manufacturing. This is consistent with an increasing supply of skilled labour in the NIEs, which has been created through, for example, investment in education. Over time, their comparative advantage is gradually switching away from lower-skilled industries and towards higher-skilled industries. Table D presents three general measures of skill levels from educational data.

According to these measures, OECD countries generally appear to have lower illiteracy rates and higher school enrolment ratios than the NIEs. However, illiteracy rates measure only one basic aspect of skill and enrolment ratios relate to people who have yet to enter the workforce. An alternative measure of the endowment of skilled labour was provided by Barro and Lee (1993), who constructed measures of the stock of human capital by looking at the proportion of the population aged over 25 that had attained different levels of education (see Table E).

These estimates suggest that OECD and Formerly Centrally Planned Economies (FCPEs) have the highest stock of human capital, but a major problem with such data is that it does not reflect the quality of the education. Two commonly used (though imperfect) proxies of educational quality are government expenditure on education as a

#### **Table D Educational data**

	Illiteracy	Enrolment ratios (a)		Education quality proxies		
	Per cent (a)	Primary	Tertiary	Government	Primary	
	(1990)	and secondary (1991)	(1991)	expenditure on education as a percentage of GNP (1991) (a)	pupil/ teacher ratio (1991) (b)	
United Kingdom United States Japan	0.5 79	95 90 99 89 98 89	27.8 <sup>90</sup> 76.2 31 3	5.9 90 5.3 89 4 7 89	20 21	
Canada	3.4 86	106 90	98.8	7.4 90	15	
France Western German	y (c) —	$\begin{smallmatrix}104\\107&90\end{smallmatrix}$	40.0 36.1 90	5.8 4.1 90	12 17	
Italy Holland	2.9	82 99 90	31.7 37.6 90	3.1 6.3 <sup>90</sup>	12 17	
Belgium		101	38.2 90	5.2	10	
Hong Kong Taiwan (d) Republic of Kore Singapore Thailand Philippines Malaysia Indonesia Indonesia India China	$ \begin{array}{c} 11.9 & ^{71} \\ 7.6 \\ 3.7 \\ 17.1 & ^{80} \\ 7.0 \\ 6.4 \\ 21.6 \\ 18.4 \\ 51.8 \\ 22.2 \\ \end{array} $	88 92 97 87 89 62 90 97 76 81 89 68 90 86	17.6 <sup>89</sup> 21.0 39.9 11.8 <sup>84</sup> 16.3 <sup>89</sup> 27.8 7.3 90 9.5 6.7 87 1.6	$3.0 \ 90$ 5.5 4.1 3.4 88 3.8 90 3.0 5.6 0.9 88 3.1 89 2.3	27 27 34 26 18 33 20 23 60 22	
Argentina Brazil Mexico	4.7 18.3 12.4	96 89 85	43.4 11.7 15.2 90	1.5 4.6 <sup>89</sup> 4.5	18 23 30	
Czechoslovakia Hungary Poland	$\begin{array}{c} \hline 1.1 & 80 \\ 1.2 & 79 \end{array}$	90 86 94	16.3 15.3 21.5	3.5 6.1 90 4.6	12 17	

not available.

Note: Enrolment ratios may be greater than 100 because some pupils are older or younger than the standard school age

Source: UNCTAD, Handbook of International Trade and Development Statistics, 1993. Source: World Bank, World Development Report, 1994. Primary pupil/teacher ratio data is for Eastern and Western Germany. Source: Monthly Bulletin of Statistics of the Republic of China.

(a) (b)

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percentage of GNP and the primary school pupil-teacher ratio. As Table D shows, these two measures generally support the view that the quality of education is highest in OECD and FCPE countries.

Overall, it would appear that the OECD is relatively well endowed with higher-skilled labour and the NIEs with lower-skilled labour, but the FCPE countries also appear to be well endowed with higher-skilled labour. But this position is not static: the extent of investment in human capital has been cited as an important factor in the development of some of the NIEs, a view which is given some support by 'endogenous growth' theories, which stress the important role of human capital in stimulating growth.<sup>(1)</sup> Indeed, between 1960 and 1985, the fastest rate of growth in years of schooling of the population aged over 25 occurred in the East Asian economies, which include the first and

### **Table E**

#### Highest educational level attained (1985)

Percentage of population aged over 25 years

	No school	Primary	Secondary	Higher	Average years' schooling
Latin America	22.4	56.6	13.9	7.1	4.47
Eastern Asia (a	a) 23.6	51.3	18.8	6.3	5.19
South Asia	69.0	13.7	14.1	3.2	2.81
FCPEs	2.3	36.1	51.9	9.8	9.17
OECD	3.3	37.7	40.8	18.2	8.88

Source: Barro, R and Lee, J, 'International comparisons of educational attainment', Journal of Monetary Economics, 32, 1993, pages 363–94

(a) Includes first and second generation Asian NIEs.

(1) See for example Romer, P, 'Increasing returns and long-run growth', Journal of Political Economy, 94:5, pages 1,002–37, October 1986.

second generation Asian NIEs. In addition, in comparative cognitive tests of school children, those in first-generation Asian NIEs often perform strongly, matching—or even exceeding—the performance of some OECD countries.<sup>(1)</sup>

Table D shows that, despite this apparently rapid increase in the quantity of skilled labour in the first and second generation Asian NIEs over the period, they do not yet appear to have reached the levels of the OECD countries. Given this evidence, the Heckscher-Ohlin theory would predict that UK imports from OECD countries would tend to be greater in products requiring relatively higher skills and, by contrast, imports from the NIEs would tend to be greater in products requiring relatively lower skills. Charts 8 and 9 show a proxy for higher skill levels—the percentage of non-manual workers employed—in 28 mainly

#### Chart 8

Share of total UK imports from non-OECD countries in 1992 and the percentage of non-manual workers by industry



The line is based on a simple regression.

#### Chart 9

# Share of total UK imports from first and second generation NIEs in 1992 and the percentage of non-manual workers by industry



manufacturing industries. These are plotted against the industries' share of UK imports from non-OECD and from the first and second-generation NIEs.<sup>(2)</sup>

The charts show that, as the proportion of non-manual workers in an industry increases, the share of imports from non-OECD countries and the first and second-generation NIEs decreases. The industries where the share of imports is highest, from both non-OECD countries and the first and second-generation Asian NIEs, are clothing, leather, fur and travel goods and footwear—all of which are industries with relatively low-skilled workers.

However, Chart 9 shows the relationship is seemingly less strong for the first and second-generation Asian NIEs. This may illustrate the dynamic nature of the gains from trade. The first and second-generation NIEs have been growing strongly for a number of years and have invested heavily in human and physical capital. During the 1980s, some of the fastest growing UK imports from the Asian NIEs were for high-technology products, such as electronic equipment and office machinery.

Despite this pattern changing over time, Chart 9 also suggests that the share of UK imports from the first and second-generation Asian NIEs still tends to be greater in the products of relatively lower-skilled industries.

It is difficult to be precise about the skill content of UK imports from non-OECD countries. Because the production of many goods is split into stages, it is increasingly feasible, as transport costs have fallen, for firms to locate different stages of production in different countries. The higher-skill stages can be performed in skill-rich regions and the components then transported to relatively lower-skilled, labour-rich regions for final assembly.

#### **Capital flows**

Theories of economic development often stress the role of capital accumulation. If it is assumed that OECD countries are relatively well-endowed with capital and that capital is relatively scarce in the NIEs, then the marginal return on capital must be less in OECD countries than in the NIEs. So OECD countries would find it advantageous to lend savings to the NIEs rather than invest all their savings domestically. By contrast, the NIEs may not to have enough savings to take advantage of all their domestic investment opportunities. They would consequently benefit from borrowing from OECD countries and expanding investment up to the point where the marginal efficiency of investment is equal to the world interest rate.<sup>(3)</sup> We would therefore expect to see a flow of capital from the OECD, where returns would be relatively low, to the NIEs, where returns would be relatively high.

This theory suggests that net capital flows from the OECD to the NIEs would be positive. Chart 10 shows that this was

(1) Source: The East Asian Miracle, The World Bank, 1993.

These figures are estimates have on broadly matched Standard International Trade Classification and Standard Industrial Classification data.
 See, for example, the two-gap model of Chenery, H B and Bruno, M, 'Development Alternatives in an Open Economy: The Case of Israel',

Economic Journal, 1962

#### Chart 10 Net private capital flows from DAC countries to the Asian NIEs (1970–92)



the case for total net private capital flows from the  $DAC^{(1)}$ group of OECD countries to the Asian NIEs between 1970 and 1992. And these net outflows appear to have increased over the period. In 1992, China received \$11 billion in foreign direct investment-the largest such inflow to any developing country.

#### The implications of trade with the NIEs

What are the implications for the OECD economies of the significant changes to the size and nature of trade between the OECD and the NIEs?

Both NIEs and OECD countries should benefit from increased trade. Trade stimulates more efficient allocation of resources between the regions, since it allows each to concentrate on producing the goods and services in which it has a comparative advantage. It can then obtain the other products it requires through trade. As a result, output in both regions will increase and, in addition to these efficiency gains, output will no longer be constrained by the size of the domestic market. Not only will each region be able to produce and sell more, but both will be able to obtain goods and services from the other region at a lower resource cost than could be achieved domestically.

The increase in trade between OECD countries and the NIEs seems to have coincided with important structural changes in OECD economies, including an apparent decline in the relative demand for lower-skilled labour. In the United States and United Kingdom, this seems to have taken the form of an increase in wage inequality between higher and lower-skilled labour since the late 1970s, as illustrated in Chart 11. It shows the ratio of non-manual to manual workers' wages in the United Kingdom and the ratio of non-production to production workers' wages in the United States.

In many OECD countries, a fall in the relative demand for lower-skilled workers appears to have led to an increase in

# Chart 11





their unemployment levels, compared to higher-skilled workers. As Table F shows, with the exceptions of Australia and Canada, there has been a higher proportionate increase in male unemployment among less educated members of the workforce than among more highly educated members in all the OECD countries. This is consistent with a fall in demand for unskilled workers relative to supply, without the full adjustment of wages that would be required to maintain full employment.

#### Table F Male unemployment rates by educational attainment

Country and age group		Lower secondary or less	Upper secondary or higher	Ratio	
Australia (25–54)	1982	5.8	2.3	2.50	
	1990	7.1	3.2	2.26	
Canada (25 and over)	1979	6.8	3.8	1.80	
	1990	11.0	6.3	1.74	
France (25-64)	1979	3.7	2.6	1.40	
	1990	8.3	4.1	2.02	
Western	1978	4.1	1.8	2.25	
Germany (25–54)	1987	14.6	5.0	2.91	
Italy (25–64)	1980	1.6	3.4	0.47	
	1989	4.7	4.6	1.04	
Japan (25–64)	1979	2.7	1.5	1.87	
	1992	3.0	1.6	1.90	
United Kingdom (25–55)	1979	5.4	2.2	2.49	
	1990	8.7	3.3	2.68	
United States (25-64)	1979	6.6	3.2	2.06	
	1989	9.7	3.9	2.51	
Data not available for NIE	countries.				
Source: The OECD Jobs S	Study (1994)				

Table G illustrates recent changes in sectors' shares of total manufacturing employment in the United Kingdom, with the industries ranked by the proportion of their workers that are non-manual. It shows that the three industries with the highest proportion of non-manual workers all increased their share of manufacturing employment between 1971 and 1994. Of the other eight sectors, only two increased their share of manufacturing employment.

Development Assistance Committee of the OECD. As of 1992, this comprised all Member States of the OECD with the exceptions of Greece, Turkey, Luxembourg and Iceland.

