Bank of England Quarterly Bulletin



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Summary		1
Recent economi	c and financial developments	
The operation of Box on the Govern	of monetary policy ment's financing requirement and remit	1
to the Bank of En Note on the gilt rep	gland for 1996/97 oo market	1 1
The internation Box on output grov Box on fiscal devel	nal environment wth in the G7 countries by type of activity opments in the European Union	1 1 1
Financial mark Box on development	xet developments nts in the UK asset-backed securities	1
market in 1994/95 Box on dividend yi	elds and future equity returns	1 1
Research and an	nalysis	
Understanding	broad money	1
How do UK co	mpanies set prices?	1
The valuation of for UK rights is	of sub-underwriting agreements ssues	1
Bank of Englar conditions	nd Agents' summary of business	1
G7 yield curves	5	1
Seasonal adjus	tment of UK monetary aggregates	2
Speeches		
EMU —conside Speech given by the Gov 13 March	erations for British membership vernor to the Royal Institute of International Affairs on	2
Some thoughts Speech given by the Gov and the Glasgow Discus	on financial regulation vernor to the Edinburgh Finance and Investment Seminar ssion Group on Finance and Investment on 28 February	2
Industrial inve Speech given by the Dep Conference on 21 Febru	stment—can the market respond? outy Governor to the National Association of Pension Funds uary	2
International r Summary of a speech gi and Derivatives Associa	egulatory co-operation post-Barings ven by Mr M D K W Foot to the International Swaps tition on 7 March	2
The London A Speech by Mr M T R Sm on 1 February	pproach and trading in distressed debt ith to the International Business Communications Conference	e 2
Statistical annex	κ	2
Volume 36	Number 2	

The Quarterly Bulletin and Inflation Report

Inflation Report (published separately)

The operation of monetary policy (pages 129–45)

The international environment (pages 146–53)

Financial market developments (pages 154–62)

Research and analysis (pages 163–226)

The *Inflation Report* analyses recent developments in the UK economy and assesses the outlook for inflation over the next two years. Section 1 reviews what has happened to retail prices, Section 2 considers what can be learnt from the monetary aggregates and financial market data, and Sections 3, 4 and 5 look at demand and output, the labour market and firms' pricing behaviour respectively. Section 6 presents the Bank's inflation projections and discusses the risks surrounding them.

The year-long rally in international bond markets came to an end in the first quarter, as markets anticipated a turning point in official interest rates. Price volatility implied by options on bonds in major markets also increased. UK official interest rates were reduced twice in the first quarter, on 18 January and 8 March. Technical conditions in the money market were difficult at times during the quarter, reflecting in part market anticipation of a cut in rates. Gilts not only shared in the global rise in yields, but saw spreads widen against continental Europe. Yields on conventional gilts rose by much more than those on index-linked gilts. Funding in 1995/96 met the Government's remit to the Bank. Successful bids in the three gilt auctions held in the quarter were widely spread. The Government's funding remit to the Bank for 1996/97 was published on 27 March. Foreign exchange markets were much calmer than bond markets in the quarter. Sterling strengthened a little on balance.

This article considers economic developments in the European Union, North America and Japan since the February 1996 *Quarterly Bulletin*. These countries account for about half of world GDP, but three quarters of UK external trade. Two topics are considered separately in boxes: the relative performance of services and manufacturing output in the G7 economies; and fiscal consolidation in Europe. GDP in these countries barely grew in the last quarter of 1995 and the outlook for Europe has deteriorated since the Bank's February *Quarterly Bulletin*.

International bond issuance rose sharply in the first quarter of 1996 and yields in major bond markets began to rise. The rise in equity prices was interrupted in the first half of the quarter, but resumed by the end of March. The sharp increase in turnover on derivatives exchanges may, like that in the first half of 1994, be a short-lived reflection of interest-rate uncertainties.

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

Understanding broad money (by Ryland Thomas of the Bank's Monetary Assessment and Strategy Division). Broad money is at the heart of the monetary transmission mechanism and consequently plays an important role in the assessment of inflationary pressures. This article examines the factors behind stronger broad money and credit growth in 1995, using recent econometric research undertaken at the Bank.

How do UK companies set prices? (by Simon Hall, Mark Walsh and Tony Yates of the Bank's Structural Economic Analysis Division). In the autumn of 1995, the Bank conducted a survey of price-setting behaviour in 654 UK companies that maintain regular contact with the Bank's Agents. The survey was inspired by the work of Alan Blinder in the United States. The survey has made available much new information. For example, companies do not regard the direct costs of changing prices as being particularly important, although prices are typically changed infrequently, on average only twice a year. Preserving customer relationships is very important for firms in making decisions about prices. And there are many differences among firms about which factors influence price changes. These results throw light on how monetary policy—which is focused on the control of inflation—

affects the economy. The article describes the survey results and how they compare with other information about UK price setting.

The valuation of sub-underwriting agreements for UK rights issues (by Francis Breedon and Ian Twinn of the Bank's Markets and Trading Systems Division). Most equity issues in the United Kingdom are underwritten—that is, a group of financial institutions guarantees to buy any unsold shares at a pre-arranged price. The pricing of this guarantee affects the cost and efficiency of industry's capital raising. Earlier studies in a number of countries, including the United Kingdom, have suggested that underwriting fees are much higher than can be accounted for by fully competitive pricing. This article explores some modifications to those previous calculations and concludes that, while a rather larger part of the fee may be accounted for, there remains a margin still to be explained.

