Bank of England Quarterly Bulletin



February 1995

Volume 35 Number 1

Bank of England Quarterly Bulletin

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Summary	3
Recent economic and financial developments Operation of monetary policy Box on money-market operations since September 1992	5 12
The international environment Box on producer and consumer prices Note on the calculation of effective exchange rates	15 22 24
Financial market developments Box on international securities transactions	26 30
Research and analysis The costs of inflation	33
Influences on broad money growth	46
Evolution of central banking in post-communist countries	54
<i>Reports</i> The CREST project	60
The gilt-edged market: developments in 1994 Box on the development of an open gilt repo market	66 70
Banking statistics: recent and prospective developments	72
Speeches	
Macroeconomic management and structural unemployment The 1994 Ashridge/City University lecture given by the Governor	77
Credibility and monetary policy: theory and evidence The first annual Scottish Economic Society/Royal Bank of Scotland lecture	0.4
Changes in UK gilt-edged and money markets Extract of a speech by Ian Plenderleith to the City of London central banking conference	04 02
Statistical annex	92
Standhour annox))

Volume 35 Number 1

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 prices are as follows:

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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.

See page 96 for details of the annual Statistical Abstract.

The gilt market

'Investing in gilts: A guide for the small investor', providing basic information for small investors, and 'British Government Securities: The Market in Gilt-Edged Securities', intended for those with a professional interest in gilts and the gilt market, may be obtained from the Bank of England, PO Box 96, Gloucester, GL1 1YB.

Working Papers

The following Working Papers have been published in the last 14 months:

N	lo <u>Title</u>	Author
1	9 The effect of futures trading on cash market volatility: evidence from the London Stock Exchange	Gary Robinson
2	0 M0: causes and consequences	F J Breedon P G Fisher
2	1 An empirical analysis of M4 in the United Kingdom	P G Fisher J L Vega
2	2 A model of building society interest rate setting	Joanna Paisley
2	3 Deriving estimates of inflation expectations from the prices of UK government bonds	Mark Deacon Andrew Derry
2	4 Estimating the term structure of interest rates	Mark Deacon Andrew Derry
2	5 Potential credit exposure on interest rate swaps	e Ian Bond Gareth Murphy Gary Robinson
2	6 New currencies in the former Soviet Union: a recipe for hyperinflation or the path to price stability?	C L Melliss e M Cornelius
2	7 Inflation inflation risks and asset return	s Io Corkish

Issued by the Inflation Report Division, Bank of England, London, EC2R 8AH, to which enquiries regarding this Bulletin should be addressed. Telephone enquiries may be made to 0171-601 4030 and letters should be marked 'for the attention of the Publications Group'.

David Miles

Printed by Park Communications © Bank of England 1995 ISSN 0005-5166

The Quarterly Bulletin and Inflation Report

Inflation Report (published separately)

Operation of monetary policy (pages 5–14)

The international environment (pages 15–25)

Financial market developments (pages 26–32)

Research and analysis (pages 33–59)

Reports (pages 60–76)

The *Inflation Report* provides a detailed analysis of recent monetary, price and demand developments in the UK economy. There are signs that the strong rise in producer input prices seen during 1994 has started to slow; however, output price inflation has started to increase more sharply. Inflation on the Government's target (RPIX) measure was 2.5% in December, up from 2.0% in September; the Bank's RPIY measure of underlying inflation (which excludes the effect of indirect taxes) rose to 1.7% in December. Section 6 of the *Report* sets out the Bank's current views on the prospects for inflation over the next two years.

As a result of the assessment of the medium-term prospects for inflation, official interest rates were raised by $\frac{1}{2}\%$ to $\frac{6}{4}\%$ on 7 December. Financial markets reacted positively, appearing to view the move as evidence of the authorities' continuing commitment to price stability. Sterling strengthened and long-term bond yields fell. Gilts performed well relative to other bond markets over the fourth quarter.

Growth in the G7 countries continued to be robust in the second half of 1994. Producer price inflation has increased in a number of OECD countries, but annual consumer price inflation in the G7 was lower towards the end of 1994 than at the start. A number of countries have increased interest rates further in response to potential inflation pressures.

The volatility of most major government bond markets fell in 1994 Q4. In the year as a whole, international borrowing activity expanded—despite the adverse interest rate environment—and the long-run trend towards increased derivatives activity continued.

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

The costs of inflation (by Clive Briault of the Bank's Monetary Assessment and Strategy Division) surveys the academic literature: economic theory suggests that inflation imposes costs through a variety of channels; consistent with this, most empirical studies have found a significant negative correlation between inflation and growth. At the broadest level, the available evidence supports the view that well-run economies with strong and efficient productive structures tend to exhibit both low inflation and high growth.

Influences on broad money growth (by Chris Salmon of the same Division) reviews the evolution of the role of broad money indicators in the monetary policy framework, and considers the factors currently influencing the growth of M4—focusing on the effects of disintermediation and balance-sheet restructuring. It compares the UK position with recent trends in Australia, Canada and the United States.

The evolution of central banking in post-communist countries (by Victoria Fleming and Stuart Cole) assesses the development of central banking in the countries of central and eastern Europe, and the former Soviet Union, and outlines the help these countries have received in the area from international financial institutions and established central banks.

The CREST project reports on progress in the development of the new equity settlement system, and looks ahead to the transition to CREST next year.

The gilt-edged market: developments in 1994 describes activity in the gilt and related derivatives markets last year, and developments in the business of the GEMMS.

Banking statistics: recent and prospective developments outlines recent progress and invites comments from users on their further statistical needs, in the light of the main bids for new statistics of which the Bank is already aware.

Operation of monetary policy

- Figures published in the fourth quarter of 1994 showed a continuation of low current retail price inflation but developing inflationary pressures in the early and intermediate stages of production.
- Data also showed output continuing to grow faster than the productive capacity of the economy, reducing the margin of unused resources. The contrast between strong external demand and relatively subdued domestic demand became more pronounced.
- At his meeting with the Governor on 7 December, the Chancellor decided that official interest rates should be raised by 1/2% to 61/4%; the change was implemented immediately by the Bank to remove market uncertainty.
- Financial markets reacted positively to the move, appearing to view it as evidence of the authorities' continuing commitment to price stability. Sterling strengthened and long-term bond yields fell.
- International bond markets were more stable in the fourth quarter. Gilts performed well in relation to other markets, and the required pace of funding was fully maintained.

Overview

Decisions on monetary policy are based on a wide range of indicators. The Bank's current assessment is given in the February *Inflation Report*; this article reviews the operation of monetary policy in the fourth quarter of 1994.

Statistics published during the quarter showed that economic activity was accelerating in the major industrialised countries. The US economy showed no evidence of the slowdown that had been widely expected; GDP growth for the third quarter in Germany maintained the pace set in the second; and there were further signs of recovery in Japan. In the United Kingdom, GDP growth in the third quarter was strong and earlier data were generally revised upwards. Output continued to grow faster than the productive capacity of the economy, reducing the margin of unused resources; unemployment continued to fall steadily.

The data showed that the profile of this UK growth was similar to that seen in previous quarters, but that the contrast between strong external demand and relatively subdued domestic demand had become more pronounced. Helped by the buoyancy of overseas economies, net external trade made a large contribution to growth in the third quarter. Manufacturing investment also remained robust and although total investment slowed, it was depressed by sectoral factors; the underlying trend was stronger and survey evidence suggested increases in the following months. In contrast, consumer spending was subdued, possibly reflecting the increases in taxation, a weak housing market and continued uncertainty about employment prospects. Confidence remained quite low and retail sales growth slowed in the fourth quarter. Slower M0 growth was consistent with this.

Ten-year gilt yield^(a) and differentials over US, German and French yields^(b)



⁽a) Gross redemption yield on semi-annual basis.
(b) Differentials with yields on comparable US Treasuries, German Bunds and French OATs.

Table A			
Changes i	in official	interest 1	rates

Country	Interest rate	Date	Change (basis points)	New level
Australia	Official cash rate	24 October	+100	6.50
Sweden	Repo rate	2 November	er +20	7.40
United States	Federal funds rate Discount rate	15 Novembe 15 Novembe	er +75 er +75	5.50 4.75
United Kingdom	Minimum lending rate	7 Decembe	r +50	6.25
Finland	Tender rate	9 Decembe	r +49	5.50
Australia	Official cash rate	13 Decembe	er +100	7.50
Sweden	Repo rate	14 Decembe	r +20	7.60

Current inflation remained low, but there was further evidence of incipient cost and price pressures. Raw material and other producer input prices continued to rise, although the latter's annualised three-month rate of increase moderated from 10.3% in September to 7.0% in October and November. Falling unit labour costs helped to attenuate the impact of rising input costs on output and retail prices, although surveys suggested increasing capacity utilisation and that an increasing balance of firms expected to raise prices in the months ahead. The annualised increase in output prices (excluding food, beverages, tobacco and petroleum) in the three months to November rose to 4.3%, from 4.0% in October and 2.6% in September.

Labour market conditions tightened, delivery times lengthened and reported industrial capacity utilisation rose to the same level as its cyclical peak in the previous cycle. Taken with firm commodity prices and rising intermediate product prices, this underlined the concern about rising output prices.

Against this background, the Chancellor decided at his meeting with the Governor on 7 December that interest rates should be raised by ¹/₂% to 6¹/₄%. The Bank implemented the change immediately both to remove the uncertainty surrounding the meeting following the Government's defeat on VAT the previous evening, and because of the gilt auction being held that morning. The interest rate announcement was made some 20 minutes before the deadline for bids so that the auction could take place on the basis of full information. The immediate reaction was positive: sterling rallied, long bond yields fell and short-term interest rates beyond the three-month maturity held steady or declined. Market commentators viewed the move as fully justified on economic grounds.

Over the fourth quarter as a whole, ten-year gilt yields fell by 23 basis points to 8.69% and the differential over equivalent US and German bonds narrowed by 31 and 6 basis points respectively. Positive perceptions about the economic situation appeared to be enhanced by the further tightening of policy at an earlier point than in previous cycles, reflecting the authorities' continuing commitment to price stability.

Data releases in the United States confirmed that output and employment continued to rise quickly; labour market conditions also tightened further, and primary and intermediate product prices accelerated. This led the Federal Reserve to raise interest rates by $^{3}/_{4}\%$ on 15 November, increasing the target federal funds rate to $5^{1}/_{2}\%$ and the discount rate to $4^{3}/_{4}\%$. This sustained a rally in US Treasuries and a recovery in the dollar. A number of other countries —including Australia, Sweden and Finland—also raised interest rates during the quarter (see Table A).

In Germany, GDP growth in the third quarter rose to 1.3%, inflation edged below 3% and growth in M3 (which does not include money-market funds) slowed to the upper end of the 4%–6% target range. The developments left market expectations of German interest rates largely unchanged; the Bundesbank held its repo rate fixed at 4.85%.

Sterling was steady throughout the period, with fluctuations against the dollar broadly offset by movements against the Deutsche Mark:

Table B Interest rates, gilt yields and exchange rates; selected dates^(a)

Interest rates (per cent per annum)				Gilt yields (b) (per cent per annum					Exchange rates			
Sterling interbank rate		terbank rates (ites (c)		Short sterling future (d)	Conventionals			Index-linked			
1994	1 month	3 months	6 months	12 months	3 months	Short	Medium	Long	Long	ERI	<u>\$/£</u>	$\underline{DM/\pounds}$
3 October 17 October 26 October 28 November 6 December 7 December 30 December	51/2 517/32 51/2 517/32 527/32 65/32 63/32	531/32 529/32 531/32 61/32 63/8 613/32 619/32	619/32 65/16 61/2 617/32 615/16 615/16 73/32	717/32 73/32 73/8 71/4 723/32 711/16 729/32	7.76 7.17 7.47 6.99 7.50 7.44 7.38	8.73 8.31 8.81 8.26 8.53 8.51 8.66	8.92 8.46 8.92 8.40 8.60 8.58 8.70	8.74 8.34 8.75 8.30 8.43 8.39 8.54	3.90 3.84 3.93 3.83 3.91 3.91 3.88	80.1 79.7 80.7 79.9 80.0 80.1 79.7	1.5755 1.6060 1.6353 1.5610 1.5572 1.5627 1.5645	2.4554 2.4151 2.4472 2.4441 2.4471 2.4475 2.4245

(a) Close-of-business rates in London.

(a) Const-of-business rates in London.
 (b) Gross-redemption yield. Representative stocks: short—6% Treasury 1999; medium—6¹/₄% Treasury 2004; long—8% Treasury 2013; index-linked—2¹/₂% Index-Linked Treasury 2016 (real yield assuming 5% inflation).

(c) Middle-market rates.

(d) Implied future rate: March 1995 contract

Sterling's effective index(a)





the effective rate index remained around 80.⁽¹⁾ The dollar encountered a renewed bout of weakness at the beginning of the period, mainly on concerns that US bonds would suffer in an environment of rising inflation and interest rates. But intervention by the Federal Reserve in early November, backed up by the rise in US interest rates in mid-November, led sentiment to turn in favour of the dollar. The Mexican peso was devalued by about 15% on 20 December and its peg to the dollar was subsequently abandoned, which triggered volatility among the major currencies in thin Christmas markets.

Foreign exchange markets

Sentiment turned sharply against the dollar at the beginning of October, as markets judged that there would be no early monetary tightening by the Federal Reserve despite renewed evidence of continuing strong growth and a gradual emergence of input-price inflation. The dollar touched a two-year low against the Deutsche Mark of DM 1.4853 on 25 October, following the return to power of the ruling coalition in the German elections; it also fell back against the yen, to a new record low of ¥96.0 on 2 November on news that trade talks with Japan were faltering. But substantial intervention by the Federal Reserve on 2/3 November-coupled with statements from the US Treasury in support of a stronger dollar-arrested its slide. Market sentiment changed as the forceful nature of the intervention persuaded many that the authorities were serious about stopping the depreciation and would raise interest rates at the Federal Open Market Committee (FOMC) meeting on 15 November. The dollar rose further following the Congressional elections on 8 November, when the clear Republican victory was seen as reducing uncertainty about Federal Reserve policy.

Consequently, the ³/₄% rise in US interest rates was greeted positively by the markets and triggered a rally in late November. The dollar reached a high for the quarter of DM 1.5834 on 9 December before retreating to around DM 1.57 in the run-up to Christmas. The decision to leave interest rates unchanged at the FOMC on 20 December caused little surprise, with the market looking to further rises in 1995. Over the Christmas period, the dollar was volatile following the large devaluation of the Mexican peso, appreciating initially—as investors viewed it as a safe haven—but then retreating equally sharply on fears that Mexico

⁽¹⁾ Since 1 February, the Bank has updated its calculation of sterling's effective rate index (ERI)—see the note on the new calculation on pages 24–25. Because it was being used at the time of the events described, this article refers to the old ERI.

Sterling exchange rates



DM/£ exchange rate and expected UK-German interest rate differential^(a)



Short-sterling futures rate curves^(a)





might draw on swap lines to generate dollars to sell in support of the peso. It ended the year at DM 1.5497 and ¥99.72.

Sterling also depreciated against the Deutsche Mark at the beginning of the period, falling to a low for the quarter of DM 2.4130 on 17 October. It recovered quickly, however, helped by continued healthy economic data. Sterling tracked the Deutsche Mark throughout November, decoupling somewhat from the dollar and rising with other European currencies to a high for the year—of \$1.6439 on 2 November—before falling back as the dollar strengthened. Around the middle of November, it found strong support at around \$1.56 to \$1.57. UK interest rate expectations firmed in late November following an estimate of GDP growth of 0.9% for the third quarter, at the same time as a sharp rise in US interest rate expectations. Increases in the differential between UK and German expected three-month interest rates tended to underpin sterling against the Deutsche Mark.

The market reacted positively to the $\frac{1}{2}$ % interest rate rise on 7 December. Sterling rose to DM 2.4686 on 8 December, before trading in a range around DM 2.455 and \$1.56 until just before Christmas. From 20 December onwards, it suffered from the dollar's volatility after the Mexican peso devaluation, falling to \$1.5645 and DM 2.4245 by the year-end. Its effective rate index moved in a narrow range around 80 throughout the quarter, as its movements against the dollar and the Deutsche Mark were generally offsetting.

After a quiet start to the period, the ERM grid gradually widened as a result of a strengthening of the Deutsche Mark. The German currency benefited from a gentle firming of interest rate expectations, with the March 1995 euromark futures rate beginning to reflect a belief that the next interest rate move would be upward. The French franc, Italian lira, Spanish peseta and Portuguese escudo all encountered periods of pressure. Uncertain political environments were a factor in France and Italy, as well as a sharp rise in interest rate expectations as investors demanded a higher risk premium. The lira fell back consistently to reach a post-war low of L1,049 against the Deutsche Mark on 20 December; the Spanish peseta also weakened in December on domestic political concerns.

Official money-market operations

Money-market rates were steady in the first few weeks of the period, following the interest rate rise on 12 September. One-month rates stayed close to $5^{1/2}$ % and three-month rates just higher than base rates, at around $5^{7/8}$ %; 12-month rates and the three-month rates implied by short-sterling futures contracts were more volatile, as is often the case as expectations about the path of official interest rates evolve. Short-sterling futures then rallied from the start of October until late November, suggesting some moderation in expectations of further interest rate rises. But then the mood changed: GDP figures were revised upwards, and showed growth in the year to the third quarter to be around 4%; the November CBI monthly trends survey pointed to continued increases in output and no change in the balance of firms expecting to raise prices in the months ahead. The Budget on 29 November also had an impact: the higher forecast for GDP growth for 1995, together with the

broadly neutral nature of the Budget in its effects on public finances, led to increased expectations that interest rates might need to be raised further.

These market expectations intensified during the week leading up the monthly Chancellor/Governor meeting on 7 December. The prices component of the Purchasing Managers Index had risen and political events were dominating the news, culminating in a Government defeat on the eve of the meeting on a procedural motion on the proposed introduction of standard rate VAT on domestic fuel. On the day of the vote, the Governor asked for the meeting to be brought forward from 9.30 am to 8.45 am on 7 December, so that if a decision were made to change interest rates, it could be implemented before the deadline for bids at the gilt auction that morning. The Bank recommended that interest rates should be raised by ¹/₂% and the Chancellor agreed.

The Bank decided to implement the change immediately in order to remove the market uncertainty that would otherwise have followed the meeting. Official rates were raised by 1/2% via the reintroduction for one day of Minimum Lending Rate at 61/4% at 9.40 am. The reaction-observable in both prices and commentsuggested that the reasons for the rate increase were fully understood, with the market's view of the overall economic environment and the associated balance of risks to the inflation outlook in accord with the authorities' judgment. The increase was absorbed smoothly: one-month money-market rates rose by only $^{5}/_{16}\%$, rates beyond three months held steady or fell and the rates implied by short-sterling futures contracts fell at all maturities. This suggested that there was considerable relief following the announcement, given the background of uncertainty. The move appeared to be viewed by the market as evidence that the authorities would continue to act prudently and would-by acting in good time-need to raise rates by less overall to contain inflation.

One measure of uncertainty is implied volatility, which can be derived from the prices of options on futures contracts. Changes in implied volatility may indicate a change in market expectations of fluctuations in the price of the underlying asset or in uncertainty about the future level of these prices. Implied volatility on the March short-sterling contract fell from 19.3% on 6 December to 17.4% on 17 December, while implied volatility on the December contract fell from 20.4% to 11.7% after the rate rise. (This contract settled two weeks later, so implied volatility was almost bound to drop significantly once the outcome of the meeting was known.) The implied volatility on the December contract was quite closely related to the December futures rate. It is possible that central forecasts of future interest rates were relatively stable, with some of the movement in futures (and cash) rates attributable to changes in the uncertainty attaching to these forecasts.

International influences on the sterling money market were mixed. Strong US economic data strengthened expectations of rising short-term interest rates there. In Germany, the Bundesbank held its repo rate steady at 4.85% throughout the period. Although official pronouncements continued to emphasise that rates could move in either direction, market hopes for a further cut in German interest rates diminished, while the expected timing of any eventual increase was pushed back.

Short-sterling futures(a) and implied volatility(b)



Degree of US monetary policy tightening expected in the first half of 1995^(a)



⁽a) Differential between December 1994 and June 1995 federal funds futures prices.

Money-market assistance



Datik of England's holdings of bills, market advances and—until 19 January 1994—funds supplied under the temporary facilities; since that date, under the repo and secured loan facilities. Bank of England's holdings of eligible bank and sterling Treasury bills outright and on a repurchase basis. Bank of England's holdings of gilt-edged stocks on a repurchase basis, and loans made against export and shipbuilding credit-related paper under temporary and repo and secured loan facilities.

Table C Influences on the cash position of the money market

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

	1994/95				
	AprSept.	Oct.	Nov.	Dec.	
Factors affecting the market's cash position					
Under/overfunding (+/-) (a)	7.4	-4.6	2.9	-1.7	
Other public sector net borrowing from banks and					
building societies (-) (b)	0.3	0.4	0.1	-0.1	
of which, local authorities deposits with banks and build	ing				
societies (+)	—	0.1	0.2	_	
Currency circulation (-)		1.0	-0.4	-2.4	
Other	4.9	-2.5	-0.1	2.3	
Total	12.5	-5.7	-2.7	-2.0	
Increase (+) in the stock of					
assistance	-8.3	5.1	-2.7	1.5	
Increase (-) in £ Treasury bills outstanding (c)	4.2	-0.7	-0.2	-0.5	
Increase in bankers'					
balances at the Bank	_	0.1	-0.1	0.1	

(a)

From 1993/94, net purchases of central government debt by banks and building societies are included in funding. Purchases by banks and building societies in 1992/93 are counted as funding in 1994/95. From 1993/94, banks' and building societies' purchases of local authorities' and public 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. (b) (c)

The stock of assistance rose sharply in October (from £4.3 billion to £9.4 billion)—in part because of receipts of advance corporation tax and privatisation proceeds-and remained relatively high for the rest of the period. Average daily money-market shortages accordingly increased during the quarter, to £900 million from around £650 million in Q3 and £600 million in Q2. The Bank held an early round of operations on days of large shortage and on each occasion a bill repo was also included (although sometimes no offers were received).

Except in the run-up to the December Chancellor/Governor meeting, the maturity of bills offered to the Bank over the period was usually short. Late lending was often used to remove any residual shortage when the market was reluctant to part with bills, which also reduced the average maturity of the total assistance provided by the Bank. This increased average daily shortages, as assistance provided via outright purchases of short maturity bills and overnight late lending rolled over.

The twice-monthly gilt repo facility continued to act as a 'self-correcting' mechanism; take-up by the market both influenced and was influenced by the pattern of daily shortages and short-term interest rates. For example, there was a run of 12 days in early November when the shortage was at least £1 billion, taking two-week and one-month rates 1/8% higher than the prevailing repo rate of $5^{21}/_{32}$ %. The take-up at the repo on 9 November increased to £4.4 billion and, when the result was published, 2-4 week rates fell back by around ³/₃₂%, as pressure was taken off the Bank's daily operations.

At the weekly Treasury bill tenders for three-month bills, on two occasions when money-market rates were relatively firm, the yield paid at the tender exceeded base rate but, unlike on 29 July, this did not disturb the market. The amount on offer was reduced from £500 million to £350 million on 4 November to offset a projected increase in the stock of assistance in the period immediately thereafter, arising from the seasonal pattern of government revenue and expenditure flows. (It was subsequently restored to £500 million on 13 January to help address the run-down in the stock of assistance in the final months of the financial year-see the box on pages 12–13.) Reflecting the reduced supply of Treasury bills, the yield discount relative to one to three-month commercial bills widened by around 3/8% during the quarter.

Gilt-edged funding

The gilt market steadied in the fourth quarter. Gilts outperformed most other government bond markets over the period, with the spread between ten-year gilt yields and their US and German equivalents narrowing by 31 and 6 basis points respectively. The yield curve flattened, with the differential between ten-year and two-year yields falling from 77 basis points to 57 basis points over the quarter, and the differential between 20-year and two-year yields narrowing from 62 to 45 basis points.

Gilt prices rose in the first half of October, allowing some tap sales, but subsequently fell back in renewed international bond market weakness (the US 30-year bond yield rose above 8%). Domestic data added to concern about the pace of growth (notably upward revisions to GDP figures for the first and second quarters, strong

⁽c)

Table E 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	Date exhausted
6% Treasury 1999	250	10.10.94	10.10.94	Tap	90.12500	Fully paid	8.53	8.51	11.10.94
6% Treasury 1999	100	10.10.94	10.10.94	To CRND					
8% Treasury 2009	250	10.10.94	10.10.94	Tap	94.53125	Fully paid	8.66	8.64	11.10.94
8% Treasury 2009	100	10.10.94	10.10.94	To CRND					
21/2% Index-Linked 2024	150	10.10.94	10.10.94	Тар	109.12500	Fully paid	3.89 (b)	3.89 (b)	11.10.94
81/2% Treasury 2007	200	13.10.94	13.10.94	Тар	99.81250	Fully paid	8.52	8.50	17.10.94
8% Treasury 2013	250	13.10.94	13.10.94	Тар	96.18750	Fully paid	8.40	8.40	14.10.94
21/2% Index-Linked 2013	150	13.10.94	13.10.94	Тар	130.00000	Fully paid	3.82 (b)	3.83 (b)	14.10.94
8% Treasury 2000	2,500	18.10.94	27.10.94	Auction	96.03125 (c)	Fully paid	8.84 (d)	8.84	27.10.94
81/2% Treasury 2005	250	4.11.94	4.11.94	Тар	99.12500	Fully paid	8.61	8.59	10.11.94
81/2% Treasury 2005	150	4.11.94	4.11.94	To CRND					
83/4% Treasury 2017	250	4.11.94	4.11.94	Тар	102.75000	Fully paid	8.47	8.46	15.11.94
83/4% Treasury 2017	150	4.11.94	4.11.94	To CRND					
21/2% Index-Linked 2009	100	4.11.94	4.11.94	Тар	152.50000	Fully paid	3.86 (b)	3.85 (b)	9.11.94
21/2% Index-Linked 2024	100	4.11.94	4.11.94	Тар	110.31250	Fully paid	3.85 (b)	3.85 (b)	16.11.94
7% Treasury 2001	200	21.11.94	21.11.94	Тар	92.00000	Fully paid	8.55	8.53	22.11.94
7% Treasury 2001	150	21.11.94	21.11.94	To CRND					
9% Treasury 2008	200	21.11.94	21.11.94	Тар	103.87500	Fully paid	8.52	8.43	23.11.94
9% Treasury 2008	100	21.11.94	21.11.94	To CRND					
9% Treasury 2012	200	21.11.94	21.11.94	Тар	104.68750	Fully paid	8.48	8.42	23.11.94
21/2% Index-Linked 2003	150	21.11.94	21.11.94	Tap	162.37500	Fully paid	3.81 (b)	3.79 (b)	23.11.94
8% Treasury 2000	200	28.11.94	28.11.94	Tap	98.68750	Fully paid	8.27	8.62	11.01.95
8% Treasury 2000	100	28.11.94	28.11.94	To CRND					
8% Treasury 2003	200	28.11.94	28.11.94	Tap	97.25000	Fully paid	8.46	8.77	11.01.95
8% Treasury 2003	100	28.11.94	28.11.94	To CRND					
8% Treasury 2013	200	28.11.94	28.11.94	Tap	97.25000	Fully paid	8.29	8.53	11.01.95
8% Treasury 2013	100	28.11.94	28.11.94	To CRND					
21/2% Index-Linked 2001	100	28.11.94	28.11.94	Tap	167.18750	Fully paid	3.73 (b)		On tap
21/2% Index-Linked 2016	100	28.11.94	28.11.94	Tap	139.25000	Fully paid	3.83 (b)	3.84 (b)	28.12.94
81/2% Treasury 2005	2,000	30.11.94	8.12.94	Auction	98.81250 (e)	Fully paid	8.66 (d)	8.66	8.12.94

(d)

Gross redemption yield, per cent. Real rate of return, assuming 5% inflation. Lowest-accepted price for competitive bids. The non-competitive allotment price was £96.15625. Yield at lowest-accepted price for competitive bids. Lowest-accepted price for competitive bids. The non-competitive allotment price was £98.9375.

Gilt sales in January–March 1995

Funding policy is conducted on the basis set out in the 1994/95 Financial Statement and Budget Report, and the remit from the Chancellor of the Exchequer to the Bank published on 17 March 1994.⁽¹⁾ The PSBR was initially forecast at £37.9 billion but was revised downwards-to £36.1 billion in the Treasury's Summer Economic Forecast and to £34.3 billion following the November Budget. The table below updates the funding arithmetic and shows the consequent funding requirement for January-March 1995.

Forecast of funding requirement for 1994/95

	£ billion (a)
PSBR Gilt redemptions <i>Less</i> cumulative overfund and gilt purchases by the monetary sector in 1992/93	34.3 8.5 10.2
Funding requirement Less expected net inflow from National Savings	32.6 3.5
Gilt sales required for full funding Less gilt sales already made (April–December 19	29.1 22.7
Further gilt sales required (January–March 1995) for full funding	6.3
(a) May not sum exactly because of rounding.	
 For further details, see the box on the funding remit Quarterly Bulletin, pages 112–13. 	in the May 1994

industrial production, M0 growth over 7% and a buoyant CBI monthly trends survey). The October auction for $\pounds 2^{1/2}$ billion of 8% Treasury 2000 was held against this background. It was the first time since February that more than £2 billion of a conventional stock had been offered, and continued the practice of creating current-coupon benchmark stocks at key maturities. The auction was satisfactory, though the market was a little disappointed with the cover of 1.2 times; the small tail of two basis points-the difference between the yields corresponding to the average and lowest-accepted prices-suggested fairly tight pricing of the bond, and there were large issues of overseas government bonds at the time. It marked a lowpoint for gilts, and after some uncertainty in the run-up to the 2 November Chancellor/Governor meeting, the market recovered. Good news on current inflation was coupled with a more supportive international environment, as US Treasuries rallied after the rise in US interest rates. The March gilt future encountered some resistance around par at the start of November, but once the contract had risen clear of this level it gained some upward momentum, which continued in the run-up to the Budget on 29 November.

The market did not gain further impetus from the Budget, as the fiscal stance presented was broadly in line with expectations, and in fact fell back on disappointment that the current year's PSBR projection was not revised down as much as expected, despite substantial downward revisions to PSBR forecasts for later years. Many had also anticipated an announcement about consultation on an open gilt repo market, and some were disappointed that trading would not begin imminently. Some analysts suggested that generalising the ability to take short positions might, if accompanied by tax changes, reduce spreads between high and low-coupon stocks, and between those which were and were not free of tax to residents abroad. These spreads did tighten before the announcement, but widened again shortly afterwards.

Money-market operations since September 1992

The stock of assistance and shortages

A key concept in the Bank's money-market operations is the 'stock of assistance'-the assets the Bank has acquired in providing liquidity to the money market. In its daily operations, the Bank acquires sterling commercial and Treasury bills, bought outright or on repo, and makes secured advances to the market. In its twice-monthly operations, it acquires gilts or other government securities on repo, and makes loans against government-guaranteed paper.

All of these assets (except Treasury bills owned outright) represent an obligation of the private sector to the Bank on maturity to redeem commercial bills, to repurchase assets repoed to the Bank or to repay borrowing. The stock of assistance is thus continually rolled over: as the private sector meets its obligations, cash is drained from it, which is normally sufficient to create a further shortage of cash in the money market; the Bank meets this shortage, at an official rate of interest, by providing renewed assistance, and so on. The stock of sterling Treasury bills in the market is maintained through the weekly tender held each Friday; when the purchasers pay for the Treasury bills in the following week, that also drains cash liquidity from the market.

The contribution of the stock of assistance to the size of daily cash shortages depends not only on its size but also on its maturity. Assistance provided via the repo facility is for a period of between two and five weeks-and bill repos are usually of two to three weeks maturitywhereas (recently at least) bills sold to the Bank often have less than a fortnight until they mature, and market advances are normally overnight. Increased use of market advances would thus tend to lower the average maturity of the stock of assistance and so raise the overall daily cash shortage. (If rolled over, market advances would reappear in the shortage on each successive day; bill repos would reappear only every two to three weeks.)

The size of each day's money-market cash shortage depends not only on maturing assistance, but also on any movements to or from the government's or other customers' sterling bank accounts at the Bank of England (and on any other transactions between the private sector and the Bank itself; the most important of these reflect changes in the note issue: a higher note issue drains liquidity, since the banks need to pay for the notes).

Any sterling payment to the government (eg of taxes or as subscription for government debt or for foreign exchange bought from the government's Exchange Equalisation Account) drains liquidity from the money market. Any sterling payment by the government (eg for public expenditure, the redemption of government debt or to purchase foreign exchange) puts liquidity into the market.

Over a financial year as a whole, the government aims to fund the public sector borrowing requirement (PSBR) (plus government debt redemptions and any underlying change in the foreign exchange reserves) through the sale of debt (other than Treasury bills)—the 'full-fund' policy. Over a financial year as a whole, therefore, public sector transactions will tend largely to offset each other in their impact on money-market liquidity (although the activities of local authorities and public corporations that do not have their accounts with the Bank of England can have an effect).

The note issue has a distinct weekly and annual pattern (with a marked peak at Christmas). And it normally rises from year to year, resulting in a persistent small drain of liquidity and a slight upward trend in the stock of assistance (depending on the scale of any change in the note issue).

Within the year, there will usually be a mismatch between the seasonal patterns of government expenditure and of tax receipts and debt sales, resulting in seasonal movements in the size of daily shortages and in the stock of assistance. These are, however, offset in part by officially managed variation through the year of the size of the weekly Treasury bill tender.

The stock of assistance since September 1992

Before the suspension of sterling's membership of the Exchange Rate Mechanism (ERM) on 16 September 1992, the Bank (acting for the Exchange Equalisation Account) made large-scale purchases of sterling from the market. During the month of September, the net flow of

Influences on the cash position of the money market

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

			1994			
	1992/93	1993/94	Q2	Q3	Q4	_
Factors affecting the market's cash position						
Under/overfunding (+/-) (a)	0.7	-3.6	5.8	1.5	-3.5	
Other public sector net borrowing from banks and						
building societies (-) (b) of which, local authorities'	-1.5	2.6	-0.2	0.5	0.3	
<i>deposits with banks and build</i> <i>societies</i> (+)	ing 0.4	2.3	-0.4	0.4	0.2	
Currency in circulation (-)	-0.9	-2.9	1.2	-1.2	-1.8	
Other (a)	-4.2	-2.2	3.2	1.7	-0.2	
Total	-6.0	-6.2	10.0	2.5	-5.2	
Increase (+) in the stock of assistance	1.9	-4.2	-7.6	-0.8	3.8	
Increase (-) in £ Treasury bills outstanding (c)	-4.2	-1.7	2.4	1.8	-1.4	
Increase in bankers'	0.1	0.2			0.1	
balances at the Bank	0.1	-0.2		_	0.1	

(a) From 1993/94, net purchases of central government debt by banks and building societies are included in funding; in 1992/93 such transactions are included in 'other'. Purchases by banks and building societies in 1992/93 are counted as funding in 1994/95.
(b) From 1993/94, banks' and building societies' purchases of local authorities' and public corporations' listed sterling stocks and bonds are included in funding.
(c) Other than those held outright by the Bank and government accounts, but including those purchased by the Bank on a repurchase basis.

sterling from the market to the Bank was £12.3 billion. Because most of the Bank's foreign exchange intervention was undertaken on 16 September itself, a significant part of the flow of funds from the money market was concentrated into one day (18 September) when the transactions settled.

The large shortage which resulted would have been difficult to relieve using bill purchases alone. The Bank therefore offered temporary facilities on 18 September 1992, whereby it purchased gilts for future resale and provided finance against export credit and shipbuilding paper.⁽¹⁾ The residual shortage on the day was £3 billion; this was relieved without difficulty through normal operations.

The stock of assistance rose from £8 billion at the end of August 1992 to £18.9 billion on 18 September. Despite the introduction of the temporary facilities, the Bank's eligible bill holdings increased sharply, to £10.8 billion on 18 September (about half of the total eligible bills outstanding at that time). The repo and secured loan facilities were originally in place for one week only, but they were subsequently re-offered 13 times over the next 16 months. They were successful in enabling money-market participants to cope with the potentially disruptive impact of the large rise in the stock of assistance without placing undue pressure on the bill market. Because of their success and additional flexibility, it was felt desirable to maintain them even as the stock of assistance declined.

The repo and secured loan facilities were made permanent in January 1994, and a Master Agreement governing their use-formalising the legal arrangements and incorporating margin requirements-was introduced in April 1994.⁽²⁾ The facility has proved a useful 'safety valve', helping to reduce the volatility of very short-term interest rates.

High and low overnight interest rates^(a)



When participation in the repo increases (usually following a period of relatively high short-term market interest rates), the average daily shortage in the following weeks will be lower than otherwise and short-dated interest rates will tend to moderate as a result. Conversely, when very short-term rates are low (below the reported, the relative attractiveness of the reportable and participation tends to moderate. Average daily cash shortages are then higher than otherwise and short rates may rise to the point where the repo becomes more attractive. So the repo facility has a stabilising influence on short-term interest rates, and this has helped to reduce volatility. The chart below shows the daily high and low for the overnight rate since August 1992. It can be seen that since the repo facility was made permanent in January last year, volatility has moderated.

The effect of the full-fund policy

The operation of the full-fund policy means that, over a financial year as a whole, public sector finances have no significant net effect on the money market. If the public sector has a deficit-entailing net payments from its accounts at the Bank, adding to market liquidity-it also has a borrowing programme to fund the deficit, entailing offsetting flows from the market to its accounts at the Bank over the year as a whole. Similarly any underlying change in the reserves is in principle reflected in government borrowing within each financial year.

Two small exceptions to the full-fund policy have already been noted. One arises from any public sector banking transactions which are not with the Bank. The second is that sales of Treasury bills do not count as funding so that, even if the PSBR is fully funded, any increase in the Treasury bill issue will drain liquidity from the system and add to the stock of assistance. Until the 1992/93 financial year, there was a third exception: gilt purchases by banks and building societies were also not counted as funding. As a consequence, any net purchases of gilts made by them had to be matched by sales to the non-bank sector, leaving the government overfinanced and so draining liquidity from the money market and adding to the stock of assistance. In 1992/93, such purchases amounted to £6.8 billion. They were an important factor in the increase in the stock of assistance over that financial year, putting pressure on the bill market and increasing volatility.⁽³⁾ From 1993/94, the definition of funding has been changed to include banks' and building societies' purchases; moreover, funding in the current financial year is being adjusted to reflect the £6.8 billion of purchases made in 1992/93. Together with an adjustment for overfunding in 1993/94, this means that there is expected to be an underfund of £10.2 billion in the current financial year (on the revised definition of funding). Other things being equal, this will permanently reduce the stock of assistance by that amount.