# Table GShare of total manufacturing employment in the UnitedKingdom by industry

	of non- manual workers 1994	of imports from non-OECD countries (1992)
1.1	55	6.4
3.5	55	_
1.3	52	17.1
-0.5	41	5.8
-1.4	41	7.7
-1.0	33	14.3
-3.6	32	13.2
3.4	31	20.9
1.4	31	20.7
-1.7	28	2.9
-2.7	22	39.5
	1.1 3.5 1.3 -0.5 -1.4 -1.0 -3.6 3.4 1.4 -1.7 -2.7	$\begin{array}{c} \mbox{Change Fer cent} \\ \mbox{of non-manual} \\ \mbox{workers} \\ 1994 \\ \hline \\ \mbox{1994} \\ \hline \\ \mbox{1.1} \\ 55 \\ 3.5 \\ 55 \\ 1.3 \\ 55 \\ 1.3 \\ 55 \\ 1.3 \\ 55 \\ 1.3 \\ 55 \\ 1.3 \\ 55 \\ 1.3 \\ 55 \\ 1.3 \\ 52 \\ -0.5 \\ 41 \\ -1.4 \\ 41 \\ -1.0 \\ 33 \\ -3.6 \\ 32 \\ 3.4 \\ 31 \\ 1.4 \\ 31 \\ -1.7 \\ 28 \\ -2.7 \\ 22 \end{array}$

There are a number of possible explanations for these structural changes in OECD labour markets. One possibility is that it may be linked to the increase in trade with developing countries and, in particular, the NIEs. According to Stolper and Samuelson,<sup>(1)</sup> a refinement of the Heckscher-Ohlin theory provides a framework for analysing the effect that trade has on the returns to the factors of production in the two regions. This theory claims that as trade increases, there is increased demand for a region's exported good, and its price rises. Since OECD countries appear to have a relatively large supply of higher-skilled labour, the Heckscher-Ohlin theory predicts that they will tend to export goods that use higher-skilled labour relatively intensively. As the price of these exports increases, firms will wish to produce more and so will require more higher-skilled labour. There will be the opposite effect on the demand for lower-skilled labour as the supply of imported goods rises, lowering their prices.

The implication of this for OECD labour markets is that the wages of higher-skilled labour will rise relative to those of lower-skilled labour. In the simple versions of this model, the overall employment of higher and lower-skilled labour is assumed to remain unchanged. However, if, for example, there are labour market imperfections or lags in the process of labour market adjustment, it may be the case that, in the short run, some mix of lower wages and lower employment will be the outcome for lower-skilled labour in the OECD. Nevertheless, any such changes in employment should prove temporary since, over time, the labour market should adjust.

In the NIEs, the outcome is reversed, with the wages of lower-skilled labour increasing and those of higher-skilled labour falling. Relative factor prices are therefore equalised across regions as the relative wages of higher-skilled labour rise in the OECD and fall in the NIEs, and the relative wages of lower-skilled labour fall in the OECD and rise in the NIEs. In reality, such adjustments may be imperfect or slow. It is important to stress that the theoretical framework does *not* imply that there will be an decrease in *aggregate* demand in the OECD, following an increase in trade with the NIEs. Indeed, the fact that the NIEs have current account deficits or relatively small surpluses suggests that their trade has not contributed to a reduction in aggregate demand in OECD countries. Rather, the theoretical framework is concerned with changes in *relative* demand, for lower and higher-skilled labour.

Another important caveat to this theory is necessary: the theoretical framework outlined above is essentially a two period model-in the first period there is no trade and in the second free trade. Reality is much more complex. In particular, it is possible for countries to alter their endowments of the factors of production over time and this process is particularly evident in the Asian NIEs. The first-generation Asian NIEs have invested heavily in education, raising their supply of higher-skilled labour above that of other Asian NIEs. This has been reflected in the nature of their trade with the OECD, which now tends to be more intra-industry (ie in similar, but different goods), than OECD trade with other Asian NIEs. They also have a greater proportion of higher-skilled manufacturing exports than other non-OECD countries. Hourly wages are also somewhat higher than in the other NIEs and earnings have grown rapidly. All this suggests that the first-generation Asian NIEs have been able to increase their supply of higher-skilled labour. Were this process to continue, the first generation of NIEs would increasingly have a comparative advantage in production of skilled-labour intensive goods and trade with the OECD would be predominantly intra-industry. The theoretical framework outlined here would no longer be appropriate for analysing trade with the first-generation NIEs, as it relies on differences in endowments of the factors of production. It would, though, remain relevant for later generations.

Although this theory predicts that lower-skilled workers in the OECD may experience a decline in their relative wages, consumers of imported goods should benefit because, as the supply of imports increases, their prices should fall. This could imply that, even if the nominal wages of lower-skilled workers do decline following an increase in trade, they may still be better off in real terms if the price of their consumption basket falls as a result of cheaper imports.

The mechanism through which the labour market is ultimately affected by increased trade between OECD countries and the NIEs is through changes in import and export prices. The international prices of higher-skilled, labour-intensive goods should increase in OECD countries, whereas the international prices of lower-skilled, labour-intensive goods should fall. However, studies have generally found that this is either not the case or the effect is not large enough to explain the observed widening of wage inequalities.<sup>(2)</sup> Another prediction of the theoretical framework is that the ratio of higher to lower-skilled

Stolper, W and Samuelson, P A, 'Protection and real wages', *Review of Economic Studies*, November 1941, pages 58–73.
 See for example, Sachs, J and Shatz, H, 'Trade and jobs in US manufacturing', *Brookings Papers on Economic Activity*, 1, 1994, pages 1–84.

#### What has caused the increase in the ratio of non-manual to manual workers' wages ?

This box investigates a number of different factors contributing to the rise in the ratio of non-manual to manual workers' wages in the United Kingdom. The theoretical framework used in the main article predicts that, following an increase in trade between two regions with different factor endowments, factor prices would tend to equalise. Lower-skilled labour wages would tend to fall in the United Kingdom and rise in the NIEs, whereas higher-skilled labour wages would tend to rise in the OECD and fall in the NIEs. However, there are a number of other plausible explanations, including the impact of technological progress and labour market reforms.

The increase in the ratio of non-manual to manual workers' wages appears to have begun around the early 1980s. By contrast, the increase in the share of UK imports from the Asian NIEs (used to proxy for all the NIEs) appears to have begun around the early to mid 1970s (see the chart). However, the mid to late 1970s was a period characterised by incomes policy. In particular, some form of incomes policy was in place from late 1972 until 1979. These policies made exemptions for the low paid, who tend to be manual workers. In addition, incomes policies generally have a greater impact on public sector workers, who are predominantly non-manual in nature. These factors may help to explain the decline in the ratio of non-manual to manual workers' wages during that period. They may also have overwhelmed any impact on wage inequality from increasing competition with the NIEs.

#### Ratio of non-manual to manual workers' wages and the share of UK imports from the Asian NIEs



As well as incomes policy, the ratio of non-manual to manual workers' wages may also have been influenced by changes in the structure of the labour market. In particular, there were a series of labour market reforms in the early 1980s, which included changes to trade union laws. Trade union membership has declined sharply since the early 1980s, particularly among manual workers.

An increase in technology may be expected to reduce the demand for manual workers relative to that for non-manual workers. New technology will often be used as a substitute for manual labour; as a result its introduction will tend to increase non-manual wages relative to manual wages.

#### Empirical results

In order to assess tentatively the impact of these various factors on the ratio of non-manual to manual workers' wages, an equation is estimated over the sample period 1961 to 1993. The coefficients from this equation represent long-run elasticities for each explanatory variable with respect to the ratio of non-manual to manual workers' wages. A dummy variable (D) was included to allow for the effects of incomes policy over the period 1973 to 1979. The estimated long run relationships are given by the equation below:

#### $NMM = -0.24 + 0.07 PM + 0.17 IMP - 0.11 TUM - 0.72 D^{(1)}$

 $(-0.23) (3.32) (2.93) (-0.38) (-3.57)^{(2)}$ 

where *NMM* is the ratio of non-manual to manual workers' wages, *IMP* is the share of total imports to the United Kingdom from the Asian NIEs, *PM* is investment in plant and machinery at constant prices, as a crude proxy for an increase in technology, and *TUM* is trade union membership, as a proxy for labour market reforms (all measured in logs).

These results suggest that, in this simple framework, both increases in technology and the rising share of imports from the Asian NIEs have had a significant impact on the relative wages of non-manual and manual workers in the United Kingdom.

In general, studies of the impact of imports on demand for lower-skilled labour have found some effect, but not enough to explain all of the observed changes in wage inequality and relative unemployment. This is often attributed to the fact that, although imports from the NIEs have increased, they are still of a relatively small magnitude in terms of OECD GDP. Technological progress is therefore often seen as a significant explanation.<sup>(3)</sup>

Estimated using the Autoregressive Distributed Lag approach, ARDL(1,0,0,1) selected using Schwarz Bayesian Criterion. This approach identifies the appropriate long-run relationship between the variables by analysing various combinations of lags.

 <sup>(2)</sup> Long-run *t*-ratios.
 (3) See, for example, Lawrence, R and Slaughter, M, 'International trade and American wages in the 1980s: giant sucking sound or small hiccup?', *Brookings Papers on Economic Activity*, Microeconomics 2, 1993, pages 161–226.

workers employed should decline in all industries as trade with the NIEs increases. This is because industries economise on the use of higher-skilled labour as their relative wages increase. Full employment is, nevertheless, maintained because the output of the sector that uses higher-skilled labour relatively intensively has increased. In fact, a number of studies have found this not to be the case and that this ratio has actually risen.<sup>(1)</sup> Also, Table G shows that there does not appear to be an obvious relationship between the changing employment pattern in the United Kingdom and the sectoral share of imports from the non-OECD countries, suggesting that other factors may have been important.

If increased trade between the OECD and the NIEs leads to rising wages for higher-skilled workers relative to lower-skilled workers in the OECD, it could also be expected to have had the opposite effect in the NIEs. However, the experience of a number of NIEs contradicts this expectation. Between 1985 and 1988, the ratio of non-production to production workers' wages in Mexico's maquiladora<sup>(2)</sup> enterprises increased from 2 to 2.5. In addition, between 1980 and 1990, the wages of university graduates in Chile rose by 56% relative to those of high school graduates.<sup>(3)</sup>

So, there are a number of facts that appear to be inconsistent with the theoretical framework, implying that international trade may not be the major cause of growing wage inequalities in a wide variety of countries. One possible alternative explanation for this divergence in wages is technological progress, which enables capital equipment (eg computers) to substitute for lower-skilled labour. This would also be expected to cause a decline in the relative demand for unskilled labour, but not necessarily just in OECD countries. In order for technology to explain the recent decline in demand for unskilled labour, it must be the case that this new technology is biased against unskilled labour and that, over the past few years, it has had a greater impact on the demand for unskilled labour than previously. A number of studies have suggested that increased computer usage in the 1980s fits this profile and have found it to be correlated with the decline in demand for unskilled labour in some OECD countries.(4)

It is possible that the trade and technology explanations for the decline in demand for unskilled labour may be related. For example, firms which face increasing competition may engage in 'defensive innovation'-investing in new technology in order to increase their productivity and remain competitive. This would make it very difficult to isolate the effect of technology alone.

It is also possible that certain labour market reforms, such as the reduction in trade union power, may have had a disproportionate impact on the wages and employment of

unskilled labour. The box on page 77 presents some tentative estimates of the extent to which technology, labour market reforms and the share of imports from the Asian NIEs may each have affected the ratio of non-manual to manual workers' wages.

#### **Implications for the future**

Although OECD trade with the NIEs is increasing, it is still quite low, both as a share of total trade and as a percentage of OECD GDP: most OECD trade is with other OECD countries. However, given that the share is rising rapidly, what are the likely implications of the rapid growth in trade between the OECD and the NIEs?

Economic theory suggests that the growth in trade with the NIEs will bring about some short-run frictions in the OECD economies. There will be an increase in the relative demand for those resources required to produce goods and services in which the OECD economies have a comparative advantage. There may be a temporary increase in lower-skilled workers' unemployment, but utilising comparative advantage means that resources will be allocated more efficiently, improving global welfare. Growth will be higher both within the OECD and in the NIEs.

The United Kingdom has experienced a shift of resources away from lower-skilled, labour-intensive, manufacturing sectors and towards higher-skilled manufacturing and service industries. As the NIEs' domestic economies grow, their demand for imports is also likely to increase, leading to higher demand for UK exports of goods and services. In addition, the United Kingdom currently runs a current account surplus with many of the Asian NIEs.

The changing scale and nature of OECD trade with the NIEs appears to be closely linked to the changing structure of their domestic economies. As the NIEs have developed, they have been able to alter their supplies of the factors of production such as capital stock and skill levels, and over time this seems to have been reflected in the type of products in which they trade with OECD countries. In particular, as their capital stocks and skill levels grow, their trade increasingly takes place in similar industries to those in which OECD countries have specialised.

In conclusion, while there is some evidence that trade with the NIEs may be having some adverse impact on demand for lower-skilled labour in OECD countries, most studies have found that this impact is relatively modest and that other factors, such as technology, may have played a significant role. Increased trade with NIEs can be expected to deliver benefits to OECD countries by making it possible for production to be increasingly specialised internationally and for economic growth to be faster as a result.

See for example, Bound, J and Johnson, G, 'Changes in the structure of wages in the 1980s: an evaluation of alternative explanations', *American Economic Review*, June, 1992, pages 371–92.
 Maquiladora industries are exempt from import and export duties.
 Source: World Development Report, World Bank, 1995.
 See for example Machin, S, 'Changes in the relative demand for skills in the UK labour market', Discussion Paper No 952, Centre for Economic Policy Research, 1994.

## The gilt-edged market: developments in 1995

This article reviews the gilt-edged market in 1995, continuing the annual series begun in 1989. Numerous changes to the gilt market were announced as part of the most extensive programme of reform since Big Bang in 1986. World bond markets rallied, particularly towards the end of the year, when yields in some countries approached their 1993 lows. This fall reflected a gradual reduction in expectations of world economic growth and inflation. Gilt yields fell over the course of the year, and turnover increased slightly. More than £27 billion worth of stock was issued, and the number of gilt issues with over £5 billion outstanding reached 18. One new gilt-edged market-maker started business during the year and three withdrew, leaving a total of 20.

#### Structural reforms in 1995

During 1995 a series of reforms were introduced or announced as part of the continuing development of the gilt market. These are designed to maintain and enhance the attractiveness of the gilt market to investors, and thereby help reduce government funding costs.

#### Issuance techniques

- An auction calendar, and a size range of  $\pounds 2-3$  billion per auction, were included in the Chancellor's remit to the Bank in March for funding in 1995/96. This consolidated the move in recent years towards a schedule of auctions. The remit also indicated before the start of the financial year the proportions of stock, by maturity and type, that the authorities were aiming to issue, and provided for quarterly announcements by the Bank of the maturity range of the stock to be auctioned in the following quarter.
- The joint Treasury/Bank Report of the Debt Management Review<sup>(1)</sup> (DMR) was published on 19 July. This confirmed auctions as the primary means of issuance of conventional stock and announced plans for greater transparency in tap issuance.
- The DMR announced that the government would amend the framework for funding with effect from 1996/97. This had two major components. First, it removed the current prohibition on funding with debt of less than three years' maturity. This prohibition contrasts with the practice in most other industrialised countries. The government will thus be able in future to issue debt of any maturity, within a set maturity structure to be determined each year. Secondly, it refocused debt issuance away from the Public Sector Borrowing Requirement onto the Central Government Borrowing Requirement, reflecting the fact that money raised through debt issuance is used entirely to finance central government operations.

- On 3 August, the Bank introduced its changes to procedures for tap sales. Tap issues are now announced at 10.15 am for bids at 10.45 am, and details of the amount sold at the initial and any subsequent mini-tenders are published.
- Towards the end of September, the Bank convened the first of the planned formal meetings with gilt-edged market-makers and end-investors. These are held quarterly to seek views on the maturities of the gilts to be issued at auction in the following quarter. Both the agenda for the meetings and the minutes were published. The process was repeated in December.

#### Repo

- On 21 February 1995, the Chancellor confirmed that the tax changes needed to facilitate an open gilt repo market would be introduced.<sup>(2)</sup> A repo is a sale of stock with a simultaneous agreement to repurchase it at a future date. Repo enables market participants to borrow cash against gilt collateral and so finance long positions in gilts. Reverse repo enables participants to borrow stock and to cover short positions.
- On 29 March, the Bank published 'Plans for the Open Gilt Repo Market', setting out plans for the structure and operation of the market and announcing that it would begin on 2 January 1996. At the same time, drafts of a Gilt Repo Legal Agreement and a Code of Best Practice were issued by two working parties of market practitioners convened by the Bank.
- The Bank announced, on 12 July, that from January 1996, the ex-dividend period for all gilts would be reduced from 37 calendar days to seven working days (except  $3^{1/2}$ % War Loan, for which the period was reduced to ten working days).
- On 27 July, a consultative paper on the settlement of gilt repo transactions was issued by a third working party.

The executive summary of the report is reproduced in the box, 'Debt Management Review' on page 226 of the August 1995 *Quarterly Bulletin* See the box on 'The open gilt repo market' on page 131 of the May 1995 *Quarterly Bulletin*.

- The Bank issued a package of final papers on 8 November, including legal documentation for use in the gilt repo market, the Code of Best Practice and a paper setting out points of detail on settlement matters.<sup>(1)</sup>
- The London Stock Exchange published rule changes to facilitate gilt repo on 8 December.
- The Gilt-Edged Stock Lending Agreement was amended so that its provisions would dovetail with those of the new Gilt Repo Legal Agreement, and released on 22 December.
- As a consequence of the introduction of an open gilt repo market, a number of gilt-edged market intermediaries announced changes to their corporate structure toward the end of 1995. Specifically, most Stock Exchange money brokers announced that they would be merging their gilt business with a discount house or bank, mostly from within the same financial group, to offer an integrated repo and stock lending service.
- The gilt repo market started on 2 January 1996, since when there has been no restriction on the ability to repo, borrow or lend gilt-edged stock. Initial indications are that the market started smoothly and that activity is steadily building up.

#### **Strips**

- On 25 May, the Bank issued a consultative paper on the creation of an official stripping facility for gilts.
- It was announced on 10 July that the Government had decided in principle to introduce the tax changes that would make a stripping facility possible.
- On 19 September, the Bank announced that the new stock to be auctioned later in September  $(7^{1/2}\%)$  Treasury Stock 2006) together with the three existing benchmark stocks (8% Treasury Stock 2000, 81/2% Treasury Stock 2005 and 8% Treasury Stock 2015) would become strippable on the introduction of an official stripping facility. The aggregate amount of strippable stock outstanding at end-1995 was £29.2 billion. All these stocks have dividend dates of 7 June and 7 December.
- The Finance Bill, published on 4 January 1996, contained provisions for regulations to set out the terms on which unstripped gilts can be exchanged for their stripped components.

#### Tax reforms

• The introduction of open gilt repo trading (see above) has been made possible by a major reform of the withholding

tax system for gilts: most wholesale investors can now receive dividends gross of withholding tax. Those eligible under the new regime can elect to hold their gilts in what is known as a STAR account in the Central Gilts Office (CGO) and thereby receive gross gilt coupon payments. UK corporate investors pay tax on this income on a quarterly basis.

- Since January 1996, all manufactured gilt dividends<sup>(2)</sup> have been payable gross in all circumstances, enabling investors to repo across coupon dates without incurring a liability to withholding tax. Also, pension funds have ceased to be taxed on their fees for stock lending (to ensure a level playing field in the tax treatment of gilt stock lending and repo).
- On 24 May, the Inland Revenue announced that what had become known as the 'three dividend rule' would no longer apply. As a result, overseas investors in gilts no longer need to have the intention of holding stock over at least two, or preferably three, successive dividend dates to receive their dividend payments on FOTRA stock gross of tax.
- The cumulative effect of these changes is that for overseas corporate investors, the distinction between FOTRA stocks, which are free of withholding tax on application, and non-FOTRA stocks disappears for practical purposes.
- The Inland Revenue announced on 25 May 1995 that it was consulting on fundamental tax reform for gilts and bonds. Following this consultation, the Chancellor announced on 10 July that, from April 1996, gilts and bonds would be taxed on a total return basis for most investors, with no distinction made between capital gains and income, and with relief given against capital losses.(3) This reduced the premium attaching to low coupon stocks, and reduced the variance of stocks around the yield curve. Apart from some simplifications, the present taxation arrangements will continue to apply to individuals and trusts.
- A further important tax reform is that when an official stripping facility is introduced, coupon interest will be paid gross of tax on the strippable gilts.
- Further details of the new tax regime were announced in the November 1995 Budget, and the provisions were set out in the Finance Bill.

#### Central Gilts Office

• Improvements to the CGO during 1995 included measures to deal with gilt repo:

<sup>(1)</sup> See the note on the gilt repo market on pages 325–30 of the November 1995 Quarterly Bulletin which outlines the key features of these documents. Copies of the package are available from Ms Michelle Morris, Gilt-Edged & Money Markets Division, Bank of England, Threadneedle Street, London, EC2R 8AH. (2)

<sup>(3)</sup> 

Lonoon, EC2K AAH. A manufactured dividend is a cash payment made to a counterparty in place of the *real* dividend payment that the counterparty would have received from the government if it had still been registered as holding the stock on the ex-dividend date. See the box on 'Changes to the taxation of gilts and the development of an official strips market' on page 228 of the August 1995 *Quarterly Bulletin*.

- Operational capacity has been substantially increased, with upgraded hardware, to cater for a possible increase in volumes consequent upon repo.
- The CGO operational timetable has been extended at both ends of the day, to allow members more time for inputting and to facilitate the use of gilt repo as a money market instrument.
- The CGO service is being kept under review as the repo market develops.
- On 24 November, the Bank announced that three international centralised securities depository institutions would be members of the CGO and offer settlement and custody services from 4 March 1996: Bank of New York, Cedel Bank and Euroclear.
- The Bank also announced on 24 November that CGO would be upgraded by the early part of 1997, using CREST software. In parallel, the Bank announced that it would be reviewing with all market participants and other interested parties the strategic requirements for payment and settlement systems for financial markets in the United Kingdom as a whole and that, with this in mind, the Bank would keep open the option of merging the two settlement systems.

#### Index-linked gilts

- On 14 and 15 September 1995, the Bank of England hosted a conference on the development of the index-linked market. It brought together end-investors, market-makers, academics and government issuers from a number of countries to discuss the role of index-linked debt in the framework for government debt issuance, the market structure for index-linked debt, and techniques for extracting information on real interest rates and inflation expectations from index-linked debt. The Bank and Treasury papers prepared for the conference are available<sup>(1)</sup> and are being formally published together with a summary of the conference proceedings.
- The Bank announced on 14 December that, following the September conference, it was consulting the market in detail on the merits and practicalities of establishing a separate list of index-linked market-makers, and of holding a pilot series of auctions of index-linked gilts in the next financial year.
- After reviewing various other ideas discussed at the conference, the Bank announced that the authorities had no plans to introduce Limited Price Index (LPI) gilts or earnings-linked gilts for the time being.<sup>(2)</sup> This reflected, amongst other things, the uncertain scale of demand for such products and the potential adverse impact on the liquidity of index-linked gilts. These issues will be kept under review.