For details, see the article on the operation of monetary policy in the November 1992 *Quarterly Bulletin*. For further details of this, see the article on the operation of monetary policy in the May 1994 *Quarterly Bulletin*. A chart showing changes in the stock of assistance since 1992 (and within this the Bank's holdings of bills and amounts provided under the repo facility) is shown on page 10.

Implied volatility on government bond futures^(a)







Table F Official transactions in gilt-edged stocks

£ billions: not seasonally adjusted

	1994/95 (a)			
	AprSept.	Oct.	Nov.	Dec.
Gross official sales (+) (b) Redemptions and net official purchases of stock	14.6	4.1	1.9	2.1
within a year of maturity(-)	4.3	_	1.7	_
Net official sales (c) of which net purchases by:	10.3	4.1	0.1	2.1
Banks (c)	-0.3	0.6	0.2	0.4
Building societies (c)	-0.1	0.3	-0.5	0.7
Overseas sector	-2.8	_	-0.1	_
M4 private sector (c)	13.4	3.0	0.6	1.0

Later instalments are included in the month when they fall due; not in the month

First instanticus are included in the inform when they fair due, not in the inform when the sale is secured. 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 (b) maturity apart from transactions under purchase and resale agreements. Excluding transactions under purchase and resale agreements.

(c)

One feature of the outperformance of gilts during the fourth quarter was an apparent reduction in uncertainty, which may have been reflected in a reduction in the risk premium element in gilt yields relative to other markets. Between October and December, the implied volatility on the March gilt future fell relative to that on the equivalent contracts for the United States and Germany.

There was no auction in November because of the timing of the Budget, but £3 billion (nominal) of tap stocks were brought during the month, enabling the Bank to satisfy demand in a rising market. The 7 December auction (£2 billion of 81/2% Treasury 2005) was timed between the Budget and the expected slowdown in market activity before the Christmas break. It came, however, on the same morning as the Chancellor/Governor meeting. Once the decision to raise interest rates had been taken, the Bank felt that the least disruptive and most equitable of the options available was to announce the rate increase before the deadline for bids at 10.00 am. Participants could then place their bids in full knowledge of the adjustment to monetary policy, although the Bank recognised that this timing was problematic from the gilt-edged market-makers' perspective. The interest rate announcement was made at 9.40 am. The auction itself was 1.34 times covered and priced to yield 8.64% with a tail of two basis points.

Index-linked gilts were stable over the period, with the yield moving within a five basis-point range around 3.85% for the majority of stocks. The conventional yield curve flattened after the interest rate rise, but the real yield curve was already flat and did not react. Tap sales of index-linked gilts were made on five occasions in the quarter. Some commentators inferred a link with the White Paper on pension fund asset allocation (following the Goode report in June) which recommended an increase in the exposure of pension funds to 'capital-certain' assets such as index-linked gilts.

The two auctions were supplemented with tap sales and small amounts were also sold from official holdings; the Bank kept well up with the required pace of funding. Total gilt sales of £8.1 billion were made during the quarter, bringing the total for the financial year to £22.7 billion, and leaving £6.3 billion of gilts to be sold in the first quarter of 1995 to meet the revised funding target for the year of $\pounds 29.1$ billion (see the box on page 11).

In the fourth quarter, large purchases continued to be made by the M4 private sector (which includes pension funds and insurance companies); the sector was also the largest net purchaser in the second and third quarters, adding to holdings as gilt prices fell. Banks were modest net purchasers of gilts, having kept their holdings steady or been net sellers in the previous two quarters.⁽¹⁾

For further details on the flow of funds in the gilt market, and estimated holdings of gilts by sector, see the article on developments in the gilt market during 1994, on pages 66–71.

The international environment

- Growth in the Group of Seven countries continued to be robust in the second half of 1994. The US economy grew strongly; in the third quarter, consumption strengthened in continental Europe particularly in western Germany—and in Japan, the recovery broadened.
- Non-oil commodity prices rose by around 25% between 1993 and 1994; oil prices fell by 7%. Producer price inflation is rising in a number of OECD countries.
- Despite stronger growth and rising raw material prices, annual consumer price inflation in the G7 countries was lower towards the end of 1994 than at the beginning.
- In response to potential inflation pressures, official interest rates were increased further in a number of countries—mainly those which have been recovering longest.









Overview

In the third and fourth quarters of last year, economic growth continued to be robust in the Group of Seven (G7) countries. In the United States, growth was strong despite higher interest rates and higher capacity utilisation. In continental Europe, where recovery is about two years behind the United States, growth broadened in the third quarter. And in Japan, where the recession was the shallowest in the G7-but also one of the longest-private sector spending began to recover, supported by fiscal policy.

In the third quarter of last year, growth in the G7 economies was around 1%, compared with 0.9% in the second. Chart 1 shows growth rates in the major economies. In the United States, only the housing market seemed to slow in response to higher interest rates, and GDP growth—at 1% in the quarter—was still above the estimated growth rate of productive capacity. In France and western Germany, GDP rose by 0.8% and 1.3% respectively, and western German consumption rose by 1.5%. In Japan, GDP rose by 0.9% in the third quarter, and growth in the second quarter was revised from a fall to a rise.

Growth in the industrialised world was stronger in 1994 as a whole than most forecasters had expected at the beginning of the year. In December 1993, the OECD forecast growth in G7 GDP of 2.1% in 1994; a year later its estimate was 3%. When economies recover from recession, growth can be rapid: in the first two years after the recession in the early 1980s, G7 GDP rose by 2.9% and 4.6% respectively. With demand now rising rapidly worldwide, growth this year may be stronger than many recent forecasts have suggested.

Despite the strengthening of growth in the industrial world, annual rates of consumer price inflation have so far been flat or falling in most countries (see Chart 2). In the G7, annual consumer price inflation was 2.4% at the beginning of 1994 and 2.2% by November. But price pressures have been building in the production chain, as Chart 3 shows. Annual producer price inflation in the G7 was 0.1% at the beginning of 1994 and 1.5% by

Chart 3 Producer prices in the major economies



Chart 4 United States: business investment over recent cycles^(a)



September. Excluding oil, commodity prices—as measured by the Economist dollar-denominated index—rose by around 25% between 1993 and 1994. In the fourth quarter, these commodity prices rose by 2% while oil prices fell. But commodity prices are volatile and respond rapidly to news; if GDP growth forecasts are revised further upwards, it is possible that commodity prices, particularly the prices of demand-sensitive metals, will rise further. The OECD forecasts a rise of around $3^{1}/_{2}$ % in non-oil commodity prices in 1995, with G7 output growth projected to be 3%.

In response to higher-than-expected growth and rising producer price pressures, some countries have raised interest rates further. The Federal Reserve raised its target federal funds rate by 0.75 percentage points in November; official interest rates were also increased in Australia, Canada and Sweden—as well as the United Kingdom—in the fourth quarter. Most of these countries were among the first to recover after the downturn (stimulated by easier monetary policy and, in some cases, lower exchange rates).

In the United States, output continued to grow above trend

In the United States, GDP rose by 1% in the third quarter, compared with estimated capacity growth of around 0.6%. The growth was broadly based: consumption rose by 0.8% and private business investment by 3.4%. Business investment was 14% higher than a year earlier and appeared not to have been adversely affected by the rise in long-term interest rates from October 1993. Rising capacity utilisation and buoyant corporate profits supported capital investment: retained corporate earnings rose by 15% a year in 1992 and 1993, and by a further 25% in the first three quarters of 1994.

Some commentators have suggested that the sharp rise in investment has increased the productive potential of the US economy, allowing it to grow at a faster rate than in the past without generating inflationary pressures. But as Chart 4 shows, the profile of investment has been similar to that in the recovery after the 1974–75 recession, casting some doubt on this suggestion. The box on page 17 looks in more detail at the cyclical positions of the major overseas economies and the main components of their recoveries.

By the end of the third quarter, the US personal sector seemed little affected by higher interest rates. The rise in consumption in the third quarter was followed by robust retail sales in October, although they were flat in November and December. In the fourth quarter, consumer confidence was at its highest since 1990 and in November consumer credit continued to grow at a rapid rate. The strength of employment, which rose by 3% in the year to the fourth quarter, helped support consumer spending last year. Higher interest rates may, however, have affected the housing market: the annual growth of housing starts was weaker in the second half of the year than in the first.

The Federal Reserve increased interest rates by 2.5 percentage points between February and November 1994; long-term interest rates started rising in October 1993. Because changes in interest rates take time to affect economic activity, most of last year's monetary tightening may not have an impact on the economy until this year. There are at least two other reasons why US activity continued to grow strongly last year. First, as Chart 5 shows, the

The composition of recovery in the G7 economies

The world economy grew more quickly than most commentators expected last year. This box looks at the timing and duration of the cycle in the G7 economies and at the main factors behind the strengthening demand.

Table 1 compares the recent cycle in the G7 countries. As it shows, the US recession was the shortest, and the Japanese and UK downturns the longest—each lasting seven quarters. Japan's recession was the shallowest, and the Canadian and UK recessions the deepest. The stance of fiscal and monetary policies affected these profiles. The rapid US recovery followed a prolonged period of low real interest rates; these also partly explain why US growth did not slow much in 1994. In Japan, the loosening in fiscal policy—there have been four fiscal packages since August 1992 totalling ¥45 trillion—probably prevented a deeper downturn.

Table 1

G7 cyclical positions

	GDP	Number of quarters from (<i>percentage change in GDP</i> in italics):				
	Peak	Trough	Pea	k to trough	Trou 1994	igh to 4 Q3
Canada France Italy Japan United Kingdom	1990 Q1 1992 Q1 1992 Q2 1992 Q1	1991 Q1 1993 Q1 1993 Q3 1993 Q4	4 4 5 7	-3.6 -1.4 -1.7 -1.2 3.7	$ \begin{array}{c} 14 \\ 6 \\ 4 \\ 3 \\ 10 \end{array} $	9.0 3.3 3.7 1.9 7.1
United States Western Germany	1990 Q2 1990 Q2 1992 Q1	1992 Q1 1991 Q1 1993 Q1	3 4	-1.5 -2.9	10 14 6	10.8 4.0

Table 2 shows the cumulative contributions to growth since the trough in GDP for five of the G7 countries. Consumption has contributed proportionately less to growth in western Germany than in the other four; real personal disposable income there fell ¹/₂% in 1993 and further in the first half of 1994. The rise in German consumption has therefore meant a fall in the saving ratio—to its lowest level since 1967. The rise in taxes this year could hold back both German consumption and consumer price inflation. Nevertheless, at the end of 1994, futures markets appeared to be discounting higher short-term interest rates during the first half of this year.

Only in the United States has business investment contributed to recovery. But despite its strong growth, US business investment

Chart 5

United States: 'real' short-term interest rates(a)



(a) Three-month market rate less current consumer price inflation.

Table 2

Contributions to GDP since trough

Percentage changes in italics

	As a perce	As a percentage of total GDP growth					
	Consump- tion	Invest- ment (b)	Government expenditure	Net external trade	Stock- building		
France	58	_	9	12	12	3.3	
Japan	68	-26	32	-5	16	1.9	
United Kingdom	57	-1	7	19	17	6.9	
United States	65	30	-3	-18	13	10.8	
Western Germany	30	-15	_	5	70	4.0	
(a) Growth since tro	uch						

(a) Growth since trough.
 (b) Private investment less residential investment; western Germany also excludes construction industry.

is still a smaller proportion of GDP than in France, Japan or western Germany. In these three countries, business investment began to rise in 1994 but, in the third quarter, had recovered by less than at the same point in the last recovery.

In part, the different investment profiles may reflect the timing of the recoveries. The first three years of US recovery coincided with the sharp bond market rally during which the 30-year long bond yield reached an historic low, encouraging fixed-rate borrowing and business investment. Strong corporate profits and the closing of its output gap last year also boosted US investment. By contrast, European and Japanese recoveries began as long-term interest rates were near to, or past, their trough. Last year's rise in long rates could therefore be holding back a recovery in investment. And in Japan, companies are still adjusting following their high investment during the speculative boom.

Net exports contributed strongly to growth in Canada, Italy and the United Kingdom, helped by more competitive exchange rates and strong external demand (in the first half of last year, 80% of Canada's exports were to the United States). They have contributed less to growth in western Germany, and have reduced Japanese and US growth. Between 1992 and 1994, current account deficits in Italy and the United Kingdom fell and, in the third quarter, both countries had current account surpluses. By contrast, the Canadian deficit has remained large—despite a steady visible goods surplus—because of large payments to foreign holders of Canadian debt.

rise in short-term interest rates followed a long period during which 'real' short-term interest rates were close to zero. This period allowed banks to rebuild their profits and capital while the economy built up substantial momentum. Despite rising from mid-1993, 'real' rates were around 3% by the end of the year, compared with an average of $2^{1}/_{2}$ % since 1970—and lower than at the same point in the recovery in the early 1980s. Second, greater competition for lending business (both within the banking sector, and between banks and finance companies) may have offset some of the intended monetary tightening. Federal Reserve surveys of loan officers, for instance, show that US banks have eased their lending criteria (collateral, covenants and maximum loan criteria) since mid-1993. Towards the end of last year, lending to the small business sector was growing more quickly than overall business lending. In previous cycles, lending to small businesses (which are more dependent than larger businesses on bank finance) has tended to slow first.

Chart 6 Western Germany: business investment over recent cycles^(a)



⁽a) Dates shown indicate the quarter in which the trough in output was reached

Table AContributions to western German GDP growth

Percentage points (a)

	1993	1994		
	Year	<u>Q1</u>	<u>Q2</u>	<u>Q</u> 3
Consumption	0.1	0.2	-0.6	0.8
Total investment	-1.7	0.8	-0.2	0.2
Government expenditure	-0.2	-0.2	-0.1	0.2
Stockbuilding	-0.3	_	1.6	0.2
Domestic demand	-2.1	0.8	0.8	1.5
Net exernal trade	0.4	-0.2	0.2	-0.2
GDP	-1.7	0.5	1.0	1.3
(a) Quarterly contributions are re-	lative to the pre	vious quarte	r.	

Chart 7 France: consumption over recent cycles^(a)



(a) Dates shown indicate the quarter in which the trough in output was reached.

Growth in continental Europe has strengthened

In France and western Germany, growth has been stronger than expected at the time of the last *Bulletin*. Domestic demand growth has also broadened: consumption and business investment are recovering, although the latter is lower than at the same point in previous recoveries (as Chart 6 shows for western Germany).

Unemployment is still high in Europe: the OECD estimates that it will be 11.3% in its European member countries in 1995, compared with a high of 9.9% after the recession in the 1980s. But the rate of change of unemployment may also be an important influence on consumer confidence and spending. In most countries, unemployment has stopped rising and in some it has started to fall; a more stable employment outlook may have contributed to the strength of European growth in the second half of last year.

Table A shows the contributions to western German GDP growth in the third quarter and Table 2 on page 17 looks at contributions to growth since the trough in GDP. The recovery in western Germany has been based on consumption and stockbuilding. (Stockbuilding seems on present estimates to have made a large contribution in the second quarter of 1994, though these figures are sometimes revised.) External trade has made virtually no contribution to the recovery. Export volumes rose by $5^{1/2}$ % in the year to the third quarter while import volumes rose by around $11^{1/2}$ %, as the domestic economy strengthened. The Deutsche Mark's real effective exchange rate appreciated sharply in 1992 but remained broadly unchanged in the following two years.

Western German consumption rose by $1^{1/2}$ % in the third quarter, after falling in the second. Retail sales fell sharply in October and November, however, illustrating the still unsteady demand in parts of the personal sector. Income tax increases in January may hold back consumption in 1995; the OECD projects that consumption will grow by 1.2% this year, compared with 2.2% in the rest of the European Union. But with employment no longer falling and official interest rates still low, personal sector demand may grow more strongly than expected.

In France, GDP rose by 0.8% in the third quarter, with consumption rising by 0.9% and investment by 1.5%. Earlier last year, consumption was supported by a government subsidy scheme to encourage car purchases. Participation in the scheme fell in the second half, but by then consumption of other goods was recovering. By October, consumer confidence had risen sharply to close to its average in the late 1980s. Despite this, consumption in the third quarter had recovered by less than at a similar point in the two preceding recoveries, as Chart 7 shows. And unemployment at 12.6% in November—has not yet begun to fall decisively.

Last year, French business confidence rose to its highest since the late 1980s, despite a rise of around two percentage points in ten-year interest rates. These higher rates probably prevented a larger increase in business investment, which nevertheless grew in the year to the third quarter.

In Italy, where recovery began later than in France or western Germany, domestic demand has strengthened further. By the third quarter of 1994, consumption had increased for five consecutive quarters. Consumer confidence rose strongly in 1994. But net exports, which made a large contribution to growth in 1993, had a negative impact in the first three quarters of 1994. Political uncertainty and the difficult passage of the budget may also have hindered a stronger recovery; uncertainty over pension reforms and over whether fiscal stringency would lead to increased taxation may, for instance, have held back consumption.

In Spain, growth has also broadened. In the third quarter last year, GDP rose by 0.6%, and for the first time for nearly two years domestic demand was higher than a year earlier (largely because of investment). Export volumes rose by 17% in the year to the third quarter, helped by a more competitive exchange rate since September 1992. Import volumes rose by 10% over the same period—their strength was one reason why the Bank of Spain raised interest rates in January.

Recovery in Japan is now more firmly established

Japan's recession was one of the longest (at seven quarters) in the G7. Output reached its trough in the final quarter of 1993; since then, recovery has gathered pace. In the third quarter of last year, GDP rose by 0.9% and second-quarter GDP was revised up to a 0.2% rise. Investment has continued to be unsteady and the recovery in 1995 may depend largely on consumption. The past effects of the high yen and a rise in Japanese demand may mean that net external trade will make a negative contribution in 1995.

Table B shows contributions to Japanese GDP growth. The rise in GDP in the third quarter brought the first quarterly rise in business investment since 1991. But it may not herald a sharp change of direction: in the Bank of Japan's December Tankan survey, major manufacturers reported that capital spending would fall in the fiscal year ending in March and that employment was higher than necessary. It nevertheless reported a possible rise in profitability over the same period, which could foreshadow future investment.

The strength of personal consumption in the third quarter of last year suggested that tax rebates in June were successful in raising consumer spending. Further tax rebates in December may help to support consumption in 1995. Overall, last year's tax rebates amounted to \$5.5 trillion (£35 billion), around 2% of annual private consumption. The rebates will continue in 1995, but by 1997 the revenue loss will have been reversed.

Japan's current account surplus fell in the third quarter but the German and US deficits rose

Japan's current account surplus fell relative to GDP during the first three quarters of 1994 (see Chart 8). The fall largely reflected the increase in Japanese domestic demand and the effect of past yen appreciation (Japan's nominal effective exchange rate rose by around 25% in the two years to December 1994). The US current account deficit rose over the same period, as the strength of US demand outweighed any effect of the dollar's depreciation. And Germany's current account deficit rose sharply in the third quarter, from 1% to 2.5% of GDP. Most of the change was the result of a higher deficit on invisibles. In contrast to a surplus of DM 2.9 billion in the second quarter, there was a deficit on interest, profits and dividends of DM 5 billion; the travel deficit also rose sharply.

Table BContributions to Japanese GDP growth

Percentage points (a)

	1993	1994		
	Year	<u>Q1</u>	<u>Q2</u>	Q3
Consumption	0.6	0.8	-0.2	0.7
Total investment	-1.7	-0.5	-0.1	0.2
Government expenditure	1.4	0.3	0.1	0.2
Stockbuilding	-0.2	0.2	0.2	-0.1
Domestic demand	_	0.8	0.2	1.0
Net external trade	-0.2	_	_	-0.1
GDP	-0.2	0.8	0.2	0.9
(a) Quarterly contributions are rel	lative to the pre	vious quarte	r.	

Chart 8 Current account balances



⁽a) Western Germany before 1991

Chart 9 Real commodity prices and industrial production



Table C Unit wage costs in manufacturing^(a)

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	<u>1992</u> <u>Year</u>	<u>1993</u> <u>Year</u>	<u>1994</u> <u>Q1</u>	<u>Q2</u>	<u>Q3</u>
Canada France Italy Japan United States Western Germany	-3.3 2.5 4.7 8.6 -1.4 4.9	-2.6 3.5 3.0 4.5 -1.2 1.6	-1.4 1.0 -0.7 4.9 -0.6 -5.0	-0.9 -0.9 -3.3 0.6 -0.9 -8.1	-3.3 -1.8 -1.1 -5.8
Major six	1.6	0.5	-0.6	-2.6	
Memo: United Kingdom	1.9	0.6	1.9	-0.2	-1.5

.. not available.

(a) Bank estimates for major six countries.

Higher demand led to rising raw material prices

In the G7 economies, annual producer price inflation was 0.1% at the beginning of the year but 1.5% by September. Producer price inflation also edged up in other industrialised countries, including Spain and Sweden. Higher producer output price inflation has so far been partly the result of increases in raw material prices and the prices of intermediate goods, such as chemicals and steel. Earnings growth, by contrast, has been weak because of job uncertainty and—outside the United States—historically high unemployment.

Commodity prices, measured by the Economist non-oil dollar index, rose by around 25% between 1993 and 1994; oil prices fell. The rise in metal prices last year was partly a response to higher actual and prospective world growth. Chart 9 shows the correlation between real commodity prices and G7 industrial production growth in the last 20 years or so. By December, real commodity prices were higher than at the equivalent stage in the previous two recoveries. Bank research suggests that in the past real commodity prices have overshot in response to changes in news about future activity, although it is difficult to predict when any readjustment might occur (in the fourth quarter real commodity prices were only 7% above their 1990 average).

The OECD projects that non-oil commodity prices will rise by around $3^{1}/_{2}$ % this year and oil prices by $2^{1}/_{2}$ %. If GDP forecasts are increased, commodity prices-particularly of demand-sensitive metals—could rise by more than this. Although industrial demand for commodities has increased, and some metal stocks (at the London Metal Exchange) fell last year, stocks are high by recent standards. Some commodities (particularly metals) are also held as part of asset portfolios; although higher interest rates will have increased the cost of holding commodities, last year's fall in bond prices increased their attractiveness as investments. As noted in the financial market developments section of this Bulletin, turnover on the London Metal Exchange rose sharply last year. Some commentators have ascribed this to a rise in 'speculative' activity, but it is difficult to distinguish speculation from end-user hedging, and the rise in metal prices was probably the result of expectations of rising end-user demand.

So far, earnings inflation has not risen sharply, even in countries where recovery is firmly established. In the United States—where GDP began rising in 1991 and unemployment fell sharply last year to below most estimates of 'equilibrium'—average hourly earnings rose by 2.3% in the year to the fourth quarter, little changed from 1993 and 1992. In Europe and Japan, unemployment is still well above its pre-recession low. During the early stages of recovery, economies have also benefited from a cyclical improvement in productivity which has resulted in falling unit wage costs (see Table C). This has helped to offset some of the pressure from rising commodity prices.

In the United States, the Federal Reserve's *Beige Book* has reported a progressive tightening in labour market conditions over the last year. In most other countries, labour market pressures are less acute, but may rise this year. The current wage round in Germany will be a key influence on future inflation in Germany and also, perhaps, in other parts of Europe.

Last year, consumer price inflation was flat or falling

Despite some evidence of rising inflation pressures at earlier stages in the price chain, consumer price inflation has not risen. In the G7 countries, consumer price inflation remained flat for most of last year, and in many cases was near to historic lows. Even in the United States, where it began to rise in the summer and autumn, it fell towards the end of the year.

In western Germany, consumer price inflation continued to fall in the second half of the year; in December, the 12-month rate was 2.7%, compared with 3% in June. When last year's indirect tax increases drop out of the annual comparison in January, it should fall further. In France, consumer price inflation was broadly flat in the second half of 1994 at around 1.6%–1.7%, compared with an average of nearly 6% since 1980. In Italy, annual inflation was 4.1% in December compared with a 25-year low of 3.6% in July. And in Spain too, annual inflation in November was near to a 25-year low. But with producer price inflation perhaps rising in parts of the OECD in 1995, pressures on consumer price inflation may increase. The box on page 22 assesses some implications of the recent rise in producer price inflation in the major industrialised countries.

In Japan, there are fewer inflation pressures at present. Consumer price inflation was 1% in the year to November, compared with 1.2% at the beginning of 1994. Producer prices were still falling in November (largely because the strength of the yen led to falling imported raw material prices), though the rate of fall decreased during the year. And land prices may still be adjusting to the speculative boom which ended in the early 1990s. According to a survey by the National Land Agency, commercial land prices fell 6.7% in the year to July 1994 while residential prices fell by 1.2%.

Money and credit growth have continued to give mixed signals

Although growth in the OECD is strengthening, monetary aggregates in some countries have not pointed upwards so unequivocally. In the United States, for instance, M2 growth was 0.9% in the year to December, lower than earlier in the year. And M1 growth fell for most of 1994, though it was distorted by mortgage refinancing in 1993. Some credit aggregates have grown strongly, however. Chart 10 shows that while corporate borrowing from bond markets was less buoyant than in 1993, bank lending growth increased. Bank lending to individuals also grew strongly last year, rising nearly 15% in the year to November.

In Germany, annualised M3 growth fell over the course of 1994—in November, it was 5.8% higher than in the fourth quarter of 1993 just inside the 4%–6% target range. As reported in the last *Bulletin*, the use of money-market funds (permitted from August) lowered the growth rate, as deposits were switched out of M3; without the transfer, M3 growth would have been above its target range (probably at around 6.9% in November). In December, the Bundesbank announced an unchanged M3 target for next year; it will also monitor, but not target, a wider M3 measure which includes money-market funds and Deutsche Mark deposits held in banks outside Germany.

The Bank of France also set out its monetary strategy for 1995 in December, reaffirming price stability as its ultimate objective and

Chart 10 United States: credit aggregates



Producer and consumer prices

In the second half of last year, producer price inflation⁽¹⁾ rose in most G7 countries, but consumer price inflation did not. (Charts 2 and 3 on pages 15–16 show recent movements in consumer and producer prices in the major six economies.) Producer price inflation has also risen in Canada, Spain and Sweden since 1992. This box assesses the implications of rising producer price inflation for consumer prices.

Producer price inflation tends to be more volatile—and lower—than consumer price inflation. The differences are partly attributable to the prices of services: producer price indices do not include services prices, which have tended to rise faster than goods prices and are generally less volatile. But using a consumer *goods* price index does not entirely eliminate the differences in inflation rates.

Consumer and producer prices are measured at different points in the production and distribution chain. Producer prices should reflect the prices of raw materials and intermediate goods and unit labour costs, as well as producers' margins. The difference between producer and consumer goods inflation should reflect changes in retailers' margins, although taxes, distribution costs and imported goods prices will also have an impact.

Non-oil commodity prices, as measured by the dollar-denominated Economist index, rose by around 25% in 1994, putting upward pressure on producer prices worldwide, particularly at intermediate stages of production. However, this was partly offset by the effect of unit wage costs which, in the second quarter of 1994, were lower than a year earlier in nearly all of the G7 countries. The lower unit wage costs were the result of restrained earnings growth and cyclical improvements in productivity, both of which are likely to be reversed as the recovery matures. As capacity constraints begin to bind therefore, without a fall in commodity prices, pressures on producer prices will rise. However, structural reform in labour markets might help to contain wage pressures.

The G7 countries can currently be divided into two broad groups: in the first—comprising Canada, Italy and the United Kingdom—producer price inflation is now higher than consumer goods price inflation; in the second, comprising the United States, Japan, western Germany and France, producer price inflation is still lower. The groups suggest that the differential cannot simply be explained by cyclical factors, given the different positions of the United States and Italy.

A factor uniting the groups is recent exchange rate developments. Canada, Italy and the United Kingdom have all experienced substantial exchange rate depreciations since the start of the decade, whereas all the countries in the second group have had relatively stable, or appreciating, exchange rates. A depreciating exchange rate will lead to increased price pressures through higher demand and higher costs of imported raw materials and intermediate goods. Some feed-through to consumer prices would also be expected, however.

Consumer goods inflation has generally tended to follow the same pattern as producer price inflation, as the chart shows. But since 1987, producer price inflation has been higher than consumer price inflation in only one year (1989). So recent experience would suggest that where producer price inflation is now higher than consumer goods price inflation, the difference will not be sustained. The strength of the consumer sector may affect the dynamics of the relationship between the two measures. And structural change in the retail sector, like that seen in the United Kingdom, may also change it over the medium term.

The prices of consumer *services* may be less volatile than consumer goods prices because the demand for consumer goods, such as cars, is more cyclical. In the previous economic cycle, consumer services price inflation in the major economies started rising five years after the trough in GDP growth. If this were repeated in this cycle, consumer services price inflation would not start rising until the end of 1996 at the earliest.

While consumer sectors remain weak, the outlook for consumer price inflation in most economies remains benign, despite the rise in producer price inflation. Upward pressure on consumer price inflation seems likely to arise first in countries furthest ahead in the recovery and whose exchange rates have depreciated significantly. These generally are the countries that have already started to raise their interest rates. Tighter monetary policy will help to contain inflationary pressure. And even in those countries, consumer *services* price inflation may continue to fall for some time, offsetting a rise in consumer *goods* price inflation.





(1) The producer price series used have been selected to be as close to the CSO's definition of output producer prices as possible, ie measuring the prices manufacturers charge for goods as they leave the factory.

aiming to keep inflation below 2% in the medium term. Its intermediate objectives are exchange rate stability and M3 growth of around 5% in the medium term. In October, M3 was unchanged compared with a year earlier (M3 had fallen in the previous 12 months); privatisations, tax changes and the Balladur bond all reduced M3 growth. The authorities also monitor a measure of total domestic debt; its 12-month growth rate slowed in the first half of 1994 to 2.5% in August.

In November, the Bank of Spain announced new monetary objectives for 1995. Annual growth of ALP (liquid assets of the private sector) is no longer to be an official target variable—the Bank adopted a medium-term inflation target for annual growth in the consumer price index of 3% or less within three years. The inflation rate targeted will rise as a result of indirect tax increases, like the United Kingdom's target RPIX rate.

In Japan, annual growth of M2 plus CDs rose gradually last year, in line with the gradual economic recovery: in December, it was 2.9%, compared with 1.4% a year earlier at the trough in GDP. Bank lending remained weak, however; in December, it was lower than a year earlier. In the December Tankan survey, businesses said that the availability of credit had increased further but that interest charges had also increased (in line with the rise in market rates during last year). Net borrowing in the commercial paper market was also weak: in August, outstanding borrowing was lower than a year earlier.

Monetary policy has been tightened again in countries further ahead in the economic cycle

In the fourth quarter, official interest rates were increased further in Australia, Canada, Sweden and the United States, as well as the United Kingdom. The 75 basis-point increase in the US target federal funds rate in November was more than some commentators had expected. It was also the largest single rise since the early 1980s. Between the rise and the end of the year, the yield on the 30-year US long bond fell by around 20 basis points while the gap between 2-year and 30-year interest rates fell. Nevertheless, at the end of 1994, eurodollar futures prices appeared to discount further rises in three-month interest rates before the end of 1995.

In the United States, the first increase in official interest rates occurred about three years after the trough in GDP; in the United Kingdom, the lag was around $2^{1}/_{2}$ years (though rates started from higher levels). By the first quarter of 1995, recovery in France and western Germany had lasted two years: it is perhaps not surprising, therefore, that futures markets appeared to be discounting rising short-term interest rates in the first half of this year. In Japan, the recovery had lasted five quarters by the first quarter of this year; consumer price inflation was also very low and, based on unofficial measures, may have been negative. Given the strengthening of its real effective exchange rate last year, Japanese monetary policy was tighter than the 1.75% official discount rate would suggest; fiscal policy was, however, loosened during the cycle—as described in the last *Bulletin*.

Revisions to the calculation of effective exchange rates

This note describes recent changes made by the International Monetary Fund (IMF) to update and expand its calculation of effective exchange rate indices. The indices calculated by the Bank of England have changed as a consequence; and the Bank has published indices on the new basis since 1 February.

An effective exchange rate is a measure of the value of a currency against a 'basket' of other currencies, relative to a base date. It is calculated as a weighted geometric average of the exchange rates, expressed in the form of an index.

The effective exchange rate indices for sterling and other currencies published by the Bank are based on the method the IMF uses to calculate effective exchange rates for a number of industrialised countries. The indices produced by the Bank and the IMF are calculated in the same way but published with different frequencies: the IMF publishes effective exchange rate indices in the monthly International Financial Statistics (IFS), whereas the Bank publishes the UK effective exchange rate every hour during the London business day.

The weights are designed to measure, for an individual country, the relative importance of each of the other countries as a competitor to its manufacturing sector. The weight for each country is derived from three components.

Table A

Weights derived from trade in manufactures^(a)

Based on 1989-91 trade flows

	Australia	Austria	Belgium- Luxembourg	Canada	Denmark	Finland	France	Germany	Greece	Italy	
Australia	_	0.49	1.16	1.82	0.34	0.61	3.08	7.94	0.07	3.21	
Austria	0.09	_	3.02	0.49	0.86	0.85	6.21	49.93	0.31	10.18	
Belgium-Luxembourg	0.11	1.44	_	0.51	0.79	0.73	18.95	29.13	0.27	7.86	
Canada	0.15	0.21	0.46		0.12	0.21	1.57	2.81	0.03	1.21	
Denmark	0.13	1.66	3.19	0.53		3.42	7.12	27.28	0.32	5.03	
Finland	0.23	1.69	3.05	0.95	3.54	_	7.33	22.12	0.28	5.60	
France	0.13	1.31	8.38	0.76	0.78	0.78	_	28.56	0.35	14.38	
Germany	0.19	6.01	7.35	0.78	1.71	1.34	16.29		0.59	12.99	
Greece	0.08	1.94	3.55	0.41	1.04	0.88	10.46	30.76	_	19.66	
Italy	0.17	2.78	4.50	0.76	0.72	0.77	18.60	29.48	0.85	-	
Japan	1.42	0.96	1.88	3.19	0.51	0.61	4.63	13.69	0.19	3.79	
Netherlands	0.13	1.50	9.89	0.77	1.34	0.98	11.85	31.32	0.25	6.63	
New Zealand	17.77	0.43	0.89	1.87	0.40	0.51	2.20	6.20	0.03	3.33	
Norway	0.14	1.24	2.75	0.81	6.31	3.93	6.09	19.20	0.28	4.85	
Portugal	0.08	1.32	3.22	0.48	1.42	1.41	15.57	23.07	0.22	7.64	
Republic of Ireland	0.17	0.87	3.25	0.84	0.93	0.79	9.58	15.98	0.14	5.54	
Spain	0.06	1.34	3.93	0.48	0.71	0.79	21.46	23.99	0.26	14.02	
Sweden	0.27	1.71	3.55	1.16	5.60	6.69	7.15	22.28	0.27	6.05	
Switzerland	0.17	4.04	3.04	0.62	0.93	0.78	12.07	33.58	0.28	11.37	
United Kingdom	0.48	1.19	5.39	1.38	1.38	1.41	12.59	22.49	0.31	8.27	
United States	0.67	0.56	2.12	25.09	0.47	0.59	5.84	11.50	0.13	4.56	
	Japan	Netherlands	New Zealand	Norway	Portugal	Republic of Ireland	Spain	Sweden	Switzerland	United Kingdom	United States
Australia	31.44	1.28	8 17	0.27	0.12	0.36	0.46	1.67	1 40	10.15	25.97
Austria	4 15	2.93	0.04	0.48	0.40	0.35	2.07	2.09	6.45	4 87	4 22
Belgium-Luxembourg	3.85	9.22	0.04	0.51	0.47	0.62	2.90	2.07	2 32	10.53	7.67
Canada	5.95	0.66	0.07	0.14	0.06	0.15	0.32	0.61	0.43	2.45	82.39
Denmark	4.24	5.01	0.07	4.71	0.83	0.71	2.11	13.14	2.85	10.83	6.84
Finland	5.22	3.82	0.09	3.04	0.85	0.63	2.43	16.24	2.48	11.48	8.93
France	4 20	4.88	0.04	0.50	1.00	0.81	7.00	1.85	4.07	10.87	9.34
Germany	7.08	7.36	0.07	0.90	0.85	0.77	4 46	3.28	6.45	11.07	10.48
Greece	5.05	3.13	0.07	0.70	0.42	0.35	2.56	2.04	2.77	8.06	6.13
Italy	4.45	3.53	0.08	0.52	0.64	0.60	5.92	2.02	4.96	9.23	9.43
Japan	_	2.07	0.61	0.47	0.18	0.45	1.39	1.48	2.40	6.67	53.40
Netherlands	4.55		0.06	0.97	0.58	0.84	2.76	2.66	2.29	11.96	8.66
New Zealand	29.45	1 29		0.36	0.13	0.33	0.41	1 91	1 39	9.52	21.58
Norway	5.14	4.89	0.08		0.88	0.60	1.73	17.54	1.89	12.50	9.14
Portugal	2.49	3.71	0.04	1.12	—	0.52	14.32	3.74	2.58	11.26	5.82
Republic of Ireland	4.90	4.13	0.07	0.58	0.40	_	2.40	2.37	2.07	31.59	13.39
Spain	3.88	3.49	0.02	0.44	2.82	0.62		1.96	2.30	10.20	7.21
Sweden	5.20	4.24	0.14	5.58	0.93	0.77	2.48		2.74	11.56	11.63
Switzerland	6.45	2.80	0.08	0.46	0.49	0.52	2.23	2.10		8.37	9.64
United Kingdom	7.00	5.71	0.21	1.19	0.84	3.08	3.85	3.45	3.27		16.49
United States	30.29	2.23	0.25	0.47	0.23	0.70	1.47	1.88	2.03	8.91	_

(a) The weights relating to the effective exchange rates of the countries in the left-hand column are obtained by reading across the appropriate rows. The weights for an individual currency will not necessarily sum exactly to a hundred; this is because of rounding, as the weights are quoted to two decimal places.

To take an example, the weight of the US dollar in the sterling index takes account of: (i) US competition in the UK domestic market (ie bilateral import competitiveness); (ii) UK competition in the US domestic market (ie bilateral export competitiveness); and (iii) competition between US and UK manufactured goods in third-country markets (ie the markets of the other 19 industrialised countries included and those in four other broad groups). The components are weighted together differently in the calculation of each country's index, according to the degree of competition in each market.⁽¹⁾

Beginning with the January 1995 edition of its International Financial Statistics, the IMF has started publishing new monthly nominal effective exchange rate indices.