The various developments to the gilt market described above fall into three main categories: measures to increase transparency and predictability of issuance methods; steps, such as repo, to promote the liquidity and efficiency of the secondary market; and enhancements to gilt-edged stock as an investment instrument, through the availability of a strips facility, for example. Many of these developments are being facilitated by important changes to the tax system and enhancements to gilt settlement services. The overall objective is to help reduce the government's long-term financing costs.

#### Gilt yields in 1995

Over the course of 1995, bond yields declined in the major economies, reflecting a steady reduction in expectations of growth and inflation in many countries (see Chart 1). The yield on the ten-year benchmark gilt started the year at 8.67% and trended gradually downwards, reaching an intra-year low of 7.36% on 6 December and ending the year at 7.41%.



Chart 2, showing the differentials of ten-year gilt yields over US, French and German government bonds, illustrates the intra-period and inter-market volatility that can occur even where a consistent trend across markets is evident over the medium term. The spread of UK yields over the United States widened at the end of June (to a 1995 peak of 230 basis points), reflecting political uncertainties in the United Kingdom and expectations of interest rate reductions in the United States. Gilt prices firmed over the summer as domestic political factors became less important, but faltered in October after the slightly uncovered (ie not all stock was sold) September gilt auction (see below). A well-covered gilt auction in October, coupled with market worries over the US budget process, contributed in the autumn to a narrowing of spreads over US government bonds. Gilt spreads over German and French government bonds exhibited less volatility.

From Ms Michelle Cook, Monetary Analysis, Bank of England, Threadneedle Street, London EC2R 8AH. LPI bonds would be indexed to the lower of, say, 5% and the Retail Price Index. Earnings-linked bonds would be indexed to a measure of earnings

growth.

#### Chart 2 Ten-year yield differentials of the United Kingdom over the United States, France and Germany



Over the year as a whole, gilt yields declined from their autumn 1994 levels, and an upward-sloping curve developed. Chart 3 illustrates how bond market rallies in both 1993 and 1995 were associated with upward-sloping yield curves. (Although the chart uses par yield curves, broadly the same picture is obtained using zero coupon curves.) Chart 4 shows the associated changes in implied forward interest rates. The forward curve ceased to be

#### Chart 3 Par yields on British government stocks



inverted in late spring, as implied forward rates two to six years ahead fell below implied forward rates further out; the curve became increasingly positive-sloping later in the year.

This change was reflected in an increase in the spread between long and medium par yields, from a low of -38 basis points on 20 June 1994 to being positive in May 1995, and peaking at 32 basis points on 27 October, shortly after the fourth auction in the year of the benchmark



This 3D surface illustrates how the implied forward rate curve has evolved week-by-week since the beginning of the year. The shading emphasises the level of forward rates at any given point on the surface. The implied forward rates are annualised six-month interest rates derived from the zero-coupon yield curve.

20-year stock (see Chart 5). This ended a period of inversion at the long end of the yield curve.

#### Chart 5





There are several possible explanations for the changing shape of the yield curve. First and most obviously, the change may have reflected a shift in market expectations of future inflation and interest rates. It is also possible that the greater scale of issuance of 20-year stock during calendar 1995 compared with 1994 contributed to the development of an upward-sloping yield curve. A further possibility is that other factors contributed to the change, such as the reduction in volatility, making the convexity properties of longer maturity bonds less valuable.<sup>(1)</sup>

Chart 6 shows implied bond market volatility in some of the major markets. It was on average much lower in all markets in 1995. In addition, the apparent correlation between implied volatility in the UK and German government bond



markets was much greater in 1995 than in the previous two years, and the levels were more comparable.

Chart 7 suggests that the real yield curve became positive in 1995. Yields on different maturities of index-linked stocks tended to diverge in 1995 compared with 1994.



**Gilt-edged funding requirement** 

In the funding remit to the Bank for 1995/96,<sup>(2)</sup> the PSBR was forecast at £21.5 billion, with a gilt funding requirement of £23.1 billion, including £4.1 billion to re-finance maturing gilts. The Treasury's Summer Economic Forecast increased the forecasts to £23.6 billion and £25.8 billion respectively. In the November 1995 Budget, the PSBR was again revised upwards, to £29.0 billion, and the gilt funding target was increased to £31.1 billion, including a larger underfund from the previous year.<sup>(3)</sup> On the following morning the Bank announced that, as a result of the changes, the remit had been revised and that a further gilt auction would be held in February 1996, bringing the total number of auctions in the financial year to nine.

#### **Stocks issued**

There were gross sales to the market of £27.4 billion of stock in calendar 1995, of which £7.1 billion was made in the first calendar quarter of 1995, and the remaining £20.3 billion in the current 1995/96 financial year.

The remit provided for the Bank to aim to make approximately 15% of sales in 1995/96 in index-linked stocks, with the remainder in conventional stocks in

Convexity shows the curvature of the price-yield relationship and is, broadly, the rate at which the price sensitivity of a bond with respect to yield changes with yield, ic the second derivative of price with respect to yield. During 1995, gilt market volatility (as measured, for example, by the implied volatility of gilt options) was lower than in the previous year; implied volatility is calculated from at-the-money options prices and measures the expected degree of price movements in the underlying security for the remaining life of an option, and so is an indicator of uncertainty about future bond prices. Implied volatility averaged 7.9% in 1995, down from 10.7% in 1994. When volatility is low there is, in principle, less of a premium attached to bonds with high convexity, (the prices of which in principle rise by proportionately more in a rally than they fall when the market is falling). Twenty-year current coupon gilts have relatively high convexity, so the diminishing attractiveness of this property may have contributed to the fact that 20-year gilt prices did not rally as strongly as 10-year gilts towards the end of the year.
 Published by HM Treasury on 30 March 1995 and reproduced on pages 134–35 of the May 1995 *Quarterly Bulletin*.
 At the end of the 1994/95 financial year, the amount of underfunding was £1.4 billion, although it was not possible to finalise this figure until November 1995.

approximately equal proportions of one third each of short, medium and long maturities (3–7 years, 7–15 years and over 15 years respectively).

The Bank continued to build up, in a range of maturities, large, liquid issues which the market uses as benchmark stocks. Seven of the nine auctions during 1995 added to existing stocks. Two new stocks were created in 1995: a 20-year benchmark was created at the beginning of the year and auctioned on three subsequent occasions; and in auctions in the latter part of the year a 10-year benchmark for 1996 was created and built up. All conventional stocks issued by auction and by tap in 1995 paid coupon interest free of tax to overseas holders on application.

#### Method of stock issuance

Auctions formed the primary means of funding in 1995, continuing the trend of recent years. Nine auctions were held in calendar 1995; three in the first quarter and the remaining six in the current financial year. As noted above, three auctions are being held in the final quarter of 1995/96.

Table A gives auction details for 1995. The auction amounts ranged from £2 billion to £3 billion, as provided for in the remit. A total of £22.0 billion of stock was issued at auction, accounting for 93% of conventional issuance in 1995, and raising £21.3 billion. The average level of cover was 1.65 times, marginally below the average for the previous calendar year. The January auction of the 20-year benchmark was well-received, with no tail (see note to Table A), as was the February auction of the ten-year benchmark. The March auction added a further £2 billion to the 20-year benchmark stock in somewhat difficult market conditions.

#### Table A Auction results

Stock title	Status	Amount of issue £ billions	Date of auction 1995	Average yield per cent	Times covered	Tail (a)
8% 2015	New	2.0	25 Jan.	8.58	1.79	_
81/2% 2005	Fungible	2.0	22 Feb.	8.72	2.08	_
8% 2015	Fungible	2.0	29 Mar.	8.40	1.24	2
8% 2000'A'	Fungible					
	after 5 days	2.0	26 Apr.	8.30	2.17	_
81/2% 2005	Fungible	2.5	29 June	8.42	2.00	_
8% 2015	Fungible	2.5	26 July	8.33	1.42	1
71/2% 2006	New	3.0	27 Sept.	8.02	0.99	7
8% 2015'A'	Fungible		-			
	after 6 days	3.0	25 Oct.	8.33	1.997	_
71/2% 2006	Fungible	3.0	6 Dec.	7.45	1.12	11
<ul><li>71/2% 2006</li><li>(a) The different ware allotted</li></ul>	Fungible	3.0 between the	6 Dec. average yield	7.45 and the highest	1.12 t yield at whice	ch bid

The first auction of the new financial year in April was an 'A' tranche of the five-year benchmark stock, merging with the parent stock in the ex-dividend period five days after issue: a fungible issue may have been unattractive to investors not wishing to receive a large amount of accrued interest. The auction scheduled for June was put back one day to give the market time to digest the Summer Economic Forecast published by the Treasury on 28 June. The auction of the long benchmark at the end of July was well bid following the end of a period of political uncertainty early in the month with the Prime Minister's re-election as leader of the Conservative Party.

The September auction of £3 billion of a new ten-year benchmark for 1996 was the first gilt auction to be uncovered (albeit only very marginally so), and the tail of seven basis points was the longest then recorded. Notwithstanding the market turbulence in which the auction took place, it was disappointing that 'when issued' trading in the run-up to the auction, which is normally seen as an effective mechanism for price discovery, failed to find a level at which the auction would clear.

The October auction of the long benchmark, issued as an 'A' tranche for the same reasons as the April auction stock, was all but twice covered with no tail. The early December auction was held after the Budget but ahead of the thin trading that tends to precede the Christmas break. Despite an auction of German bunds being held on the same day as the gilt auction, the auction was fully covered. The record tail of 11 basis points, however, indicated a wide dispersion of bids, and again led to questions about the effectiveness of price discovery in the 'when issued' period.

The remaining £6.1 billion of gross sales of stock was sold to the gilt-edged market-makers (GEMMs) for onward sale to the market. Ten tap packages were brought during the year; four were of index-linked stock only, four were of a combination of index-linked and conventional stock, and two packages were taps of the floating-rate gilt together with index-linked stock. Before the release of the Inland Revenue consultative paper on tax reform in late May, the authorities refrained from issuing index-linked stock into a strong market rally because of the possibility that the forthcoming tax announcement could create uncertainty in the market.

#### **Stock outstanding**

The total nominal value of gilt-edged stock outstanding (including the inflation uplift on index-linked stocks) rose from £227.9 billion at end-1994 to £252.7 billion at end-1995 (and from £211.8 billion to £233.2 billion excluding the inflation uplift). Chart 8 shows the



breakdown of stock outstanding (at nominal prices including inflation uplift) for all gilts at end-1994 and end-1995.

The proportion of short:medium:long conventionals changed from 45:38:17 at the end of 1994 to 43:39:18 at the end of 1995, reflecting the greater issuance of mediums and longs than shorts during the calendar year. Over the same period, the modified duration of conventionals outstanding (excluding small stocks) rose slightly to 5.51 years (see Table B).

# Table B Modified duration<sup>(a)</sup> of conventional gilts

	End-1994	End-1995
Shorts (0-7 yrs)	3.09	2.78
Mediums (7–15 yrs)	6.50	6.60
Longs (>15 yrs)	9.10	9.43
Total conventionals	5.42	5.51

(a) The 'duration' of a bond is the weighted average of the time to each of its cash flows, where the weights are the present values of each of the payments as a proportion of the total present value of all the cash flows. 'Modified duration' is an adaptation of this to give the price sensitivity of a bond to changes in its yield.

Details of the last annual survey of gilt holdings, showing sectoral holdings of gilts, were published in the Bank's 'Gilts and the Gilt Market: Review 1994–95'. The next survey of holdings, as at end-1995, is currently under way.