There have been two changes to the method, neither of which alters the underlying conceptual framework. The first is the updating of the trade weights.⁽²⁾ The previous weights were based on disaggregated trade flows for 143 manufactured products in 1980. In the new index, the weights have been updated to reflect average aggregate trade flows in manufactured goods for the period 1989–91. The second change is that the number of countries covered has been increased from 17 to 21, reflecting the widening in EU membership to include Greece and Portugal and the inclusion of Australia and New Zealand.

The 21 countries included in the calculation were chosen partly because of their ability to provide timely and reliable data on unit labour costs; the IMF uses unit labour cost data to construct measures of real exchange rates. This criterion helps to explain the omission from the calculations, for example, of some of the newly industrialised Asian countries.

On the basis of the new weights for the sterling effective exchange rate index, the total weight of EU countries (now including the two European countries added to the calculation—Portugal and Greece—and also Austria, Finland and Sweden, which were previously included but have only recently joined the European Union) has increased from 55.6% to 70.0%. Apart from the new Member States, the weights of every EU country except Denmark previously included in the calculation have risen. The largest increases were for Spain, whose weight rose by 1.8 percentage points to 3.9%, and Germany, the weight for which rose by 2.5 percentage points to 22.5%.

As a result, the weight of the non-EU bloc has fallen—with a decline in the weight for every non-EU country previously

Table B'New' and 'old' indices of the sterling ERI

Quarterly averages

	<u>1990=100</u>		<u>1985=100</u>
	New	<u>Old (a)</u>	Old
1991 Q1	102.6	102.8	93.8
Q2	100.7	100.2	91.4
Õ3	99.9	99.4	90.7
Q4	99.8	99.6	90.9
1992 Q1	99.4	99.2	90.5
Õ2	101.2	101.2	92.3
$\overline{\overline{03}}$	99.4	99.6	90.9
Q4	87.7	87.5	79.8
1993 O1	86.6	86.0	78.5
Õ2	88.7	87.9	80.2
Ò3	90.2	88.8	81.0
Q4	90.2	88.8	81.0
1994 01	90.7	89.1	81.3
Ò2	89.1	87.7	80.0
<u> </u>	87.9	86.8	79.2
Q 4	89.1	87.9	80.2

(a) The old index rescaled so that 1990=100.

included in the calculation. There have been large falls in the weights for Switzerland (declining from 5.5% to 3.3%), the United States (falling from 20.4% to 16.5%) and Japan (falling from 8.8% to 7.0%). The decline in the weight of the US dollar continues a trend apparent at the time of the last revision in 1988, when it was reduced from 24.6% to 20.4%. The matrix of weights is shown in Table A.

The base date for the new sterling index is 1990=100. A change in the base date influences only the scale of the index and not the percentage changes between different dates; nor does it require any alteration to the weights used in the calculation. Table B and the chart compare the new exchange rate index for sterling with the old index.





⁽¹⁾ For details of how these weights are derived, see 'Measuring price competitiveness for industrialised country trade in manufactures' by McGuirk, A, *IMF Working Paper*, April 1987.

The formula for the resultant nominal effective exchange rate is: $E_{j} = \frac{20}{+} N_{i}^{W_{i}}$ where: $E_{j} = \text{the nominal effective exchange rate for country } j;$ $N_{i} = \text{the bilateral exchange rate between country } j \text{ and country } i \text{ (expressed in the form of an index); and } w_{i} = \text{the total weight of country } i \text{ in relation to country } j.$

⁽²⁾ The weights used until January were introduced in 1988; see the article, 'Revisions to the calculation of effective exchange rates', in the November 1988 Quarterly Bulletin, pages 528–29.

Financial market developments

- There was a reduction in volatility, and a partial decoupling, of the major industrial countries' bond markets in the final quarter of 1994.
- In 1994 as a whole, in spite of a particularly adverse global interest rate environment, international borrowing activity expanded: significant growth in the medium-term note and syndicated credit markets more than offset a reduction in bond issues.
- Since early 1994, the volume of activity in exchange-traded derivatives has fallen, as financial markets have become less volatile, but the longer-term trend towards increased volumes has continued as risk management tools have gained wider acceptance.

Bond and equity prices

Most major bond markets worldwide were affected by turbulence and falls in prices for much of 1994, particularly after the increase in US official interest rates in February. In the fourth quarter, however, there were some signs that markets were becoming more settled: the yields on ten-year government bonds were unchanged over the quarter in the United States, Germany and Japan, and declined in France and the United Kingdom (see Chart 1); and volatility in most major bond markets also declined. Steadier conditions may have reflected increased market confidence in the actions of monetary authorities to contain inflationary pressures in various countries.



The yield curve for US Treasuries flattened significantly during the quarter: the spread between thirty-year and two-year rates fell from 125 basis points to just under 20 basis points over the period. There were signs of growing investor confidence—evident in buying at the long end of the yield curve—particularly after the Federal Reserve's 75 basis-point increase in the target federal funds rate to 5.5% on 15 November, which was larger than many market participants had expected. The long bond yield peaked at 8.16% on 7 November, its highest since August 1991; by the end of the quarter, the yield had fallen to 7.88%. Two-year yields rose from 6.60% to 7.71% over the quarter, reflecting expectations of further official rate rises.

For much of 1994, events in the US Treasury market significantly influenced other countries' bond markets perhaps more than might have been expected given differences in cyclical and inflationary conditions. But the degree of synchronisation in bond market movements appeared to weaken in the fourth quarter, in part perhaps because market attention to some extent shifted away from the United States to countries where there was a greater perception that a tightening of monetary policy was in prospect. In addition, some market participants may have held smaller cross-currency (and possibly less leveraged) positions in the fourth quarter than earlier in the year. Many investors repatriated portions of their bond portfolios in the first three quarters (the box on international securities transactions on pages 30–31 discusses this in more detail).

The bond market fall in the spring of 1994 appears to have taken its toll on equity prices in the major industrial countries, with the magnitude and timing of the effect varying in the light of local conditions. Over the fourth quarter as a whole, equity indices in most major markets were little changed (see Chart 2). In the United States, the Standard and Poor's 500 index fell sharply-but temporarily-in November, following the increase in interest rates. In Japan, the equity market had been a notable exception to the global trend during the first half of the year, posting strong gains. But some switching from equities into long-term government bonds and the disappointing reaction to the Japan Tobacco privatisation contributed to a spell of weakness thereafter. The FT-SE 100 recovered from a five-month low in early December-despite some positive corporate earnings figures-to end the quarter 39 points higher at 3,065; the market was generally subdued owing to

Chart 2



investor concern that the growth in corporate earnings might slow.

Bond and equity price movements over the year as a whole seem to have been affected by a longer-term trend towards international asset diversification and experience with that strategy. Many Japanese investors, for example, have shown an increased reluctance recently to hold overseas assets, following disappointing returns in yen terms from overseas investment-mainly as a result of the appreciation of the currency. Conversely, many American investors have been increasingly tempted overseas in search of benefits from diversification. US pension funds and mutual funds, which have traditionally held a very small proportion of their assets overseas-far less than their UK equivalents-have shown greater interest in foreign assets recently.

International financing activity

In spite of a particularly adverse global interest rate environment, borrowing in the international capital and credit markets continued to expand in 1994. The volume of borrowing facilities arranged expanded by 5% to \$864 billion and, after reduced activity in the aftermath of the bond market weakness in the early part of the year, activity was buoyant in the fourth quarter (see Table A).

There were, however, very different developments in the main market segments. The unsettled bond market conditions for much of the year contributed to a 21% fall in straight fixed-rate bond issuance in 1994; and, despite some signs that the market was becoming more settled in the final months, the volume of issues in the fourth quarter remained 20% below the quarterly average for 1993. There was, however, strong growth in the euromedium-term note (EMTN) market, which has become increasingly difficult to distinguish from the eurobond market: the volume of new programmes rose by 69% in 1994 and issuance under

Table A Total financing activity:(a) international markets by sector

\$ billions; by announcement date

	1993	1994				
	Year	Year	Q1	Q2	Q3	Q4
International bond issues						
Straights	375.7	296.1	77.1	68.6	75.0	75.4
Equity-related	39.6	33.2	20.7	5.7	4.0	2.8
of which:						
Warrants	20.8	10.8	8.2	0.8	0.7	1.1
Convertibles	18.8	22.3	12.5	4.8	3.3	1.7
Floating-rate notes	68.5	92.7	38.7	17.8	17.9	18.3
Bonds with non-equity						
warrants (currency,		0.1				
gold, debt)	1.5	0.1	0.1			
Total	485.4	422.1	136.2	92.1	96.9	96.5
Credit facilities (announcen	nents)					
Euronote facilities	117.4	193.3	35.7	46.0	40.2	71.4
of which:						
CP	24.2	36.4	3.9	15.4	10.9	6.2
MTNs	92.7	157.0	31.9	30.6	29.3	65.2
NIFs/RUFs	0.5	_	-	_	_	_
Syndicated credits	221.2	248.6	52.0	64.5	59.3	72.8
Total	338.6	441.9	87.7	110.5	99.5	144.2
<i>Memo:</i> amounts outstanding All international						
Bonds (b)	1,847.9		1,977.4	2,060.1	2,049.3	
Euronotes (c)	255.8	323.2	289.8	330.3	378.7	323.2
of which, EMTNs	146.6	292.5	177.9	216.5	259.4	292.5
not available						

Maturities of one year and over. The table includes euro and foreign issues and publicised (a) Maturnes of one year and over. The table includes euro and foreign issues and publicited placements. Issues which repackage existing bond issues are not included. Figures may not add to totals because of rounding. Bond total includes issues from MTN programmes. BIS-adjusted figures, including currency adjustment. Includes issues of fixed-rate bonds and floating-rate notes. Euroclear figures.

(b)

(c)

existing programmes also grew strongly. The floating-rate note (FRN) and syndicated credit markets also grew significantly.

The deterioration in market conditions came to a halt in the latter part of 1994: the decline in the average maturity of new issues halted, large-scale offerings such as global bonds returned to the market, and some borrowers who had stayed out of the market in the unsettled conditions earlier in the year returned.

International bonds

Borrowers

In the fourth quarter, banks continued to be a major source of demand for capital (see Chart 3). Over the year as a whole, they raised \$122 billion, an increase of 53% on 1993. In contrast, the volume of international bond issues by industrial and commercial companies was subdued: in 1994 as a whole, volumes were 33% lower than in the previous year. The strength of EMTN issuance and syndicated borrowing suggests that companies may have preferred to use those markets rather than make bond issues to raise long-term debt.

Supranational borrowers were more active in the fourth quarter, increasing their share of total international bond issues from about 6% to 10%. Over 1994 as a whole, however, their share fell again to 7%, compared with 11% in 1993. Many supranational borrowers were able to refrain

Chart 3 Borrowers in the international bond market



from issuing during the unsettled conditions earlier in the year because of their high liquidity levels; they have since chosen to re-enter the market.

Sovereign borrowers were particularly active in the international bond market in 1994. Three of the top five borrowers in the euromarkets in the year to October were sovereign borrowers; the largest, Sweden, issued nearly a third more debt than the largest private borrower. On occasion, the international markets provided some sovereign borrowers with more attractive funding opportunities than their domestic markets.

OECD issues continued to account for roughly three quarters of all borrowing in the fourth quarter. This proportion has been fairly stable for the past two years. Latin American borrowers more than doubled their issues of international bonds to \$6 billion between the third and fourth quarters. Renewed investor confidence in the region was a contributory factor; it remains to be seen how far this will be affected by the recent unsettled conditions in Mexican financial markets. International bond issues by Asian borrowers fell in each quarter in 1994, from about \$11 billion to \$4 billion; the fall was particularly evident in fixed-rate borrowing.

Instruments

In 1994 as a whole, the subdued level of fixed-rate borrowing—which continued in the fourth quarter—was offset in part by increased issues of FRNs. FRN issues were 35% higher at almost \$93 billion (see Chart 4). Issues of structured notes in international markets, however, fell to \$0.6 billion in the fourth quarter of 1994, compared with \$2.4 billion in the last quarter of 1993. Investors have been increasingly cautious about complex financial instruments, following reported losses by some who had taken large positions in mortgage-backed securities and structured instruments earlier in 1994.

Chart 4 International bond issues



Gross borrowing in bonds with equity warrants attached was \$1.1 billion in the fourth quarter; there has been a decline in such issues since a change in Japanese accounting regulations on 1 April 1994, which raised the immediate costs of issue. Convertible issues also fell significantly over the quarter to \$1.7 billion. With estimated redemptions of \$11.7 billion over the quarter, there were net repayments of almost \$9 billion in the equity-linked sector.

Currency composition

Borrowing in dollar-denominated international bonds totalled \$37.3 billion, 39% of total issues (see Table B). This was a similar share to that in 1993 and the first quarter of 1994, following two quieter quarters.

Table B

Currency composition of international bond issues

\$ billions						
	1993	1994				
Currency denomination	Year	Year	Q1	Q2	Q3	Q4
US dollar	175.8	147.3	53.3	26.2	30.6	37.3
Yen	58.7	77.8	11.1	20.7	23.9	22.1
Deutsche Mark	56.4	39.8	13.7	8.4	8.5	9.2
Sterling	42.6	29.5	13.5	6.6	5.3	4.1
French franc	42.3	28.7	13.6	8.5	3.1	3.5
Swiss franc	27.5	20.8	7.1	3.2	6.2	4.3
Italian lira	12.3	17.1	4.7	5.0	4.6	2.7
Ecu	11.4	7.6	3.4	1.8	1.5	0.9
Other	58.2	53.3	16.1	11.6	13.2	12.3
Total	485.2	421.9	136.5	92.0	96.9	96.4
Source: Bank of England IC!	MS databas	e.				

The popularity of yen-denominated bonds continued in the fourth quarter; yen issues constituted almost a quarter of total borrowing, totalling \$22.1 billion. Yen-denominated assets in general were in demand from Japanese investors who wished to avoid potential currency losses, but there was also substantial foreign interest in international issues; euroyen issues by Japanese borrowers actually declined to \$3 billion. A major factor behind the increased borrowing in euroyen during the last three quarters of 1994 was recent deregulation, notably the removal at the start of the year of the lock-up period for foreign public sector borrowers.⁽¹⁾ Foreign borrowers accounted for over 80% of euroyen issues in 1994, borrowing over \$13 billion in each of the last three quarters. The relative appeal of euroyen issues led, however, to a decline in Samurai issues;⁽²⁾ they accounted for only 13% of total yen issuance in the fourth quarter, compared with almost a quarter in the same period in 1992 and 1993.

Deutsche Mark, sterling and French franc issues fell in 1994. In the French franc sector, potential issuers may have been deterred by new arrangements under which they must now satisfy the authorities that at least half the investors in a eurofranc issue will be foreign. Italian lira issuance, however, rose by some 40% in 1994, spurred by recent deregulation. Although Italian investors have continued to absorb the largest share of new lira issues, foreign investors have increasingly been attracted by high-coupon lira bonds.

The volatility in currency and bond markets in the early part of 1994, combined with uncertainty over the direction of interest rates, affected the Ecu market throughout the year. During the fourth quarter, activity remained subdued owing to the limited natural investor base and uncertainty over the future development of the Ecu. The Bank held its regular monthly Ecu Treasury bill auctions, which continued to be oversubscribed at all three maturities on offer. Overall cover was at least two times at each auction, at levels in a range of 10-40 basis points below Ecu Libid. ECU 200 million of one-month, ECU 500 million of three-month and ECU 300 million of six-month bills were on offer at each tender. There are currently ECU 3.5 billion Treasury bills outstanding across the maturities. Turnover was ECU 2 billion in September, rising to ECU 2.5 billion in October and ECU 3.8 billion in November.

Turnover in all three of the outstanding Ecu Treasury notes, maturing in 1995, 1996 and 1997, has been fairly steady at around ECU 2 billion per month. The Bank held a tender on 18 October, re-opening the Ecu Treasury note maturing in January 1997. ECU 500 million was sold at the tender which was five times covered and bids were allotted at yields in a tight range of 7.60% to 7.62%. The note has maintained its benchmark status in the 1997 segment of the Ecu curve.

Among the United Kingdom's other foreign currency debt, the DM 5.5 billion five-year and US\$3 billion ten-year bonds, launched in 1992 to complete HMG's ECU 10 billion foreign currency borrowing programme, continued to trade well in the fourth quarter. They remained liquid and maintained tight spreads in comparison with the comparable underlying government bonds. They continued to be among the more actively traded Eurobond issues settled through the international settlement systems.

Maturities

Many investors responded to the particularly uncertain market conditions earlier in 1994 by shortening the duration of their portfolios, notably by making investment fund allocations at shorter maturities. As a result, borrowers found it increasingly difficult to place bonds with relatively long maturities. In the latter part of 1994, there was evidence of increased investor appetite for longer maturities, at least in some currencies, and of a corresponding selective lengthening of the maturity of issues.

Secondary market turnover

The turnover of bonds, as measured by the volume of settlements through Euroclear and Cedel, was \$5,900 billion in the fourth quarter, 10% below the first quarter level (see Chart 5). The fall was accounted for by a reduction in the volume of domestic government bonds traded through the two systems-turnover in these instruments had previously driven the strong increase in volumes.

Chart 5 Secondary market turnover



Note issues

The impressive growth of the EMTN market in recent years continued in 1994, helped by borrowers' desire, faced with unsettled bond market conditions, for flexibility in the timing, size, currency and maturity of their financing. And as market uncertainty diminished, increased borrower and investor familiarity with EMTNs and the advantages arising from their flexibility spurred further growth in the market. In assessing developments in different segments of the international capital markets, the increasingly blurred distinction between securities issued with normal eurobond documentation and those offered under EMTN documentation should be kept in mind.

Previously, euroyen bonds could not be sold to Japanese domestic investors for a period of 90 days after issue, although issuers regularly registered investor interest on the day of issue but only delivered the bonds after 90 days. Issues by public sector entities became exempt from these 'seasoning' restrictions whether from 1 January. A Samura' bond is a yen-denominated bond issued in the Japanese domestic market by a foreign issuer. (1)

⁽²⁾

International securities transactions in 1994

This box uses official flow of funds, money, credit and capital accounts data from four countries⁽¹⁾ to investigate some of the transaction flows that accompanied the fluctuations in international government bond and equity prices in the first three quarters of 1994. It looks most closely at bond transactions, since equity price falls during the period were less significant than those in bond markets.⁽²⁾ And it focuses particularly on the first half of the year, when financial markets were most disturbed. It highlights a number of broad patterns-for example in the categories of investor that were net purchasers or net sellers of securities, and how the pace of securities issuance altered—as well as some of the problems of interpretation.

The transactions data analysed are the quantity counterparts of the price changes but, for several reasons, need to be interpreted carefully. First, there is no simple causal relationship between changes in any category of investors' asset holdings and price changes. Only the changes in portfolios, not the direction of price pressures which these may have generated or have been generated by, can be observed. Indeed in principle, large changes in prices can occur without any portfolio shifts at all, particularly among broad categories of investor. Second, differences in national statistical methods-for example in the treatment of reposand in financial market structures can complicate data interpretation, though the significance of this potential problem is reduced by looking at broad categories of investor. And finally, different types of investor are likely to react at different speeds-and perhaps in opposite directions-to the same piece of news, because of their differing constraints and objectives; to give one example, professional investors are likely to react swiftly to limit any losses. But such behavioural characteristics are difficult to identify a priori.

In addition to these problems of interpretation, there are some difficulties with the available data: flow of funds data tend to be out of date, subject to revision and often insufficiently disaggregated to allow a full analysis.⁽³⁾ And the data from different sources are not always consistent.

While bearing these caveats in mind, several main patterns can be identified from the transactions data for the first three quarters of 1994.

First, the changes to the pattern of government bond transactions were greater than those in equity markets; this was consistent with the larger bond price movements during the period. Net sales-or a slowing of the rate of purchases-by categories of investors were more widespread in government bond markets than in equity markets. The contrast was strongest in the United States in the second and third quarters; it was less clear cut in Japan, where transactions in bond and equity markets were

relatively undisturbed. The rate of net government bond issues also generally slowed more than equity issues, reflecting a reduction in required funding, especially in the United Kingdom throughout the period and in Germany in the second quarter. This contrast was less obvious in the United States-where the slowdown in government bond issues in the second and third quarters was matched by a slowdown in corporate equity issues-and weakest in Japan, where issue patterns in both markets were relatively unchanged.

Second, domestic flow of funds and capital account data⁽⁴⁾ indicate that there were widespread net sales of securities especially government bonds-by foreign investors, suggesting a retrenchment from foreign investments and a return to domestic habitats. The German government bond market was the first to be affected, with foreign investors making net sales in each of the first two quarters (see Table 1). The retrenchment seems to have been strongest in

Table 1 German bond market^(a)

DM 1.:11

DM billions					
	1993		1994		
	H1	H2	<u>Q1</u>	<u>Q2</u>	Q3
Net sales	197.4	185.2	61.0	33.8	74.2
of which, public bonds	120.7	109.9	34.1	13.3	39.9
Purchases by:					
Residents	76.8	93.5	69.2	57.2	62.8
Credit institutions	77.0	87.4	.52.9	28.4	20.5
Non-banks	0.2	7.0	16.7	29.0	42.8
Non-residents	136.0	90.0	-1.5	-19.2	18.4
of which:	2.6	()		1.2	0.4
US	3.0	0.2	5.4	-1.3	0.4
Japanese	4.0	4.8	-1.4	5.2	-4.2
EU	121.1	68.3	-9.1	-21.6	12.4
of which, UK	71.1	54.8	-1.2	-15.5	4.1
Source: Bundesbank.					

(a) Both government and corporate bonds

the second quarter, when there were net sales of government bonds by foreign investors in all four countries. UK investors were reported to be major net sellers of both US and German government bonds.⁽⁵⁾ The retrenchment abated in the third quarter, when foreign investors made large net purchases of German and (especially) US government bonds; and their net sales of UK gilts fell significantly. Foreign investors' net sales of Japanese government bonds rose significantly, however.

The capital account data, however, provide less evidence that the retrenchment originated in the four countries considered. They indicate that only Japanese and, particularly, UK investors repatriated substantial funds from abroad at some time during the period; the UK repatriation was evident in net sales of foreign securities, residents' repayment of borrowing from overseas and running down of

Germany, Japan, the United Kingdom and the United States.
 Chart 1 in the article on developments in the gilt-edged market in 1994 illustrates movements in yields in some major countries' government bonds during 1994; see page 66.
 For example, German data do not split non-bank residents into households and non-bank financial institutions.
 Direct foreign investment flows are excluded from the analysis, since the focus is on transactions in securities markets.
 But the international nature of UK securities markets means that such sales cannot necessarily be attributed solely to UK investors. Securities firms from many countries have UK operations, and several international markets (eg the Eurobond market) have their centres in London.

their overseas deposits, and UK banks' reduction of their net overseas exposure. In contrast, the data suggest that US and German investors continued to make net purchases of foreign securities-both equities and bonds-throughout the period, though their scale fell progressively, especially in the US case. The retrenchment seems therefore to have originated in part from investors in countries not considered in this analysis, or not to have affected foreign investments in all countries.⁽⁶⁾ The data suggest that the limited retrenchment weakened after the first quarter-when Japanese investors resumed their (large) purchases of foreign securities and UK investors' net sales halved-and ended in the third quarter, when UK investors resumed their net purchases of foreign securities.

Third, the pattern of banks' transactions in their domestic government bonds altered significantly in the first three quarters compared with 1993, while for domestic equities their transactions pattern remained relatively unchanged. The turnaround in government bond transactions was most pronounced in the United States and Japan; domestic banks made net sales in the second and (especially) third quarters in the United States, and in the first and third quarters in Japan. UK and German banks altered their patterns less, though they made smaller net purchases than in 1993 and in the United Kingdom made small net sales in the third quarter. Domestic banks continued generally to be net purchasers of domestic equities, though often at lower rates than in 1993. Only US domestic banks (in the first quarter) and German banks (in the second) were net sellers of equities.

Fourth, households in the United States and Japan consistently made net sales of domestic equities during the period, as did UK households in the second and third quarters. Indeed, households' net equity sales were among the largest recorded, especially in the United States and the United Kingdom. But the net sales in both these countries did not represent a significant change in transaction patterns. In Japan, however, households' net equity sales contrasted more strongly with their past behaviour. Households also generally continued to make net purchases of domestic government bonds-at mainly above their average 1993

Table 2

US Treasury securities

\$ billions 1993 1994 H1H2 Q1 Q2 Q3 105.9 Net issues (a) 142.4 53.0 29.6 32.5 Transactions by: Domestic private sector 104.7 34.6 27.6 22.8 1.9 of which: Non-financial sector 50.8 11.6 68.0 41.3 37 3 of which, households Commercial banks Non-bank financial sector 34.8 9.2 44.7 43.1 59.6 49.7 10.7 18.6 144 -9.3 -9.2 -20.7 -54.9 -14.74.4 of which: Life insurance companies 12.8 8.5 -1.7 5.8 1.9 -1.8 1.5 -5.2 -13.4 Private pension funds 81 6.8 -90 -12 15.6 -24.8 -11.3 -17.3 -16.4 10.3 Mutual funds 0.2 -5.1 0.3 -1.7 Money-market mutual funds 0.6 -40.0 Brokers and dealers 20.1 10.5 Non-residents 53.4 -1.5 20.9 Source: US Federal Reserve. (a) Net of Treasury bill rollovers

quarterly rates. In some periods, for example in the second and third quarters in the United States, households were the largest net purchasers of domestic government bonds (see Table 2).

Fifth, the domestic non-bank financial sectors-which include insurance companies and pension funds among others-generally made few net sales of domestic government bonds or domestic equities. And at times, their net purchases of securities were at a rate at, or above, their 1993 quarterly average—for example in UK equities and Japanese bonds (on the latter see Table 3). The major exception was in the United States, where the non-bank financial sector was a major seller of US Treasuries, especially in the first quarter. Several parts of the US non-bank financial sector also made large net sales of corporate equities.

Table 3 Japanese bond market^(a)

¥100 k:11

100 billions					
	1993		1994		
	H1	H2	Q1	Q2	Q3
Net bond issues of which:	149	74	76	78	
Public	183	-7	79	82	24
Other	-34	81	-3	-4	
Net purchases by:					
Banks (b)	-16.8	27.0	-22.1	17.2	-8.6
Credit associations (c)	6.9	5.5	4.3	5.4	1.2
OFIs	18.0	9.2	10.9	1.9	7.1
Insurance corporations	26.6	22.3	11.8	34.5	14.8
Investment trusts	15.3	21.3	4.1	8.6	0.1
Pension funds	3.7	3.9	1.6	2.1	3.7
Bond dealers	-1.9	-7.5	2.6	-6.4	-3.8
Companies	11.2	6.6	5.0	7.1	8.0
Individuals	3.5	1.3	2.2	3.0	3.4
Others	-93.5	-92.2	-49.6	-45.3	-54.2
Non-residents (\$ billions)	-19.8	-11.3	11.6	-9.9	-14.6 (d

.. not available

Sources: Bank of Japan and Japanese Security Dealers' Association

Both public and private bonds. City banks; regional banks; long-term credit banks; trust banks; financial institutions for agriculture and forestry and second regional banks. Shinkin banks. (b) (c)

(d) Provisional.

Finally, government bond dealers made large net sales of domestic government bonds in all countries for which data are available. Only in the United States did they make sales in all three quarters, however. Both UK and US dealers' net sales were highest in the first quarter, when UK GEMMs sold most of their gilt portfolio (see Table 4). Net sales by Japanese bond dealers began in the second quarter and halved in the following quarter.

Table 4 **UK gilt transactions**

1993	1993		1994		
H1	H2	01	Q2	03	
		<u> </u>		<u> </u>	
26.1	26.3	6.0	4.4	5.9	
0.1	0.4	1.2	-1.7	-0.2	
6.4	4.3	1.1	0.1	-0.5	
ies					
7.1	4.0	3.3	3.4	3.9	
5.2	5.4	-4.3	2.1	1.2	
2.0	4.0	-5.7	0.3	-0.5	
2.2	3.2	1.6	0.7	2.7	
0.4	0.2	0.1	-0.1	-0.4	
4.7	8.7	4.2	-1.7	-1.1	
	1993 H1 26.1 0.1 6.4 7.1 5.2 2.0 2.2 0.4 4.7	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	

(6) The latter explanation would imply that foreign investors continued to purchase securities in the countries not considered in this analysis.

Syndicated credits

The volume of announced syndicated credits has been on an upward trend: it rose by 12% to \$249 billion in 1994 as a whole, and activity also picked up strongly in the fourth quarter. The upward trend has in part reflected an improvement in the world economy and a consequent increase in mergers and acquisitions activity. There has, however, been a marked increase in competition among banks for syndicated lending mandates recently. The spreads and fees that banks have been able to charge corporate borrowers have come under considerable pressure, and some borrowers have reportedly negotiated more favourable loan structures than had been usual in the recent past.

The increasingly aggressive competition in the syndicated credit market and the unsettled bond market conditions after early February contributed to the significant pick-up in activity over the course of 1994. This marked something of a change in pattern from the experience of recent years when the bond and medium-term note markets have offered more flexible finance at lower overall costs for highly rated borrowers than the syndicated credit market. Although the bond and medium-term note markets have remained an attractive and widely used financing channel for highly rated borrowers, the relative attractiveness of the syndicated credit market has increased, resulting in a shift of activity.

Equities

Equity turnover in London, New York and Tokyo fell over the course of 1994 from the historically high level in the first quarter. During the fourth quarter, the Tokyo Stock Exchange announced changes to its listing rules in an effort to stem the reduction in the number of companies listed. The minimum net asset requirement was reduced from ¥100 billion to ¥10 billion, and pre-tax profit is now only required to be ¥2 billion for the first two of the three years prior to listing, reduced from ¥20 billion. Reporting requirements were also eased. These changes came into effect on 1 January.

Derivatives

In 1994 as a whole, major derivative exchanges were affected by the trend towards the growing use of derivatives by industrial and commercial companies and investment institutions to manage their risk exposures, and by the unsettled conditions in bond and money markets which further increased the demand for risk management tools. At 153 million contracts, turnover on the London International Financial Futures Exchange (LIFFE) was 50% higher in 1994 than in 1993, despite a 9% fall in turnover between the third and fourth quarters. This pattern—of weaker activity as the year progressed, superimposed on a long-term growth trend—was also seen in the world's other major derivative exchanges. Among LIFFE's contracts, the Italian futures and options contracts performed particularly strongly in 1994: volumes in the BTP and Eurolira futures increased 86% and 134% respectively. (The turnover of lira-denominated contracts constituted nearly 11% of LIFFE's total turnover during 1994.) Volumes in LIFFE's German government bond futures contract rose 83% during 1994—consolidating its position as the exchange's most heavily traded contract and Deutsche Mark denominated contracts accounted for over half of the exchange's total turnover in the year.

Aggregate turnover on the London commodity exchanges the London Metal Exchange (LME), the International Petroleum Exchange and London Commodities Exchange increased by 14% in the fourth quarter. They traded a total of nearly 66 million contracts in 1994—a 25% increase on 1993. Turnover on the LME was at record levels in the fourth quarter, up 22% compared with the third quarter and 36% higher than in the same period a year earlier. The increased volumes reflected the continued upward trend in base metal prices and active 'non-trade' interest by funds and financial institutions. Changes in the LME's membership were evidence of the increased non-trade involvement: in 1992, banks and securities houses constituted roughly 7% of members; this had risen to 25% by the third quarter of 1994.

There are several reasons for the non-trade interest in commodities, particularly base metals. There has been an increasing appreciation among investors of the benefits of a commodity element in portfolios to enhance their risk-return attributes; and commodity derivatives have facilitated the adjustment of risk exposures by, for example, eliminating the requirement for physical delivery. The increased interest has been reflected in increased activity in the over-the-counter (OTC)—as well as exchange-traded—markets, and a range of warrants on baskets of base metals were issued by a range of financial institutions in 1994. Copper and aluminium attracted particular attention because the markets in these metals are both relatively deep and liquid. Non-trade interest in soft commodities was also strong during 1994.

Several exchanges took steps to increase their international links during the quarter. LIFFE initiated discussions with the Singapore exchange (SIMEX) about the listing of its eurodeutschemark futures contract in the Asian time zone, and reached agreement with the Tokyo exchange (TIFFE) about the listing of its euroyen futures contract, which is similar to TIFFE's contract. And LIFFE and the Chicago Board of Trade initiated a feasibility study into a possible link between the two exchanges' after-hours electronic trading systems. Meanwhile, the development of closer links between the DTB and MATIF (the main German and French derivatives exchanges) is progressing. DTB screens have been set up in France to allow MATIF members to trade DTB bond contracts; and trading in two (as yet unspecified) MATIF contracts will be transferred on to the joint system by the end of 1995.

The costs of inflation

By Clive Briault of the Bank's Monetary Assessment and Strategy Division.

This article surveys the academic literature on the costs of inflation. There are many well-established theoretical reasons why inflation—and uncertainty about future inflation—may reduce economic welfare. Moreover, there has recently been an expansion in empirical work on the relationship between inflation and growth, looking either at a single country or across countries. Most studies have found a significant negative correlation between inflation and growth. And at the broadest level, the article concludes, the available evidence supports the view that well-run economies with strong and efficient productive structures tend to exhibit both low inflation and high growth.

The article also briefly reviews the emerging literature on the costs of reducing inflation, which suggests that the short-term trade-off between unemployment and inflation is more pronounced in countries with low inflation.

In his 1992 LSE Bank of England lecture on the case for price stability.⁽¹⁾ the then Governor listed many of the costs of inflation, giving particular emphasis to those arising from unanticipated inflation. In addition to the costs that arise even if inflation is perfectly anticipated—as a result of the need to economise on real money balances and revise price lists, and of the less than full indexation of tax systems and debt contracts-there are important costs arising from unanticipated inflation. These include:

- the unplanned redistribution of income and wealth;
- additional uncertainty about future prices introduced into decisions about consumption, saving, borrowing and investment; and
- the higher costs of identifying changes in relative prices and allocating resources accordingly.

People may respond to these costs by attempting to predict future inflation or by searching out information on relative prices, but the allocation of increased scarce resources to such activities is costly for society as a whole (even if it may be privately profitable for those who undertake it).

This article expands on the Governor's remarks, looking at the growing theoretical and, especially, empirical literature on the costs of inflation, and in particular at the relationship between inflation and growth over the longer term.⁽²⁾ It is not intended to provide a comprehensive survey of academic work in this area,⁽³⁾ but rather to offer a selective review, particularly of recent empirical contributions.

The first two sections describe the main theories of the costs of anticipated and unanticipated inflation respectively, and some related empirical results. The third section considers recent empirical work on the determinants of economic growth over the longer term, in which the importance of inflation is assessed alongside that of variables such as investment, government spending and the presence of market distortions. The final section discusses the possible trade-off between the benefits of lower inflation and the costs of reducing inflation.

Anticipated inflation

The simplest conceptual model in which to analyse the costs of perfectly anticipated inflation is one of an economy in perfect competitive equilibrium and in which there are no distortions except for the non-payment of interest on notes and coin.⁽⁴⁾ This can be used to illustrate the key issues, although it is clearly not a realistic description of the world. In such a model, inflation constitutes a tax on holdings of currency, and it imposes welfare costs as agents alter their behaviour in response. At their most basic, these take the form of 'shoe leather' costs: people will make more frequent trips to the bank to withdraw currency (if bank deposits pay interest or provide depositors with other services) and attempt to synchronise cash expenditures with the receipt of cash income.⁽⁵⁾ These welfare costs would disappear if there was deflation at a rate sufficient to drive

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Published in the November 1992 *Quarterly Bulletin*, pages 441–48. The Governor discussed the short-run trade-off between inflation and unemployment—the 'Phillips curve'—in his lecture. There are a number of major survey articles in this area, including Driffill, Mizon and Ulph (1990), Fischer (1981a and 1994), Fischer and Modigliani (1975), Howiti (1990), McTaggart (1992), Orphanides and Solow (1990) and Woodford (1990). It would be possible (albeit at a cost) to pay something like interest on currency, for example—as discussed by Goodhart (1993)—through a lottery using the serial numbers on banknotes, and to remunerate banks' reserves held at the central bank. But if this was achieved, the optimal rate of inflation in this type of framework would become indeterminate. As described in Bailey (1956), pages 100–2.

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the nominal interest rate on interest-bearing and riskless substitutes for cash down to zero, since people would then no longer need to economise on their holdings of cash.⁽¹⁾

In this simple model, the cost of inflation depends on how much the demand for cash varies with the nominal interest rate. The cost will be positively related both to the rate of inflation (which will be reflected in the nominal interest rate) and to the sensitivity of the demand for cash to the interest foregone as a result of holding cash. Using such an approach, some estimates have suggested that even fully anticipated inflation may have large welfare costs.⁽²⁾ But these estimates are very sensitive to the specification of the money demand function and to the chosen definition of money (in most developed economies, cash in domestic circulation is a fairly small proportion of national income).

In addition, the demand for money approach is incomplete, since real income, real wealth and the real rate of interest are assumed to be unaffected by inflation. And the approach is limited to a comparison of various rates of inflation (different nominal interest rates) rather than of different growth paths of the economy. In reality, inflation probably affects savings behaviour and capital accumulation, not least because any change in the real demand for cash represents a switch in the portfolio of assets held in the economy.

The implications of these points have been considered in a number of theoretical models, which generate a variety of outcomes.⁽³⁾ In a simple neo-classical growth model, introducing real cash balances as the only alternative form of wealth can lead to the conclusion that higher inflation will be associated with increased physical capital but a slower rate of growth of output per head, as the economy moves towards its steady state. But if the level of wealth is made to depend on saving behaviour, which is in turn influenced by inflation, the result can be reversed.

The conclusions also depend on the assumptions made about the role played by money within the economy-for example on whether money is included in consumers' utility functions directly, or whether there is assumed to be a cash-in-advance constraint, so that purchases can take place only using money balances held for some time in advance.⁽⁴⁾ And in models with more elaborate sectoral distinctions, inflation can result in an inefficient allocation of productive capital to the private financial sector.⁽⁵⁾

But it is difficult to identify an intuitively-appealing role for money within traditional growth models, and equally difficult to provide a rationale for the existence of money in a hypothetical economy in which the only distortion is the

non-payment of interest on currency.⁽⁶⁾ And once additional distortions are introduced, the optimal rate of inflation becomes more difficult to determine. For example, if non-distortionary lump-sum taxes and subsidies are not available to the government, then raising revenue through an inflation tax-seigniorage-may be no less desirable than other forms of taxation which distort economic behaviour.⁽⁷⁾ Inflation will still be costly for the economy, and this will limit the extent to which it should be used as a source of revenue, but its optimal rate may still be positive.