Table C shows the 18 stocks of which there was £5 billion nominal or more outstanding at the end of 1995. This compares with 14 such stocks at the end of 1994, and with only three such stocks three years ago, reflecting the policy of developing benchmark issues. Further, there are now four stocks with over £8 billion outstanding, up from two at the end of 1994; the 1995 long benchmark exceeds £9 billion. The combined nominal value of the 18 largest stocks at end-1995 totalled £122.4 billion, constituting 60% of total conventional stock outstanding.

# Table CLarge-issue stocks at end-1995

Stock	Original issue date	Nominal amount outstanding (£ millions)
8% 2015	26 January 1995	9,500
81/2% 2005	29 September 1994	8,900
8% 2003	3 December 1992	8,600
71/4% 1998	23 October 1992	8,150
7% 2001	29 July 1993	7,750
83/4% 2017	30 April 1992	7,550
81/2% 2007	16 July 1986	7,397
6% 1999	28 October 1993	6,600
93/4% 2002	15 August 1985	6,527
63/4% 2004	30 September 1993	6,500
8% 2013	1 April 1993	6,100
71/2% 2006	28 September 1995	6,000
Floating Rate 1999	31 March 1994	5,700
9% 2008	11 February 1987	5,621
83/4% 1997	9 October 1969	5,550
9% 2012	7 February 1992	5,360
9% 2000	3 March 1980 (a)	5,358
9% 2011	12 July 1987 (a)	5,273
(a) Date of creation, on a	conversion from other stocks.	

#### Turnover in the gilt market

Chart 9 shows turnover in gilts on the London Stock Exchange by value, while Chart 10 shows the number of bargains. Both charts show total turnover and customer turnover, the difference between the two being trades among market principals. As can be seen, turnover levels are driven by customer activity, with core market activity remaining broadly constant over time. It is possible that this relationship may be affected by the start of the gilt repo market in January 1996. Although gilt repo trades will not themselves be reportable to the Exchange, the interaction of the gilt repo and cash gilt markets may lead over time to behavioural changes in the cash gilt market.

#### Chart 9 Average daily turno

#### Average daily turnover: value





#### Chart 10 Average daily turnover: bargains



The two charts show that turnover by value rose slightly in 1995, after having declined during the difficult market conditions of 1994, while the number of bargains struck continued to trend marginally downwards as average bargain sizes increased. Over 1995 as a whole, average daily turnover was £6.2 billion, little changed from £6.1 billion in 1994. The average number of daily transactions declined from 2,800 in 1994 to 2,600, while the average size of customer deal rose from £1.5 million to £1.7 million. The increase in the average bargain size corresponds to market perceptions of a trend toward larger

lot trades. Most of the increase in turnover by value occurred during June 1995 and was tax-related. It was accounted for by 'bed-and-breakfasting' of gilts, where a gilt is sold and repurchased by the same investor, normally on the same day. These trades were undertaken on a large scale by many institutional investors in June to ensure that they would minimise any tax liability arising on their gilt holdings, regardless of the outcome of the Inland Revenue's consultations on proposals for tax reforms (see above).

Data on work volumes in the Central Gilts Office, the settlement system for gilts run by the Bank, are shown in Chart 11. This shows that deliveries of specific stock from one CGO member to another (member-to-member deliveries)<sup>(1)</sup> were on a very slight downward trend during the year. This is consistent with Stock Exchange turnover data, as the CGO data show the number of transactions rather than their value. Delivery-by-value trades (DBVs) are the transfer of unspecified gilts of a specified value; a mechanism frequently used to provide general collateral against loans of specific gilts, or to finance long positions in gilts. The number of DBVs declined marginally during 1995. It is possible that the volume of transactions in CGO will increase during 1996, following the introduction of gilt repo trading.





After a surge during the 1994 bear market, stock lending stabilised in 1995 close to the new levels. The average level of stock lending fell slightly from £12.7 billion in 1994 to £12.0 billion in 1995. The low for the year was £10.4 billion in early September. Since the beginning of the open gilt repo market in January, stock lending no longer has to be channelled through Stock Exchange money brokers, and the Bank will therefore no longer be able to obtain comprehensive data on stock lending. The Bank has asked the major market participants to provide data on the scale of their gilt stock lending and repo activity, with a view to publishing aggregated data in due course. Although turnover in gilt derivatives on LIFFE, the London International Financial Futures and Options Exchange, declined during 1995, as shown in Chart 12, this reflected more the extraordinary surge in volumes in February 1994, when the market fell sharply, than any decline in underlying interest in derivatives contracts. During 1995, turnover in futures averaged 54,000 contracts a day, down from 76,000 a day in 1994, but still 16% above the average for 1993. Turnover in options showed a more subdued pattern, with average daily turnover down 26% on 1994, and down 15% on 1993, at 7,000 contracts. It is possible that the removal of restrictions in January 1996 on shorting the market will have implications for the pattern of trading in gilt derivatives and for the interaction of derivatives with the cash market.

#### Chart 12 LIFFE gilt derivatives: number of contracts







#### **GEMMs' financial performance**

Building on the gains that resulted from a strengthening gilt market in the final quarter of 1994, the GEMMs returned to profit in 1995 having made operating losses in 1994. Their

A member-to-member delivery is a delivery of a specified nominal amount of a specified stock from one CGO member to another through the CGO system.

financial performance was particularly strong in the first half of 1995. As in previous years, performance varied markedly between individual GEMMs. A profit was reported by nearly half the GEMMs that were active throughout 1995. The GEMMs in aggregate returned a profit in every quarter apart from October to December, with the strongest results being in the second quarter. The profit figures of the GEMMs in Table D do not fully reflect group income from gilt business; for example, related business, such as hedging positions and arbitrage trading, is often booked elsewhere in the group.

#### **Table D** Capitalisation of gilt-edged market-makers

£ millions

	Oct. 86– End 1990	1991	1992	1993	<u>1994 (a)</u>	1995 (b)
GEMMs' capital at beginning of period (c)	595	395	432	511	734	812
Net injections or withdrawals of capital	-38	-12	15	164	138	-13
Operating profits (+)/ losses (-) (d)	-162	49	64	59	-60	13
of period	395	432	511	734	812	812

(h)

Data for 1994 have been revised. Data for 1995 are provisional. Capital base, as set out in the Bank of England's 'Blue Paper' ('The future structure of the gilt-edged market') published by the Bank in 1985 and reproduced in the June 1985 *Bulletin*, pages 250–87. Net profits/losses after overheads and tax.

(d)

During 1995, there was one new GEMM and three departures, leaving a total of 20 GEMMs at the end of the year. Retained profits of £13 million, reflecting the stronger financial performance in 1995, offset net capital withdrawals of £13 million; the amount of capital dedicated to the gilt market was unchanged from the previous year at £812 million at the end of 1995.

Approximately £30 billion of business in index-linked gilts was transacted by the GEMMs in 1995. Although this business was little changed between 1994 and 1995, the number of players with more than 5% of index-linked business increased from five to eight, helping to open up the market. The combined share of the top five GEMMs in index-linked business fell from 91% in 1994 to 76% in 1995. Spreads contracted, and market liquidity in index-linked was generally regarded as being somewhat improved.

Chart 14 shows GEMMs' retail trade with clients and agency brokers.<sup>(1)</sup> The total share of the top seven firms was unchanged at approximately 70%. Although the firms comprising the top seven remained unaltered, their rankings changed: only two of the top seven firms held the same position in 1995 as in 1994.



Figures shown in the columns are the percentage shares of each group of GEMMs.

#### **Summary**

During the last year trading conditions for gilts were less turbulent than in either 1993 or 1994. The underlying structure of the market functioned well, and the GEMMs continued to fulfil their role in providing liquidity. A series of important reforms to the market were implemented or were announced for future implementation. Open gilt repo trading commenced smoothly on 2 January 1996. Further changes to the structure of the gilt market due to be implemented in 1996/97 include major tax reforms in April 1996, the introduction of an upgraded CGO service, and a gilt stripping facility. Other possible reforms, including those to the index-linked market, remain under review as part of the on-going development programme for the gilt market, designed to help reduce the government's long-term financing costs.

This measure of 'retail' does not include trade with inter-dealer brokers, direct trades with other GEMMs nor trades with the Bank. In order to (1)offer a better comparison between companies engaged in very similar business activities, the data exclude the two small-deal specialists, conduct a large number of relatively low-value trades.

### Changeover to the single currency

The European Monetary Institute (EMI) published on 14 November a document ('The changeover to the single currency') setting out how a single European currency might be introduced within those countries participating in Stage 3 of Economic and Monetary Union (EMU). This was endorsed, with only small amendments, by the December European Council in Madrid.

This note, prepared by John Townend, a Deputy Director of the Bank and the Governor's Alternate on the EMI Council, describes the essence of the EMI paper, sets it in a UK context, and explains briefly the action which the Bank has subsequently taken to progress the work.

#### Introduction

The EMI paper explaining how the single currency might be introduced in practical terms addresses technical issues only; it represents a central bank contribution to the debate initiated by the European Commission in May 1995 when it published its 'Green Paper on the Practical Arrangements for the Introduction of the Single Currency'. Questions relating to the possible start-date for Stage 3 of EMU, or which countries might be eligible to participate, are for political decision and the EMI paper can offer no guidance beyond the Maastricht Treaty. The EMI paper, together with further input from the Commission, was discussed by Finance Ministers on 27 November and at the European Council in Madrid on 15-16 December. The changeover scenario adopted by the European Council is consistent with that described by the EMI. The European Council also decided to name the single currency the 'euro' and this name is therefore used here.

The United Kingdom is in a different position from other countries since it is not *required* to join the single currency area: this will be for decision by Government and Parliament. The United Kingdom is nevertheless fully committed to assisting in the technical preparations for Stage 3 so that the broad framework for the introduction of the euro would be technically satisfactory if it were to participate. The Bank of England has therefore been active in the discussions leading to the EMI document and supports its general thrust.

Where it helps the exposition, this note assumes that the United Kingdom is a participant in the single currency area in order to describe the relationship between transactions in sterling and euro during the transition when both denominations would co-exist: if the United Kingdom does not exercise its right to opt in, some, but not all, of the issues would remain relevant.

#### Timetable for the transition

The EMI paper sets out a provisional timetable for the transition, divided into three periods:

- a first period beginning with an announcement, some twelve months before the due date, that Stage 3 will start on that day and will initially comprise an identified group of countries: the European Central Bank (ECB) would be established early in this period;
- a second period beginning with the start of Stage 3, when participating countries' exchange rates (between each other) will be replaced by irrevocably locked conversion factors, during which the euro will begin to be used in the banking system alongside existing national currencies, but when there will be no physical euro banknotes or coin; and
- a final period which will begin with the introduction, no later than three years after the start of Stage 3, of euro banknotes and coin alongside existing national banknotes; and which will end, six months later, when national banknotes and coin cease to be legal tender. At that point the transition to the euro will be officially complete but central banks would continue indefinitely thereafter to exchange national currency notes and coin for euro.

#### **Principles governing the transition**

The paper sets out five basic principles to guide the transition process:

- (i) it must be underpinned by a clear legal framework;
- (ii) it must be as simple as possible and not confusing;
- (iii) it must not impose unnecessary costs;
- (iv) it must facilitate a single monetary policy; and
- (v) there should be no compulsion to use, nor any prohibition from using, either the euro or the national currency during the transition.

#### What the transition might look like

#### The first period

#### The European Central Bank

Early in the first period, the ECB will be established and it will take final decisions, on the basis of preparatory work previously undertaken by the EMI and national central banks, on a wide range of operational issues to allow a seamless transition in the conduct of monetary policy for the euro area at the start of Stage 3. The date from which euro banknotes and coin will become available, no later than three years from the start of Stage 3, would also be announced by the ECB. The design of the notes would need to be finalised, together with the necessary preparations to allow production to begin.

#### Governments

During this period governments will need to effect the necessary legal changes, involving potentially both primary and secondary legislation at the European and national level, required to implement all aspects of the single currency.