Finally, the existence of tax systems that are not fully indexed and of contracts set in nominal terms (as, for example, for most mortgage borrowing) leads to further distortions from perfectly anticipated inflation. The true cost of inflation in this respect is the cost of adapting the tax system or financial contracts so that they are fully indexed, if that is possible, rather than the costs arising from a combination of inflation and non-indexation; but if non-indexation persists then inflation could be extremely damaging to an economy.

Unanticipated inflation

Redistribution costs

Unanticipated inflation leads to redistributions of income and wealth-in particular from creditors to debtors, when contracts are less than fully indexed, and from those with fixed nominal incomes to those who pay them. Such redistributions may be very costly for certain individuals and sectors of the economy. They may also undermine confidence in property rights. The difficulty of measuring the overall welfare costs here-not least because for every immediate loser there is an immediate gainer-should not obscure their importance.

Costs for decision-taking

Uncertainty about future price levels is likely to distort the allocation of resources in a number of ways. First, in the absence of index-linked assets, increased uncertainty may increase the attractiveness of real (as opposed to nominal) assets because they give a hedge against inflation. Second, uncertainty is likely to discourage agents from entering into long-term monetary contracts, thereby removing the assurance provided by longer-term contracts. This is likely to inhibit investments where the return is a long time ahead, and thus to reduce companies' investment rates and lead to investment in shorter-lived assets (which may represent a less efficient form of investment). Third, savers and lenders may respond to uncertainty by demanding a risk premium, so increasing the real cost of funds for borrowers. Fourth,

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As argued by Friedman (1969) in his derivation of the 'optimum' quantity of money. Bailey (1956) provides an early example of this, using Cagan's (1956) data on hyperinflation episodes. Fischer (1981a) and Lucas (1993) offer more recent analyses. The estimated cost of exceptionally high rates of inflation can be up to 50% of GDP, but even with low inflation a one percentage point increase in inflation is estimated to generate a welfare cost equivalent to up to 0.1% of output. These are described in the survey article by Orphanides and Solow (1990). Again, estimates of the cost of inflation can be derived from such models. They vary widely, but are generally smaller than those derived from measuring the area under a money demand curve; see the survey in Gomme (1993). For example, in Ireland (1994). As discussed by Hahn (1971, 1973). A point made by Phelps (1972, 1973). Cooley and Hansen (1991) calibrate a cash-in-advance model to assess the optimal distribution of tax on money, goods, labour and capital. But Kimbrough (1986a, 1986b) argues that since money balances are an intermediate good they should not be taxed.

capital will be misallocated if savers and investors form different expectations of inflation and thus different views of the *ex ante* real rate of interest.⁽¹⁾

Uncertainty about future rates of inflation is likely to be greater at higher rates of inflation.⁽²⁾ During a period of low inflation, the public may be reasonably sure that the authorities will be content with the situation and will attempt to prolong it. Following an inflationary shock, however, if the public are unsure about the preferences of the authorities, they will be uncertain how far the shock will be accommodated through monetary policy and therefore about the future rate of inflation.⁽³⁾ The authorities themselves may be unsure what to do in a period of high inflation, because they face a dilemma: they would like to disinflate, but may be reluctant to do so because of the recession that would probably result over the short term. Disinflation will probably occur eventually, but its timing will be uncertain.(4)

But future inflation may be uncertain even when current inflation is low. The public may be unsure whether any future exogenous inflationary shocks (for example, adverse shifts in the terms of trade) will be accommodated by the authorities, or whether they might deliberately create an unexpected bout of inflation in an attempt to boost output and employment in the short term, perhaps for electoral reasons.

The earliest empirical work on the relationship between inflation and uncertainty used fairly simple measures of inflation variability, such as standard deviations around the average level of inflation over periods or across countries. The results suggested that there was a positive relationship between the variability and the level of inflation.⁽⁵⁾ But there can also be considerable variability of inflation around a near zero mean, as was the case in many countries before the Second World War.⁽⁶⁾

Moreover, variability and uncertainty are not the same thing. Inflation might be highly variable, but if the processes generating it were understood there might be little associated uncertainty; and the costs of variable inflation will be lower if the variations are predictable. Attempts have been made to construct measures of uncertainty by adjusting measures of variability to take account of this, using either econometric models or survey data on inflation expectations to compare inflation outturns with predicted values.⁽⁷⁾ Most of the results suggest a positive relationship between the rate of inflation and these measures of 'conditional' uncertainty, particularly for uncertainty over longer time horizons.

But some caution should be applied in interpreting these results. They depend not only on whether the equation for forecasting inflation is specified using a univariate or a structural model (and on whether models or survey data are used) but also on whether it allows for structural changes in the inflation process. In general, the relationship between inflation uncertainty and the level of inflation appears to be strongest when there is a change in the trend rate of inflation-or when there is uncertainty about the possibility of such a change-rather than when there is shorter-term variability in inflation around an unchanged trend rate. This is important if, as suggested above, inflation is most costly when the period of uncertainty stretches over a number of years rather than over shorter periods.

There may also be a causal link between the variability and the average level of inflation, at least if monetary policy is accommodating. For example, variable inflation might lead risk-averse workers to negotiate a nominal wage that incorporated a premium in case the price level proved higher than expected. This would tend to push up nominal and real wages. Moreover, if unanticipated inflation generated the illusion of a real increase in company profits-or even an actual increase, perhaps because firms had financed themselves earlier by borrowing at fixed nominal interest rates below current market levels, or were paying below current market rents on old leases-then firms might be prepared to concede higher wages.

Impact on relative price movements

The relationship between inflation and changes in relative prices has also been much studied. Changes in relative prices give signals which guide resource allocation in market economies. It is therefore an important question whether higher inflation makes it more difficult to perceive and to react to changes in relative prices, or causes relative price changes which would not otherwise occur.

Misperceptions of relative price changes are usually analysed using models that assume that expectations are rational and that the market-clearing process always functions smoothly, whereas unanticipated changes in inflation and increased relative price variability both result from unanticipated changes in the money stock.⁽⁸⁾ In such models, a fully perceived change in the money stock has no effect on relative prices and there is no confusion between aggregate and relative price changes. However, a misperceived change leads to movements in prices in individual markets which participants regard, at least in part, as changes in relative prices. Assuming demand and supply elasticities in individual markets differ, these perceived

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There have been relatively few attempts to model formally the impact of uncertainty on economic welfare. Rankin (1994) surveys this area and suggests a model in which uncertainty about the future money supply—and so inflation—has a detrimental effect on the economy because risk-averse workers push up money wages and thus unemployment, and because of the increased variability of future prices and output. As argued by Friedman (1977) and Okun (1971). This is a familiar result in the 'rules versu discretion' literature, surveyed in Fischer (1990) and Cukierman (1992). Ball (1992) presents a model along these lines. See, for example, Foster (1978), Laffee and Kleiman (1977), Logue and Willet (1976) and Okun (1971). Backus and Kehoe (1992) cite mean rates of inflation for the United Kingdom of 0.09%, -1.07% and 6.92% for the periods 1870–1914, 1920–39 and 1950–83 respectively, with standard deviations of 2.37, 6.86 and 5.05. Including Ball and Cechetti (1990), Brunner and Hess (1993), Cukierman and Wachtel (1979), Engle (1983), Evans (1991), Evans and Wachtel (1993), Jansen (1984), McTaggart (1992) and Pagan, Hall and Trivedi (1983). Models of this type have been developed from Lucas (1973) and include Cukierman (1982 and 1984). It could be argued that the costs arising in these types of model represent the cost of money surprises rather than of inflation, but in practice the link between money and the aggregate price level is a convenience rather than a necessity, and the basic results carry across to any model in which market participants cannot distinguish perfectly between relative price changes and movements in the aggregate price level. (8)

relative price changes result in changes in actual relative prices, which in turn cause a misallocation of resources. Such a misallocation arises from unanticipated inflation or disinflation.

As with uncertainty about future inflation, there may also be an intertemporal misallocation of resources. For example, where imperfect information creates a variety of expectations of inflation, resources will be inefficiently allocated over time because real rates of return are misperceived by at least some agents.

A second type of model has been built on the notion of 'menu costs'. This type of model was intended to explain the non-neutrality of money (why changes in the money supply may have effects on the real economy), at least over the short term, by providing an explanation for nominal price rigidity.⁽¹⁾ Menu costs—including the costs of changing price labels, gathering information about markets and taking decisions to change prices-cause prices to be adjusted infrequently, but more rapidly in response to large shocks than to small ones. Models of menu costs usually assume that firms adjust their prices either at fixed intervals⁽²⁾ or whenever their relative prices move too far away from their correct levels.⁽³⁾ In either case, the price level will usually not adjust immediately to a monetary shock, so money may not be neutral. When inflation increases, prices are changed more frequently, but not frequently enough to maintain the previous dispersion of relative prices. As a result, relative prices move out of line, leading to a misallocation of resources. The menu-cost approach relates increased relative price variability to inflation or deflation itself, rather than to unanticipated inflation, and so suggests a way in which even fully anticipated inflation entails costs.

Such models generally imply that the optimal rate of inflation, if one exists, is zero.⁽⁴⁾ For example, Ball and Mankiw (1994b) presented a model in which firms change their prices only when induced to do so by a sufficiently large shock: they tolerate limited deviations of actual from desired prices. Positive inflation will then cause firms' relative prices to decline automatically between price adjustments. So when a firm wants to lower its relative price it may not need to pay the full menu cost, because inflation does some or all of the work. By contrast, inflation will widen the gap between desired and actual prices when a firm wants to increase its relative price. So shocks that raise firms' desired prices cause larger price responses than shocks that lower desired prices. (The opposite would be true if the general price level was falling-a firm wanting a lower relative price would have to pay the menu cost to jump ahead of the falling prices charged by other firms.)

Tobin (1972) used an assumption of downward price and wage rigidity to suggest that a positive rate of inflation could be optimal-a variant of the 'oiling the wheels' argument in

favour of modest inflation. But his approach treated the asymmetry of price adjustment as exogenous whereas, as just outlined, in the menu-cost model of Ball and Mankiw it may be an endogenous response to inflation. In these models, inflation is costly because it creates inefficient relative price variability without any offsetting benefit.

If, however, the existence of menu costs means that prices adjust more rapidly at higher rates of inflation then the impact of certain types of shocks on quantities (such as real output and employment) could be mitigated through higher inflation. But this is an argument in favour of price flexibility rather than inflation itself; and given its other costs, it is unlikely that inflation is the best means of achieving such flexibility.

The impact of unanticipated inflation on relative prices is also crucial to the effect of inflation on what Laidler (1990) terms the social productivity of money. Even low rates of inflation may be costly because they undermine the usefulness of money as a unit of account and as a store of value, while high rates of inflation may also undermine its usefulness as a means of exchange. This cost cannot, by definition, be assessed using a model which implicitly treats the contribution of money to the functioning of an economy as negligible. If the use of money confers only small benefits then any damage that inflation might do must necessarily be minor. But if the social productivity of the monetary system is high, the disruption of that system by inflation is potentially much more serious.

Empirical work suggests that relative price variability and the rate of inflation have been positively related over a wide range of countries and over time in individual countries, and that relative price variability is positively related to the extent of unanticipated inflation.(5)

Again, however, questions about the direction of causation arise. Relative price variability might be exogenous, in which case an asymmetric response of prices to shocks could lead to inflation if some prices are inflexible downwards. This effect would diminish as inflation increased, unless there were some reason why prices rose more easily than they fell in relation to some core or expected rate of inflation. Price inflexibility might then lead to both higher inflation and resource misallocations.

Similarly, inflation and relative price variability might be positively related if both were affected by major supply shocks, if speeds of adjustment or short-run supply elasticities varied across industries, or if an accommodating monetary policy allowed major price shocks to lead to higher inflation. Or government policy might cause both inflation and relative price variability. For example, higher government spending might both increase inflation and change the composition of final demand and so relative

Ball and Mankiw (1994a) provide a broad overview of the role of menu costs and of the various approaches adopted towards modelling them. Examples of this type include Blanchard (1983), Blinder (1991) and Taylor (1979). Models of this type include Ball and Mankiw (1994b), Barro (1972), Caballero and Engel (1992), Caplin and Leahy (1991), Caplin and Spulber (1987), Danzinger (1984 and 1987) and Sheshinski and Weiss (1977 and 1983). However, as discussed below, the non-neutrality of money may have implications for the costs of moving from positive to zero inflation. See Clare and Thomas (1993), Fischer (1981b), Jaffee and Kleiman (1977), Parks (1978), and Vining and Elwertowski (1976). (1)

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prices or, through indirect taxation, it might change relative prices directly.⁽¹⁾ Fischer (1981b) demonstrated that the relationship between inflation and relative price variability in the United States was mainly the result of food and energy price shocks after 1973, and that much the same had been true in West Germany and Japan. He also found a strong contemporaneous correlation between inflation and relative price variability, with no clear sequence. Studies using UK data show that, apart from oil price shocks, the major determinant of relative price variability has been changes in indirect taxation.⁽²⁾

So it is difficult to reach any firm conclusion that higher rates of inflation necessarily lead to greater relative price variability. Inflation and changes in relative prices could have a common cause; or relative price variability could be the cause of inflation. In each case, it would be wrong to conclude that higher inflation was itself the cause of increased relative price variability, or even that relative price variability necessarily involved a welfare cost.

Indexation

If many of the costs of inflation could be avoided using index-linked contracts, why is indexation not widespread? Institutional arrangements have tended not to adapt to take account of inflation (except in some countries experiencing very high inflation). This may be because the costs of indexation are relatively high. Indexation may also be inefficient because it inhibits changes in relative prices which would otherwise be desirable. And as it becomes a feature of an economic system, excess demand and other inflationary pressures will tend to be transmitted into prices more rapidly. So even if an indexed economy suffers fewer of the costs of inflation, it also tends to have higher inflation (since indexation may also reduce the counterinflationary resolve of the authorities). As a result, those costs which cannot be removed through indexation (in particular those relating to relative prices and to anticipated inflation) may become more severe.⁽³⁾

The effects of inflation on growth

The arguments presented above suggest that inflation and inflation uncertainty lead to a misallocation of resources; they are therefore likely to reduce the rate of growth of an economy. Attempts have been made to estimate by how much.

One possible starting-point is a neo-classical growth model. In this, an economy's growth rate is determined by technical progress and the growth rate of labour supply, both of which are assumed to be exogenous, but the level of output per 'effective' worker in steady-state equilibrium depends on a set of variables—which might include the rate of inflation that determine the efficiency with which labour and capital are used. If returns to capital are diminishing, the growth rate will be slower the higher is the initial level of real output per head relative to the steady-state position. If all countries had the same steady-state position, poorer countries (defined by their initial stock of physical and human capital) would grow more rapidly until they caught up with the richer countries. But this 'convergence' hypothesis would not necessarily hold if national steady-state positions differed.

More recent growth models have focused on the determinants of technical progress, which include investment and the level and effectiveness of research and development expenditure. The rate of inflation (and other factors) may, by influencing these, be important in determining both the steady-state rate of growth and the path along which an economy approaches it.

Empirical work here has been conducted on a number of bases. First, some studies have used time-series data for individual countries, whereas others have adopted a cross-country approach in which the data for each country are averaged over extended periods. A further method is to use a panel of data which combines these two approaches.

Second, some studies include inflation as the only determinant of growth, while others include a range of other possible determinants, either to take account of one-off disturbances (such as oil price shocks) or in an attempt to model growth more comprehensively by testing the significance of other possible influences. Third, although growth per head is usually chosen as the dependent variable, some studies have focused on factor productivity or investment. And some have used both the rate of inflation and its variability (absolute or relative to a prediction) as explanatory variables.

Although a few studies have found no relationship between inflation and the growth rate, the general consensus is that growth is significantly and negatively related to inflation. In some cases, the correlation is estimated to be quite large, suggesting that a one percentage point reduction in inflation could be associated with an increase in the rate of growth by something between 0.1 and 0.5 percentage points. But it is recognised that this relationship is unlikely to be monotonic: the results do not imply that a move from stable prices to deflation would increase the growth rate. (There have been so few instances of sustained falling prices that the available data do not permit any reliable assessment of their effect.)

Time-series approaches

Beginning with single country time-series analysis, the simplest approach is to regress output growth on current and lagged inflation. Grimes (1991) ran such equations for 21 industrialised countries, including terms of trade and year-specific dummy variables to pick up supply-side shocks. He found a significant negative relationship for 13

These possibilities are discussed in Fischer (1981b).
 See, for example, Mizon and Themes (1988).

See, for example, Mizon and Thomas (1988).
 Patinkin (1993) offers a vivid account of the problems faced by Israel under a system of widespread indexation.

countries, which implied that a sustained increase in inflation from 0% to 9% would lead to a full percentage point reduction in annual growth rates. In contrast, Stanners (1993) found only a weak (but negative) correlation between inflation and growth using time-series data for nine industrialised countries.

Simple equations regressing growth on inflation cannot, however, be expected to generate unbiased results. For one thing, in almost all countries there is a positive relationship, at least over the short run, between growth and inflation, with the direction of causation running from higher growth (at least in relation to productive potential) to higher inflation. In addition, single-country time-series observations that exhibit a negative correlation may be picking up the results of the authorities' reactions: a period of high inflation (or inflationary pressures) is likely to provoke a tightening of monetary policy, which in turn will cause both inflation and (in the short run) growth to decline.

Similar difficulties afflict studies which use time series from single countries to estimate the influence of inflation on productivity growth.(1) Some of them-for example Rudebusch and Wilcox (1994)-attempted to allow for the short-run trade-off between inflation and growth, and for reaction function considerations. Without any allowance for cyclical factors, they estimated a significant negative relationship between inflation and productivity growth in the United States, with a one percentage point reduction in inflation associated with an increase in annual productivity growth of 0.35 percentage points.⁽²⁾ In addition, they found that inflation 'Granger causes' productivity growth (that is, productivity growth can be 'explained' in a statistical sense by lagged inflation terms, but inflation cannot be 'explained' by lagged productivity growth). But once a cyclically adjusted productivity growth series was used, the estimated relationship became much weaker. An alternative method of allowing for cyclical factors-by including the growth of real output as an additional variable-weakened the original results far less, so that a statistically-significant negative correlation between inflation and productivity growth remained; but Sbordone and Kuttner (1994) have shown that including the US federal funds rate as a further additional variable eliminates this correlation.

Jarrett and Selody (1982) also attempted to isolate the effects of policy reactions, in their case by including capacity utilisation as an additional explanatory variable. Their results, using Canadian data, were very close to those derived by Rudebusch and Wilcox using cyclically unadjusted data: a one percentage point reduction in inflation was associated with a 0.3 percentage point increase in productivity growth. However, an updating of their study by Fortin (1993) found that although inflation had a negative impact on productivity growth over a longer sample period, the result was no longer statistically significant. A further problem with these results is that much of the negative correlation between inflation and output or productivity growth depends on a relatively small number of observations, in particular in the years immediately following the oil price shocks of 1972–73 and 1979, when inflation was relatively high and output and productivity growth relatively low. If these years were excluded, the results presented by Rudebusch and Wilcox would become less significant. So the conclusions depend heavily on how the evidence of the oil price shocks is interpreted. As the box on page 39 discusses, data for the United Kingdom reveal a similar difficulty.

The results are also based on a limited range of explanatory variables (partly because there are a limited number of data observations). This means that the estimated equations do not allow for the influence of many possible determinants of growth other than the rate of inflation, which may distort the results. One response-adopted by McTaggart (1992) and Smyth (1994)—is to estimate a production function including inflation as an argument. Both studies found that inflation had a negative impact on growth, but neither could identify the channels at work. Again, these regressions may have picked up short-run effects, rather than longer-term determinants of the growth rate. The results were broadly consistent with those for other time-series studies: for example, Smyth found that a one percentage point increase in inflation reduced the growth rate of private-sector output by 0.2 percentage points.

Some time-series studies have also assessed the importance of inflation *variability*. McTaggart (1992) found that inflation variability had a positive effect on the growth rate, but Jansen (1989) found that although inflation had a significant negative relationship with output growth, attempts to measure the effect on growth of the conditional variance of inflation yielded insignificant results.

It is also unclear why a change in inflation (or inflation uncertainty) should have as rapid an impact on output or productivity growth as some of the results suggest. It seems more plausible that productivity or output growth should respond favourably to a regime of low inflation (and low uncertainty about future inflation) extending over a much longer period, closer to a decade than a single quarter or year.

Cross-country approaches

The other main method of estimating the effect of inflation on growth is to use cross-country data. The use of such data was helped by the work of the World Bank and of Summers and Heston (1988), who developed a database on growth rates and their possible determinants for 130 countries from 1950. This work has encouraged other researchers to construct consistent series for additional explanatory variables with a similar coverage. By averaging the data for each country in the sample over a number of years, it is

Including Clark (1982), Jarrett and Selody (1982), McTaggart (1992), Rudebusch and Wilcox (1994), and Smyth (1994).
 They reported similar results for Canada and the United Kingdom, but much smaller and generally insignificant results for Japan, France, Germany and Italy.

The relationship between UK inflation and productivity growth

Time-series data on inflation and productivity growth in the United Kingdom and the United States are plotted in Charts 1 and 2 below. The charts suggests that in both countries there has been a negative relationship between the two variables in the post-war period; the line



included in each case is drawn to provide a best fit to the data. In the United Kingdom, a one percentage point rise in inflation is associated with a reduction in productivity growth of 0.14 of a percentage point. A similar increase in US inflation is associated with a 0.22 percentage point reduction in productivity growth.

The results for both countries are, however, influenced by the particular conditions during the 1970s, when inflation

possible to avoid many of the problems of short-run trade-offs and policy reactions which arise when using high frequency data. However, statistical tests on the direction of causation cannot be applied to cross-sectional data.

One of the earliest cross-sectional studies was by Kormendi and Meguire (1985). Using data for 47 countries over the 1950–77 period and a wide set of explanatory variables each averaged over six-year periods—they found that inflation had a significant negative correlation with output growth, apparently because of the negative association between inflation and investment. Their results suggested that one percentage point higher inflation was associated with a half-point reduction in the annual growth rate.

Grier and Tullock (1989) used pooled time series (five-year averages) and cross-sectional data between 1951 and 1980 for 113 countries to assess the impact of a range of variables on real output growth. They found that a single empirical model could not explain differences in growth among these countries and therefore presented different results for

was very high and productivity growth low. (Data for these years form a group in the bottom right-hand corner

Chart 2





of each chart; these observations might be regarded as belonging to a different inflation 'regime'.) In the pre-oil shock period (before 1972), there was no significant correlation between inflation and productivity growth in the United Kingdom—the negative correlation is strongest after 1973.

The effect of adjusting the UK data for cyclical influences—by introducing real output as an additional variable—is to weaken the negative correlation between inflation and productivity growth. The same effect is obtained when adjusting the US data.

different country groups. For OECD countries, they found strong negative correlations between growth and the share of government spending in national income, and between growth and the variability of inflation, but no significant relation between growth and inflation. Elsewhere, the only significant relation between inflation and growth was a negative association in the African countries; and inflation variability had a significant negative relation with growth in the Asian countries.

De Gregorio (1992, 1993) used cross-sectional data for 12 Latin American countries to test the implications of an endogenous growth model in which the level and efficiency of investment are related negatively to the rate of inflation. He found that both inflation and its variance were negatively correlated with growth; the effect appeared to arise mainly because of a reduction in the efficiency of investment. His results suggested that a halving of the inflation rate in these countries between 1950 and 1985—from 34% to 17% might have increased their annual growth rates by half a percentage point. However, he used only a limited set of explanatory variables. Peng (1993) offered supporting evidence in a study of three Latin American countries, but found no significant relationship in three Pacific Basin economies. He attributed this difference to the persistence of high inflation in the Latin American countries. Alexander (1994) used a combination of time-series and cross-sectional data for 11 OECD countries, and found a significant negative relationship between growth and both the level and the rate of change of inflation, even having allowed for the growth in capital and labour. A one percentage point reduction in the rate of inflation would, according to these results, be associated with a quarter-point increase in real annual growth.

Fischer (1993) reported a study of the impact of inflation on growth using cross-sectional and panel data for 80 countries. He presented tests for the importance of macroeconomic stability-of which inflation is just one indicator-as a determinant of growth, and found that inflation was significantly negatively correlated with growth and also negatively, but less statistically significantly, related to the rate of capital accumulation and productivity growth. The results suggested that a one percentage point increase in inflation was associated with a decline in annual output growth of 0.04 percentage points. But the effect varied with the level of inflation: it was higher at lower rates of inflation (in the range of 0%–15% inflation, a one percentage point increase in inflation was associated with a reduction in annual output growth of 0.125 points). The negative relationship was obtained using data both before and after 1973, when supply shocks became more important.

Barro and Sala-i-Martin (1994) presented tests based on panel data for almost 100 countries, where the variables were averaged over the periods 1965-75 and 1975-85. They used a number of variables-including schooling, health and life expectancy-to capture the initial stock of physical and human capital in each economy, together with a wide variety of 'environmental' variables, which may be thought of as determining the steady-state level of output per 'effective' worker in a neo-classical growth model. The implication is that the higher this steady state, the more rapid will be a country's rate of growth from a given starting-point. So far as the 'environmental' variables were concerned, they found that higher government consumption as a proportion of national income had a negative impact on the growth rate, as did proxies for the extent of market distortions in an economy, such as the size of the black market premium on foreign exchange and of tariffs imposed on external trade. Similarly, a number of variables designed to pick up the impact of government-induced actions were statistically significant with the expected sign. These included a negative impact of political instability (used as a proxy for the security of property rights) and a positive impact of proxies for the rule of law. In subsequent research, not yet published, Barro has found a significant, negative relation across countries between inflation and growth when a variety of other influences are held constant.

Other recent examples of this approach focus on a variety of similar variables. Knight, Loayza and Villanueva (1993) considered both the openness of a country's trade policies (since the external trade sector can serve as a vehicle for technology transfer, a channel for promoting efficiency and a source of foreign exchange) and the stock of public sector infrastructure (which again could improve the efficiency with which factors of production are used). King and Levine (1993) concentrated on the role of financial institutions in evaluating prospective entrepreneurs and funding the most promising ones, on the assumption that this would lead to a more efficient use of capital and increase the probability of successful innovations. And Easterly (1993) looked at various types of price distortion, such as subsidies on input prices and investment goods, ceilings on nominal interest rates and the black market premium on foreign exchange. Each study found a number of proxies for the relevant variables to have a significant correlation (with the expected sign) with the rate of growth.

The apparent importance of a wide range of other factors (even if the results in relation to them are no more robust than those for inflation variables) makes it more difficult to gauge the significance and magnitude of the impact of inflation on growth. This is particularly so given that many of the other factors are likely to be related to inflation either causally or because both are influenced by a third factor. But at the broadest level, the available evidence supports the view that well-run and well-governed economies with strong and efficient productive structures tend to exhibit both low inflation and high growth, though it is extremely difficult to identify and estimate the separate influence of inflation.

There are, however, a number of reasons to treat all of these results with some caution. First, some later studies have found that earlier results are sensitive even to fairly small changes in the sample period, the sample of countries used, the definitions of the variables and the specification of the estimated equation.⁽¹⁾

Second, inflation and growth may be determined endogenously. One response to this possibility is to use an instrumental variable which is sufficiently correlated with inflation to generate reasonable estimation results and which is exogenous. Cukierman *et al* (1993) used a measure of central bank independence as an instrument for inflation, but other research has suggested that central bank independence and inflation may not be well enough correlated to justify this. Barro and Sala-i-Martin (1994) used lagged values of their 'environmental' variables, but admitted that this may be imperfect because their starting-point values may be determined by past growth performance, and because the prospects for growth in the future and the manner in which an economy is managed can become mutually reinforcing.

Even studies that use cross-sectional data could be invalidated if growth and inflation were determined by a

⁽¹⁾ See in particular, Levine and Renelt (1992) and Levine and Zervos (1993).

third variable. Researchers commonly cite supply shocks as a candidate for this, in particular the oil price shock in the early 1970s which lowered growth and raised inflation in most countries.⁽¹⁾ Some attempts have been made to allow for this by including terms of trade changes in the estimated equations⁽²⁾ but this may not be an adequate proxy for all supply shocks. Fischer (1981b) concluded that 'since the inflation rate is not an exogenous variable to the economy, there is some logical difficulty in discussing the costs of inflation per se rather than the costs and benefits of alternative policy choices'.

Such considerations have led a number of commentators to express scepticism about the value of empirical work on inflation and growth (and indeed about tests of the determinants of growth generally). For example, Solow (1994) commented that although various political-economic factors 'might easily affect the growth rate if the growth rate were easily affected I do not find this a confidence-inspiring project. It seems altogether too vulnerable to bias from omitted variables, to reverse causation, and above all to the recurrent suspicion that the experiences of very different national economies are not to be explained as if they represented different points on some well defined surface . . . The introduction of a wide range of explanatory variables has the advantage of offering partial shelter from the bias due to omitted variables. But this protection is paid for. As the range of explanation broadens, it becomes harder and harder to believe in an underlying structural, reversible relation . . .'.

However, this scepticism may itself be overdone. Despite a number of shortcomings, the available evidence provides support for a negative relationship between inflation and growth, consistent with the predictions of the theoretical literature. But it would be still more convincing if a structured, micro-level testing of the hypotheses generated by the economic theory of the costs of inflation could be undertaken-and if this confirmed the negative relationship between inflation and growth.

Costs of disinflation

There are likely to be costs, in lost output and employment, attached to reducing the rate of inflation. For example, there are many different kinds of nominal rigidity-especially in the labour market, but also in debt contracts-which imply that it takes time for economic agents to adjust their behaviour if inflation is at an unexpected rate.⁽³⁾ Unless economic agents anticipate inflation reductions-and have time to adjust their contracts accordingly-disinflation will lead to lost output and employment, at least over the short term. And it has been argued that such costs may persist over the medium term-if not necessarily permanentlyparticularly in the labour market.⁽⁴⁾ Thus even though the efficiency gains from moving to an optimal rate of inflation

will be permanent, whereas any costs of doing so will be temporary, the costs could still outweigh the benefits, depending on the rate of discount to be applied to the benefits. Theoretically, it might be better to accept a permanent modest rate of inflation than to pay the costs of reducing inflation to an even lower rate, although Okun (1971) doubted whether inflation could be held permanently at a modest level, describing this as the 'mirage' of steady inflation.

It is also important to consider the pace of adjustment, particularly because the costs of disinflation may be related to its speed. In some models of disinflation, the optimal approach is to reduce inflation slowly, because a sharp reduction may generate greater uncertainty-which is costly.⁽⁵⁾ However, this result depends on assumptions about the information available to economic agents and the manner in which they form their expectations about inflation. And gradualism may not be an appropriate response to very high inflation, because the costs of a sharp reduction may be lower than those of continuing high inflation.

The costs of reducing inflation are no easier to calculate than the benefits of lower inflation. Indeed, the cost of reducing inflation by a percentage point may not remain constant as the rate of inflation falls towards zero. It may be, for example, that the credibility gained through achieving low inflation in the past (or through central bank independence) reduces the costs of subsequent policies designed to reduce inflation. Sargent (1982, 1983) suggested that since contracts denominated in nominal terms will be adjusted more promptly and more fully if the authorities announce a credible policy of disinflation, then such an announcement could reduce the rate of inflation with little cost in terms of output or employment. And Chadha, Masson and Meredith (1992) argued—on the basis of both theoretical considerations and a multicountry model developed by the IMF—that the output costs of a disinflationary policy will be smaller: if the policy is announced in advance and is phased in gradually; the more credible is the policy; and the greater are the importance of expected future inflation in determining current wage and price setting, and the responsiveness of wages and prices to demand conditions.

But others have suggested that the cost of reducing inflation is likely to be higher at lower rates of inflation. For example, as discussed earlier, Lucas (1973) argued that since inflation variability is likely to be lower at low rates of inflation, movements in prices are more likely to be regarded as relative price movements than as changes in the general price level. This may lead to larger adjustments in output and employment as individual firms respond to the price changes which they observe. Thus the short-run Phillips curve may be flatter at lower and less variable rates of inflation. Alternatively, Gray (1978) presented a model in

- (5) As argued in Balvers and Cosimano (1994).

Easterly *et al* (1993) present results which suggest that shocks, in particular terms of trade shocks, explain statistically as much of the variance in growth rates over ten-year periods as do country characteristics and policies. For example, Fischer (1993). The vast literature on this subject is surveyed by Blanchard (1990), Dixon and Rankin (1994) and Romer (1993). As discussed and assessed in Blanchard and Summers (1986) and Fortin (1993). (1)

which lower and less variable inflation increased the optimal length of contracts and reduced the optimal degree of indexation. This in turn increased the extent of nominal wage rigidity and thereby increased the impact of nominal shocks on output and employment.

In Ball, Mankiw and Romer's (1988) menu-cost model, lower inflation leads to less frequent price changes for a given level of adjustment costs, so lessening the responsiveness of prices to nominal shocks, again leading to higher short-run output and employment costs. Finally, building on these earlier models, Walsh (1994) argued that greater central bank independence could increase the costs of disinflation, not only by creating lower and less variable inflation but also by reducing expectations of nominal shocks. The degree of central bank independence might reduce the cost of lowering inflation through Sargent's 'credibility bonus', but this might be more than offset by its impact on nominal rigidities.

The empirical evidence suggests that there is indeed a significant and negative correlation between the average level of inflation and the short-term output: inflation trade-off, although it is not possible to identify the cause of this correlation. The seminal results are those of Ball, Mankiw and Romer (1988), who found a strikingly large negative correlation.⁽¹⁾ Ball (1993) found that the negative correlation was lower when wage-setting was more flexible, and Walsh (1994) reported results (albeit based on a small sample of eight European countries) which suggested that the magnitude of the short-term output:inflation trade-off is related negatively to the rate of inflation and positively to the degree of central bank independence. Using data on 17 OECD countries, Posen (1994) also found that the costs of

disinflation were positively related to the degree of central bank independence, but there did not appear to be any significant relationship between central bank independence and nominal wage rigidity.

On the optimal speed of disinflation, Ball (1993) found that the short-run costs of reducing inflation were inversely related to the speed of adjustment: a short, sharp shock was the best approach to reducing inflation. However, the results of Walsh (1994) could be interpreted as suggesting the opposite, at least if more independent central banks tend to introduce more rapid disinflations. And Yates and Chapple (1994) found it difficult to establish any clear relationship between the speed and the costs of disinflation. An important consideration for the authorities is that too blunt an effort to reduce inflation could undermine public support for price stability and therefore prove self-defeating.

Finally, the authorities may be able to influence the costs of reducing inflation, for example by establishing greater credibility, or by removing the micro-level rigidities which make the process of wage and price formation unresponsive to deflationary pressures. Even if the extent of nominal rigidities is itself a function of the inflationary regime, it may also be responsive to supply-side initiatives introduced by the authorities.

Conclusions

Economic theory suggests that inflation imposes costs on the economy through a variety of channels. And although the empirical evidence cannot be regarded as conclusive, it is broadly consistent with the theoretical results. This implies that there are advantages in achieving and maintaining price stability, even if these are difficult to quantify precisely.

(1) Cozier and Wilkinson (1990) found no such evidence for Canada, but Yates and Chapple (1994) found the negative correlation to be remarkably robust to changes in functional form, sample size and sample periods. However, although the sign and statistical significance of the negative correlation were robust, the magnitude of the coefficients on average inflation varied considerably across different specifications.

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Influences on broad money growth

By Chris Salmon of the Bank's Monetary Assessment and Strategy Division.

Broad money growth—the growth of M4—is one of a range of real and financial indicators analysed by the UK monetary authorities in their assessment of inflation pressures and prospects. This article reviews how the role of broad money indicators in the monetary policy framework has evolved since 1980. It then considers the factors currently influencing M4 growth, focusing in particular on the effects of balance-sheet restructuring and disintermediation. In that context, it examines recent trends in broad money growth in three countries—Australia, Canada and the United States—where recovery from recession began about a year earlier than in the United Kingdom.

The 1995/96 Medium Term Financial Strategy (MTFS) announced by the Chancellor in last November's Budget included an unchanged medium-term monitoring range for the annual growth of M4 of 3% to 9%.⁽¹⁾ M4 growthwhich was 4.5% in the year to November 1994-has remained in the lower half of that range since monitoring ranges were introduced in October 1992, following the suspension of sterling's membership of the ERM in the previous month.(2)

This article provides a brief review of the role that the analysis of broad money growth has had in the formulation of monetary policy since the inception of the MTFS in 1980, when the growth of sterling M3 (£M3)⁽³⁾ had a unique status as an intermediate target. In the current framework, M4 is used as an information variable, along with a range of other financial and real indicators, analysed by the authorities when forming a view about likely inflationary trends.

The article then considers M4's likely growth during this year, focusing in particular on the effects of balance-sheet restructuring and disintermediation. It draws comparisons with the recent growth of broad money in Australia, Canada and the United States, where economic recovery has led that in the United Kingdom by roughly a year.

Broad money and the monetary policy framework

Central to the choice of the monetary policy framework are views about how the instruments of monetary policy affect the economy and, ultimately, inflation-the transmission mechanism of monetary policy. But as the Bank's Chief Economist, Mervyn King, noted last year,⁽⁴⁾ 'the transmission mechanism of monetary policy is one of the

most important, yet least well understood, aspects of economic behaviour.' For although inflation is a monetary phenomenon, an understanding of it requires-among other things-a coherent theory of the demand for money; this has proved elusive.

Early monetarist analysis, as exemplified by Milton Friedman and discussed by Goodhart and Crockett,⁽⁵⁾ stressed the substitutability of monetary and real assets. The argument was that economic agents typically choose between money and goods rather than between money and other 'near-money' financial assets; as a result, the income velocity of money-which is a measure of the average value of transactions financed by each unit of the money stock during a given period-should remain broadly stable. More traditional Keynesian analysis had emphasised the substitutability of money and alternative financial assets.

The monetarist analysis implied that a build-up in money balances would be associated with an increase in nominal incomes and-eventually-the price level. Accompanying empirical work gave support to the monetarist viewpoint. And together, the theoretical and empirical arguments led to the adoption of monetary targeting in the United Kingdom, and later to the initial formulation of the MTFS (see the table on page 48).