A crucial element, which the EMI considers should be in the form of a Council Regulation with direct effect (an approach endorsed by the European Council), would be legislation to provide certainty about the status of the euro, in its irrevocably locked relationship to national currencies, to ensure equal treatment in law for transactions expressed either in national currencies or euro. The paper sets out a number of legal principles which any particular legal solution should satisfy, including that there should be legally enforceable equivalence between the euro and national currency units.

Conventions on rounding, for transactions which become redenominated from their original denomination into either national currency or the euro, would need to be established, and may need to be enshrined in law.

#### Private sector

The private sector, bank and non-bank, in the relevant countries will need to continue planning and preparing its response in the light of the announced framework for central bank and government actions.

#### The second period

At the start of Stage 3, participating countries' exchange rates (between each other) will be replaced by the irrevocably locked conversion factors. The euro will become a monetary unit in its own right: it will have a fixed conversion rate in terms of the monetary units of the participating countries.

#### Actions by central banks

The EU national central banks, together with the ECB, will constitute the European System of Central Banks (ESCB).

The ESCB will begin to conduct a single monetary policy for the euro area. The ultimate objective of monetary policy, enshrined in the Maastricht Treaty, is price stability and this is expected to be achieved, as is the case generally now, by establishing short-term interest rates at the appropriate level. Work is in hand in transforming this objective into a detailed framework for the conduct of monetary operations.

The ESCB will denominate its own internal accounts and conduct its monetary operations, and any foreign exchange operations, in euro. But, as explained below, this would not necessarily mean that the Bank of England's market counterparties would immediately have to change their own operations or way of accounting, because the Bank would make available conversion facilities to redenominate euro amounts into the equivalent sterling amounts for any account holder which so wished. In other words, a counterparty could continue to denominate its accounts, and operate, in sterling even though the Bank of England was denominating its own operations in euro.

What happens outside the Bank would depend in any event on the development of the payments and settlements infrastructure. In the United Kingdom this is largely owned and run by the private sector. Arrangements are already in train for CHAPS, the present same-day payments system (which provides net settlement at the end of each banking day), to be modified and linked to a real-time accounting system at the Bank to produce a real-time gross settlement system (RTGS) in 1996.

It is essential that the RTGS system not be disrupted at the start of Stage 3. It is equally important that the system be developed to allow the processing of domestic payments denominated in euro while continuing to accommodate payments denominated in sterling. The way in which this dual functionality would best be achieved is a technical matter for discussion with the banks. Cross-border payments would be facilitated through a European-wide linking of RTGS systems (called TARGET), the details of which have yet to be determined. It would also be possible to link to TARGET even if the United Kingdom did not participate in the euro area.

The development of securities settlement systems would also need to be considered.

It is expected that the main markets (domestic as well as foreign exchange) in the euro area would quickly become dominated by transactions denominated in euro. It may be sensible in some areas to agree elements of market standardisation, for example in price or interest rate quotation. In the United Kingdom this would be for discussion between the Bank and the financial community. But the availability of conversion facilities would allow those banks which have not geared themselves as quickly as others to cope with euro denominations to participate in these markets on equal terms.

#### Recommendations for government action

#### **Publicity**

The EMI recommends that governments engage in a campaign of public information as an essential prerequisite for the successful introduction of the euro.

#### The law

As mentioned above, legislation would have to come into effect at the beginning of this period establishing clearly the legal status of the euro. The European Council added that the substitution of the euro for national currencies shall not of itself alter the continuity of contracts.

During this period national currency banknotes and coin would remain the only legal tender since at this stage there would be no euro equivalent. In the United Kingdom only sterling notes and coin would be legal tender during this period.

#### Public debt

The EMI expects that, from the start of Stage 3, governments would issue new public debt denominated in euro; and the European Summit agreed that new tradable public debt *will* be issued from then in euro—particularly debt coming to maturity after 1 January 2002. That does not mean outstanding national currency debt need be redenominated and the EMI suggests this question be studied further.

#### Other actions

The EMI recommends that there should be national discretion to allow public sector authorities to accept receipts denominated in euro, where they so wish during this period; but that public sector payments in euro would best be delayed until euro notes and coin become available from the beginning of the final transition period.

#### Banks and non-banks

Banks and non-banks would need to decide how to change their activities in the light of the actions by central banks and governments. Consistent with the no compulsion, no prohibition principle, banks would be free to make transactions, and offer facilities, in euro from the start of this period, but they would only *have* to do so by the end of the transition. There may be little retail demand for euro facilities until euro banknotes become available.

#### The final period of transition

#### Cash

This period will begin with the introduction, no later than three years after the start of the previous period (that is, by 1 January 2002), of euro banknotes and coin which would immediately be legal tender, temporarily alongside national currency notes and coin. Anyone who wished would be able to exchange on demand, at commercial banks and the Bank of England, national currency notes and coin for the new notes and coin. After six months, by 1 July 2002, sterling notes and coin would lose their legal tender status, although they would continue to be exchangeable indefinitely at the Bank of England.

#### Non-cash

The introduction of physical euro would give an impetus to banks to provide euro denominated accounts to their retail customers and for the spread within the retail sector of the use of euro.

As noted above, public administrations are recommended to switch to using euro for their payments (such as social security benefits, civil servants' salaries and pensions) on a particular date early in this final period. By the time national currency notes cease to be legal tender, all transactions involving the public sector should have become denominated in euro. The European Council agreed that all public sector operations will use Euro by 1 July 2002: EU legislation will define the time frame and might leave some freedom to individual countries.

#### Taking the work forward

The EMI will continue to work on the technical details for the introduction of the euro, consistent with its mandate. The Bank of England and other national central banks will continue to participate in its work.

Separately the Bank is also taking forward its own discussions with the UK banking community on the details of the possible transition to the euro for the United Kingdom; and widening these discussions beyond banks to include other sectors. The Bank has therefore held a number of meetings with the different interest groups, including banks, building societies, the CBI, the Retail Consortium and a wide range of market associations. In each case the Bank has invited participants to identify areas where it would help the private sector in its own planning for the Bank to specify more precisely its own operations and actions; and to identify those areas where, although the Bank is not directly involved, it might help to provide a catalyst for co-ordinating actions (including in the payments and settlements area and in markets) within the private sector. The Bank has also stressed the importance of considering these questions both in the context of the United Kingdom as a participant in Stage 3 and in the context of Stage 3 beginning but the United Kingdom exercising its right not to opt in.

## The Bank of England: how the pieces fit together

The **Governor** of the Bank, Eddie George, discusses<sup>(1)</sup> the Bank's functions as a central bank. Drawing on the Bank's internal 'mission statement', he explains and illustrates the three core purposes: maintaining the integrity and value of the currency; maintaining the stability of the financial system, both domestic and international; and seeking to ensure the effectiveness of the United Kingdom's financial services. He emphasises the relevance of each of the core purposes to the other two and describes how they all fit together to make a coherent whole.

This is the fourth and last in the series of LSE Bank of England lectures. My predecessor as Governor, Lord Kingsdown, began the series by making the case for price stability as the immediate objective of monetary policy. In my own earlier lecture I spoke about the pursuit of financial stability—describing our oversight of the financial system and our role as lender of last resort to the banking system. And in the third lecture, just over a year ago, the former Deputy Governor, Rupert Pennant-Rea, spoke about the international context within which we endeavour to achieve these fundamental, twin, objectives of monetary and financial stability.

If you had invited any major central bank to deliver these lectures it is quite likely that they would have chosen to speak on these three topics. And, while there would certainly have been important national differences of detail, it is likely, too, that the substance of what they would have said would have been much the same. The pursuit— nationally and internationally—of monetary and financial stability is the essential *raison d'être* of central banks everywhere, and there is nowadays a broad consensus—both across countries and within countries across much of the political spectrum—about what that involves. But once you go beyond that level of generality, each central bank is unique—in terms of its constitutional position, the range of its activities, its size, structure and organisation, and so on.

So in this final lecture I should like to talk quite specifically about the Bank of England, discussing the institution as a whole and how the different pieces fit together.

#### The Bank's role

The Bank of England Act, which brought the Bank into public ownership in 1946, makes no mention whatsoever of the Bank's role or the purposes for which it exists. The Act explicitly defines the constitutional relationship between the Bank and the government, providing that:

'The Treasury may from time to time give such directions to the Bank as, after consultation with the governor of the Bank, they think necessary in the public interest... subject to which the affairs of the Bank shall be managed by the Court of Directors . . .'

The Act also empowers:

'the Bank, if they think it necessary in the public interest, to request information from and make recommendations to bankers, and may, if so authorised by the Treasury, issue directions to any banker...'

The Bank's 1946 Charter goes into considerable detail on the conduct of Court—even fixing the remuneration of Directors in respect of their services on the Court at £500 a year. And it describes circumstances in which a Governor, Deputy Governor or Director shall vacate his office, including, *inter alia*,

"... if he be found lunatic or become of unsound mind".

But, for reasons that are explained in John Fforde's admirable history, *The Bank of England and Public Policy 1941 to 1958*, and in contrast to other cases where central banks were set up *ab initio*, it was not felt necessary in this country either to define in statute the central bank's duties and responsibilities or to specify the purposes for which its powers were to be used, because, in John Fforde's phrase, 'the central bank was there already, the evolutionary product of growth over time'.

The Bank's role has continued to evolve over the past 50 years within the flexible framework of the 1946 Act. It has, of course, adapted to changes in government policy, including in particular the progressive movement away from intervention and direct forms of control in many areas of the Bank's activity; and it has had to respond to external changes in the economic and financial environment. But the essential substance of its role has not greatly altered.

Some five years ago we decided with our Court of Directors, as the basis for our internal management framework, to define our 'core purposes' in what is in effect a 'mission statement'. It begins with the general statement:

(1) In a lecture at the London School of Economics delivered on Thursday, 25 January 1996.

'As the central bank of the United Kingdom, we are committed to promoting the public good by maintaining a stable and efficient monetary framework as our contribution to a healthy economy'.

In pursuing that goal we identify three core purposes:

- Maintaining the integrity and value of the currency.
- Maintaining the stability of the financial system, both domestic and international.
- Seeking to ensure the effectiveness of the United Kingdom's financial services.

The first two of these purposes you will recognise, at this level of generality, as the essential purposes of all central banks. The third—concerning the effectiveness of the United Kingdom' financial services—is more unusual, and perhaps peculiar to the Bank of England which has a long-established tradition of encouraging the financial services industry in this country to meet the needs of the wider economy both domestically and as the world's major international financial centre.

#### Maintaining the integrity and value of the currency

In elaborating our monetary stability purpose, our statement goes on:

'Above all, this involves securing price stability as a precondition for achieving the wider economic goals of sustainable growth and employment. We pursue this core purpose by influencing decisions on interest rates, on the basis of economic and financial analysis of developments both at home and abroad; by participating in international discussions to promote the health of the world economy; by implementing agreed policy through our market operations and our dealings with the financial system; and by maintaining confidence in the note issue'.

I want to make two comments arising out of that—about why we place so much emphasis on monetary stability and about the activities we undertake in pursuing it.

I am well aware that some people still think that the Bank sees price stability as an end in itself—to be pursued without regard to the implications for the truly good things in economic life like the growth of activity and employment and increasing welfare.

Now there is a sense in which we do see price stability as an end in itself—as I hope you all would if you were responsible for issuing some £20 billion worth of promises to pay in the form of banknotes for fixed nominal amounts which may be worth very much less in real terms by the time they are presented. 'Honest' money is desirable in its own right, and helps to ensure transparency in relationships between borrowers and lenders.