But as has been well documented, problems were encountered with this 'pure' monetarism in the United Kingdom. Between 1980 and 1986, the annual target ranges for £M3 were achieved only twice-in both cases after upward revisions to the ranges originally set. The Governor of the Bank remarked in 1986 that the 'intermediate objective was chosen in the belief that there was a reasonably stable relationship between the rate of monetary

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The definitions of the various broad money aggregates currently used and discussed in the remainder of this article—including, in the United Kingdom's case, M4—are given in the box on page 51. Monitoring ranges were introduced for M0 and M4. Initially, M4's monitoring range was set at 4%–8% for the second half of 1992/93. In the 1993/94 Budget, it was set at 3%–9% for the remainder of the MTFS, and it was left unchanged in the 1994/95 and 1995/96 MTFSs. A definition of sterling M3 is given in the article, 'Changes to monetary aggregates and the analysis of bank lending', in the March 1984 *Quarterly Bulletin*, pages 78–83. In "The transmission mechanism of monetary aggregates have been by MK King at Lombard Street Research on 9 May 1994 and reprinted in the (3)

<sup>Buildin, pages 78–83.
In 'The transmission mechanism of monetary policy', a speech given by Mr King at Lombard Street Research on 9 May 1994 and reprinted in the August 1994</sup> *Quarterly Bulletin*, pages 261–68.
In 'The importance of money', June 1970 *Quarterly Bulletin*, pages 159–98.

growth and the rate of growth of nominal incomes. But in practice our ability to use an estimate of that relationship for target setting, and to meet those targets, has, quite frankly, been less than impressive'.⁽¹⁾

As a result, the emphasis placed on the growth of £M3 in particular, and on broad money in general, was gradually reduced. Target ranges for other monetary variables, both narrower and broader, were first introduced and then-in the case of narrower aggregates—given more prominence than £M3. In the 1987/88 MTFS, £M3 targets were dropped completely; this left M0 as the only monetary aggregate for which a target range was set, and this was described as 'illustrative'. And now, instead of being intermediate targets, monetary aggregates are used as indicators that act as information variables on the state of inflationary pressures in the economy.

The income velocity of broad money proved unstable, reflecting changes in the relationship between money and nominal incomes (see Chart 1). Furthermore, the velocity of narrow money was more predictable over the period-hence the upgrading of its role in the MTFS. It is important here not

Chart 1 M4 velocity^(a) growth



to confuse predictability and causality, however. M0 is purely demand-determined in the short run and so has no obvious short-term causal role. It may, though, still have a predictive role. For example, if economic activity were misrecorded and narrow money measured accurately, then M0 might have more predictive power for inflation simply because it was a more accurate indicator of economic activity.

Changes in broad money holdings and in the rate of interest received on them are affected by (among other things) the

policy actions of the authorities-which ultimately influence aggregate activity and the price level, as agents substitute between assets. And the deposits included in broad money are held not only as transactions balances but also as a store of value. As a consequence, the transmission mechanism is more complex than the early monetarist analysis supposed: the demand for broad money is related to both income and wealth. And savings are more likely than transactions balances to be switched between money and other financial assets in response to relative interest rate changes.

Recent research has responded to this in two ways: by augmenting standard money-demand equations to include wealth terms,⁽²⁾ and by estimating Divisia measures of money.⁽³⁾ Divisia measures weight different deposits according to estimates of their transactions characteristics in an attempt to measure transactions balances. Although the two approaches are different, their intention is the same: to try to allow for the influence of changes in wealth on money holdings. If this can be done, then estimates of the income velocity of broad money could be expected to be more accurate. Researchers following both routes have found that it is useful to distinguish between the personal and corporate sectors.

More generally, research has also focused on both sides of banks' balance sheets-deposits and loans. Studies in the United States⁽⁴⁾ and the United Kingdom⁽⁵⁾ have suggested that in addition to the traditional money (deposits) channel, monetary policy may be transmitted through a separate 'credit channel'. The suggestion rests on the observation that banks have a 'special' position: they are expert at monitoring the creditworthiness of would-be borrowers. Some agents-particularly those whose risk is harder for lenders to assess-may have to rely on banks for credit. This allows banks to have some influence on the relative price of credit-their interest rate-and so to exert a separate influence on how monetary policy is transmitted to activity. Thus the overall effectiveness of monetary policy is dependent, at least in part, on banks' behaviour.

In the United Kingdom, Dale and Haldane concluded that the credit channel was important for the personal sector—which has less access to the capital market than the corporate sector—and that a sectoral analysis of personal lending by banks and building societies therefore yields additional information.

The influence of this type of research on the current monetary policy framework is apparent. First, the monitoring ranges set for M4 and M0 in the 1992/93 MTFS and thereafter were explicitly medium-term: they are intended as guides to the monetary growth that would be

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In 'Financial change and broad money', the Loughborough University Banking Centre annual lecture in finance, given on 22 October 1986 and reprinted in the December 1986 *Quarterly Bulletin*, pages 499–508. See, for example, Hall, S G, Henry, S G B and Wilcox, J B, 'The long-run determination of the UK monetary aggregates', *Bank of England Discussion Paper No* 41, August 1989, and Fisher, P and Vega, J, 'An Empirical Analysis of M4 in the United Kingdom', *Bank of England Working Paper No* 21, December 1993.

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	The role of broad money targets in the MTFS since 1980
1980/81	Target ranges for £M3 set for four years, as the sole intermediate target.
	The MTFS noted that 'to reduce inflation [the government] will progressively reduce the growth of the money stock.'
1981/82	Role of broad money unchanged.
1982/83-1983/84	Common target ranges set for £M3, M1 and PSL2.(a)
	The 1983/84 MTFS noted that 'in recent years the economic significance of the wider aggregates has been affected by changes in savings behaviour and by structural changes to the financial system.'
1984/85	Separate target ranges set for M0 and £M3, with attention also paid to PSL2 and M2.(a)
1985/86	Separate target ranges set for M0 and £M3, without a specific role for PSL2 and M2.
1986/87	£M3 target range set for 1986/87 only. Illustrative ranges for future years set only for M0.
	The MTFS noted that 'illustrative ranges for future years are not set for £M3 because the uncertainties surrounding its velocity are at present too great.'
1987/88–1992/93	No target ranges set for broad money aggregates; illustrative target ranges set for M0. On 6 October 1990, sterling entered the ERM; its membership was suspended on 16 September 1992.
	The 1990/91 MTFS noted that 'the authorities monitor M4 and other broad aggregates closely. But experience shows that the relationship between broad money growth and inflation is complex and variable'.
1993/94–1995/96	Medium-term monitoring ranges set for M4 and M0.
	The 1995/96 MTFS noted that 'decisions about interest rates are based on an assessment
	of the prospects for underlying inflation in one or two years' time. This assessment is based on a wide range of information, including the growth in narrow and broad monetary aggregates.'

consistent with low-inflationary growth, rather than as year-specific targets. The move away from annual targets reflected the uncertain lag between policy changes and movements in money, prices, wealth and income. Second, each of the Bank's quarterly *Inflation Reports* contains detailed sectoral analysis of developments in the components and counterparts of M4, and in the Bank's measure of Divisia M4.

Current trends in M4 growth

As Chart 2 shows, real M4 grew more quickly than real GDP throughout the 1980s.⁽¹⁾ But since 1991, their growth rates have been closer. Charts 3 to 5 compare the recent trends with similar phases in previous business cycles; because there have been different rates of nominal income growth in the periods concerned, it is more instructive to compare M4 velocity growth—which takes account of the effect of income growth on M4—than M4 growth itself. The charts show that total and sectoral M4 velocity growth

(1) The analysis of trends in M4 growth in this article covers data up to the third quarter of 1994.

since the beginning of the current recovery have not been unusual. Recent velocity growth has generally been slower

Chart 2 Real GDP and real M4 growth^(a)



Chart 3 M4 velocity growth^(a) following recessions



Chart 4

Personal sector M4 velocity growth^(a)



(a) Dates shown indicate the quarter in which the trough in output was reached.

Chart 5 Corporate sector M4 velocity growth^(a)



(a) Dates shown indicate the quarter in which the trough in output was reached

than in the 1970s' recovery and faster than in that of the 1980s. In the two earlier upturns, velocity fell in the third year of recovery. If repeated this time, a similar fall would require a significant pick-up in M4 growth in 1995, given nominal GDP growth of around 6%.

A significant feature of the most recent recession and recovery has been balance-sheet restructuring by the private sector.⁽¹⁾ Agents have used income that they might otherwise have spent to repay debt. In general, the banking sector actively manages its liabilities, bringing its deposits into line with the perceived opportunities for profitable lending. So, other things being equal, the weak private sector demand for credit as a result of balance-sheet restructuring has been translated into low M4 growth.

Personal sector

A significant influence on personal sector behaviour has been the decline in house prices from their peak in the late 1980s. Households have found themselves with either negative housing equity or less tangible wealth than they previously expected. Many have suffered financial distress—as evidenced by the rise in mortgage possessions and arrears after 1991. The value of one-off mortgage repayments has also greatly increased, as households have attempted to counteract the impact of the house price falls on their debt. As Chart 6 shows, the personal sector's gross debt fell slightly as a proportion of income between 1991 and 1993.

Chart 6

Personal and corporate sector gross debt as a proportion of income



Personal sector borrowing for house purchase has grown relatively slowly in the upturn—at around $9^{1}/_{2}\%$ a year, compared with an average increase of $19^{1}/_{2}\%$ during the 1980s. Unless people are now much more content with their levels of debt, growth in borrowing for house purchase seems unlikely to increase substantially in the short term.

(1) This feature has been widely noted; see, for example, Sterne, G and Smith, J C, 'Personal and corporate sector debt', in the May 1994 Quarterly Bulletin, pages 144–55.

There has also been a breakdown in the previously close inverse relationship between total personal sector borrowing and the saving ratio (see Chart 7). This may reflect a shift towards financing consumption from income rather than from borrowing. Until last April's tax rises, such a hypothesis was supported by very slow growth in lending for consumption by banks and building societies. But lending for this purpose has since picked up, perhaps because households have borrowed to offset the impact of the tax rises on their post-tax spending power. So the breakdown in the borrowing:savings ratio may prove temporary.





However, borrowing for consumption accounts for only around 10% of individuals' borrowing from banks and building societies; the rest is mortgage lending. So while the housing market remains subdued, the prospect of a significant increase in overall personal sector borrowing remains low.

Corporate sector

Recent developments in the corporate sector have been different. In the early stages of the recovery, corporate net debt as a proportion of post-tax profits changed little. Since the beginning of 1993, however, it has fallen sharply. Although both assets and liabilities have fallen as a proportion of income over the period, the decline in gross debt has been much larger, accounting for the reduction in net debt (see Chart 6). In aggregate, industrial and commercial companies (ICCs) made net repayments of borrowings from banks and building societies of £7.0 billion—from an end-1992 level of around £140 billion—between 1993 Q1 and 1994 Q3.

In previous upturns, UK companies have increased their borrowings. The change to net repayments reflects a switch in ICCs' methods of financing. Although their gross investment has been slightly greater as a proportion of GDP than during the previous two recoveries, ICCs have made less use of debt financing, preferring to use equity finance

(1) 233 companies responded to the survey, of which 189 had a turnover in excess of £200 million

instead (see Charts 8 and 9). Their use of internal funds has been comparable with previous recoveries (as Chart 10 shows).

It is possible that once companies have succeeded in reducing their debt to desired levels, the flow of new corporate borrowing from banks and building societies will pick up, as in the past. But given their wider access to the capital markets than individuals, companies' recent switch to equity finance could herald a long-term shift in their preferences away from debt.

The Association of Corporate Treasurers' 1994 survey of the UK corporate banking market suggested that, whatever long-term trends eventually emerge, significant numbers of companies will remain reluctant to borrow from banks in 1995. It provided a detailed breakdown of larger companies' financing intentions.⁽¹⁾ 34% of companies surveyed intended to increase bank borrowing during 1995 and 27% to reduce

Chart 8 ICCs' bank borrowing^(a)



(a) Dates shown indicate the quarter in which the trough in output was reached.

Chart 9 ICCs' capital issues^(a)



(a) Dates shown indicate the quarter in which the trough in output was reached.

Chart 10 ICCs' internal funds^(a)



it—a positive balance of just 7%. Within this, a positive balance of the largest companies in the sample (those with a turnover greater than £2 billion) and those with high credit ratings (A+/A or higher) intended to reduce bank borrowing. Other forms of debt financing, such as leasing and bond finance, were said to be preferred debt instruments, with private placements (especially in the United States) the most favoured source of finance. Large firms have the widest capital market access and the survey responses suggested that they would increase their recourse to capital market funds.

Medium-sized firms (those with turnover in the $\pounds 201-500$ million range) with lower credit ratings seem the most likely to increase bank borrowing during 1995, according to the survey. The survey also covered banks, and revealed some mismatch: banks seemed keen to increase their corporate lending, but still had a preference to lend to the largest firms—those that were least interested in borrowing from them—although they seemed more inclined to lend to medium-sized firms than previously.

The weakening of global equity and bond markets during 1994 could have a countervailing influence. Companies may have taken the weakness into account in their 1995 plans and the survey results may indicate a continued preference for equity despite the weakness in equity prices last year. If so, the slowdown in capital market activity in the second half of 1994 may have resulted from firms delaying equity issues until market conditions became more favourable.

A possible stimulus to borrowing by ICCs could come from a significant increase in investment. If this occurs, even if the proportion of debt to total finance remains relatively low by historical standards, borrowing will increase. Investment surveys suggest that some increase in investment is likely, although the timing remains uncertain.

These factors do not seem to point to a sharp rise in ICCs' or individuals' borrowing from banks and building societies. But there are considerable uncertainties. In particular, agents' desired debt levels are not known, so it is not possible to know whether balance-sheet restructuring is yet complete.

International comparisons

The United Kingdom has not been alone in experiencing low broad money growth during the 1990s. It is therefore instructive to examine developments in other countries to see if they can throw any light on developments in the United Kingdom. Such comparisons can, of course, only be suggestive: each country has features unique to its financial structure in particular and its economy more generally, so that the demand for money will have characteristics specific to each. But in Australia, Canada and the United States at

Broad money aggregates

The definitions of the currently used broad money aggregates discussed in this article are:

1 United Kingdom: M4

M4 consists of holdings by the 'M4 private sector' (all UK residents except the public sector, banks and building societies) of sterling currency and deposits (including CDs and similar bank and building society liabilities) at banks and building societies in the United Kingdom.

2 Australia: M3

M3 consists of currency in circulation outside banks, non-bank private sector (NBPS) sight and time deposits with banks, and NBPS holdings of CDs.

3 Canada: M2 and M3

M2 consists of currency in circulation outside banks, demand deposits, non-personal notice deposits and personal savings deposits with banks.

M3 consists additionally of non-personal fixed-term deposits and foreign currency deposits by residents.

4 United States: M2 and M3

M2 consists of currency in circulation outside banks, travellers cheques, demand and time deposits with commercial banks, overnight repurchase agreements issued by commercial banks, overnight eurodollars held by US residents at foreign branches of US banks worldwide, time deposits of less than US \$100,000 and individuals' holdings of money-market mutual funds.

M3 consists additionally of large time deposits, term repurchase agreements, term eurodollars held by US residents at foreign branches of US banks worldwide, and balances of institution-only money-market mutual funds. least, there may be enough common characteristics to make comparative analysis worthwhile.

These economies share two particular features. First, their recoveries began before the United Kingdom's-their most recent troughs in output were 1991 Q1 (for Canada and the United States) and 1991 Q2 (for Australia), compared with 1992 Q2 in the United Kingdom. Second, their most recent economic cycles share common features with the United Kingdom's. In particular, the upturns which preceded the last recession were associated with rapid balance-sheet expansion by the private sector and asset-price booms (both property and financial prices)-key elements in any explanation of the evolution of broad money in the United Kingdom since the mid-1980s.

Chart 11 compares developments in real private sector borrowing from the banking sector. The pattern in Australia has been that most similar to the United Kingdom, with a sharp increase in the rate of growth of debt during the second half of 1980s, followed by a sharp reduction in 1990. The debt build-up in the United States started in 1983 earlier than in the United Kingdom-but accelerated less rapidly during the late 1980s. In Canada, a cycle in debt is also apparent, but it was more muted than in the other

Chart 11

Growth in real private sector indebtedness to banks





M4 lending, deflated by the GDP deflator. Bank credit to the private sector, deflated by the GDP deflator. Credit claims on the private sector of the banking sector, deflated by the GDP deflator.

countries and less similar to the United Kingdom's. Since 1990, the growth rate of real borrowing from banks has increased in Australia, Canada and the United States, but not in the United Kingdom-suggesting that the early 1990s' recession had a greater impact on private sector behaviour here.

Chart 12 compares the changes in broad money velocity in the four countries between 1980 and 1993. For Australia the M3 aggregate is used, for Canada and the United States both M2 and M3. The measures differ in coverage, making comparisons complicated: in particular, US and Canadian definitions of M2 are somewhat narrower than UK M4, and M3 somewhat broader. (The box on page 51 provides detailed definitions of the aggregates.) Three features stand out, however. First, by all measures broad money velocity growth in all the countries has been variable. Second, velocity growth increased in each country from the beginning of the 1990s until at least mid-1992. And third, in Canada and the United States, M2 and M3 velocity growth are very similar, suggesting that parallels with the United Kingdom are not sensitive to the choice of aggregate.

Chart 12

Broad money velocity

Australia and the United States



Looking at more recent developments, Australian M3 velocity growth has been erratic since 1992 Q2, exhibiting no clear trend. In Canada, M3 velocity growth peaked in 1994 Q1, and fell in Q2 and Q3 (by a total of around two percentage points), whereas M2 velocity growth peaked in Q2, before falling back by around $\frac{3}{4}$ of a percentage point in Q3. US broad money velocity growth (both M2 and M3) abated significantly during 1993, but increased again in 1994 Q2 and Q3, partly offsetting 1993's falls.

One interpretation of these developments is that broad money velocity growth in each country is at a turning-point-that the increase in velocity growth observed during the 1990s has run its course. Detailed analysis of corporate sector behaviour in these economies shows that since the beginning of 1994:

- In Australia, after three years of decline, business credit expanded by 3% in the second quarter and by 4% in the third (at annualised rates). Total private sector credit picked up as well, as private sector borrowing grew (stimulated by rising house prices).
- In Canada, business loans by chartered banks were roughly 7% higher during the second and third quarters of 1994 than in the previous five.
- US non-financial companies have increased their borrowing substantially-from a quarterly average of \$51 billion in 1993, to an average of \$121 billion in the first three quarters of 1994. This was mainly the result of increased bank borrowing.

These data suggest that companies in all three countries have been willing to make increased use of bank financing, perhaps because they have largely completed their balance-sheet restructuring.(1)

It would be wrong to draw strong conclusions for UK M4 from this comparison. But the developments elsewhere do suggest that once UK companies have completed their balance-sheet restructuring they may resume bank financing—prompting greater M4 growth.⁽²⁾ The international comparisons do not, however, indicate the likely timing or scale of such a development.

Conclusions

Inflation is ultimately a monetary phenomenon. Analysis of developments in the stock of money can therefore help in an assessment of the state of inflationary pressures in the economy. The money:inflation relationship is complex, however, partly because it is affected by variations in the level of wealth and by financial innovations. For that reason, monetary aggregates are used as information variables by the UK monetary authorities when analysing the appropriate stance of monetary policy, rather than as intermediate targets.

Broad money growth—as measured by M4—is currently being influenced by private sector balance-sheet restructuring and a shift away from bank and building society intermediation. It is less clear whether there has been an enduring change in the preferred financing methods of the private sector; companies seem more likely to have changed their preferred techniques than the household sector. In Australia, Canada and the United States, however-countries where recovery began about a year earlier than in the United Kingdom-companies have recently increased their borrowing from banks.

Of course, the attitude of banks towards lending demand is also important. For instance, during 1994 US banks relaxed their credit terms to companies, facilitating the increase in corporate borrowing.
 The increase in US M2 and M3 velocity during 1994 seems related to significant direct purchases of money-market instruments (such as Treasury bills) by households. Previously broad money growth in the United States had been depressed by strong growth in bond and equity market mutual funds. It is rare for British households to substitute between assets in this way, and such substitution is unlikely to be a significant feature of behaviour during 1995, suggesting that the most recent pick-up in US velocity is not pertinent to the United Kingdom.

The evolution of central banking in post-communist countries

By Victoria Fleming and Stuart Cole.(1)

This article looks at the development to date of central banking in the post-communist countries of central and eastern Europe, and the former Soviet Union. After outlining the state banks' previous role in a centrally planned system, it assesses the progress made in the different countries in three crucial areas: restructuring of the banking sector, reform of monetary and currency arrangements, and modernisation of payment systems. It also describes the help given by international financial institutions and established central banks—including the Bank of England—in the process of change.

Financial sector reform has proved to be one of the greatest challenges facing the former Soviet Union (FSU) and central and eastern European countries (CEECs)⁽²⁾ in their transition to a market economy. Their central banks have played a vital role in this reform—mainly shaping developments, but also being shaped by them. This article looks at how those central banks have evolved. It describes first the role of the state banks under the central planning system. It then gives an overview of how far the reforms have progressed in the different countries. Finally, it describes how progress has been assisted by established central banks and international financial institutions; a separate box describes the Bank of England's involvement in these historic developments.

Problems of central banking under central planning

Under central planning, resources were allocated by the government according to centralised plans for the whole economy. For the most part, 'finance' consisted of accounting entries resulting from decisions made in pursuit of the plan. So if an enterprise had insufficient finance to allow it to meet its output targets under the plan, it was given more money by the government—either as a subsidy or as a credit. Because of this 'soft budget' environment, enterprises rarely, if ever, went bankrupt (although bankruptcy was technically possible in some countries).

There was no clear separation of the central bank from the commercial banks: instead a monobank structure operated, in which the central bank undertook a wide range of what in capitalist countries are considered commercial banking functions. The central bank did not conduct monetary policy (as it is understood in capitalist economies); rather its main role was to provide the credit necessary to the economy for the central plan to be put into effect. A number of specialist institutions (for example, agricultural banks) also provided banking services to specific sectors of the economy, channelling credit to and from them in line with the central authorities' objectives. In practice, however, these institutions were part of the centralised monobank structure. The central planning system in principle included a cash plan and a credit plan, which determined respectively the currency issue and the level of credit needed to meet output targets.

Within the centralised system, two distinct and separate financial mechanisms operated: one served the household sector, the other the enterprise and government sectors. The main institution for households was the savings bank. Households received their income and did their spending mainly in cash. Any savings could be deposited with the savings bank, and were then channelled back to the state. Households wishing to borrow, and having the necessary permission, could receive credit from the savings bank at a fixed-and typically low-rate of interest. The second mechanism served enterprise and government. The central bank and other specialist banks provided credit to enterprises and to the government in accordance with the central plan. The separation of these two mechanisms was absolute: individuals were allowed to deal only with the savings bank and enterprises only with their respective institutions. The savings banks could not lend to or take deposits from enterprises.

Interest and exchange rates played no role in credit allocation, which was determined by the central plan. Credit was provided to enterprises at fixed, low rates of interest and little consideration was given to default risk or loan maturity. The surpluses earned by enterprises were usually returned to the state as a result of very high marginal tax rates. And any surplus financial assets that enterprises held earned little interest and were in effect channelled back to the government by the banking system. The exchange rate was used mainly as an accounting device to link the domestic to the international economy. Foreign exchange purchases, imports and exports, and levels of foreign borrowing were all determined as part of the central plan, and domestic

⁽¹⁾ The article was written while the authors were working, respectively, in the Bank's Centre for Central Banking Studies, and Supervision and Surveillance areas

Surveillance areas.
 (2) For the purposes of this article, 'central Europe' refers to Hungary, Poland, the Czech Republic and Slovenia, 'eastern Europe' to Slovakia, Albania, Romania and Bulgaria.

prices—even of internationally traded goods—bore little relation to world prices.

So the state budget, mediated by the banking system, served as the main source of both investment funds and enterprise subsidies. And credits offered by the banking sector to enterprises were in effect financial transfers between different government departments. This close relationship between the suppliers and users of capital resulted in inefficiencies in its allocation.

Progress with reforms

Creating an efficient, market-based financial sector has been an essential part of removing the state from the process of credit allocation. It has had three main elements: restructuring the banking sector, including the central bank; introducing market-orientated monetary management, including liberalising interest and exchange rates; and modernising payment systems. The changes involved have been implemented very rapidly.

Restructuring the financial sector

Reform of the financial system began with the dismantling of the monobank system, and the separation of central and commercial banks. The former central banks were restructured and their commercial banking functions removed into separate institutions. And new small private banks were encouraged to develop in order to boost competition. In most cases, the central bank was made responsible for the implementation of monetary policy, exchange rate policy and banking supervision—though not in Hungary, where a separate supervisory authority has been established—and for the creation of an efficient payment system.

The changes to central bank functions were in many cases linked with a radical transformation in structure. Generally, the aim was to reduce their size, by centralising their activities and reducing their branch networks. The central banks have also sought to attract market-orientated staff; this has meant establishing new recruitment, appraisal and promotion procedures. Training has also been given a high priority, and in a number of cases new training departments and institutes have been established, in some instances in conjunction with commercial banks.

In the CEECs, the restructuring process began in the late 1980s, initially in Hungary (in 1987) and Poland (in 1988). In many countries in the region, new legal and accounting frameworks were put in place. In Poland, some 800 branches of the central bank were converted into nine separate commercial banks. Elsewhere, central bank branches were maintained as regional 'agencies'—primarily to collate local economic data, conduct banking supervision and operate local payment systems.

Despite the speed with which the restructuring of the financial sector was initially tackled, the sector continues to face problems—both financial and institutional. These vary

from country to country. In many of the FSU countries, the former savings banks continue to dominate transactions involving the household sector, and the commercial banks remain specialised by either region or economic sector. And credit allocation remains concentrated in a few banks partly owned by the state; these continue to struggle with non-performing assets inherited from the communist regime (although in some cases the assets have been taken over by the state). In central and eastern Europe, the reforms have progressed further: in Hungary and Poland, for example, there are active and sophisticated money markets and functioning capital markets.

Table AExtent of progress with banking sector reform in CEECsand FSU countries

Little progress (a)	Some progress (b)	Substantial progress (c)		
Armenia	Albania	Croatia		
Azerbaijan	Bulgaria	Czech Republic		
Belarus	FYR Macedonia	Estonia		
Georgia	Kyrgyzstan	Hungary		
Kazakhstan	Lithuania	Latvia		
Fajikistan	Moldova	Poland		
Furkmenistan	Romania	Slovakia		
Jkraine	Russian Federation	Slovenia		
Izbekistan				

Source: EBRD Transition Report, October 1994.

Notes:

- (a) Little progress beyond the division of the previous monobank into central and commercial banks.
- (b) Interest rates significantly influencing the allocation of credit.
 (c) Substantial progress on bank recapitalisation, bank auditing and establishment of a functioning prudential supervisory system; significant presence of private banks; full interest rate liberalisation with little preferential access to cheap refinancing.

Reforming monetary management

As the financial reforms have progressed, the new central banks have often encouraged major changes in the instruments used by the authorities to conduct macroeconomic policy. First, interest and exchange rates have become major components of market reforms and key instruments in stabilisation policies. In central Europe and some of the Baltic countries, post-communist monetary policy was often very restrictive initially, as a way both of dampening inflation expectations following the liberalisation of the goods market and of establishing public confidence in the domestic currency. In eastern Europe and elsewhere in the FSU countries, the initial stance was generally more lax. Second, there have been a number of moves to reduce the extent of centrally directed credit. In Poland, for example, two laws passed in 1991 (the National Bank of Poland Act and the Banking Act) limited the provision of central bank credit to the government.

An important element in the increasing importance of monetary policy has been the movement towards using indirect tools of monetary control—primarily market-determined interest rates, refinance auctions and open-market operations (see Table B for details). Generally, the central European economies have made the most headway in this area, although progress across the whole region has been hampered to varying degrees by the initially rudimentary nature of financial markets. Indirect instruments were used first by the National Bank of Hungary in 1987, when they replaced credit ceilings. In the same

Table B

Examples of direct and indirect monetary policy instruments used by economies in transition

Type of instrument	Definition
Direct Credit ceilings and controls	Central bank imposes quantitative limits on, or influences the direction of, lending by commercial banks, either generally or selectively.
Administered interest rates	Interest rates fixed directly by the authorities, not by market forces.
Indirect Reserve requirements	Every bank required to hold obligatory reserves at central bank, calculated as percentage of the bank's loans or deposits.
Refinance auctions	Auctions at which domestic commercial banks bid for credit from the central bank. When introduced, credit frequently unsecured, but collateralisation often subsequently introduced.
Secured lending	Short-term central bank credit facilities, offered against collateral, often at a penal interest rate.
Open-market operations	
(a) Outright purchases or sales	Sales or purchases of securities by the central bank, as a means of influencing the liquidity of the banking system and short-term interest rates.
(b) Repos (sale and repurchase agreements)	Sales of securities by the market to the central bank, with agreement to repurchase them on an agreed date at an agreed price; thus similar to a short-term secured loan with the central bank providing temporary liquidity to the market.
(c) Reverse repos	Sales of securities by the central bank to the market, with an agreement to repurchase them on an agreed date at an agreed price, so temporarily withdrawing liquidity from market.
(d) Foreign exchange transactions	Spot or swap transactions by central bank with intention of influencing liquidity of money market (may also have direct influence on exchange rate).

year, reserve requirements became available to the Hungarian central bank as an instrument of monetary control, although it made little initial use of them for this purpose.

Hungary was also the first of the countries to issue Treasury bills—which it did in 1989—and to use them in open-market operations for monetary policy purposes. It was followed in 1990 by Poland—where the central bank issued bills—and by the former Czechoslovakia in 1992. Initially, because of high inflation expectations, the bills had very short maturities, sometimes of only a few weeks; but maturities have tended to lengthen as inflation has fallen. The success of the Czech reform programme has led to large capital inflows, which the authorities are trying to sterilise both by selling Czech National Bank bills and Treasury bills, and by increasing reserve requirements.

As these arrangements have developed, there have inevitably been tensions between central banks and ministries of finance. It is often in the interests of monetary policy, normally the responsibility of central banks, to keep interest rates high in order to bear down on inflation in the long term; fiscal policy considerations, on the other hand—normally the responsibility of ministries of finance—may favour keeping interest rates low to reduce the government's debt-servicing burden, and to avoid short-run costs in terms of output and unemployment.

While market operations have gradually been used more widely in central Europe—and maturity dates have lengthened—in other countries the development of effective monetary policies has been complicated by an increase in foreign currency deposits and a continuing high demand for loans despite rising interest rates. In those countries, the demand for credit has remained insensitive to its price for a variety of reasons, including the continuing monopoly power of many enterprises, incomplete price liberalisation and slow progress with the pursuit of bankruptcy proceedings. In some countries, the interest rate increases have sometimes been too small to influence the demand for credit; in others, such as Ukraine, real interest rates remained negative for some time despite official increases. As a result, the increases had little influence on borrowing.

In addition, the evolution of indirect monetary instruments has been slower in these countries. In Romania, for example, the authorities continued throughout 1991 to rely on credit controls as a tool of monetary management. They allowed bank credit to the enterprise sector to expand substantially at the end of 1991, in order to bring within the banking system the inter-enterprise arrears that had grown substantially during the year. But this expansion led to a need to tighten monetary policy sharply in early 1992 in order to combat inflation. In mid-1992, more indirect methods of monetary management were established, with the National Bank placing increasing reliance on credit auctions to influence liquidity in the banking system.

A key element in the redesign of monetary policy has been the deregulation of interest rates. Interest rate policy has been designed to address two problems: large price rises following price liberalisation, and the large monetary and debt overhang inherited from central planning. Positive real interest rates have had to be established, which has often meant sharp nominal rises; in Poland, real rates have been positive since February 1990, in Bulgaria since 1991 and in Romania since late 1993.

But it has been difficult to determine the correct level of interest rates: although positive real rates have been judged necessary to stimulate domestic currency savings and to contain inflation, too high a rate has sometimes been seen as risking higher inflation in the short term. At the same time, rates have needed to be high enough to protect balance of payments' positions, prevent large capital outflows and, in some cases, maintain the adopted exchange rate regime. And the weakness of banks' balance sheets has introduced a further consideration: higher lending rates would cause bad debts to increase.

Immediately after interest rate deregulation, the norm has been wide spreads between bank lending and deposit rates; in many countries, these persist. But spreads in central Europe are now generally smaller than those in eastern Europe and the FSU countries, in part perhaps because of greater competition in the banking sector.

In the former Czechoslovakia, for example, in 1991 average spreads were large. Although the banks were allowed some freedom to decide rates, the central bank maintained effective control via the discount rate, a maximum lending rate and moral suasion. In 1992, however, the ceiling on interest rates was abolished; as a result, the average spread rose a little further. For a time, the size of spreads allowed the banks to strengthen their capital positions and create reserve funds to cover potential risks. But it was not sustainable indefinitely (disintermediation through alternative financial channels might eventually have occurred); and spreads subsequently started to narrow.

Independent currencies

A development among many of the reforming countries especially the FSU countries—has been the introduction of independent currencies. They have been introduced both as symbols of newly gained sovereignty and as a way of breaking away from the high inflation endemic in the rouble zone.

The policy has been most successful in the Baltic republics, where independent currencies have been successfully introduced and inflation contained. Independent currencies alone, of course, are not sufficient for macroeconomic stabilisation; supportive monetary and fiscal policies are equally important. And in the Ukraine, for example, where the rouble was replaced by the karbovanets in 1992, inflation has been even higher than in Russia, as monetary policy has served only to support the very loose fiscal position. The experience of the transcaucasian republics—which have struggled with hyperinflation—has at times been still more difficult.

As important as the introduction of new currencies have been reforms to introduce new exchange rate regimes and to unify the various administered exchange rates. Progress with unification has varied considerably across the region. In central Europe it was achieved at the start of the reform process, whereas in Russia dual exchange rates were unified in early 1992 and in Romania in mid-1994.

In choosing the exchange rate regime, a key consideration has been whether foreign exchange reserves were sufficient to allow the official intervention that might be required if the exchange rate were either fixed or managed. IMF standby facilities—and their associated policy conditions—as well as stabilisation funds provided by industrial countries have given credibility to the exchange rate pegs introduced by a number of countries as part of their reform programmes.

Another consideration has been whether rapid inflation has become embedded. When it has, and has been accompanied by a continuous depreciation against hard currencies, it has been extremely difficult to judge what adjustment to domestic monetary policy was needed to support a particular exchange rate policy. In such circumstances, the authorities have in practice often been obliged to accept a free float with some expectation that a more actively managed rate might be possible once domestic monetary conditions were under control. Occasionally, they have retained multiple rates or strict foreign exchange controls.

The exchange rate regimes adopted in the CEECs range from a fixed rate in the former Czechoslovakia—where the crown was fixed against a basket of currencies and inflation is among the lowest in the region—to more flexible regimes in Poland and Hungary, where a crawling peg and a fixed but adjustable peg, respectively, have allowed cumulatively large, but controlled, depreciations in the exchange rate. Romania and Bulgaria have adopted essentially freely-floating rates.

Within the FSU countries, the experience of the Baltic republics has been distinct. Estonia successfully introduced a currency board in 1992, before inflation had become too seriously endemic after marshalling enough reserves to support it; Lithuania has recently followed suit. A currency board guarantees to exchange domestic currency for a specified foreign currency at fixed rate, and should always be able to do so, since it is required to hold realisable financial assets in the reserve currency at least equal to the value of the domestic monetary base. This 100% cover for the domestic currency gives great credibility to its exchange rate. Partly because of the domestic monetary stance, Latvia's currency has been stable: it is pegged to the IMF's special drawing rights (SDRs)-a basket of currencies created by the International Monetary Fund. But elsewhere in the FSU countries, exchange rates are floating, and generally depreciating continuously, as a result of the relative indiscipline of macroeconomic policy. Table C summarises

Table C Currency arrangements in selected CEECs and FSU countries

Currency	Percentage o US dollar in	change against the year to:	Exchange regime at end-1994	
	End-1993	End-1994		
Czech crown	-3.2%	1.0%	Fixed peg. Two-currency basket: \$:DM 35%:65%	
Hungarian forint	-16.5%	-13.0%	Adjustable peg. Two-currency basket: \$:DM 50%:50%.	
Polish zloty	-33.1%	-23.9%	Crawling peg. Five-currency basket: \$:DM:£:SwFr:FFr 45%:35%:10%:5%:5%.	
Romanian leu	-146.8%	-114.6%	Free float.	
Slovenian tolar	-39.2%	-14.2%	Free float.	
Estonian kroon	-9.1%		DM-backed currency board.	
Latvian lats	29.4%	9.8% (a)	De facto peg to SDR.	
Russian rouble	-318.9%	-113.3%	Free float.	
Ukrainian karbovanets	-1,254.5%	-240.1% (a)	Free float.	

Sources: BIS, IMF.

(a) Estimate of change to end-October. In the Ukraine, the National Bank abolished the previous official rate on 24 October 1994. the currency arrangements in selected countries in the region.

Modernising payment systems

The modernisation of payment systems has been a difficult challenge. The systems inherited from central planning were slow and cumbersome, despite elements of automation, and have failed to cope with the increasing numbers of transactions and the demands for more rapid payment in a market economy. A slow payments mechanism can leave banks with large volumes of uncleared transactions, and makes assessments of risk and creditworthiness—which were not necessary in the pre-reform period—complex and uncertain. It is also a concern for banking supervisors. For businesses, it can create severe cash-flow problems. And more generally, it weakens the application of the hard budget constraint, which is essential if a market economy is to allocate resources efficiently.

As with other areas of reform, headway in the modernisation of payment systems varies considerably across the region. In Russia, for example, some progress has been made: it is reported that by mid-1993 the credit float-the credit trapped in a payment system as a result of the delay between posting payment entries to the accounts of payer and payee-had halved from its 1992 peak. In part, this reflects the central bank's efforts to modernise the operating procedures of its cash settlement centres. Progress has also been made in developing clearing houses, where the central bank has set up a licensing system. Much remains to be done there, however, for example to introduce technical standards, payment instruments for the retail sector and a legal framework for payment systems. Progress with reform in this area has perhaps been greatest in Poland; and the Polish experience of developing clearing arrangements is being studied by other countries in the region.

Assistance from established central banks and international financial institutions

Since the fall of communism, the reforming central banks of the CEECs and the FSU countries have made a number of requests to established central banks and international financial institutions for advice on central banking in a market economy.

A number of these institutions have responded by offering support, mainly in the form of training and technical assistance. Help is needed particularly in the core areas of central banking—assuring monetary and financial stability but also in areas such as organisational structure and staff issues. The effectiveness of such assistance depends not only on the donor institution addressing the practical issues facing the recipient, but also on the advice and training being put to use effectively.