But more fundamentally the reason we are committed to price stability is not as an end in itself but because we see it as a means to the end of precisely those good things in life which our critics assume we disregard. Implicit in their criticism is the notion that the aims of price stability and economic growth are necessarily in conflict with each other. Our conviction—based on the repeated experience of the past 50 years-is that such conflict is illusory in anything other than the short term. Time and again we have seen attempts to stimulate the economy directly result in a relatively short period of faster economic growth, followed by recession brought on by the policy restraint which was eventually unavoidable to bring increasing economic imbalance and accelerating inflation back under control. We therefore see permanent price stability as a necessary condition for achieving steadier, sustainable, growth into the medium and long term. It can also contribute indirectly to increasing the sustainable rate of growth, improving the efficiency of the economy by enabling economic decisions of all kinds to be based on real considerations rather than on speculation on the inflation outcome, and by enabling relative price movements to transmit more meaningful signals about resource allocation which are otherwise masked by erratic changes in the general level of prices.

This is essentially the case for price stability—the case for 'sound' money—developed by Lord Kingsdown in his initial lecture. The point I would emphasise is the relevance of price stability, and related economic stability in a much broader sense, to our other core purposes, financial stability and the effectiveness of our financial services in meeting the needs of the wider economy.

The link from monetary stability to financial stability is very clear and was touched upon in my own earlier lecture. Monetary instability, and the volatility in financial markets which it engenders, are probably the most serious of all the various types of risk that banks and other lenders or investors have to cope with. If you look around the world, almost every case where there has been a serious threat of systemic financial disturbance can be traced back to macroeconomic policy failures of one kind or another. Monetary instability leaves financial institutions generally vulnerable to abrupt changes in the creditworthiness of borrowers or other sudden shifts in asset values that are extraordinarily difficult to predict or to insure against. Monetary stability is therefore fundamentally important to financial stability as well as to the long-run performance of the economy.

But monetary stability contributes, too, to our third core purpose—the effectiveness of the financial system—going beyond the reduction of financial risk.

One of the most frequent criticisms one hears about the financial institutions in this country is that they take an

excessively short-term approach to lending and investment. That is sometimes put down to our particular institutional structure. What is clear in that debate, however, is that high and variable inflation and the economic instability that it reflects would tend to engender short-term attitudes regardless of the institutional structure. Longer-term lending would be deterred, for example, by the uncertainty premium that would necessarily be included in long-term interest rates, and long-term rates would also incorporate an element of compensation for the expected erosion of the real value of the loan capital, effectively representing early capital repayment. Given their past experience even nominally short-term lenders will tend where they can to recall their loans at the first sign of downturn while there is value left in the borrowers. And more generally it would be entirely rational in an unstable environment for investors whether in real or financial assets-to look for a rapid payback rather than to the longer term. I do not claim that instability is necessarily the whole story-there may well be other factors. But our history of monetary instability must be an important influence on the behaviour of our financial institutions, and for that matter of the boards of our industrial and commercial companies, especially their finance directors. To this extent greater monetary stability can deliver, not just a double, but a triple whammy.

The case for permanently low inflation, as a necessary condition for achieving steadier and more sustainable economic growth, has gained increasing acceptance in this country over the past 20-odd years. This is reflected in the political decision by the Government to set an explicit inflation target—of  $2^{1}/_{2}$ % or less for the indefinite future— as the immediate objective of monetary policy. The Labour Party, too, has committed itself to setting a low inflation target if it comes to power.

Given that political decision, the process of monetary policy *formulation* is essentially a technical one. The Bank's role is to provide technical advice on the policy, and in particular on the short-term interest rate, that it considers necessary to achieve the inflation objective. Decisions about monetary policy remain for the Chancellor—consistent with the 1946 Bank of England Act. That process is now uniquely transparent and has given rise to a certain amount of public interest and debate. That is a subject for another occasion. What matters in the end is the results, in terms of our performance—on inflation but also on growth and employment. All I would say is that we have made steady progress in all these respects over the past three years or so, and the prospects remain very encouraging.

The Bank is also responsible for the *implementation* of monetary policy decisions through its operations primarily in the money market, but also, as agent for the Government, in the gilt-edged and foreign exchange markets.

For the most part these activities, and the other banking services which the Bank provides to central government, are uncontroversial through there is, quite rightly, constant pressure to ensure that they are performed efficiently. Questions are sometimes raised about the Bank's role in managing the government's borrowing, which some people argue is not a necessary central banking function and may somehow conflict with the operation of monetary policy. And it is true that, like a number of our other activities, government debt management could in principle be organised in other ways. But there is no possibility for conflict that I can see in today's context in this country. The Bank undertakes the government funding program as agent for the Government on the basis of a mandate received from the Treasury, and drawn up essentially independently of the monetary policy process but with the explicit objective of avoiding recourse to monetary financing (ie short-term finance from the banking system) year by year. The essential substance of that mandate is regularly published, as is the outcome. And the bulk of the funding is raised through auctions in the bond markets to a timetable and in amounts that are signalled well in advance. As with the process of monetary policy formulation, the whole process of government debt management is nowadays almost wholly transparent.

From the Bank's point of view our day-to-day involvement in all the main financial markets is an invaluable source of information and intelligence-and enables us to develop an expertise—which are invaluable to us in pursuing all three of our core purposes. In the monetary policy context, understanding of market perceptions and market developments is an important complement to our economic analysis in formulating our advice. It is equally important to us in detecting, understanding, and responding to disturbances that may impact on the stability of the financial system. And it enables us to understand at first hand developments that may affect the users of financial markets, helping us to be better attuned to their concerns. In this respect our activities-as well as our purposes-are mutually reinforcing and relevant to the work of the Bank as a whole.

#### Maintaining the stability of the financial system

Let me move on to our second core purpose, maintaining the stability of the financial system, which, in terms of our 'mission statement'

'we seek to achieve through supervising individual institutions and markets; through monitoring the links between financial markets; through analysing the health of the domestic and international economy; through co-operation with other financial supervisors, both nationally and internationally; and through promoting sound and efficient payment and settlement arrangements. In exceptional circumstances, the Bank may also provide or organise last resort financial support where this is needed to avoid systemic damage'.

Our central banking interest in financial stability is clear. If monetary instability is a potent source of disruption of the financial system, then it is equally the case that general instability originating in the financial system can complicate, even disrupt, our pursuit of monetary stability. It is because of this externality—the potential damage to the economy as a whole going beyond the effect on any particular institution—that all central banks would recognise the *twin* objectives of monetary and financial stability—in the sense of the stability of the financial system as a whole: and it is the same externality that justifies the setting of minimum prudential standards, for systemic reasons, as well as our lender-of-last-resort role.

Even this is not uncontroversial. Some argue here too that there is a potential conflict between the pursuit of monetary stability and concern with financial stability such that if these responsibilities are combined in a single institution then monetary policy punches may be pulled at times for fear of the financial instability they might otherwise create. I can certainly envisage circumstances in which financial fragility is a constraint on monetary policy. It was no doubt a factor, though not an overriding factor, in the United States three or four years ago for example, and it is a factor now in Japan. But you cannot avoid the potential tension just by distinguishing institutionally the two responsibilities. Whoever was responsible for monetary policy in a situation of tension would have to take account of the financial fragility, and vice versa, regardless of the institutional structure.

More fundamental questions concerning the extent and nature of the central banking responsibility in relation to the financial system arise from the rapid evolution of the global financial market place, on the one hand, and from increasing public policy interest in quite different aspects of the behaviour of financial institutions, on the other.

Historically, central banking grew largely out of concern for the stability of the financial system, and in particular the banking system, because it was there that systemic risksthe risks of contagion-were concentrated. More recently traditional distinctions between different types of financial institution, including banks, have become increasingly blurred, under the impact of competition and of innovation of financial products and techniques, made possible by changes in technology and the move away from direct financial controls. At the same time financial service businesses of all kinds have become increasingly international in their scope, with London the host to financial institutions from all parts of the world and British institutions established in an increasing variety of traditional and emerging overseas financial markets. Together these developments have contributed to the rapid expansion of financial market transactions, through which intermediaries of all kinds assume exposures to each other, increasing the possibility for shocks originating in one part of the global financial market place to be transmitted elsewhere.

Meanwhile, to varying degrees in different countries, the public policy interest in the behaviour of financial institutions has spread well beyond just an interest in the stability of the financial system as a whole. It extends, for example, to an interest in the financial stability of individual institutions for reasons of depositor or investor, or policyholder or pensioner, protection. It extends to many areas of business conduct in order to protect users of financial services, especially less financially-sophisticated retail users, from abuse of various kinds, ranging from outright deception to failure to give 'best advice' or 'best execution', involving varying degrees of intervention in the relationship between financial institutions and their individual clients. And it extends, too, to the protection of society more broadly against the use of the financial system to launder drug monies or the proceeds of other organised crime.

Taken together, these developments raise a number of extraordinarily difficult questions—not just in this country, but in all countries individually and also at the international level.

A fundamental question is where to strike the balance between the undoubted benefits that flow from competition, including global competition, in financial services-in terms of financial resource allocation as well as for individual users of financial services-and the various social concerns just identified that argue for public intervention. Although most people would probably accept that some regulation can contribute to the competitive efficiency of financial services-by helping to retain the confidence of potential users of those services-there is, as in relation to many other forms of social intervention, plenty of room to debate the appropriate forms and degrees of financial regulation and the point at which it starts to interfere with the competitive efficiency or effectiveness of the financial system as a whole. The complaint that 'we are over-regulated' meets the counter-complaint that 'we are underprotected' often, unfortunately, accompanied by the complaint that services are too expensive or insufficiently available on an adequately competitive basis. The essentially political trade-offs in this area are especially difficult to determine because they are so much a matter of degree on either side, which it seems impossible to define with any precision.

The other very difficult issue (assuming that we do know just what it is that we are trying to achieve) is how we can best organise ourselves institutionally, in terms of the supervisory/regulatory structure.

Should that structure be based, for example, upon the type of financial institution, or on the type of activity, or on the type of user or on the particular social purpose being pursued? It is clear, from the diversity of structures across countries, that there is no single model, and any model would need to adapt as the market and as public policy interests change. It is tempting to think that all these problems could be resolved by sweeping everything together into a single financial services regulator—though I am bound to say that this approach seems to me seriously to underestimate the complexity of the issues. But whatever structure we have, there will need to be clear definition and understanding of the responsibilities of the different institutional elements in the structure (or different interests within a single institution) and intensive co-operation between them—both domestically and internationally. It is a difficult, on-going agenda which will take some time to work through.

As it is, the Bank of England is responsible for the authorisation and supervision of banks, under separate legislation-the Banking Act of 1987. This responsibility, to provide substantial, though not absolute, protection for depositors in individual banks, in fact fits comfortably alongside our traditional responsibility for the stability of the financial system as a whole. Notwithstanding the market developments that I have described, banks do still have distinctive characteristics giving them a key role in the financial system. Their balance sheets are still typically dominated by liquid liabilities on the one side and longer-term, predominantly non-marketable, assets on the other. This makes them especially vulnerable to liquidity pressures as a result of a sudden loss of confidence on the part of their depositors. Banks, at least in this country, still have a unique role in the payments, and therefore settlement, systems. Supervising each individual bank, therefore, equally helps us to monitor potential threats to institutions that are still, in this sense, at the heart of the financial system as a whole. And when preventative supervision fails-as it will inevitably from time to time-it puts us in a better position than we might otherwise be to assess whether a failure would create unmanageable difficulties for other financial institutions, and so to assess the case for lender of last resort assistance, or for seeking other solutions.

Now, of course, I accept that this is not the only possible arrangement. It does nevertheless have very considerable advantages of informational and operational synergy in relation to our concern with the stability of the financial system as a whole. And our continuous monitoring of individual bank behaviour can also provide insights and better understanding of the monetary influences on the macroeconomy, which are helpful in relation to our monetary stability purpose. These advantages would need to be weighed against the perceived advantages of alternative supervisory regulatory structures.

Whatever view one takes of these particular issues, two things seem very clear. First, that any central bank must monitor developments in the banking system very closely, and that will necessarily involve monitoring what is happening in individual banks. And, secondly, a central bank cannot, in the modern world, limit its view to developments in the banking system alone. Because systemic threats can originate in other parts of the financial system, and because of the speed with which they can be transmitted through the system, we must necessarily take a very close interest in the financial sector as a whole. This underpins our concern with financial stability but it is the foundation also of our third core purpose to which I now, finally, turn.

## Seeking to ensure the effectiveness of the United Kingdom's financial services

This third core purpose we describe to ourselves as 'seeking to ensure the effectiveness of the United Kingdom's financial services', and we elaborate as

'wanting a financial system that offers opportunities for firms of all sizes to have access to capital on terms that give adequate protection to investors, and which enhances the international competitive position of the City of London and other UK financial centres. We aim to achieve these goals through our expertise in the market place; by acting as a catalyst to collective action where market forces alone are deficient; by supporting the development of a financial infrastructure that furthers these goals; by advising government; and by encouraging British interests through our contacts with financial authorities overseas'.

Now I want to be clear we do not mean by this that the Bank has, or thinks it ought to have, some sort of blueprint or dirigiste masterplan for the way in which financial services should develop in this country. That, properly, is for the market to determine through the interaction of competing institutions seeking to meet the evolving needs of financial services users. But there are situations in which there would be benefits to the community as a whole from collective initiatives, but where the market on its own finds it difficult to act because of the conflicting interests of the individual market participants. And it is in these situations where the Bank can play a useful role.

We have no formal locus in this area, we rely upon collective consent. But we do have a long and valid tradition of involvement, as a facilitator; and that tradition survives even in today's increasingly competitive environment, in which financial services have increasingly become governed by statute. And we are—both through the information, the expertise and the contacts that we acquire in pursuing our other core purposes and through our unique position somewhere between central government and the rest of the economy—well placed to play a constructive role. What is more this role helpfully complements and supports the rest of what we do. Let me give you some examples of what it involves.

The case for the Bank's involvement is perhaps most obvious and effective when it flows most directly from our other core activities. It was, for example, entirely natural and directly relevant that we should join with the banks and the Stock Exchange at the time of Big Bang to develop assured book-entry settlement arrangements for the gilt-edged market in which we ourselves are a major player—the Central Gilts Office. It was equally relevant that when the LondonClear project for money-market settlements, or the Taurus project for equity settlements, stalled, we should accept mandates from the market to develop appropriate systems in these cases too. Somewhat further removed from our own direct concerns, we took a close and benevolent interest in the market's successful endeavours to set up a financial futures exchange here in London, and we also played a match-making role in the subsequent merger of the London International Financial Futures Exchange and the London Traded Options Market. Now we are supporting the Stock Exchange in its current efforts to reform the equity market structure. In all of these examples (and there are many others) by contributing what we can to the effectiveness of markets in the first instance as an end in itself for the users of those markets, we are able also to reduce the risks in the financial systemthrough safer settlement and increased liquidity, for example. We also improve our understanding of the relevant activities which contributes particularly to our ability to identify and manage systemic risks that may arise in these areas.

Further along the spectrum, the Bank has, over a long period, encouraged the financial sector to identify areas in which its support for the wider economy could be improved. Through the founding of what is now 3i, for example, we contributed to the provision of venture capital to smaller companies. And we have more recently been very active in promoting a better understanding between the providers of finance of all kinds and the small business sector, not least because of the important part that small business can play in increasing employment. We also contribute to the development of the Private Finance Initiative. Through this kind of activity—and again drawing on our broader understanding of the financial system—we are able to play a constructive part in improving the structural context within which monetary policy has to operate.

I have tried to provide you with a rounded view of the Bank of England as an institution—covering all three of our core purposes rather than focusing on any one of them. There are, of course, all kinds of ways to skin a cat. But we believe that taken together our activities make a coherent whole; that the three core objectives complement and reinforce each other and that there is a synergy—of information, contacts and relationships, and expertise and experience—which makes it efficient to pursue those objectives together. I hope that I have persuaded you that the pieces do indeed fit together.

### **Finance for small firms**

The **Deputy Governor**, Howard Davies,<sup>(1)</sup> pointed out that relationships between banks and their small business customers have continued to improve during the past year. Banks remain the most significant source of external finance (49% of funds) and competition remains strong, especially for higher quality small business customers. Changing banks does not appear to be a significant problem for these customers, although those that do wish to change face some significant direct and indirect costs. Lending to small firms fell slightly again during 1995, reflecting the continued lack of demand. Term loans now account for 63% of bank lending to small firms and this trend away from borrowing on overdraft appears to be slowing.

The Bank of England's annual report on Finance for Small Firms<sup>(2)</sup>—the third in the series which flowed from an initiative taken by the Governor in 1993-has been published.

In 1993, the best that could be said about the relationship between banks and their small firms customers was that both sides were in a state of armed neutrality. There were some 'safe areas', but much of the ground on which both sides camped was bitterly contested. And the Bank of England had been asked twice by the then Chancellor, in 1991 and 1992, to examine the structure of bank lending to small firms and, in particular, to assess whether reductions in base rate were being passed through. Those reviews found no guilty men, but did not resolve the underlying problem-one rooted in suspicion and distrust. The Governor's initiative was designed to address that.

At the time, I sat on the other side of the table, representing firms both big and small at the Confederation of British Industry (CBI). And I well remember wondering what value the Bank's work could add in such unpromising territory.

You will expect me to say that I have now been converted. But that conversion occurred well before I joined the Bank.

The Bank of England's quarterly reports on small business statistics have quickly become one of the most useful sources of data on the development of small business, for one thing. The regular seminars with small firms' representatives, and the banks, are valuable fora for the exchange of views. And the annual reports conveniently summarise progress.

But after more than two years work it is worth asking whether anything has changed, on the ground. While it is undoubtedly true that there has been a deeper and closer dialogue between providers and users of finance in the last two years, has that dialogue resulted in measurable

improvement in the availability of appropriate financing packages for small businesses-which is the prime purpose of the exercise?

The picture painted by the third report is, overall, a positive one. The number of new start-ups has grown in the last year, though not as rapidly as in 1994. But the trends in overall numbers and activity have more to do with the state of the economy as a whole. Small firms, and large ones, have benefited from a period of price stability and steady expansion. What can we say more specifically about the provision of finance for growth?

Here it is fair to say that there is both light and shade though, on balance, the picture is brighter than before. Certainly small firms themselves, and their representatives, are now more positive about their relationships with banks than they were in 1993. But while the mood music surrounding their relationship is not without significance, it is more important to assess the extent to which practice in the provision of finance has changed.

On the credit side of the account, we can see a number of positive developments:

- Bank charges have continued to fall over the last year and the process of determining charges has become more transparent. Average lending margins have remained largely constant at between 3% and 4% over base rate, but small firms themselves recognise the need for banks to price risk accurately if the market is to remain attractive to them.
- There has been an important change in the composition of advances. It is no longer true to say that small firms are excessively reliant on variable rate overdrafts, as they were five years ago, which left them more vulnerable to the economic downturn of the early 1990s. Over the last three years the proportion of lending to small firms represented by overdrafts has declined from 49% to 37%,

In a speech to the Manchester Merchant and International Bankers Association on 17 January 1996. For further information or a copy of the report, 'Finance for Small Firms', please contact Adrian Piper (0171–601 4117), Melanie Lund (0171–601 4430) or Stuart Cooper (0171–601 4814), in the Bank's Business Finance Division.

with term lending of one sort of another making up the balance of 63%. That is a big, and important shift.

- There is evidence that banks are becoming more sophisticated at segmenting the marketplace, and tailoring appropriate packages to different sorts of small business. They are increasingly dividing the sector into 'lifestyle' and 'growth' businesses, and delivering financial products differently to the two categories. That allows bank charges for simple transactions to fall, and facilitates a more proactive and flexible approach for growth businesses to which banks can pay more attention.
- Much more use is now made of business plan and cashflow-based approaches to lending, rather than reliance on property-based security. One impetus for that change has been the depressed state of the property market, but it has meant that banks have been obliged to become more familiar with the dynamics of the businesses to which they lend, which will have important positive effects in the future.
- Surveys of small firms show some evidence that their relationships with their banks are seen as more positive than at any time in the last five years. In one survey, 85% of firms report a constant or improved relationship with their banks.

So far, so good. And the Bank's latest report gives chapter and verse in each area. But there is a debit side to this balance sheet, as well. And a dispassionate observer would have to point to some continuing difficulties, which make it hard to say with confidence that, as a nation, we are getting the most out of the entrepreneurship evident in our smaller firms.

It is clear that equity finance remains a difficult area, as it has been at least since 1931, when the 'MacMillan gap' was first identified. This is not solely a problem for the providers of finance. Many small business owners continue to be reluctant to open up the ownership of their firms, even when future growth depends on it.

The formal venture capital industry invests relatively little at the smaller end of the market. Only 5% of UK venture capital investment goes into startup and early-stage companies. Informal 'business angel' venture capital networks can be highly successful. But their spread is very patchy. Venture capital trusts may have an important role to play, but they have only just got off the ground. The Enterprise Investment Scheme has raised disappointingly small sums so far. The Stock Exchange's Alternative Investment Market, by contrast, made an extremely encouraging start in the second half of 1995.

A second difficult area is the availability of finance for high-technology and science-based companies, in particular. Venture capitalists have particular problems recognising and understanding the commercial prospects of high-technology projects. As a result, relatively little finance has been flowing into infant technology-based firms. And corporate venturing—investment by large corporations in the equity of growing technology-based companies—has not occurred in the United Kingdom to anything like the extent it has in the United States. It is hard to see any but cultural obstacles to that development. It is a disappointing gap in the United Kingdom's corporate armoury.

Among small firms themselves, financial management remains unsatisfactory in many cases, as small firms' representatives are themselves very ready to acknowledge. It is more difficult to know how to correct that weakness. One promising route is the Small Business Initiative, launched in East Anglia two years ago. This offers the incentive of a 1% reduction in overdraft rates for three years for small firms whose managers complete a financial training course. It is too early to assess the benefits rigorously. But an academic assessment of the first year's participants argues that their financial management skills index rose by over half as a result of the course. The completion rate is almost 100% and 88% of participants thought the course would improve their long-term decision-making. These results suggest, at the very least, that such schemes may have broader application. Other pilots are already operating and it would be good to see them expand across the country.

There are concerns, too, about government support programmes. The Bank of England is not, I think, in a good position to evaluate government support. But small-firm representatives are concerned about the long-term viability of the Business Link network, whose introduction they generally have welcomed. Will it prove self-financing, once the first three years of government funding has expired? Will the Personal Business Advisors recruited prove to be up to the demanding job? And there are concerns about the impact of the end of the Enterprise Allowance Scheme/Business Start-up Scheme in March of last year. By contrast, the volumes of lending under the Small Firms Loan Guarantee Scheme have risen sharply after the changes introduced in 1994.

This analysis suggests that there remain a number of important areas in which change would be beneficial. And some of these are susceptible to the kind of analytical and collaborative approach which the Bank of England has been taking in its small firms initiative to date.

In 1996, therefore, we shall be focusing attention, in particular, on initiatives to improve financial and management skills, on encouraging increased use of equity finance by growth oriented small businesses, and seeking to improve the availability of that finance at the same time, and on monitoring the effectiveness of Business Links in meeting the requirements of small businesses for information and financial advice.

Our fourth report will cover those issues in more detail. In the meantime we shall be working with small firms organisations, and with the banks, both centrally and regionally through the Bank's network of agents.