Multilateral assistance

The main multilateral donors have been the International Monetary Fund, the World Bank, the European Bank for Reconstruction and Development and the European Union. All have provided training and technical assistance, drawing on their own staff and the staff of established central banks, as well as other bodies. The multilateral agencies have also set up a joint training institute in Vienna—the Joint Vienna Institute.

As part of the IMF's activities, its Monetary and Exchange Affairs Department has provided technical assistance itself and has co-ordinated that given by 'co-operating' central banks. Activities for each country have usually been divided among the donor central banks. The IMF has then co-ordinated missions to agree with the recipient authorities a detailed reform programme in each area of the central bank. Once that has been done, assistance has often switched towards smaller, more focused missions, short-term visits by experts and technical assistance workshops to assist with implementation of the programmes. The IMF has also appointed resident advisers to the central banks in most of the post-communist countries.

The short-term visits by experts allow continuing advice as reforms progress. The technical assistance workshops enable problems common to a number of countries to be discussed by those responsible for tackling them. And resident advisers provide local assistance by liaising with co-operating central banks, as well as monitoring and assisting the implementation of reforms.

In addition to technical assistance, the IMF Institute in Washington has continued to provide specialised training in economic analysis and policy-making for officials, including central bankers from its new member states.

The IMF's twin institution, the World Bank, traditionally provides longer-term finance for structural and sectoral reform as well as for projects. In the post-communist countries, it has also provided technical assistance, and its Economic Development Institute (EDI) has offered training. As far as training is concerned, the IMF covers central banking and the World Bank the broader financial sector including commercial banking.

The European Bank for Reconstruction and Development (EBRD) was set up in 1991 to foster the transition to open-market economies, and to promote private and entrepreneurial initiative in the CEECs and the FSU countries applying the principles of democracy, pluralism and market economics. As well as making loans and investments in both public and private sector bodies, the EBRD also provides technical assistance and training. In 1993, the EBRD's technical co-operation funds (which also cover training) committed ECU 85 million (roughly £64 million). The EBRD has supported the establishment of bank training institutes in Romania, Albania and Russia, and a regional bank training centre in Uzbekistan. Although the centres focus on commercial banking, there has been some central bank involvement.

The European Union has two programmes under which assistance can be provided to former communist central

Assistance from the Bank of England

For several decades, the Bank of England has been providing technical assistance and training to central banks around the world, particularly those in the Commonwealth states. It set up its Centre for Central Banking Studies (CCBS) in 1990 to give a more specific focus to this work, in response to the additional demand for assistance from central banks in eastern and central Europe and the FSU countries. Roughly 70% of its training is now focused on these countries.

In its first four years, the CCBS has trained well over 2,000 participants from over 105 countries and co-ordinated technical assistance from the Bank of England to more than 30 central banks. In its training, the Centre explains and explores the main principles and functions of central banking, drawing on international comparisons. It offers a variety of short courses and seminars designed to meet participants' requirements, and course members are able to compare the experiences of their countries. In addition to using its permanent staff, the CCBS draws on speakers from elsewhere in the Bank, from government, the UK financial sector and universities.

As well as offering courses at its London premises, the Centre runs courses and seminars abroad for central

banks. The first is PHARE, which was set up in 1989 to help the countries of central and eastern Europe rejoin the mainstream of European development and build closer political and economic ties with the European Union. In the five years of operation to 1994, PHARE made available a total of ECU 4,283 million (approximately £3,330 million) in grants to 11 partner countries. Within this, it has, for example, funded the drawing-up of a training programme for the staff of the National Bank of Poland.

The second programme—set up in 1990—is TACIS. It aims to assist the FSU states to deal with the economic and social problems of becoming democratic market economies. TACIS has provided grant finance for technical assistance, the transfer of know-how and training; a total of ECU 850 million (roughly £682 million) was committed under the programme in 1991 and 1992. Several of the new central banks receive assistance from TACIS. Together with the IMF, for example, it provides a comprehensive training programme to the Central Bank of the Russian Federation, which includes courses offered by many established central banks.

The Bank for International Settlements has also been providing training and technical assistance to the new central banks; it has staged occasional seminars and courses, and it maintains a database on the training and technical assistance being provided, in order to facilitate co-ordination. bankers from a single country or a region. In 1994, it ran courses in Bulgaria, the Czech Republic, Hungary, Macedonia, Romania, Russia, Slovenia and Ukraine among others, and also provided teachers or lecturers for courses organised in a number of other countries. Where necessary, the courses are interpreted into the participants' language.

The CCBS is largely financed by the Bank, but some of its activities are supported by the British Government's Know How Fund and the European Commission's PHARE and TACIS programmes. The Centre also co-operates in providing technical assistance and training with other organisations, including the IMF, British Invisibles and the Chartered Institute of Bankers.

As central banking in the post-communist countries has developed, the CCBS's training methods have been adapted, so that increasingly the basic instruction in central banking has been supplemented by seminars and workshops where common policy issues are discussed.

The Centre also co-ordinates the Bank's technical assistance to central banks around the world, aiming to provide experts to advise on particular subjects or projects, and to arrange assignments in the Bank.

The Joint Vienna Institute (JVI) is a co-operative venture between the BIS, EBRD, World Bank, IMF and OECD. The European Commission also played a important role in its start-up and early development, and it is supported by the government of Austria, the Austrian National Bank and several other donor countries. It provides training to help the former centrally planned economies in eastern and central Europe, the FSU countries and Asia in their transition to market-based systems. It offers a variety of courses, run by the sponsoring institutions, in economic and financial management and public administration to policy advisers, training officers and private sector executives.

Bilateral assistance

In addition to their participation in these multilateral initiatives, many established central banks provide training or technical assistance directly (while keeping others informed of their activities). They are often supported in this by their own government aid agencies or similar bodies. The Austrian National Bank and the Bank of England appear to be among the most heavily involved. Several central banks, including those two and the Swiss National Bank, have set up special training institutions or departments for international central bankers. The Swiss and Austrian institutions train both commercial and central bankers, and the Austrian Bankers College also provides language tuition. The Bank of England concentrates on training central bankers, both in London and abroad (see the box above).

The CREST project

Late last year, a consortium of 69 firms from across the equity industry subscribed the £12 million of capital needed to develop CREST, the new equity settlement system being developed by a Bank of England project team. CREST is now less than 12 months away from trialling with firms. Software development of the core system is under way, and with last December's publication of detailed standards for communicating with CREST, software firms and in-house development teams across the industry should now be well advanced in designing and building their own systems to interface with it. This article reviews the history of the project and its current state, and looks towards the transition next year from the current Talisman system to CREST.

Work on TAURUS, the London Stock Exchange's plan for dematerialised equity settlement, was suspended by the Stock Exchange's Board on 11 March 1993. The Exchange asked the Bank of England to set up a Task Force to 'consider the best way forward for the development of securities settlement, share registration and share transfer in the United Kingdom and to identify possible alternatives to TAURUS'.⁽¹⁾

The Task Force first met the following morning; 16 weeks later, it made its report, which was essentially a project brief. It recommended that work begin to specify a new system to replace the current Stock Exchange settlement system, Talisman: this was to be called CREST. In less than a year from that date, the business requirements of the CREST system had been specified in detail, and work on the overall computer design was almost complete.

It is still less than two years since the Task Force began its work. CREST has progressed to the stage where the software of the system is being written, and potential users have the information they need in order to change and develop their own systems. 69 shareholders have each provided between £30,000 and £390,000 of capital to CRESTCO—the company that will own and is financing the system. And detailed plans for the trialling of the system and the procedures for moving stocks from Talisman to CREST are already being made. With six months of trialling likely before the system is implemented in the third quarter of next year, the project remains on schedule to meet the deadlines set by the Task Force in June 1993.

In May last year, the Governor told the annual conference of the Association of Private Client Investment Managers and Stockbrokers that they 'should be in no doubt about the Bank of England's commitment to seeing the CREST project completed, on time and to budget'. That remains the project team's brief.

The project to date

The Task Force which the Bank brought together in March 1993 was not intended to represent the equity industry directly. Its members were chosen for their individual expertise and standing in a range of areas within the industry, from retail stockbroking to market-making to investment; it also included representatives of the regulatory authorities (the Stock Exchange, the Securities and Investments Board, and HM Treasury).

The Task Force quickly decided that it should not begin by formally reviewing the collapse of TAURUS. Rather, it considered settlement issues more generally, set out clear objectives to be met and addressed its solution to those objectives. In doing so, it consulted widely. In the weeks after its formation, it heard—in person or in writing—from several hundred firms and individuals, both in the United Kingdom and overseas, advocating a wide range of solutions.

The objectives

The primary objectives which the Task Force identified to improve settlement in the United Kingdom were:

- to increase the efficiency of settlement by reducing the volume of paper circulating in the course of settlement;
- to provide opportunities for streamlining and automating settlement processing, so reducing the risk;
- to provide opportunities for shortening the settlement cycle, so further reducing risk; and
- to establish a sound and effective delivery versus payment (DVP) system, to minimise the risk that any participant in the securities markets should lose the full value of stock traded.

⁽¹⁾ Task Force on Securities Settlement, 'Report to the Governor of the Bank of England', June 1993. This, and all the papers published by the project team, are available by writing to the CREST Project at the Bank's address. A regular newsletter is also available free of charge on request.

What CREST will provide

CREST is a mechanism for holding and transferring shares and other securities in dematerialised (electronic book-entry) form. It is therefore designed to settle obligations entered into elsewhere (eg on the Stock Exchange); it is not designed to provide post-trade functions—such as trade confirmation and contract notes for clients—or to provide complex management information systems for its users. Accordingly, CREST will:

- maintain a record of all its members' eligible holdings of stock, which will be dematerialised (ie no certificates will be issued for stock held in CREST);
- respond to electronic messages from members to transfer stock from one CREST account to another;
- authenticate the origin and content of messages it receives, compare the instructions input by the buyer and the seller and match them;
- check the availability on the settlement day of stock and cash in the CREST members' accounts, and move the stock from the seller's account to the buyer's. The buying member's bank will be instructed to pay the selling member's bank—and will be unconditionally obliged to do so, thus ensuring effective delivery versus payment (DVP); and
- notify the stock's registrar, who will have undertaken to register all valid transfers within two hours of the transfer in the system. As a result, the contents of a member's accounts on the register and in CREST will mirror each other.

In addition to these mechanisms for settling transactions between its members, CREST will also provide:

- An efficient mechanism for the deposit and withdrawal of stock in paper form, to enable those who wish to do so to sell or buy share certificates through a CREST member quickly and economically.
- The ability to segregate holdings of shares into a number of separately designated accounts, both in CREST and on the register.
- A range of functions to facilitate stock borrowing and lending. There will be a new mechanism for providing collateral,⁽¹⁾ which will significantly improve the security against stock loans. All the benefits of electronic book-entry settlement will be available to lenders, so that making stock loans and receiving loan returns will be faster and cheaper than at present.
- A mechanism for moving securities and money between participants in settlement of any obligation. Since participants include registrars, CREST will thus ease members' involvement in a range of 'stock events'—such as the payment of cash distributions and dividends, and the receipt and trading of new securities, including allotment letters. Where desired by users, these mechanisms will provide effective delivery versus payment.
- An automated system for the calculation and settlement of claims arising from stock events.
- Access to all system data for relevant regulators.

(1) This will be known as 'deliveries by value' (DBVs), and will replace the current short-term collateral certificates. With a DBV mechanism—such as that in the Central Gilts Office operated by the Bank since 1986—securities offered as collateral for a loan are actually delivered to the lender. The current arrangements rely on a floating charge being taken over securities which remain in the borrower's possession.

The Task Force expected that the achievement of these objectives would result in a deeper, more liquid equity market, making the primary market more useful to businesses trying to raise capital and the secondary market more attractive both to small and large investors.

But it also recognised the importance, while achieving these objectives, of preserving the right of shareholders to retain their paper share certificates or to receive certificates on purchasing shares, if they so wish. A cardinal principle of the design for CREST is that it will be voluntary. CREST will therefore not disadvantage such shareholders; but equally it will only deliver the full benefits of cheaper settlement to those who choose to adopt the new methods it makes possible. This approach has made it easier for a wide range of interested parties to accept the preferred design, and to keep the regulatory approach relatively simple.

Rolling settlement

The Task Force's recommendations for achieving these objectives were, in the long term, to be achieved by the CREST system; but there were also short-term recommendations on introducing rolling settlement in the UK equity market, initially on a 'ten days after trade date' (T+10) cycle and later on a T+5 cycle. These changes are entirely separate from the design of CREST. Responsibility for making them has accordingly remained with the Stock Exchange, which is implementing rolling settlement using the current Talisman system. The move to a T+10 cycle was successfully achieved, as recommended, on 18 July last year; and the Exchange has set the date of 26 June 1995 for the move to a T+5 cycle, subject to the readiness of the market. The Bank fully supports the Stock Exchange's decisions in this area.

CREST and the Bank

The timetable recommended by the Task Force was deliberately ambitious. The Governor, accepting the Task Force's recommendations, therefore agreed that the Bank would lead (and initially fund) the next stage of work on CREST—the project specification. It was felt that this would maintain the momentum and also help to provide disinterested leadership for the project.

Accordingly, a project team was formed from Bank staff in the middle of 1993 and it began educating itself on the methods and procedures of the equity market, and educating the market on the CREST proposals. At the same time, a CREST Steering Committee was drawn together. Like the Task Force, its members were chosen in their personal capacity, to provide wide experience and coverage of the full breadth of the industry. Though not appointed to represent their particular sectors of the industry, in practice many took on the additional role of bringing wider views to the Committee. The project team and the Bank remain extremely grateful for their taking on this wider role, and for the enormous amount of open and constructive debate which took place direct with firms and individuals across the industry in the latter half of 1993.

Those months of discussion led to the publication of the team's first Green Book,⁽¹⁾ which described in greater detail than had been possible in the Task Force Report the nature of the CREST design which the Bank expected to implement.

The blueprint was at that stage deliberately minimal. It included those functions needed for settlement and related market activity, but excluded some associated functions which were required only by a minority, which were not deemed critical to a settlement system or which, the team suggested, could adequately be performed by users of the system locally.

The Green Book appeared at the beginning of November 1993. In the following two months, the members of the project team were involved in several hundred discussions with firms and individual practitioners to establish where this minimal prescription needed enhancement. As a result of these, in January/February 1994 the team produced a revised—and substantially enlarged—design document, offering a near-definitive description of the business requirements for CREST. In the following months, increasing emphasis was given to the way in which the system would be used by the market, to allow the team to define the business requirements more precisely, in order that the detailed computer design could be produced.

Developing the project

The publication of the business design at the beginning of May 1994 concluded the specification phase of the project. By that date, the team had produced: the business design; (in conjunction with HM Treasury) a list of the legal issues to be addressed by the new Regulations under the Companies Act that would be needed; an outline of the manual procedures necessary to allow sales of certificated stock to be dematerialised efficiently to allow delivery through CREST; and a series of papers on the procedures for using CREST to manage related activity in corporate securities, such as dividend and rights issues, take-overs and other stock events. The team also proposed an industry-wide ownership structure for CREST, and was able to publish a list of potential shareholders.

With this evidence of industry commitment to the proposed solution, several streams of work were pursued in the second half of 1994—the start of the implementation phase. The detailed design work on the *computer system* produced first a design document (the 'functional specification' of the system) and subsequently the detailed specification of CREST messages, which enables future users of CREST to begin designing their back-office systems. Both were made widely available. Work also began on a series of software releases which will, by the end of April this year, have enabled recipients to see and comment on the design of the WindowsTM-based software being provided by CREST for terminal-based access.

Further work was undertaken on the *business requirements*, developing in more detail the procedures for handling paper and executing stock events. Drafting work was undertaken by HM Treasury on the *legal structure*, so that draft Regulations under the Companies Act could be issued this February; and in parallel detailed discussions went ahead with the Securities and Investments Board, whose authorisation will be required before CREST can begin operating.

Two *network providers* were chosen to build communications networks to a high standard of security and resilience, and to carry CREST messages between users and the CREST system. They are the Society for Worldwide Interbank Funds Transfer (S.W.I.F.T.), and Syntegra (the systems integration arm of British Telecom) in a strategic alliance with Thomson Financial Services. They will be subject to a high degree of monitoring, with regular checks during 1995 to ensure that their plans fit the agreed standards for service and security, and are implemented to the required timetable.

Finally, the *ownership structure* was established, with 69 shareholders subscribing £12 million of capital to CRESTCO, the company set up to own and run the system. The project team also worked to reinforce this market commitment to the project. Pen Kent, in his role as chairman of CRESTCO, told the first shareholders' meeting last year that 'the launch of CRESTCO is not just a financial milestone, it signals the commitment of these 69 firms to help build CREST; and to use the system when it is inaugurated in the second half of 1996'.

(1) 'CREST-Principles and Requirements', November 1993, now superseded by 'CREST-the Business Description', December 1994.

CREST and its users

CREST and the private investor

There has been a recurrent concern, in the press and elsewhere, that CREST might disadvantage the private investor. CREST and the associated moves to improve settlement are clearly aimed mainly at high-value transactions, where the risk of financial instability is greatest. But the flow of high-value institutional investment is an invaluable source of market liquidity, which benefits all investors. And the project team has given a great deal of attention to ensuring that private investors have a genuine choice. They will not be obliged to hold their shares in CREST, nor will they be forced to use a nominee who does so. Many who trade rarely will no doubt continue to hold share certificates. They will not receive the full benefits of electronic settlement but there is no reason why, as a result of CREST, their settlement costs should be higher than today. And CREST will provide an efficient mechanism for handling the paperwork generated by their transactions.⁽¹⁾

The paper-based investor is also likely to find it useful to trade on a more extended settlement timetable than the institutional market. Paper-based messages between investor, broker and registrar are dependent on postal services, and inevitably take longer than electronic messages. During the early period of rolling settlement, many market-makers have given their retail customers the facility to deal for settlement on dates up to T+25 at the same price as T+10 settlement. The project team believes that the market will continue to provide longer-dated settlement at little or no additional cost for private investors, both when the market standard becomes T+5 settlement later this year and once it is reduced further when CREST is operational.

However, private investors will also be able to benefit from the efficiencies of electronic dematerialised settlement if they so choose. One way will be through a nominee, although this route may impede the flow of benefits and ownership rights stemming from company membership.

But it is important that all investors should have the opportunity to reap the benefits both of company membership and of cheaper electronic settlement. For that reason, the concept of 'sponsored membership' has been developed. By nominating an agent within CREST-a sponsor-a sponsored member can retain his name on the register and so gain the benefits of company membership, and have the full advantages of operating in CREST, but without the need to invest directly in the computer links necessary to communicate with CREST.

Sponsored membership of CREST is an important additional option for private clients, particularly those who regularly make transactions. CREST has also contributed to work being done by ProShare⁽²⁾ seeking a voluntary way to

maintain communication between companies and shareholders. The object is to develop proposals to allow companies and their shareholders (when shares are held in nominee holdings) to work together on a voluntary basis to sustain the direct relationship between owner and company.

The legal and regulatory infrastructure

Because CREST will be voluntary and will be used to carry out operations which are the electronic equivalent of those performed today in a paper-based system, it is possible to a large extent to rely on the existing law governing shareholding. There are, however, some additional needs, mainly to disapply the requirements on companies to issue paper share certificates where shareholders do not require them, and to provide for an electronic message to be a valid instruction to transfer stock (replacing for electronic settlement the stock transfer form). The Companies Act 1989 contains provisions⁽³⁾ for Regulations to be made to effect this; and the Treasury is issuing a draft of the Regulations that it proposes should be made for CREST.

These will, for example, ensure that listed companies do not need to change their articles of association so as to have their shares eligible for CREST: a simple Board resolution will be adequate. The Regulations will need to be supplemented with a range of contracts, freely entered into, between CREST and its users, and between users (eg between a settlement bank and its client).

Under the provisions of the Financial Services Act 1986, CREST must gain the status of a Recognised Clearing House (RCH). In practice, authorisation as an RCH will need to be obtained from the Securities and Investments Board (SIB). The SIB will need to be satisfied (among other things) that CREST has adequate security measures to protect the assets of those using the system. Additionally, the proposed Regulations contain further tests to be applied before CREST can be authorised. To contribute to this process, an independent review of CREST security will be undertaken. On behalf of CRESTCO, the project team has also commissioned independent auditors to monitor aspects of the project, including security.

Because CREST provides an electronic equivalent of the current arrangements and gives investors the choice of whether they use the system or not, it is also possible to rely on the existing compensation arrangements. Just as investors can at present be exposed to an agent's abuse of his authority to act for them, that possibility will exist with CREST. So investors will in most circumstances have recourse to the Investors' Compensation Scheme administered by the SIB.

CREST's high degree of electronic security reflects the seriousness with which the project team and the authorities take the need to protect those using the system. But the team has also agreed with HM Treasury that CREST will accept

Described in 'CREST—the Paper Interface', December 1994.
 ProShare is an organisation, funded by the private sector, which aims to promote wider and deeper share ownership among individuals.
 In Section 207.

CREST and companies

CREST must win an adequate base of companies willing to allow their shareholders the option of transferring their stock through the system. As noted above, it will require only a Board resolution to enable shareholders to do this; and the project team has already had helpful indications that several major companies are considering passing such a resolution at an early date.

What will CREST offer companies, as opposed to their shareholders? By providing cheaper settlement and wider access to book-entry transfer of stock, it will encourage a deeper and more liquid market. This should in turn improve the terms on which companies can raise capital. With its emphasis on rapid registration of settled trades, CREST will ensure that company registers are more up to date. And by allowing all investors to hold stock in their own names electronically, it may counter the drift into nominee companies. This would reduce the need for companies to issue Section 212 notices,⁽¹⁾ and for nominee companies and company registrars to process the resultant information, reducing the costs for the whole industry of establishing the underlying shareholding structure. (Of course, the ProShare initiative mentioned above may provide other ways of reducing the need for Section 212 notices.)

The Bank's project team has made initial contacts with a large number of company secretaries, which it will follow up in the early part of this year, to ensure that companies are aware of the impact that CREST may have on them and their shareholders.

 Section 212 of the Companies Act 1985 empowers a company to issue a notice requiring a shareholder to reveal the names of beneficial owners on whose behalf it is holding shares.

limited liability (capped at £50,000 per message) for messages that it processes which are subsequently proved to have been forged—ie not to have originated from the user from whom they purported to come. CREST (in co-operation with the two selected network providers) has sophisticated mechanisms to confirm that all messages originate from a valid source.

Ownership and management of CREST

The provision of £12 million of finance by 69 firms has not just signalled their commitment to help build CREST; it has also changed the nature of the relationship between the Bank's project team and its customers, the equity industry. In the project phase following the delivery of the core software, control of CREST will pass from the Bank to CRESTCO. In this later phase, it will remain important to avoid changes to the design, with the consequent risks to the project timetable; and continuity will be required in the management of training, the trialling of the system and the transition to settlement in CREST. These processes will also need to be funded (the ± 12 million covers only the costs of the present phase), either by the shareholders or from the capital market.

To CRESTCO, too, fall decisions on the operations and management of the system. Until the control of the project passes to CRESTCO, an Advisory Committee drawn from shareholders will continue to make recommendations on business decisions to the project team, which in turn has bound itself to follow these recommendations. The Advisory Committee has already made significant decisions about the management of the system, about contracting out some aspects of the computer operations and about the staffing implications for CRESTCO. It will also be the body which sets tariff policy.

All market participants will have an opportunity to share in the ownership and governance of CREST, through a shareholding in CRESTCO. There are limits on sectoral and individual participation to prevent undue concentration of ownership. Shareholdings will be adjusted over time to reflect usage, either through formal biennial rebalancings of shareholdings once CREST is operational or through transfers in the secondary market agreed by buyer and seller.

Tariffs

The tariffs to be charged for using CREST will be decided later this year, but some important principles have already been established:

- CRESTCO will pay a reasonable, but not excessive, return on capital in line with the core principle of seeking to recover its costs;⁽¹⁾
- CRESTCO's pricing policy will aim to be equitable across customers, and across sectors of the equity industry; and
- all members will pay for the resources they consume, taking account of the capital and running costs of providing those resources.

The timetable ahead

The timetable for the inauguration of the system is tight and demanding. CREST will be ready for operation well before the end of 1996, and its users will also need to be ready. Their work is under way, following the issue of the specification of CREST message requirements by the project team. The final target is implementation of the system—in the third quarter of 1996—but there are a number of important interim targets.

Software development began last November; the project team will deliver the core software for CREST to CRESTCO fully tested by the end of 1995. In parallel, the two network providers will, by the same date, have developed the systems

⁽¹⁾ The return to shareholders is fixed at 4% over the yield on the subscription date on a reference gilt-edged security, amounting to some 12.7% per year.

necessary to support their role in CREST. Before the end of 1995, the networks and the CREST software will have been tested separately and together; and it is very likely that they will also have undergone initial tests with third-party users in the handful of locations chosen for testing—beta test sites.

The beta testers' own software will be linked to their chosen networks and thence to the CREST software, to ensure 'end-to-end' performance of the CREST system as a whole. This will require the development work on the beta sites to have been completed well before the end of 1995 (perhaps three to six months ahead of other users). Many potential users of CREST have expressed interest in being beta test sites; later this month a handful will be selected, representing most types of CREST user. The project team will be working closely with the network providers and chosen beta sites during 1995 to ensure their readiness for the tests.

Trialling

During the first few months of 1996, a further phase of user trialling will begin, to ensure that CREST registrars are capable of functioning effectively. After this, it will be possible to move to full-scale user trialling with all potential CREST users. The important decision on the length of this trialling period will be made by CRESTCO. CREST could be inaugurated as soon as a critical mass of users is ready; on the other hand, more extensive trialling could be offered to maximise the opportunities for users to address any problems identified.

System management

At the same time, CRESTCO's own staff will increasingly be taking over from the Bank team. This transition will need to be as carefully managed as the transition of settlement from Talisman to CREST, and planning has already begun.

CRESTCO will not need to provide its own staff to operate its computer systems; it will appoint a facilities manager to do so. At the end of 1994, three firms were invited to tender for this job; one response was received by the due date, and it is currently being reviewed. A decision on the way forward will be made by March to allow the initial hardware configuration to be installed—and staff to be available to operate it—by the beginning of September, when network providers will install their own communications systems at the CREST site. The facilities manager will have a closely-defined role in operating the CREST computers, but the management of the system will be provided by CRESTCO staff.

Training

CRESTCo will also need to help up to several hundred users prepare for the inauguration of the new system. Proposals

for a training strategy have been put to the Advisory Committee; these envisage a mix of face-to-face and computer-based training. The first element in the latter has already been made available: demonstration packs have allowed future users to experiment with a 'working model' of the terminal-based access mechanism which CRESTCO will provide.⁽¹⁾ This PC-based software provides a set of input and enquiry screens that allow users to familiarise themselves with CREST's functions and data. Future training packages are likely to be built around this interface package.

Transition to settlement in CREST

Another prerequisite for the live operation of the system is implementation of the Regulations under the Companies Act. These are scheduled to be brought into effect in the spring of 1996. The supporting network of contracts, user agreements and the operating manuals which define procedures will need to be completed in the same period; and the detailed tariff policy must be decided.

Once these and training and trialling have been completed, CREST will begin to settle real transactions. There will not be a 'big bang'.⁽²⁾ Stocks will be added to the new system gradually, but once experience of and confidence in the system have been established, this movement will be accelerated. Since December, a working party drawing on a wide range of experience has been considering the details of the transition mechanisms, to inform the decision about how quickly migration is likely to occur.

Conclusion

The Bank took on the role of project manager for CREST because the blueprint set by the Task Force imposed a tight schedule and consequently a need for tight control over the design. The Bank's team has delivered the design on time and has continued to meet its deadlines. The team operates on a slim budget financed by a range of firms from the industry to whom it accounts regularly. So in terms of both time and money, it has little scope to hide problems or failures. It has deliberately sought to make the progress of the project as public as possible; only by demonstrating its own adherence to a tight schedule can it maintain the industry-wide momentum necessary to implement CREST on time. CREST's success is dependent on its users developing their own systems to a timetable quite as demanding as the CREST team's own.

The development period—from the issue of the interface specification to the beginning of user trialling—was set at only some 15 months; trialling will begin only 12 months from now. There is every indication at this stage that potential users will be ready for trialling when CREST is. That this is so is a credit to the securities industry, which has shrugged off past uncertainty and is now working towards a clear and common goal.

A Windows[™]-based product, known as the Graphical User Interface (GUI).
 The approach is set out in a working paper in the project team's publication 'CREST—bad deliveries, and transition', November 1994

The gilt-edged market: developments in 1994

Yields in bond markets worldwide rose markedly in 1994, reversing much of the previous year's rally. In part the rise reflected faster economic growth in the major economies, accompanied by heightened uncertainty about the outlook for inflation—though other factors were also at work. Trading conditions were occasionally turbulent in the spring, as portfolio adjustments were made. Despite this unfavourable background, gilt-edged funding was successfully maintained. This article, which continues the annual series begun in 1989, describes gilt sales and market turnover, as well as developments in related derivatives markets and the business of the gilt-edged market-makers during 1994.

Gilt yields in 1994

Yields in all major bond markets rose sharply in 1994, particularly following the increase in official US interest rates on 4 February—the first since February 1989. Chart 1 shows the par yields on ten-year bonds in the United Kingdom, the United States, Germany and France. The adjustment in the United Kingdom was relatively rapid so that, reversing the trend towards the end of 1993, the spreads between gilts and other bonds initially increased. They narrowed again in the closing months of the year as gilts outperformed most other markets, following the tightening of UK monetary policy at a relatively early stage in the economic cycle. Despite the falls in both bond and equity prices during 1994, total return indices suggest a return on gilts over 1993 and 1994 taken together of 13.7%, compared with 19.9% for equities.





Within the gilt market, the spread between five-year and twenty-year par yields continued to narrow; the yield curve was inverted at the long end from June, though the extent of the inversion declined in later months (see Chart 2). The gradual changes in interest rate expectations are shown more clearly by the implied forward interest rate curves in Chart 3. The overall picture was consistent with market

Chart 2 Par yields on British government stocks



caution about the inflation outlook, but there were signs that any uncertainty premium on gilts probably declined at the end of the year; this was suggested by the moderation in implied volatility from very high levels (as shown in Chart 5). Real yields—as measured by the return on index-linked gilts—rose in the first half of the year but stabilised thereafter (see Chart 4).



Chart 4 Real yields on British government stocks



Gilt funding requirement

The authorities ended the 1993/94 financial year with overfunding of £2.3 billion (later revised to £3.4 billion) which, together with some £6.8 billion of sales to the monetary sector in 1992/93, was carried forward into 1994/95 to count as funding under the terms of the remit given to the Bank by the Chancellor of the Exchequer.⁽¹⁾ The 1994/95 PSBR was initially forecast at £37.9 billion but was later revised downwards, to £36.1 billion in June 1994 and to £34.3 billion following the November Budget. With £9.0 billion nominal (£9.2 billion cash) of redemptions to refinance in 1994/95, on the basis of the November 1993 Budget projection, total gilt sales of around £37 billion were forecast in 1994/95 for a full fund.

Stocks issued

There were gross issues in 1994 of £30.6 billion and redemptions of £9.3 billion nominal (£9.5 billion cash). Of the gross issues, £7.8 billion were made in the 1993/94 financial year (ie in the first calendar quarter of 1994) and the remaining £22.8 billion in the current financial year.

Four new conventional stocks were created during the year, of which one was a convertible. As in 1993, new ten and five-year benchmarks were issued in the September and October auctions respectively. All new stocks again paid interest free of tax to overseas holders. In addition to issues of new stocks, the authorities continued to reopen existing issues to meet market demand and to maintain liquidity, including in particular by building up large, liquid benchmark stocks in a range of maturities. Five of the ten auctions added to existing stocks.

During 1994, the largest volume of conventional stocks was issued in the 7–15 year range (which accounted for £9.7 billion, or 32% of nominal issuance), followed by the long maturities (in excess of 15 years) with £6.4 billion, or 21% of the total. Short-dated conventional issues (under seven years) accounted for 19%, with £5.8 billion issued.

There were additions to ten of the index-linked issues—with maturities ranging from 2001 to 2024—taking the share of index-linked gilts in the total portfolio to 17.2% (including inflation uplift so as to reflect current repayment obligations). Real yields rose substantially in the first half of the year, but demand for index-linked stocks was steadier than for conventionals in the second half of the year.

Method of stock issuance

In the more difficult market conditions in 1994, auctions naturally provided a proportionally greater contribution to funding. Nevertheless, tap issues were used when market conditions allowed, as part of a continuing mixed approach to funding. Technical reforms were introduced so that when existing issues were auctioned they were for the first time fungible with the parent stock (ie indistinguishable from it from the first day of issue), enhancing their liquidity and making the issues more attractive.

As in 1993/94, the authorities announced in March that, because of the large PSBR, auctions would be held at broadly monthly intervals. Auctions were normally held on the last Wednesday of the month. Also as in the previous year, no auction was held in August (in part because of the progress with funding), or in November (because of the Budget); an auction was held instead in early December.

Table A Auction details

Stock	Status	Auction date	Amount £ millions	Average yield per cent	Cover	Tail (a) (basis points)
61/4% 2010	New	26 January	2,750	6.38	1.21	2
7% 2001 A	Tranche	23 February	2,500	6.75	1.48	6
Floating Rate 1999	New	30 March	2,500	(b)	2.28	_
6% 1999	Fungible	27 April	2,000	7.46	1.70	1
7% Convertible 1997	New	25 May	2,000	6.83	1.93	4
Floating Rate 1999	Fungible	29 June	2,000	(b)	2.72	_
6 ¹ / ₄ % 2010	Fungible	27 July	2,000	8.29	1.29	1
81/2% 2005	New	28 September	2,000	8.90	1.74	1
8% 2000	New	26 October	2,500	8.82	1.20	2
81/2% 2005	Fungible	7 December	2,000	8.64	1.34	2

(a) Calculated on a yield basis.(b) The rate of interest is reset on a quarterly basis by reference to money-market rates.

The ten auctions held over the year were for a total of £22.25 billion nominal, some 73% of the total stock issued (see Table A). The amounts auctioned ranged between £2 billion and £2.75 billion. The average level of cover, at 1.69 times, was marginally higher than in the previous year despite the difficult trading conditions. 'When issued' trading continued to contribute usefully to price discovery. In contrast to other government bond markets where auctions had to be cancelled on occasion during periods of market disturbance, gilt auctions were undertaken as planned. This was possible partly because issues could be tailored to some degree to cater for the particularly turbulent conditions in the early part of the year. Floating Rate Treasury Stock 1999 was issued in March, and reopened in June, to meet demand at short maturities where liquidity was being held; cover was 2.28 and 2.72 times at these auctions.

(1) Details of the funding remit were given in the article on the operation of monetary policy in the May 1994 Quarterly Bulletin (see pages 112–13). The remit is also set out on page 11 of 'Gilts and the Gilt Market: Review 1993–4', available from the Bank's Gilt-Edged and Money Markets Division.

Chart 5 UK implied bond market volatility^(a)



In May, 7% Treasury Convertible Stock 1997 was auctioned, convertible into 9% Treasury Stock 2012; this provided embedded options to a highly uncertain market (see Chart 5). At the time of the auction, the yield on the convertible was around 50 basis points below that on the nearest comparable stock.

The remaining £8.35 billion nominal of stock was sold on tap to the gilt-edged market-makers (GEMMs), enabling the Bank to respond quickly to demand for stock across a range of maturities and to issue into the rallies which punctuated generally weak conditions.

Stock outstanding and sectoral breakdown of holdings

The total nominal value of gilt-edged stock outstanding rose from £204.4 billion at end-1993 to £227.9 billion at end-1994 (from £190.5 billion to £211.8 billion if the inflation uplift on index-linked stocks is not taken into account). Chart 6 shows the maturity breakdown (at nominal prices) of all gilts at the end of 1993 and 1994. The

Chart 6





(1) See the February 1994 Quarterly Bulletin, pages 55-9; a box in the article explained the nature of the survey.

reduction in the share of 7–15 year stocks partly reflects the fact that one large issue (7% Treasury Stock 2001) became a sub-seven-year issue during the year.

As a result of the policy of developing benchmark issues, a growing number of stocks have large amounts outstanding (see Table B). By the end of 1994, there were 14 stocks with more than £5 billion nominal outstanding, including two with over £8 billion and a further three with over £7 billion outstanding; two years ago, there were only three stocks with £5 billion or more outstanding. The 14 largest stocks represented, at £90.8 billion, just over 50% of total conventional stock outstanding.

Table BLarge-issue stocks at end-1994

Stock	Original issue date	Nominal amount outstanding £ millions		
8% 2003	3 December 1992	8,250		
7 ¹ / ₄ % 1998	23 October 1992	8,150		
8 ³ / ₄ % 2017	30 April 1992	7,550		
8 ¹ / ₂ % 2007	16 July 1986	7,397		
7% 2001	29 July 1993	7,200		
9 ³ / ₄ % 2002	15 August 1985	6,527		
6 ³ / ₄ % 2004	30 September 1993	6,500		
6% 1999	28 October 1993	6,250		
8% 2013	1 April 1993	5,800		
9% 2008	11 February 1987	5,621		
8 ³ / ₄ % 1997	9 October 1969	5,550		
9% 2000	3 March 1980 (a)	5,358		
9% 2012	7 February 1992	5,351		
9% 2011	12 July 1987 (a)	5,273		
(a) On conversion	-			

In the February 1994 *Bulletin* article on gilt market developments, the results of the first survey of the beneficial ownership of British government stock were released.⁽¹⁾ A similar survey was conducted in the second quarter of 1994, and the results are set out in Table C. It shows that the distribution of holdings changed little between March 1993 and March 1994. Slight falls in the proportions held by insurance companies, pension funds, the personal and overseas sectors were offset by increases for 'other' financial

Table CHoldings of gilts by type of investor

	31 March 1993		31 March 1994	
	£ billions	Per cent	£ billions	Per cent
Market value of all gilts <i>of which:</i>	168.1	100.0	216.5	100.0
Official holdings Market holdings	8.4 159.7	5.0 95.0	7.9 208.6	3.6 96.4
Breakdown of market holdings:		100.0		100.0
Total UK market holdings <i>of which:</i>	128.2	80.3	169.4	81.2
Other public sector Industrial and commercial	0.4	0.3	0.7	0.3
companies	3.2	2.0	3.8	1.8
Personal sector	19.0	11.9	19.5	9.3
Banks (a)	9.6	6.0	17.6	8.4
Building societies	4.5	2.8	5.4	2.6
Other financial institutions of which:	91.5	57.3	122.4	58.7
Insurance companies	60.2	37.7	73.7	35.3
Pension funds	29.1	18.2	27.0	12.9
Other	2.2	1.4	21.7	10.4
Overseas holdings	31.5	19.7	39.2	18.8
(a) Includes nominee companies.				

68

institutions, including fund managers. Figures on transactions in marketable government debt by value suggest that the overseas sector may have reduced its holding of gilts somewhat since the date of the survey, while most domestic sectors actively increased their holdings, more than offsetting the fall in prices. A further survey is being conducted as at 31 December 1994 and it is planned to repeat this each year. The Bank is very grateful for the co-operation it receives in conducting these surveys.

Turnover in the gilt market

Chart 7 shows total turnover in gilts by value. At $\pounds 6.1$ billion, the daily average during the year was slightly down on that in 1993; it reached a peak in February at $\pounds 8.6$ billion. Average daily customer turnover by value was

Chart 7





also little changed from that in 1993, at £3.3 billion; its peak was £4.7 billion in February. The average size of customer deals rose by 8% to £1.5 million; the number of such bargains fell from 2,400 a day to 2,100, with a peak of

Chart 8 Average daily turnover: bargains



2,500—again in February—compared with a peak in the same month in 1993 of 3,100 (see Chart 8). The value of gilt stock lending increased by 66% in 1994 compared with 1993. The rise was associated with the bearish market outlook, and the average level of outstanding stock lending rose sharply in February, reached £14.3 billion in June, then moderated slightly before rising to a peak of £14.5 billion in December.

As Chart 9 shows, turnover on LIFFE in gilt derivatives—the long gilt future contract and the option on the future— continued to grow in 1994. Turnover of the future averaged 76,000 contracts daily—64% higher than in 1993 (which itself had been 34% higher than in 1992). The increase was partly the result of increased activity in the early part of the year: average daily turnover reached a high of 137,000 contracts in February. Average daily turnover in the option contract was 16% higher than in 1993. Turnover reached its high, of 21,000 contracts, during the turbulent conditions that prevailed in February, when volumes in the cash and futures markets were also at their peak.





GEMMs' financial performance

The financial performance of the GEMMs recovered in the final quarter of 1994, after a weaker outturn in the first part of the year, in line with the performance of other market participants. The pattern reflected difficult trading conditions in bond markets worldwide, and followed three years in which the GEMMs had been consistently profit-making. Most, though not all, GEMMs made losses for the year as a whole, but their performance varied markedly over the year. Many of the losses occurred in the first quarter, when bond markets worldwide turned downwards. Smaller losses were made in the second and third quarters of the year. In the final quarter, GEMMs in aggregate returned to profit as the gilt market strengthened; roughly half the GEMMs made a profit in the period.

Despite difficult trading conditions, the number of GEMMs increased from 20 to 22 during the year, with three firms

The development of an open gilt repo market

In the Budget on 29 November, the Chancellor announced that the Bank was issuing a consultative paper on the development of an open gilt repo market. The Inland Revenue issued a separate paper on the potential tax implications of such a market. The development of an open gilt repo market would have important implications for the structure of the gilt market.

In a gilt sale and repurchase (repo) transaction, a seller agrees to sell gilts to a buyer, with a commitment to repurchase equivalent securities at a specified future date (or at call) at a specified price. A repo is therefore a flexible transaction amounting to the borrowing of cash against collateral for one party and stock borrowing for the other.

At present, only the gilt-edged market-makers (GEMMs) may borrow particular stocks, and they have to do so via Stock Exchange money brokers (SEMBs). The main changes proposed are that repo activity should be widened beyond the gilt-edged market-makers, and that stock should not have to be lent or borrowed via a SEMB, although it would be open to a SEMB to provide an intermediation service. The repo market would thus be entirely open.

The Bank believes that these steps should enhance the liquidity and efficiency of the gilt market, increase demand, and so over time reduce the overall interest cost to the government and the taxpayer. They would do so by: enabling all market participants to borrow stock to cover short positions; widening arbitrage opportunities; introducing the price mechanism into stock borrowing; ensuring international investors could use the repo mechanism with which they are familiar, so encouraging greater participation in the gilt market; giving would-be investors in gilts ready access to the sterling money market, using gilts as collateral; extending the range of instruments traded in the sterling money markets (as repo is essentially a form of secured money); promoting greater integration of the money and gilt markets; and enhancing the position of London as a financial centre.

In the Bank's view, it would be of great importance for gilt repo activity to be properly regulated. The Bank's paper therefore set out the arrangements envisaged for prudential supervision and for regulation of the conduct of business. It is not envisaged that any formal change in the structure of supervisory arrangements would be necessary. Prudential supervision, including of capital adequacy, would be the responsibility of an institution's existing supervisor, and gilt repo business would also be subject to the conduct of business arrangements under the Financial Services Act. Any repo activity with retail customers would therefore be covered by the investor protection provisions of that Act.

In its paper, the Bank also outlined steps that might be taken to ensure that a gilt repo market operated in a sound and orderly manner. To consider the arrangements in this area in more detail, it has formed two working groups involving market participants: to consider a master legal agreement for gilt repo transactions; and to formulate a code of best practice which core participants in the repo market would be expected to observe.

The Bank believes that the security of gilt repo transactions would be enhanced by settlement in a book-entry system, and is considering adjustments to the Central Gilts Office service to achieve this.

A final decision on the introduction of an open gilt repo market is due to be taken after the consultation process is complete. A gilt repo market could not begin to operate before all of the preparatory work was completed, and market participants had had time to make the necessary systems and other changes. It could therefore not begin before July 1995 at the earliest. The Bank has emphasised that it does not wish gilt repo activity to develop before any date decided in due course for the implementation of the proposals in its paper in an orderly manner. In the meantime, the arrangements for stock borrowing intermediated by the SEMBs remain in place. entering the market (two rejoining under new management after a period of absence) and one leaving. Together with significant further injections of capital by existing GEMMs, this added £137 million to the GEMMs' aggregate capital base, more than outweighing the depressing effect of the year's adverse financial performance (see Table D). There was a net increase of £77 million in capital committed to the gilt market, backing the GEMMs' core market-making function and other activities designed to capitalise on and complement this business. The aggregate capital base of the GEMMs more than doubled between the start of 1991 and the end of last year, rising from £395 million to £811 million.

Table D

Capitalisation of gilt-edged market-makers

£ millions					
	Oct. 1986- end-1990	1991	1992	1993 (a)	1994 (a)
GEMMs' capital at					
beginning of period (b)	595	395	432	511	734
Net injections or withdrawals					
of capital	-38	-12	15	164	137
Operating profits (+)/losses (-) (c)	-162	49	64	59	-60
GEMMs' capital at end of period	395	432	511	734	811

Source: Bank of England

(b)

Data for 1993 have been revised. Data for 1994 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 (c)

The number of Stock Exchange money brokers and inter-dealer brokers (IDBs) remained unchanged, at eight and three respectively.

Retail trade

Chart 10



Chart 10 shows GEMMs' retail trade with clients and agency brokers.⁽¹⁾ Competition among the GEMMs to provide the most effective service to investors has remained strong. There is little evidence of increasing concentration at the top end of the market: the share of the top seven firms was broadly unchanged at about 70%, and market share was more evenly spread within this group than three years ago.

(1) The measure of retail trade does not include trade with IDBs, direct trades with other GEMMs and the Bank, and identified dividend business [the The measure of retain take our his mean take with busis, there means with our shows and the bank, and neutrine distinct distincts the same show of a stock cound dividend and the purchase (sale) of the same stock ex dividend to and from the same client]. To offer a better comparison between companies engaged in very similar business activities, the data exclude the two small-deal specialists (one of which was a new entrant in 1994). Small-deal specialists transact a large number of relatively low-value trades.

Banking statistics: recent and prospective developments

The Bank of England collects banking and related data for a variety of purposes—including the conduct of prudential supervision, the compilation of monetary, banking and similar financial statistics, and as a contribution to the national accounts and balance of payments statistics compiled by the Central Statistical Office. The aim is to collect the data as efficiently and economically as possible. This article briefly recounts developments since the start of the last review of banking statistics in 1987 and outlines the statistics currently available. It lists the main bids for new statistics of which the Bank is already aware, and invites comments from users on their existing and prospective needs.

The last review

The results of the last review of banking statistics were described in the August 1992 *Quarterly Bulletin*.⁽¹⁾ The main new statistical requirements decided on are listed below:

• To assist supervision of individual banks

Two new forms—the LE and BSD1—were introduced to help monitor, respectively, banks' large exposures and capital adequacy. They were designed to meet the requirements of the 1987 Banking Act and the 1988 Basle Convergence Agreement (as well as a number of subsequent European Directives).

• To improve the national accounts

New and revised forms (the A3 and BP) were introduced to measure the flows of income and expenditure between the banks and the domestic and overseas sectors more comprehensively and more often. Supplementary estimates are now provided by a small sample of banks to enable interest flows to be allocated more accurately to each domestic sector. And to allow transactions in assets to be estimated more accurately (excluding valuation effects), existing forms reporting amounts outstanding were supplemented by a new form [Q1(R)], which shows transactions in UK investments and revaluations (eg write-offs) of loans.

• To improve the analysis by industry of lending to, and deposits from, UK residents

It was agreed to redefine the industrial categories according to the latest (1992) Standard Industrial Classification. Additional categories were to be introduced to analyse the large amounts of business with non-bank financial institutions, and to allow a parallel analysis of deposits.

• To give more detail of lending to the personal sector

A new form [the Q1(D)] was introduced to obtain from the main banks involved monthly detail about gross

(1) See the article, 'Banking statistics review', Quarterly Bulletin, August 1992, pages 314-21.

and net lending—and approvals of future lending secured on residential property, and about gross and net consumer credit. Previously, information had been provided quarterly.

• To redefine bank retail deposits

Retail deposits on the previous definition—based on the maturity and size of deposit—had proved difficult to measure, and the definition did not meet its original aim of capturing 'transactions balances'. It was therefore simplified. *Retail* deposits (the main component of the monetary aggregate, M2, and therefore of the retail element of M4) are now defined as deposits which arise from a customer's acceptance of an advertised rate (including a nil rate) for a particular product, typically offered through the banks' branch networks.

Other changes decided in the last review

More detail was to be provided in various areas to tailor the statistics more closely to developments in the markets; for example Ecu business was to be reported more explicitly.

Progress in introducing the changes

Almost all of the changes agreed in the last review have been implemented. One introduced recently is the greater monthly detail of lending to the personal sector, provided since April 1993; this is now fully used to provide detailed coverage of personal borrowing (both secured on dwellings and consumer credit, from banks, building societies and other lenders) in the full monetary statistics release each month.

With the exception of changing its timing to end-quarters, however, the proposed changes to the industrial analysis have not been made, because the banks have wished to be sure of future European needs before they recode their accounts. Besides the need to update and extend the classification used in these statistics, the data—including the new analysis of deposits—will probably be required
Monetary, banking and related statistical releases

An extensive list of monetary and banking data releases is made for each reporting date. To illustrate this, the list below gives the actual and planned releases for data to the end of December 1994. All the releases shown are monthly, except those labelled Q (quarterly), H (half-yearly) and A (annual). Major releases other than monetary and banking statistics are shown in italics. Sources other than the Bank of England are also given in brackets: BBA = British Bankers' Association; BIS = Bank for International Settlements, Basle; and CSO = Central Statistical Office. UK statistics are released at 9.30 am.

<u>1995</u>

3 January	M0: provisional (fuller data: 20 January).
4 January	UK official reserves (HM Treasury).
13 January	Capital issues and redemptions.
16 January	Producer price index (CSO).
18 January	Retail price index (CSO).
	Public sector borrowing requirement (CSO).
	Labour market (Employment Department) (fuller data: 15 February).
19 January	Retail sales (CSO).
20 January	M4, lending and other counterparts of M4: provisional; major British banks' data, including analysis of lending (BBA); building societies' data (Building Societies Association); final M0.
23 January	Gross domestic product: preliminary (CSO) (Q) (fuller data: 22 February).
26 January	Overseas trade with non European Union (CSO).
30 January	Major British banks' mortgage lending (BBA) (fuller data: 3 February).
3 February	Full monetary statistics (final M4 and lending, sectoral M4 and lending, personal borrowing, Divisia
	money, liquid assets outside M4, bank and building society balance sheets, money market, public sector
	funding, bill and sterling CD transactions by discount houses, sterling commercial paper issues and
	holdings, sterling medium-term note issues); industrial analysis of major British banks' lending (BBA)
	(Q) (fuller data: 10 February).
7 February	Index of production (CSO).
10 February	Industrial analysis of bank lending (Q).
15 February	Labour market (Employment Department).
22 February	<i>Output, income and expenditure: provisional (CSO) (Q) (fuller data: 24 March).</i>
23 February	Capital expenditure, and stocks and work in progress: provisional $(CSO)(Q)$ (fuller data: 27 March).
10 March	Visible trade (CSO).
22 March	External business of banks in the United Kingdom, including country analysis (Q).
24 March	National accounts, balance of payments $(CSO)(Q)$.
27 March	Capital expenditure, and stocks and work in progress (CSO) (Q) .
3 May	External claims of UK-registered banks' worldwide offices, including country and maturity analysis (H).
Mid-May	Global international banking and financial market developments, including country analysis (BIS) (Q).
Mid-July	Maturity and sectoral distribution of international bank lending (BIS) (H).
Early August	National accounts 'Blue Book', balance of payments 'Pink Book' (CSO) (A).

as an input to the industrial analysis of GDP, if the Central Statistical Office (CSO) moves to measure the contribution of financial services to GDP more fully by introducing 'financial intermediation services indirectly measured'.

Although the data on revaluations have been useful in improving the accuracy of the statistics on loan flows, the new data on transactions in UK investments have not yet been fully used. It has proved difficult to ensure that they give a more accurate picture than the existing method of comparing the opening and closing amounts outstanding in a period. A particular problem is lack of clarity over the treatment of repos: this will need to be solved in or before the next review.

A new review?

In the past, the intention has been to review the banking statistics every five years. In practice, reviews have been less frequent, because the changes considered have been so substantial that their discussion—and the subsequent implementation of those agreed—has taken a long time. The last review, for example, began in 1987 but the final set of changes was not implemented until the spring of 1993. Although the banks and the collectors of the statistics might have hoped for a sizable interval before the start of a new review, it is already clear that some new needs will have to be met soon. The Bank has therefore compiled a list of all reasonable bids of which it is aware at this stage, to allow priorities to be assessed. It will then discuss with the British Bankers' Association how to go forward. It will be important to be economical in any new requirements, especially for costly items, and to look for any possible economies in the existing system. An economical system of collecting statistics is valuable not only in keeping costs down, so helping to maintain UK banks' competitiveness, but also in helping to focus on what is important.

The main bids already identified are listed below:

To assist supervision of individual banks

- A new form to obtain additional information on capital adequacy will be needed in order to monitor compliance with the new EU Capital Adequacy Directive (CAD), which comes into effect on 1 January 1996. The Directive sets capital requirements to cover trading risks in various markets, and applies both to banks in respect of this part of their business and to non-bank investment firms, such as securities dealers (who will report to their regulatory organisation). The new form will provide data on risks arising from interest rate, equity and foreign exchange positions, and on counterparty and settlement risk. Complementary changes to other forms may be needed; for example the existing capital adequacy return (BSD1) may be restricted to just the banking book. Other EU Directives (eg the Investment Services Directive) may also require changes to bank reporting.
- A new form will also be needed to enable the Bank to meet its responsibility, under the European Union's Second Banking Co-ordination Directive, for the supervision of branches of UK-incorporated banks throughout the European Economic Area.
- The Bank will need to revise its requirements for data relevant to monitoring banks' liquidity (including the maturity analysis on forms Q6 and S5). The data need to capture cash flows from off-balance sheet positions and to provide more detail on concentrated deposits and marketable assets (to permit banks to discount a wider range of assets to their sight value).
- Refinements to the half-yearly form B7 are already being discussed with the British Bankers' Association. The B7 reports profits, large exposures and certain other information for UK branches of foreign banks; it enables the Bank to fulfil its obligation to supervise the branches of non-EU banks operating in the United Kingdom.

To assist surveillance of markets

• More data are needed on derivatives (supplementing those already collected for the supervision of individual institutions and by the International Swaps and Derivatives Association): first to measure the size and structure of the markets more accurately; and second to improve the coverage of derivatives in the formal national accounts and monetary statistics.

The first requirement will be met initially by an addition to the next international triennial foreign exchange survey in April 1995 (which covers non-banks such as securities firms as well as banks). It may be the precursor of more frequent reporting by the most active derivatives dealers. The format of this reporting would probably be agreed internationally, as for the April 1995 survey.

The Bank and the Central Statistical Office are discussing how to meet the second requirement. It may be possible to modify existing report forms, but because of the complexity of the transactions data in particular a separate form may be needed. The banking supervisors' needs in this area will be met either by existing forms or by the proposed new Capital Adequacy Directive form (see above); a review being carried out by a Bank for International Settlements working party may identify a need for some extra reporting, but is also expected to emphasise the importance of co-ordination with other data-collection, to minimise the reporting burden.

To assist monetary analysis and monetary policy-making

• More comprehensive data on interest rates in banking business would be valuable, to throw light on the transmission of monetary policy (particularly the relationship between changes in base rates and the rates on deposits and borrowing).

There is already publicly available information about the rates paid on the large deposits of business customers (proxied by money-market rates), on retail deposits and on mortgage and credit card loans. In addition, a small sample of banks already provide information which enables the Bank to estimate quarterly average rates on each economic sector's sterling deposits and borrowing (for use in compiling the national accounts). The main gap is data on rates on business borrowing, ideally split by small, medium and large companies. Co-ordinated data on the rates applied to mortgages and personal loans, and to deposits by individuals and small, medium and large companies, would also be helpful—even though such data are to some degree already publicly available.

What are needed are frequent data (eg for a stated day in each month), perhaps expressed as a range, with an indication of where in the range most business is done, and separating new and existing business, and floating and fixed-rate lending. In each category, an indication of the size of business would be needed.

- The more comprehensive data on derivatives mentioned above would also assist monetary analysis (for example by indicating how, as a result of changes in the floating-rate component of interest rate swaps, net interest flows shift between economic sectors).
- Data on cash-loaded 'smart' cards will be needed when the amounts concerned become material, to complement the series covering notes and coin within M0.
- To supplement the monthly personal borrowing series introduced following the last review (see above), a fuller

monthly sectoral analysis of M4 and lending would add considerable value to these aggregate statistics, partly by allowing an estimate of Divisia money to be compiled monthly instead of only quarterly.(1)

- Analogously to the demand for data to improve understanding of the impact of interest rate changes on different sizes of company, there is a demand for general economic data that differentiate small, medium and large companies-including on bank deposits and borrowing. US academic studies have made much use of such data.
- Banks in each EU country will need to be ready, from the start of their country's participation in monetary union, to divide their non-domestic business between that within the monetary union (with a broad sectoral analysis) and that outside; the data will enable the European Central Bank to compile monthly monetary and balance of payments statistics for the monetary union. There is also likely to be a demand, from European institutions if not domestically, for greater geographical detail in the balance of payments accounts.

To improve the national accounts, including the balance of payments statistics

• Further detail may be needed to implement the revised internationally agreed standards recommended in the European System of Integrated Economic Accounts (ESA 95, which is itself based on the 1993 UN/IMF System of National Accounts). It is aimed to implement these standards by 1998, applying them retrospectively to cover periods back to the beginning of 1995. Some of the changes (eg separate identification of a central bank sector, if this is decided on) may not require changes to banks' reporting. But it is likely that others that do

require new reporting (eg other modifications to the sectoral analysis, and possibly a change to an accruals rather than a cash basis) will have to be based on estimates for the early part of the period after 1994, since they could probably not be introduced quickly.

- More data are needed on derivatives (see above).
- Besides the possible use of the industrial analysis of lending and deposits to allocate the income and expenditure implicit in banks' financial intermediation services (mentioned above), there may be a demand for more detail of banks' explicit service earnings (eg their monthly overseas earnings if it is judged worthwhile to measure the monthly balance of payments current account in such detail).
- The international benchmark survey of portfolio investment, proposed by the IMF and scheduled for end-1997, would give additional geographical information on UK liabilities as well as assets-provided the major countries participate-and improve the estimates of total UK net external assets. If the survey goes ahead, the banks will be asked to participate, unless their existing forms provide sufficient data.

Comments

This list of bids, some of which will have to be met because of legal requirements, is already substantial. As emphasised above, it is important to keep the statistics-collecting system economical. The Bank would welcome any comments on the value of the existing statistics and on the above listincluding any suggestions for additions, bearing in mind the need for strong justification for any costly changes to the existing statistics.(2)

For the contribution of sectoral analysis to an understanding of M4 and lending see, for example, the articles on the determination of M0 and M4 in the February 1994 *Quarterly Bulletin*, pages 46–50, on Divisia money in the May 1993 *Quarterly Bulletin* pages 240–55, and the May 1994 *Inflation Report*, pages 16–17, and the article on pages 46–53 of this *Bulletin*. Comments or proposals for additions should be sent to John Thorp in the Bank's Monetary and Financial Statistics Division, if possible by the end

of February.

Statistical returns currently submitted by banks⁽¹⁾

	Deadline ⁽²⁾	Prime purpose ⁽³⁾
Balance sheet returns		
Balance sheet (Form BS): monthly (422) or quarterly (42) Selected balance sheet items (Form W1): weekly (95)	5–9 days 4 days	M, N, S M
Balance sheet for small banks (Form QBS): quarterly (34)	10 days	M, N, S
Further analysis of the balance sheet		
Sector details (Form Q1): quarterly (422)	12 days	M, N
Analysis of sterling loans secured on dwellings [Form Q1(A)]: quarterly (11)	15 days	L
Monthly and annual analysis of personal lending [Form Q1(D)]: monthly (47)	15 days	M, L
Write-offs, other revaluations, transactions in investments [Form Q1(R)]: quarterly (410) ⁽⁴⁾	20 days	M, N
Industrial etc analysis of lending and facilities granted to UK residents (Form Q3): quarterly (422) Residual maturity of liabilities and assets (Forms Q6, S5, QMA): quarterly (Q6 449, S5 391,	10 days	L
QMA 34)	10 days	S
Capital expenditure (Form Q8): quarterly (393)	15 days	Ν
Country analysis of sterling liabilities to, and claims on, overseas residents (Form S1):	•	
quarterly (deposits 311, custody holdings 97, claims 300) or annual (deposits 116, claims 112)	15 days	Ι
Country analysis of non-sterling liabilities and claims on overseas residents (Form S2)	-	
(liabilities 316, claims 304) or annual (liabilities 116, claims 100)	20 days	Ι
Currency analysis of liabilities and claims (Form S2, Section 2): quarterly (315)	15 days	I, M, N
Foreign currency exposure (Form S3): monthly (346; but annex A 23, annex B 76)	10 days	M, S
Country exposure of worldwide offices of UK-registered banks (Form C1): half yearly (92) ⁽⁵⁾	2 months	I, S
Other returns		
Capital adequacy (Form BSD1): quarterly (226)	10–20 days	S
Large exposures (Form LE): quarterly (226)	10 days-	S
	1 month	
Profits, exposures etc of UK branches of foreign banks (Form B7): half yearly (159)	10 days	S
Revenue and expenditure (Form A3): quarterly (100)/annual (340)	7 weeks	Ν
Current account transactions with overseas residents (Form BP): quarterly (186)/annual(286)	7 weeks	Ν
Overseas direct investment (Form H1): annual (498)/triennial (498)	10 weeks	Ν
Securities transactions affecting the balance of payments (Form P1): quarterly (113)	1 month	Ν
Market value of securities etc (Form A1): annual (394)	1 month	Ν
Market value of British government stocks held for overseas residents (Form A2): annual (98)	1 month	Ν
Transactions in gold bullion and coin with certain UK residents (Form G): quarterly (23)	10 days	Ν
Discount houses' transactions in sterling CDs (Form CD (DM)): monthly (10)	5 days	S
Bill turnover in the money market (Form MM): monthly (10)	5 days	S
Market-makers' holdings of loan capital issued by banks (Form M1): quarterly (8)	10-20 days	S
Representative interest rates, quarterly (to estimate interest flows) (24)	6 weeks	Ν

Figures in brackets give the approximate number of banks submitting the form. The building societies' input to the monetary statistics (including the monthly personal borrowing statistics) and the national accounts is derived largely from a monthly form (MFS1) and a quarterly form (QFS2) submitted to the Building Societies Commission, which sends aggregate data to the Bank of England.
 Days are working days.
 I = international banking statistics, L = analysis of domestic lending, M = monetary statistics, N = national accounts (including the balance of payments and sector balance sheets), S = supervisory (including supervision of markets as well as banking supervision).
 Part of the form is submitted by a smaller sample.
 A similar form (B1) is submitted by 165 foreign banks in respect of their UK branches' lending.

Macroeconomic management and structural unemployment

The **Governor** explains⁽¹⁾ the limited contribution that macroeconomic policy can make to resolving the problem of unemployment. He describes the experience of unemployment in OECD countries in the post-war period and the differences between the experiences in the United States, Japan, the United Kingdom and the rest of Europe. He examines the development of theories of unemployment and points out that, by almost any reckoning, a large element of unemployment at present is structural, and so beyond the immediate reach of macroeconomic policy.

He examines the causes of structural unemployment, exploring in particular two commonly emphasised influences—technology and international trade. Both exert powerful commercial pressures on countries to adapt their types and processes of production; in so doing, they affect the pattern of the demand for labour. The level of structural unemployment, he suggests, depends on the interaction of these pressures and an economy's flexibility to respond, which is constrained in a number of ways.

Although there may be little direct contribution that monetary policy can make to alleviating structural unemployment, central banks do have a small but direct role, through helping to improve the supply-side functioning of the economy—and particularly by trying to ensure that the financial sector gives effective support to the wider economy.

I am delighted to be here to give the 1994 Ashridge/City University lecture, and I have chosen to speak on the subject of unemployment. Those of you who read a series of newspaper headlines through the summer, suggesting that 'Unemployment is not our problem, say central bankers', may find this choice of subject somewhat quixotic. It is a fact—a regrettable fact—that central bankers do, through their emphasis on the importance of price stability, give the impression that they are indifferent to the problem of unemployment. That is not true in my experience, and I should like to try to dispel that false impression this evening.

I don't know any central banker who does not see price stability as a *means* to the end of sustainable economic growth and employment. But we are all very conscious of the limits to which monetary policy—and macroeconomic policy more generally, including overall fiscal policy—can contribute directly to 'full employment' in some absolute sense. I should like, therefore, to try to explain the important, but limited, contribution that macroeconomic (or conjunctural) policy can make to resolving the problem of unemployment; and then to explore some of the more deep-seated *structural* causes of unemployment.

Some facts

Let me begin by setting out some of the sad facts about unemployment—which is, of course, a problem in nearly all industrial countries, not just a problem for this country.

Chart 1 Unemployment in the OECD area



Unemployment in the OECD countries currently totals some 34 million people (see Chart 1)—and I emphasise that we are talking about people and not just numbers. That represents some 8% of the labour force across the whole area. The problem is less acute in Japan than elsewhere, with 2 million people unemployed, or only some 3% of the labour force—although there is a widespread perception of underemployment in Japan, with much recent talk particularly of 'window-side workers'. It is worse in the United States, some 6%. And it is most severe in Europe where, on OECD data, there are 17 million people unemployed in the European Union (excluding eastern

Germany), an unemployment rate of $11^{1/2}$ %. Other measures put the number of people unemployed in Europe even higher.

For the area as a whole—and for Europe especially—these levels are without precedent in the post-war period (see Chart 2). In fact throughout the 1950s and 1960s, the number of people unemployed in the OECD area was around 10 million. It trebled between 1969 and 1983, declined only modestly—by some 6 million—in the later 1980s, before rising again, by some 8 million to the current level, so far in the 1990s. Most of these changes reflect what has happened in Europe, and the European Union in particular, where the rate of unemployment is roughly four times what it was 20 years ago, having risen from $2^{3}/_{4}\%$ to some $11^{1}/_{2}\%$.







To put it in context, although unemployment is now falling in the United Kingdom, we still have some $2^{1/2}$ million people unemployed—about 9% of the workforce—which is less than in most of the rest of Europe (see Chart 3). As in Europe, the UK labour force has increased very rapidly—by $1^{1/2}$ million in the past decade (see Chart 4).

Now there was a time when many people took the view that unemployment was essentially a result of inadequate



Chart 4 UK employment and labour force



demand, and that it could be reduced quite simply by pursuing expansionary fiscal and monetary policies. And so, of course, it could—up to a point and for a time. But what we saw in practice—rather clearly in this country, but not only in this country—was that there were limits to this approach, limits that were repeatedly exceeded.

Carried too far—or persisted in for too long—expansionary macroeconomic policies with the aim of boosting economic growth came up against capacity constraints and then spilled over into higher and accelerating inflation, and a worsening external trade balance. Policy then had to be tightened to bring the situation under control, which inevitably caused a short-term rise in unemployment.

But the problem with this approach went deeper than the mere ups and downs of each cycle. Over time, those ups and downs did cumulative damage. Though it's difficult to prove, instability almost certainly resulted in lower average growth and employment, and a lower rate of investment— and to that extent a lower potential rate of growth—than might have been achieved through the steadier and more stable expansion of demand and output.

The 'natural' rate of unemployment

The idea that there is a 'natural' rate of unemployment at which inflation is stable—a concept developed in the late 1960s—is now embedded in the economic literature. It emphasises that the results of trying to reduce unemployment below this 'natural' rate are unstable and potentially explosive for inflation. Conceptually, the 'natural' rate is determined by the structural characteristics of the economy, including importantly of the markets for labour and goods. Notionally, the question for macroeconomic policy is how to identify the 'natural' rate of unemployment at any particular time—in other words, to identify how far macroeconomic policy can be pushed before it begins to generate inflation. But beyond that are the much more fundamental questions about the structural characteristics that determine the 'natural' rate, and how it can be reduced in the future. Again, conceptually, identifying the 'natural' rate of unemployment is largely a matter of separating out the cyclical component of unemployment from its trend. As a matter of observation, total unemployment in the United States has been characterised by a large cyclical variation around a fairly stable trend, while in the European Union the cycle—at least until the late 1980s—has been less pronounced but it has been superimposed on a strongly rising trend. And the United Kingdom has experienced large cycles in unemployment, around a less strongly rising trend; and it is encouraging to note that in the current cycle unemployment peaked at a lower rate than in the previous cycle and started falling much sooner—within a year of growth resuming.

From these observations it is possible to derive theoretical estimates of the 'natural' rate of unemployment in different countries or regions. By comparing these estimates with the actual levels of unemployment, you can then derive estimates of the cyclical component of unemployment which, again in theory, is that part of unemployment that one could legitimately hope to eliminate through an expansion of demand.

For what they are worth, the OECD's calculations along these lines suggest that the 'natural' rate of unemployment in the United States is some $6\%-6^{1/2}\%$, whereas it is $8^{1/2}\%-10\%$ in the European Union. Their estimate for the United Kingdom—some $8\%-8^{1/2}\%$ —is at or below the bottom end of the range for the rest of the European Union, and somewhere between it and the United States. Today, that leaves the United States pretty well at 'full employment' defined in terms of the 'natural' rate. Europe as a whole still has some limited scope—perhaps $1^{1/2}\%-3\%$ —for a cyclical fall in unemployment which, on this particular arithmetic, is all that one could safely aim to achieve through macroeconomic management.

But these estimates are just that—estimates. Other estimates for the United Kingdom, for example, put the 'natural' rate much lower—down to perhaps half the OECD estimate. So they are not to be taken as a reliable guide for macroeconomic policy. The trend in unemployment itself may well be affected by the cycle or otherwise masked by it. As a practical matter, macroeconomic policy has to adopt a cautious approach, watching closely for early warning signs of renewed incipient inflationary pressure which, in terms of the theory, would signal that we were approaching the 'natural' rate of unemployment—or approaching it too rapidly—and, as they begin to appear, to slow the expansion to its sustainable rate.

Structural unemployment

But the more important point for my present purpose is that by almost any reckoning a large part of the present level of total OECD unemployment is *structural*. That means it is beyond the immediate reach of macroeconomic policy, and is unlikely to disappear as a result of the present cyclical expansion. Confronted with this unpalatable prospect, Mr Chairman, it would not be surprising if the recent macroeconomic policy consensus within the OECD were beginning to fray. In fact I detect no signs of this.

Where the temptation in the past might have been for governments to seek to spend their way out of even structural unemployment, the shared understanding now is that unsound public finances, by pre-empting national savings and deterring private investment, would be likely only to make things worse in anything but the short term. Fiscal policy therefore is being directed to reducing government deficits, not just as a result of the cyclical upswing but also through discretionary tightening to reduce structural deficits. This certainly was the intention—and the effect—of the two budgets in this country last year.

Similarly, monetary policy everywhere remains firmly directed to achieving and maintaining price stability. In several countries recently, this has been seen in a greater readiness than in the past to tighten policy pre-emptively before pressures appear in the retail price statistics. The shared understanding here is that inflation is more likely to discourage investment, by damaging industrial confidence in the sustainable growth of demand, than timely—and in the end smaller—increases in interest rates.

Here, too, the perception is that if monetary policy were to target unemployment directly, without regard to the supply capacity of the economy or to the inflationary consequence, that would only make the problem of unemployment worse in anything but the short term. That's what central bankers mean when they emphasise price stability. It's not that they don't care about unemployment; it is that price stability—a sound monetary framework within which businesses and their customers can plan their affairs for the longer term, without the fear that those plans will be upset by erratic and unpredictable fluctuations in the value of money—is the best contribution that we can make to getting unemployment down in the longer term.

Now this orthodoxy—and it is now the orthodoxy—is all very well, you may say. But if that's all you can do through macroeconomic policy—through monetary policy, in particular—what are we going to do about the appallingly wasteful and socially unacceptable levels of structural unemployment?

And that, of course, is the question which has increasingly, and quite rightly, pushed itself to the top of the political agenda. It is much the most urgent and important economic issue confronting the European Union; and in a different form, of low real wages—poverty in work—it is equally important in the United States. That is why we have seen this year the excellent OECD study on employment and unemployment published in May and on which I have drawn heavily in preparing this lecture. We have also had the Delors White Paper published towards the end of last year, together with the jobs summit in Detroit last March.

Composition of unemployment

You won't be surprised to learn that I don't pretend to know all the causes of structural unemployment, let alone the cures. But in thinking about them, it is probably helpful to start with some more facts—this time about the *composition* of unemployment within the OECD.

Obviously, some groups of people are affected more severely by unemployment than others. Unemployment among *young people* (under 25), for example, is much higher in the OECD than the overall average rate of unemployment—some 15% against 8%; and youth unemployment is much higher in the European Union generally (20%) than in the United States (13%). Within Europe, it ranges from 30% or more in Italy and Spain, and some 25% in France, to around 5% in Germany. In the United Kingdom, youth unemployment is closer to the rate in the United States.

Long-term (over one year) unemployment, which typically affects older people particularly severely, is also much higher within the European Union—nearly half of the total number of people unemployed—than it is in the United States, where the proportion is only around 10%. In the United Kingdom, long-term unemployment is about one third of the total, but again encouragingly peaked at a much lower figure than in the previous cycle and has started to fall more quickly.

These differences in the proportion of long-term unemployment reflect different rates of unemployment *turnover*, with the monthly inflow to unemployment in the United States more than six times higher than in the European Union, and more than three times higher than in the United Kingdom (see the table). And the United States

Unemployment flows and duration

	Infl (19	ow rate (a) 87–89)	Outflow rate (b) (1988)	Implicit average unemployment duration in months (1987–89)	Long-term unemployment (c) (1992)	
United Kingdom		0.8	9.5	10.2	35.4	
European Union	(d)	0.4	4.7	30.9	42.2	
United States	(-)	2.6	45.7	2.2	11.2	
Note: (a) Monthly inflow (b) Monthly outflo (c) Defined as dura (d) Because of lack	v to u w fro ation k of c	nemployme om unemplo > 12 month lata, EU figu	nt as a percentage o yment as a percenta s; expressed as a pe ires exclude Luxem	f labour force. ge of total unemploym ercentage of total unem bourg and Portugal.	ient. iployment.	
Sources:						
 High and persi Paper No 132. 	High and persistent unemployment: assessment of the problem and its causes, OECD Working Paper No 132.					
(2) OECD Employ	ment	Outlook, pa	ige 12, July 1990.			

(2) OECD Improviment Outlook, page 12, sury 1990.
 (3) OECD Jobs Study, Table 1, 'The profile of OECD unemployment'

has seen much faster *growth of employment* (see Chart 5), with a net 40 million jobs created in the United States since 1973—mostly in the private sector—compared with only around five million in the European Union, nearly all in the public sector. Indeed, within Europe, only the United Kingdom and Germany created net private sector employment during this period. In short, it is easier to lose your job in the United States, but easier to find another one; whereas in Europe, while there is less risk of becoming

Chart 5 Employment in OECD regions



unemployed, you are likely to remain unemployed for much longer.

Changes in the pattern of employment have been broadly similar throughout the OECD area, with a continuation of the long-term decline in employment in agriculture, and to a lesser extent in manufacturing, with most of the new jobs growth coming in service industries. Other characteristics include a reversal of the long-term decline in the proportion of self-employment in many OECD countries, including particularly the United Kingdom, as well as an increase in part-time working, again including in this country. And although I don't have internationally comparable data, I suspect that one would find a pattern of increasing employment in smaller-scale businesses if the UK experience is anything to go by.

Over the past 20 years as a whole, all OECD countries saw a shift of demand away from unskilled to more highly skilled jobs. But this shift did not persist in the 1980s in the United States, where wage differentials widened and real wages actually fell in absolute terms—in contrast to European experience.

Explanations of structural unemployment

Now, against that background, what are the *explanations* that are offered for the high level of structural unemployment? Recent discussion has tended to emphasise two main influences affecting both the overall demand for labour and the pattern of demand for labour in the industrial countries. They are technology and international trade, and I will discuss them in turn.

I suppose that throughout history established producers and their employees have felt threatened by new products and new techniques made possible by new inventions and new technologies. I dimly recall something about the Luddite riots from my history lessons at school. And of course innovation—driven by competition and itself driving competition—can threaten employees, businesses and countries whose established activity is challenged, making particular materials or capital investments, or particular human skills, obsolete.

The experience of history, on the other hand, is that at the macroeconomic level technical progress is a very positive influence as an engine of economic progress, increasing *aggregate* economic activity and welfare, notwithstanding the often painful problems of transition as resources are transferred to meet other economic needs. History demonstrates too of course the ultimate futility of established interests seeking to hold back the tide of technical progress, which then simply washes all around the sand-castle until it is eventually overwhelmed.

Perhaps I am just getting old, but I am not alone in the impression that technical progress has been speeding up and continues to accelerate—everywhere. The effect on the labour market, put very simply, is to increase the demand for new skills—typically 'higher' skills in the sense that they require more education and training or retraining to acquire—and to reduce, at least relatively, the demand for the less skilled or for skills that have become outdated. That certainly has been the pattern that we have seen throughout the industrial world. More rapid technological advance has also meant the more rapid rise and fall of particular companies or whole industries, with the result that fewer people can now expect to remain in the same job for life.

What it does for aggregate employment in the longer term is not clear, though, as I say, historical experience is generally encouraging, with technical progress tending to reduce the 'natural' rate of unemployment over time. At the level of the individual employee or the firm or the country or region, its effect depends on how adaptable they are. This is partly a matter of attitude, how far they embrace change rather than resist it; and partly a matter of the flexibility of the structural context—the flexibility of the labour market and of welfare arrangements, the regulatory regime, or the education and training system, for example, which help to determine how far at the microeconomic level people and businesses are capable of adapting.

Somewhat similar considerations apply in the case of international trade. There is no serious dispute that trade within and between the industrial countries, but also globally—is a positive influence on world economic activity, encouraging global economic development and raising average living standards. But of course that does not mean that every employee or business or even nation necessarily benefits—certainly not in the shorter term.

The fashionable concern is over the 'threat' which the emerging countries, and some of the countries in transition to a market economy, pose to production and employment in the industrial world. It is, of course, a fact that productive capacity—capital, technology and management—can and does move very freely to almost anywhere in the world for many reasons, but one of them being to take advantage of low-cost labour (allowing for relative productivity). Now it is possible to exaggerate the present significance of this new 'threat'. Certainly developing-country exports to the developed world have been growing quite rapidly, and the four original newly-industrialising, or 'tiger', economies of Asia have been an important part of that, though they still account for only some 2% of world GDP and 7% of world trade. In the case of both the United States and the European Union as a whole, *total* imports from the four Asian NIEs to less than 2%.

So competition is still being driven predominantly by trade within and between the industrial countries, and that in itself is enough to affect the pattern of demand for labour. Nevertheless it is clear that production will continue to expand very rapidly in many of the emerging economies, and that they will over time come to form a much larger part of the world economy. They will, therefore, increasingly challenge existing production in the industrial countries over a wider range of output.

Again at the macroeconomic level, the growth of the emerging economies is in the longer term an opportunity rather than a threat. Rising incomes there will spill over as increasing demand for those goods and services in which the industrial world has, and continues to have, a comparative advantage. There will be rich rewards for those individuals, businesses and countries—that are able to adapt to the changing pattern, and to identify and satisfy those increasing demands. We are already seeing more and more specialisation, with even smaller businesses trading across a widening range of countries. Meanwhile, because much of the advantage of the emerging economies is based upon relatively low cost labour, their development is likely to accentuate the changing *pattern* of demand for labour already identified in the industrial countries as a whole.

Not surprisingly, on this front too some established interests are instinctively inclined to look for protection. This of course ignores the interests of consumers in the industrialised countries, who are less well organised and less able to make themselves heard. And it ignores the interests of those who can adapt and those who stand to benefit in future from growth in the emerging countries, who by definition are yet to be identified.

Taking technology and trade together, what we see then—up to this point—are powerful commercial pressures within and on the industrial countries to adapt both the pattern and the processes of production. These pressures are causing a major industrial restructuring, particularly by larger companies, which are typically reducing the size of—but improving the quality of—their workforce, changing the pattern of demand for labour in favour of the more highly skilled and those with transferable skills and against those with lower, more industry-specific, skills.

What that does to the overall demand for labour is unclear. Technical progress and international trade are continuous processes. It may be that the present restructuring is a transitional period of particular turbulence, and that in the longer term the trend rate of growth in the industrial countries will be increased and the 'natural' rate of unemployment be reduced. In the meantime anyway, it depends—in the aggregate, but more particularly for each country individually—on how adaptable the industrial economies are and on how flexibly they respond to the pressure to change. In the remainder of my lecture, I will consider some of the factors that bear upon this capacity to adapt.

Flexibility in industrial economies

One factor which I have already touched upon is real wage flexibility. The changing pattern of demand for labour has produced a sharp widening of income differentials in the United States, with real wages for the unskilled falling in absolute terms, whereas they have risen elsewhere, including in the United Kingdom. Relative earnings of the top 10% compared with the bottom 10% of employees in the United States rose from under 5 to over $5^{1/2}$ times during the 1980s, whereas it fell marginally—to about 21/4 times—in Germany. In the United Kingdom, it rose from $2^{1/2}$ times to something over 3 times. This, almost certainly, is one reason for the impressive job creation in the United States and why unemployment there has not shown the same upward trend as in the European Union. It has, on the other hand, resulted in growing concern in the United States about 'poverty in work' of many of the unskilled employees.

But the degree of real wage flexibility is not the only difference between the US and the European labour markets. Broadly speaking, one might characterise the US labour market as largely unregulated, compared with the extensive regulation within continental Europe—with the United Kingdom somewhere in between.

There are many aspects to this and the position varies from one European country to another. But in general, labour market legislation imposes more restrictions, for example, on hours worked, more constraints on redundancy, and there is more provision for minimum wages. Labour taxes tend to be higher in Europe, while unemployment benefits are also typically higher in relation to average earnings and of longer duration. Typically too, labour market institutions are more structured in Europe than they are in the United States, with stronger trade union and employer representation—of 'insiders' at least—in industry-wide negotiations and so on.

Now there are no doubt pros and cons in relation to all of these arrangements. They—and their overall economic and social effect—are for others to debate. In all industrial countries, governments are re-examining labour market incentives and welfare provision, and the United Kingdom in particular has been active in these fields. My purpose this evening is simply to draw attention to the differences between the United States and continental Europe, which must go some way to explaining the greater labour market flexibility in the United States and its lower level of structural unemployment, albeit with lower relative real wages for the unskilled.

All of this, of course, is very sensitive ground for a central banker. But having got this far, let me venture a little further, because the potential for tension between the commercial pressures I have described on the one hand and social concerns, including unemployment, on the other does not stop at the influences on real wages and labour market arrangements. In principle, *any* form of social intervention—from state provision for education or health, for example, which has to be paid for through taxation, to regulation providing, say, for environmental or consumer or investor protection, which involves costs of compliance on industry—can, certainly for good as well as for ill, affect the ability of individuals, businesses and the economy at large to respond to the commercial pressures that confront all the industrial countries.

Now I don't pretend to any expertise in most of these areas. Nor do I presume to make social judgments. There clearly are areas in all this where the commercial pressures and the social concerns run—or can surely be made to run—in the same general direction. I would suppose that it is true of education and training, for example. But in principle it is true of anything that improves the productivity or potential productivity of the workforce. In other areas, it may be more difficult to strike the right balance between some particular forms of social protection, however desirable in themselves, and the flexibility and competitiveness of industry. All I would say, as a banker, is that there are always two sides to a ledger, and it is very important that both sides are carefully examined.

It is in this context that I welcome the fact that all new primary and relevant secondary legislation, including proposals for European legislation, is now subjected to a compliance cost assessment in this country; and the Deregulation Bill, which will help to identify unduly burdensome or unnecessary regulations, has a similar objective. I know that you, Mr Chairman, are forcefully representing the business case for deregulation in the expert group set up following the Corfu Summit earlier this year.

The limitations of monetary policy

My concern as a central banker, and my particular concern this evening, is not to try to provide the solutions. Rather it is to try to understand the questions—the reasons for structural unemployment in the industrial countries. If these are, as I suggest, to be found in the interaction between the commercial pressures of competition—stemming importantly from technology and trade—and constraints of various kinds on the flexibility with which the industrial economies can adapt to those pressures, then you will understand why central banks generally are so conscious of the limitations of monetary policy.

I don't believe that we would help to resolve these fundamentally difficult structural problems in an already rapidly changing world by adding to them conjunctural uncertainty. That, in my view, would only make things worse, by obscuring the relative real values of different activities that has to guide the process of identifying our respective areas of comparative advantage.

Outside mainstream monetary policy there are, I think, things that central banks *can* do to improve the supply-side functioning of the economy, especially by trying to ensure that the financial system is effective in its support of the wider economy. This is why the Bank takes such a close interest in the financing of small businesses, for example; and it is why we are participating in the Chancellor's Private Finance Initiative, trying to find ways in which private-sector disciplines can be brought to bear on traditionally public-sector infrastructure projects. But the best help we can give through monetary policy is to provide a stable monetary framework within which government and everybody in the private sector can work together to solve the structural problems.

Now there will still be those who say, 'Well that's as maybe; but they really *could* do more through monetary policy, if they really understood the social and economic devastation that unemployment causes, if they really understood the effect on people's lives—if they really cared.' For them particularly, I should like to conclude with a quotation from a book published exactly 50 years ago this week. The book is *Full Employment in a Free Society* by William Beveridge—a man of immense compassion and passionate in his concern about unemployment. He wrote:

'The part of the State lies in the adoption of a definite policy of stable prices . . . it is unreasonable to expect from trade unions a reasonable wage policy, unless there is a reasonable price policy . . . One of the first and most obvious signs that total outlay was tending to be excessive in relation to the productive resources available would be a rapid rise in prices . . . Inflation is almost as much an evil as deflation. Price policy must be an integral part of the full employment policy. Nor is there room for practical doubt as to what that policy should be. It should be a policy of maintaining a stable value of money . . .'

You don't need to accept all of Beveridge—or his particular prescriptions for achieving this end—to realise that he had a crucial point. It is a point that we have not always taken in the intervening years—but one which is now more widely understood.

Credibility and monetary policy: theory and evidence

Mervyn King, an Executive Director of the Bank and its Chief Economist, looks⁽¹⁾ *at the concept of credibility in monetary policy, why it is important and how it can be measured.*

A monetary strategy is credible if the public believes that the government will actually carry out its stated plans; if their strategy is not credible, monetary authorities will find they have an incentive to accommodate inflation expectations. By creating a 'penalty' for failure, an announced inflation target—like that at the centre of the UK monetary framework—can enhance monetary policy credibility.

He explains how information about expectations of future inflation—and so about credibility—can be derived from the prices of government bonds. And he suggests that part of the increases in bond yields in 1994 reflected a reappraisal of the long-term credibility of the monetary policies of the different countries.

Introduction

It is a great honour to be invited to deliver the first Scottish Economic Society/Royal Bank of Scotland Lecture. In the very first issue of the Scottish Journal of Political Economy in March 1954, Sir Alec Cairncross, writing about the reconstitution of the Scottish Economic Society, referred to the consequences of putting oneself at the mercy of a Scottish audience which 'has an extremely limited appetite for any lengthy analysis of general economic and social issues unless it has an obvious and immediate bearing on his personal affairs'. I have taken this advice to heart. I shall try to be brief and I shall talk about interest rates.

Since the beginning of this year, bond rates in the United Kingdom have risen by about 200 basis points. The increase over the past 12 months has been less—some 140 basis points. Nevertheless, the rise has been considerable and has occurred, to varying degrees, in all industrialised countries. What does this tell us about monetary policy in the United Kingdom? In that same article, Alec Cairncross wrote that Scottish economists rejoiced in 'the old-fashioned description "political economy", with its concrete approach and canvas'. I want tonight to relate these increases in interest rates to the credibility of monetary policy in the United Kingdom—a subject which, because it relates to the interaction between government and the private sector, does, I believe, qualify as political economy.

Few words trip more readily off the lips of central bankers than 'credibility'. Words are important. Every profession has them, and central banking is no exception. Indeed, a journalist recently described credibility as the 'new mantra of the mandarins', and argued that credibility dominates official thinking in the United Kingdom to such an extent that other objectives have been relegated to second place. This view does, I believe, misrepresent not only the role of credibility in monetary policy but also the ability of monetary stimulation to solve the structural problems of the UK economy. As my newsagent said the other morning, 'newspapers, you can't trust them—they're in the hands of the media'.

But is credibility any more than a word or a mantra? As the King of Denmark put it in *Hamlet*, 'words without thoughts never to heaven go'. So I want to organise my lecture around three questions. First, what is credibility? Second, why does it matter? And third, is it possible to measure it?

The concept of credibility

The *Oxford English Dictionary* describes 'credibility' as a mid-sixteenth century word meaning the quality of being credible or believable, or having a good reputation. In the context of monetary policy, credibility has a precise meaning. A monetary strategy—a plan of future policy actions contingent upon events—is credible if the public believes that the government will actually carry out its plans. Credibility is, therefore, a question of whether announced intentions are believable.

This could be a matter of trust. But markets, and for that matter voters, are naturally suspicious. The announced intentions are much more credible if there are incentives to pursue the stated course of action. A future monetary policy action is credible if it is in the interest of the monetary authorities to enact this policy when the time comes. Hence policy is credible when the authorities' actions are, as economists put it, 'time consistent', that is the authorities have no incentive to deviate from their original intentions. This is not a question of trust—read my lips: no more

⁽¹⁾ In the first annual Scottish Economic Society/Royal Bank of Scotland lecture in Edinburgh on 24 October 1994. The lecture was published in the Scottish Journal of Political Economy, February 1995.

inflation—but of whether the monetary authorities face an incentive to pursue low inflation.

One way of trying to achieve time consistency is to precommit to a fixed rule—for example, set interest rates so that some measure of the money supply grows at a constant rate each year. It is well known that such rules are sub-optimal. From time to time, shocks occur which mean that the optimal growth rate of the money supply changes. To refuse to respond to those shocks may enhance credibility in the policy rule, but only at the expense of sensible policy adjustments. When the shocks are sufficiently frequent and large, as they have been in most countries, the rule becomes discredited and is literally incredible. No rule for monetary policy has been discovered which could credibly be followed. It is inevitable therefore that, as Henry Simons argued in 1936, monetary policy 'must rely on a large element of discretion'.

But there is a problem with a purely discretionary monetary policy. The ability of the authorities to spring monetary surprises on an unsuspecting public allows them to exploit the short-term trade-off between inflation and output to achieve temporarily higher output. Anticipating this reaction, economic agents in the private sector come to expect inflation and to build such expectations into their wage and price-setting behaviour. Inflation will rise to a level beyond which the authorities will not choose to spring further inflation surprises, and the result of this 'game' between public and private sectors is an inbuilt inflation bias to policy.

At this equilibrium inflation rate, the marginal cost of additional inflation is equal to the marginal gain from higher output in the short term resulting from the inflation surprise. Although the recent analysis of the inflation bias, as in the pioneering work of Robert Barro and David Gordon (1983), is based on developments in game theory for which the Nobel Prize was awarded two weeks ago, the idea can be found in the writings of the mentor of the Scottish Economic Society, Adam Smith. He wrote:

'Princes and sovereign states have frequently fancied that they had a temporary interest to diminish the quantity of pure metal contained in their coins; but they seldom have fancied that they had any to augment it. The quantity of metal contained in the coins, I believe of all nations, has, accordingly, been almost continually diminishing, and hardly ever augmenting. Such variations therefore tend almost always to diminish the value of a money rent' (Smith 1776, Vol. I, page 38).

Economists have recently started to analyse ways of limiting the inflation bias of discretionary monetary policies. Kenneth Rogoff (1985) suggested that monetary policy be placed in the hands of an independent central bank run by a 'conservative' central banker who, by definition, would have a greater aversion to inflation than that of the public at large. This would help to reduce the inflation bias inherent in discretion. But it is not a perfect solution because the 'conservative' central banker will not respond to shocks as rapidly as might a more representative central banker. Output and employment will be excessively volatile.

For this reason, Canzoneri (1985), Walsh (1992) and Persson and Tabellini (1993) have analysed alternative ways of allowing discretionary use of monetary policy with an incentive to achieve low inflation on average. One suggestion is to create a penalty on either government or central bank if the average inflation rate over a period exceeds the level consistent with price stability. This allows the monetary authorities to respond to shocks without triggering expectations of an inflation bias to policy. One form which such a penalty could take is the announcement in advance of an explicit inflation target. There would be a penalty-political, reputational or, as in New Zealand, loss of tenure of the central bank governor-were the target not to be achieved. In the United Kingdom, there is now an explicit inflation target. It does, I believe, enhance the credibility of monetary policy by recognising the implausibility of basing policy on a pre-announced rule, yet at the same time limiting the inflation bias of pure discretion by creating a penalty for failure to hit the target. So credibility is an important part of any strategy to maintain low inflation.

The measurement of credibility

By its nature, credibility is not directly observable. But if credibility is important then a measure of credibility at different times, and its response to policy actions, is a useful piece of information. Can we, therefore, find indirect measures of credibility? The credibility of monetary policy is naturally measured by the difference between the official target for inflation and the private sector's expectations of inflation. But the future is uncertain. Hence both the government and the private sector have subjective distributions over the possible outturns for inflation at any future date. Credibility is a measure of how close are these two distributions. When we come to examine data, I shall summarise the distribution of inflation in terms of its mean-the expected inflation rate-and the spread of possible outturns around the mean as represented by the risk premium required by investors to accept inflation risk.

To measure credibility, therefore, it is necessary to observe both the official target range for inflation and private sector expectations of inflation. The United Kingdom is unique in affording estimates of both. First, there is a quantified official target range for the annual inflation rate of 1%-4%, with a narrowing of the range to below $2^{1}/_{2}\%$ by the end of this parliament. Second, the existence of both nominal and index-linked bonds means that it is possible to calculate a term structure for expected inflation.

If credibility is to be measured by private sector expectations of inflation, then it is natural to ask how such expectations might themselves reasonably be measured. There are two main ways—direct and indirect. The direct way involves asking agents in the private sector about their expectations. The indirect way is to infer from observable market behaviour what those expectations might be.

Direct measures of inflationary expectations can be observed in a number of surveys. These are summarised regularly in the Bank's *Inflation Report*. Such forecasts are available for only a short period ahead—typically 18 months or so. Chart 1 plots the median forecast, out of a sample of 36 private sector forecasts, of inflation (measured excluding mortgage interest payments) for the end of 1994 made at different points in the past. This series can be plotted back to the beginning of 1993. Also shown in Chart 1 are the Bank's own central projections published in the *Inflation Report*.

Chart 1





Both series show that forecasts have been revised downwards over time. This reflects a combination of learning about the magnitude of the disinflation resulting from the monetary tightening of the late 1980s and early 1990s, and a growing belief that the inflation target will be met, at least in the short term. I cannot resist pointing out that the Bank's projections have been consistently lower than the median private sector forecast, which makes it hard to understand why the Bank has been accused of whipping up inflationary fears.

There are two major problems with the forecasts implied by survey or private sector projections. The first is that they are available only for very short time periods ahead, often less than the average time lag between changes in monetary policy and their subsequent effects on inflation. Hence their ability to tell us about the credibility of monetary policy is extremely limited. The second is that they are available at only low frequencies, often no more than quarterly. Hence it is difficult to judge the impact of a change in policy, or some other event, on the credibility of the monetary regime. Both problems can be overcome by using the indirect approach to the measurement of expectations of inflation. The basic idea is very simple. The stock of government debt in conventional gilts and the market prices at which they are bought and sold make it possible to construct a yield curve for nominal interest rates over a continuous time horizon. Equally, the existence of a stock—albeit smaller—of index-linked government securities, amounting to some 15% of total government debt, means that a yield curve for real interest rates can also be calculated. From these yield curves we may derive estimates of expected inflation at any future date—an inflation term structure curve in fact.

How can we do this? There are three steps in the calculation. First, it is necessary to convert observations of the yield on bonds of different maturities into a true yield curve. A 'true' yield curve relates the interest rate which must be paid to someone who invests money today, and receives nothing until the date when the loan is repaid, to the maturity of the loan. A claim on a loan of this kind is known as a zero-coupon bond. In practice, government bonds pay coupons each year. In effect, part of the loan is repaid each year. So the observed market interest rate on, say, ten-year bonds is an average of interest rates on money lent for one year, two years, three years and so on. Using the observed interest rates on bonds of all maturities, we can unravel the interest rates that correspond to pure loans of any given maturity. The interest rate on synthetic zero-coupon bonds can be computed because any actual bond is composed of several different zero-coupon bonds. The 'true' yield curve is that for zero-coupon bonds. Chart 2 shows two such zero-coupon yield curves, one for the beginning of the year and one for a week ago. The upward shift in the yield curve during this year is evident.



The second step is to note that the yield curve describes the *average* interest rate over each maturity, denoted by b. Of more interest for our purposes is the implied short-term interest rate that is expected to hold in the future, denoted by r. The algebra of implied forward rates and the yield curve is given by equation (1), which states that the terminal value of a portfolio invested in a t-period bond is equal to that of a

portfolio continually reinvested at the short-term interest rate:

$$\exp\{tb(t)\} = \exp\{\int_0^t r(\tau)d\tau\}$$
(1)

The interest rate on a *t*-year bond is an average of the short-term interest rates that will hold over the maturity of the bond:

$$b(t) = \frac{1}{t} \int_0^t r(\tau) d\tau$$
⁽²⁾

The relationship between the forward rate and the bond yield is akin to that between marginal and average cost:

$$r(t) = b(t) + t \frac{db(t)}{dt}$$
(3)

It can be seen that the forward rate exceeds the bond yield when the yield curve is rising and is below it when the yield curve is falling. Chart 3 shows both curves for the United Kingdom at close of business on 13 October.

Chart 3 Nominal implied forward interest rates^(a)



The third step is to calculate the implied forward rate curves for both nominal and real (index-linked) bonds. Chart 4 shows these two curves for 13 October. The difference between the curves measures the sum of the expected inflation rate and the inflation risk premium. The nominal forward rate equals the sum of the expected real rate, the expected rate of inflation, the inflation risk premium and the real rate risk premium:

$$r_B = E(r) + E(\pi) + \rho_\pi + \rho_r \tag{4}$$

The real forward rate equals the sum of the expected real rate and the real rate risk premium:

$$r_I = E(r) + \rho_r \tag{5}$$

Credibility is about both the expected level of future inflation and the uncertainty associated with the inflation outturn. Hence the difference between the forward nominal

Chart 4 Nominal and real implied forward interest rates^(a)



and real rate curves is not a bad empirical estimate of the credibility of monetary policy:

$$r_B - r_I = E(\pi) + \rho_\pi \tag{6}$$

The Bank of England has been studying different technical methods of constructing the relevant yield curves and published in the November *Inflation Report* new estimates of inflation expectations based on modifications of methods suggested by Lars Svensson (1994). Other research suggests that most of the variation of the difference between the two curves comes from revisions to inflation expectations and not from changes in the inflation risk premium (Barr 1994, Brookes and Breedon 1994).

Credibility lost, credibility regained: an application of event studies

The methods which I have just described can be used to assess the impact of a number of different events on the credibility of monetary policy in the United Kingdom. I have chosen four *events*—entry into the ERM, exit from the ERM, the November 1993 Budget and the interest rate increase in September 1994. I do not mean to imply that these events were the most significant in their impact on interest rates. In many ways, the opposite is true. Changes in real interest rates, reflecting conditions in the world capital market, can be a far more important force than changes in the credibility of monetary policy, which is likely to evolve only slowly in the short run.

Consider now the four events. The first, Britain's entry into the ERM in October 1990, is shown in Chart 5. The chart shows the implied inflation term structure immediately prior to and following the announcement of entry into the ERM. Much of the impact of entry may well have occurred during the summer of 1990 as sterling appreciated, but the announcement itself led to a fall in implied forward inflation rates at almost all maturities. After the failure of several attempts to find a domestic anchor for the price level, it was

Chart 5 Implied forward inflation rates at the time of Britain's entry into the ERM



not surprising that markets gave more credibility to an external anchor than to those which had failed.

But the timing of Britain's entry coincided with the aftermath of German unification and the need for a real appreciation of the Deutsche Mark. There were only two ways in which this could be achieved—either a revaluation of the Deutsche Mark or a period of higher inflation in Germany than elsewhere. The failure of the European Monetary System to deliver an appreciation of the Deutsche Mark meant that the Bundesbank had little choice but to raise interest rates to a level sufficient to bring down inflation in Germany, thus requiring inflation elsewhere in Europe to be even lower.

For a country such as the United Kingdom, with high debt burdens inherited from the 1980s, this level of interest rates would, in all probability, have led to falling prices. Although departure from the ERM in September 1992 permitted a rebalancing of monetary and fiscal policy, it was clearly not sought by the authorities and its initial impact was a loss in credibility. This can be seen clearly in Chart 6,

Chart 6





which shows that departure from the ERM led to sharply lower expectations of nominal interest rates in the short run and higher inflation in the medium term.

The new monetary policy framework introduced in October 1992, and which has been extended subsequently through innovations such as the publication of the minutes of the monthly monetary meetings between Chancellor and Governor, gradually restored some of the lost credibility. And as shown in Chart 7, the tightening of fiscal policy begun in March 1993 and consolidated in the November 1993 Budget also led to some reduction in expected inflation rates in the medium to long run. Large budget deficits raise the probability that a future government will be tempted to inflate away the burden of debt, and the difficult—but vitally necessary—decision in 1993 to tighten fiscal policy has reduced either the expected inflation rate or the inflation risk premium, or both.

Chart 7

Implied forward inflation rates at the time of the autumn 1993 Budget



Chart 8 Implied forward inflation rates at the time of the September base rate rise



The final event, shown in Chart 8, demonstrates that the impact of the rise in interest rates in September 1994 was, as

hoped, a reduction in expected inflation and an improvement in the credibility of monetary policy. The chart shows also that there is still some way to go. Long-term credibility has not yet been established. Ten years from now the market is expecting either an inflation rate above the current target range (of below $2^{1/2}$ % by the end of this parliament) or believes that there is sufficient uncertainty about the prospects for low inflation to require a significant inflation risk premium. Neither explanation is consistent with full credibility.

Evidence from other countries

The evidence presented in the previous section related solely to the United Kingdom. Can we find evidence of changes in credibility using data from other countries? Table A shows the levels of ten-year government bond yields in the G7 countries. Leaving Japan to one side for the moment, the ranking of countries is rather close to the ranking one would expect in terms of credibility of monetary policy. The two countries with long-established independent central banks, Germany and the United States, have the lowest bond yields. Yields in France have moved closer to those in Germany than for many years. And the United Kingdom, Canada and Italy—countries with rather poor inflation records over the past 25 years—follow on behind.

Table AG7 ten-year government bond yields(a)

Japan	4.70
Germany	7.34
United States	7.61
France	8.02
United Kingdom	8.47
Canada	9.00
Italy	11.68

(a) Gross redemption yields on benchmark government bonds on 17 October 1994.

In a world of capital mobility, it would be reasonable to assume that the long-term real interest rate would be very similar across countries. Hence differences in bond yields would reflect differences in monetary credibility. There is one caveat to this conclusion. The assumption that real interest rates, measured in terms of domestic currencies, are likely to be similar in different countries depends upon the assumption that expected changes in real exchange rates over horizons as long as ten years are small. For most countries, that is a reasonable approximation. But in the case of Japan, with a history of a rising real exchange rate, it seems likely that the market is factoring into its calculations a further real appreciation of the yen. It is not easy to rationalise long-term interest rates in Japan otherwise.

Apart from the case of Japan, changes in relative bond yields do tell us something about changes in credibility. A good example of this is the experience of France. Chart 9 shows the differential between ten-year bond yields in France and Germany from 1980. At the beginning of the period, France was a country with low credibility in monetary policy and a poor inflation record. From 1983, it embarked upon a transformation of its monetary policy through membership

Chart 9 French-German long-term bond rate differentials^(a)



of the ERM and a growing commitment across the political spectrum to price stability, and now an independent central bank. The effect of this is clear. The differential between French and German bond yields has virtually disappeared.

In addition to a comparison of levels of bond yields across countries, it is instructive to compare changes in bond yields over the past year—the stylised fact with which I began this lecture. Chart 10 plots the change in ten-year bond yields since the beginning of February 1994, immediately prior to the rise in US interest rates, against the average inflation rate in each country over the previous ten years for the major

Chart 10 Rise in bond yields and past inflation



(a) Ten-year benchmark bond redemption yields. Source: Datastream.
 (b) Inflation measured by the consumption expenditure deflator. Source: OECD Economic Outlook, June 1994.

industrial countries. The better the inflation record, the smaller the rise in interest rates this year. Nor is this simply a product of changes in rates since February. Changes in yields over the past 12 months show a similar pattern—see Chart 11. Part of the rise in bond yields over the past year is almost certainly a correction from the unusually low level of long-term interest rates reached after the bond rally of 1993.

Chart 11 Rise in bond yields and past inflation



The re-appraisal of long-term rates which has taken place during 1994 reflects, in part, judgments about the long-term credibility of monetary policy in different countries which, inevitably, reflects recent history. This demonstrates that credibility is not something which can be acquired overnight; it has to be built up slowly over time. That is why, in the analysis of monetary policy, credibility is often equated with the reputation of the monetary authorities for their commitment to price stability.

Evidence from the foreign exchange market

Another source of information about credibility comes from the foreign exchange market. For given expectations about the exchange rate at some terminal date, changes in the yield curve will give rise to offsetting changes in the exchange rate. Denoting the T-year bond yield for country i at time t by b_{it} , the exchange rate between currencies *i* and *j* at time *t* by e_t , and the differential in T-year bond rates by d_t , then under the assumption of uncovered interest parity:

$$E(e_{t+T}) = e_t + d_t \tag{7}$$

For example, if dollar interest rates are below Deutsche Mark interest rates, then the dollar would be expected to appreciate in order to yield the same expected return on both dollar and Deutsche Mark investments. Of course, exchange rates will also change because of revisions to beliefs about the terminal exchange rate. This is shown in Table B, which gives the changes in exchange rates for a number of currency pairings. For example, the first row shows that the dollar has fallen by almost 8 percentage points against the yen since the first US interest rate rise in February. But the change in the yield curves in the United States and Japan over the same period should have led to an appreciation of the dollar of about 8% for a given expected dollar/yen exchange rate in ten years' time. Hence the 'news' about the dollar during this year has been equivalent to roughly a 16% fall in its value against the yen some ten years from now.

Table B Exchange rates and 'news'

Change between 3 February and 13 October 1994

	Actual percentage change (1)	Predicted percentage change (2)	'News' per cent (1)-(2)
¥/\$	-7.7	8.2	-15.9
DM/\$	-11.1	1.2	-12.3
£/\$	-6.0	0.3	-6.3
FFr/\$	-10.5	-3.1	-7.4

Notes: (a) Calculations based on ten-year government bond y (a) (b)

A positive sign represents an appreciation of the dollar. The predicted value is calculated by taking the change in the bond yield differential between two dates and compounding it over a (c)

ten-year period, given an uncovered interest parity condition.

This might reflect a change in the expected real exchange rate or a change in expected relative inflation rates over the same period. Since the 'news' about the dollar against the Deutsche Mark over the same period is about 12%, it seems likely that a good part of the fall in the dollar represents either a belief about the real effective exchange rate of the dollar or changes in the expected inflation rate in the United States. Similar, though slightly smaller, falls in the dollar can be observed in its exchange rates against sterling and the French franc. These numbers suggest that when assessing changes in nominal exchange rates it is important to take into account changes in the yield curves in the respective countries over the same time horizon.

Conclusions

I want to draw three conclusions from my talk.

First, credibility is important because the current behaviour of economic agents depends upon expectations of future actions of the monetary authorities. Talk is cheap, and to obtain the economic benefits of policies aimed at price stability means that those policies must be credible, in the sense that the authorities would face real costs if they were to allow inflation to rise. Without credibility, the monetary authorities will find they have an incentive to accommodate inflationary expectations. The adoption of an explicit inflation target provides reassurance to firms and households that the authorities would face a cost of deviating from their stated objective-provided that to hit the target implies a low average inflation rate. In other words, the target range must be neither too high nor too wide.

Second, credibility is not an all-or-nothing matter. Policy is neither credible nor incredible. It is, as we say in economics, a continuous variable. For that reason, we should place it in context and remember, as Stanley Fischer has reminded us, that 'credibility is a slippery concept which should not be overvalued' (Fischer 1994). Nevertheless, credibility can be increased by the patient pursuit of policies directed toward price stability which, over time, will create a reputation. Credibility can be enhanced by a policy framework based on an inflation target, and by institutional changes such as the degree of openness and transparency embodied in the Bank's Inflation Report and in the publication of the minutes of the monthly monetary meetings between Governor and Chancellor. The key to building credibility lies in the maxim, 'Say what you do, and do what you say'.

Third, the financial data which I have presented—the 'message from the markets'—constitute evidence on the credibility of monetary policy over the medium term. They are not a judgment on the policy of the past year, nor even that of the next year, but on the commitment to price stability which all of us in the electorate will show in the next five to ten years. The credibility of the Bundesbank derives, in part, from the collective commitment to price stability in Germany. Over the past 30 years in Britain, the experience of inflation has altered our own attitudes and demolished the belief that inflation can buy permanently higher output. The test of our commitment will come over the next decade. In the Bank of England, our task is to persuade people of the value of price stability. We may persuade only a few, but from these small acorns may grow oaks of stability.

Credibility is about beliefs on the factory floor, just as much as on the trading floor. The performance of the monetary authorities may be judged day by day in the financial markets but ultimately what matters are the views of employers and employees, and of savers and shoppers. As the Americans would say, it is Main Street not Wall Street which will determine the inflation rate.

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Changes in UK gilt-edged and money markets in recent years

Central banks have been obliged in the recent past to pursue their objectives of monetary and financial stability within an environment of rapid and continuous change. Ian Plenderleith, an Executive Director, Monetary Stability at the Bank, illustrates⁽¹⁾ the Bank's involvement in continuing change by looking at how the UK government bond and money markets have developed in recent years.

Involvement in change is nothing new to us, as I would like to illustrate by touching on an area where we are in the midst of a significant process of continuing change—the UK government bond and money markets.

These markets are operationally important to us because it is through our operations in them that we conduct monetary policy. In our daily operations in the sterling money markets, we are able to influence the level of short-term rates; and it is, of course, through changes in short-term rates that we implement changes in the monetary stance. In the government bond market—the gilt-edged market—we seek to sell government debt in order to fund the government's borrowing requirement in a non-inflationary fashion and at least cost.

It is therefore vital that we should have a close interest in the structural health of these markets. The more efficient and liquid these markets are, and the broader the range of participants in them, the more effectively we can carry out our monetary operations in them. For this reason, we have in recent years been in the forefront, working with market participants, in encouraging the markets to evolve and adapt and modernise their structures. And this is a continuing process.

In the gilt-edged market, the track record of change is considerable. The major change just eight years ago to an open and competitive structure of committed market-makers has been followed by a range of further changes in trading strategies and instruments. Soon after the new structure had bedded down, we introduced auctions. And in the subsequent period of budget surpluses, we initiated a successful series of reverse auctions, in order to reduce the National Debt. More recently, as the need for borrowing reappeared, we have established a regular pattern of monthly auctions, combined with 'tap' sales of small, additional tranchettes of existing issues as and when demand for them emerges. In this way, in a market which is marked by a wide diversity of investors interested in a range of different coupons and maturities, we have been able to maintain liquidity across the range of existing issues, while establishing major benchmarks at key points in the maturity spectrum. All of this has, we believe, enabled the government to fund its deficit in a non-inflationary fashion

and to minimise its cost of debt service, which have to be our overriding long-term aims.

We have also sought actively to develop a range of instruments, establishing floating-rate gilts earlier this year, and reintroducing convertible issues which give investors options to extend the maturity on pre-set terms. We have also, over the years, built up the largest index-linked government bond market in the world.

To support the liquidity of this range of different instruments, we have worked with the market-makers to enable them to manage their books effectively by utilising the actively traded futures contracts on LIFFE and a range of swap and derivative products. And we have provided for them to be able to extend their activity into Ecu products, where we have ourselves issued a ten-year bond and have an on-going programme of issuing short-dated Treasury bills and three-year Treasury notes.

Nor have we ignored the evidence, as inflation has declined, of reviving interest for investment in gilts on the part of personal investors. Our booklet for personal investors, describing the workings of the gilt-edged market in plain English, issued in March 1993, generated demand for over a third of a million copies; and we have attached importance to ensuring that there are proper market-making facilities available for small-sized deals in gilts—including a market-maker operating in Scotland.

It is our expectation—and firm intention—that this process of change will continue in the future, particularly as international participation in the market increases. As is known, we have consulted widely about the possible development of a gilt repo market and have the issues that need to be addressed in that area under active consideration. In parallel, we continue to seek views from market participants on the scale of possible interest in zero-coupon instruments and in coupon-stripping facilities. Changes in the pension industry may generate demand for new forms of government security. And we are addressing the best means to achieve linkage of the Central Gilts Office, which provides electronic settlement for gilts, with international systems such as Euroclear and Cedel. There are technical features of tax and dividend payment also to be addressed.

(1) In part of his speech on recent developments in practical central banking at the third City of London central banking conference on 22 November 1994.

And there are of course major changes in train in the regulatory framework as the EC Directives are implemented.

Similarly in the sterling money markets, we have encouraged diversification of instruments with, for example, the establishment of a sound structure for sterling commercial paper and medium-term notes; and we have recently developed a fortnightly repo facility, in parallel with our daily operations, in order to diversify our range of operating methods. Experience so far with this facility has been encouraging and there has, as a result, been a notable lessening of volatility in the very short-dated rates. In the money markets, as in the gilt-edged market, there has been a notable intensification of competition and of international participation in recent years, with results that have increased both the efficiency of the markets and their integration with the international financial markets.

In parallel, our regular programme of issuing Ecu money-market instruments at monthly and quarterly auctions, alongside LIFFE's futures contract on three-month Ecu interest rates, are practical steps which lay the foundations for an integrated Ecu money market here in London; this is of immediate benefit in further extending the range of London's facilities as an international financial centre, and could be of more fundamental significance in the long run.

In pursuing this process of continuing change, we have always to keep thinking about where we are going, step carefully as we proceed and listen intently to the feedback we receive, because change has to be achieved, so to speak, during normal business hours. Markets cannot be closed for renovation. They need to continue to function effectively and we need to continue to be able to conduct our monetary operations in them. This argues strongly for an evolutionary process of change and for recognising that it is the firms participating in markets who are best able to develop them effectively.

But it does not mean that changes to improve the structure of markets are not both natural and desirable. What I have described here is a considerable programme of on-going change, in which we have felt it right to take a leading part because of the importance of these markets to our pursuit of monetary stability.