Bank of England Agents' summary of business conditions. The Bank is publishing the first quarterly summary of the reports on current business conditions that it receives from its Agents in the regions. The first edition of the summary is enclosed with this copy of the *Bulletin*.

G7 yield curves (by Neil Cooper and Jim Steeley of the Bank's Monetary Instruments and Markets Division). In November 1994, the Bank of England adopted a new method for estimating yield curves from the gilt-edged market. The curves are used for measuring expectations of future interest rates and inflation. Recently the Bank used the same method to estimate the yield curves of the other G7 countries' government debt. This article describes these yield curves and explains how the estimation method was adapted to each particular market.

Seasonal adjustment of UK monetary aggregates (by Marco Bianchi of the Bank's Monetary Instruments and Markets Division). This note describes a study recently published by the Bank on ways to adjust monetary aggregates for seasonal variation.

The operation of monetary policy

- The year-long rally in international bond markets came to an end in the first quarter, as markets anticipated a turning point in official interest rates. Price volatility implied by options on bonds in major markets also increased.
- *UK official interest rates were reduced twice in the first quarter, on 18 January and 8 March.*
- Technical conditions in the money market were difficult at times during the quarter, reflecting in part market anticipation of a cut in rates.
- Gilts not only shared in the global rise in yields, but saw spreads widen against continental Europe. Yields on conventional gilts rose by much more than those on index-linked gilts.
- Funding in 1995/96 met the Government's remit to the Bank. Successful bids in the three gilt auctions held in the quarter were widely spread. The Government's funding remit to the Bank for 1996/97 was published on 27 March 1996.
- Foreign exchange markets were much calmer than bond markets in the quarter. Sterling strengthened a little on balance.



International bond and money-market environment

The year-long rally in international bond markets came to an end in the first quarter of this year, even though it became apparent that output in the major overseas economies had hardly expanded at all towards the end of last year. Inflation in these countries continued at around 2% per annum, and official interest rates were cut in a number of countries (see the article on the international environment on pages 146–53). At the start of the quarter, the markets still expected short-term interest rates to fall further. Indeed, average three-month US money-market rates fell from 5.7% in December to 5.4% in January; in Germany the fall was from 3.8% to 3.5%; in France from 5.5% to 4.6%; and in the United Kingdom, from 6.5% to 6.3%. Only in Japan, with a discount rate of just 0.5%, was there any sense that interest rates had reached a low point.

Bond yields at the start of the quarter were around their lowest levels since the peak of the 1993 rally; the US long bond yield had dropped below 6% and ten-year gilt yields were around 7.4%, the lowest since March 1994. Nevertheless, as the quarter progressed, the perception grew in markets that the global cycle of interest rate cuts might be coming to an end. Statements by policy-makers in the three largest economies encouraged this view, as did economic news later in the quarter, particularly data in the United States, suggesting that stronger real growth was under way. The fall in short-term interest rates slowed, and was reversed in the United States; short-term rates implied by futures contracts rose, as did longer money-market rates and bond yields. Equity prices were generally resilient, despite the sharp rises in bond yields, which may suggest that markets revised upwards their expectations of

future world demand—as does the implied increase in expected future inflation, where this can be derived (as in the United Kingdom). But the rise in bond yields may also reflect concern over the long-term fiscal outlook and a rise in uncertainty as a perceived turning point in the interest rate cycle approached. (Implied volatility⁽¹⁾ increased over the quarter in a number of major bond markets.) Comparisons have been made with the worldwide rise in bond yields at the start of 1994, but neither the initial fall in yields nor, so far, the correction have been as large as in that episode.

The first signs that the rally was at an end came not from the real economy, but from the political sphere. Continued delays in setting a US budget acceptable to the Congress resulted in concerns about a technical default by the US government, particularly if the heavy quarterly refunding programme due at the start of February was halted. In the United Kingdom, the reduction in the Government's majority drew attention to the possibility of an early general election. While reductions in official rates in both the United Kingdom (18 January) and United States (31 January) barely moved yields in either bond market, uncertainty grew, over both the political situation and the possibility of further cuts, and implied volatility edged higher, rising to nearly 8.5% in the United Kingdom, and by a similar amount to nearly 7% in the United States.

While signs of nervousness were already evident in bond markets in January, the major turnaround in sentiment came early in February, triggered by an unchanged German discount rate and comments by Bundesbank council members suggesting that German growth would rebound in the second half of 1996, and that there would be no further German easing until January's M3 data were seen. These turned out to be strong (if not quite as strong as market expectations) and the change in sentiment was exacerbated by technical and chart positions; open interest in the bund futures contract had been steadily increasing since the beginning of December 1995. Implied volatility on the bund futures contract jumped by around one percentage point at the start of February.

Growing international expectations of a turn in rates were further supported by remarks by the Japanese Finance Minister Kubo on

Table A

Interest rates,	gilt	yields	and	exchange	rates;	selected	dates ^(a)
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	Interest rat (per cent p	es er annum)				Gilt yiel (per cent	ds (b) t per annum)			Exchan	ge rates	
	Sterling in	terbank rates (2)		Short sterling future (d)	Convent	ionals		Index-linked			
1996	1 month	3 months	6 months	12 months	3 months	Short	Medium	Long	Long	ERI	\$/£	DM/£
29 December 1995	61/2	61/2	611/32	65/16	6.09	6.79	7.41	7.66	3.56	83.1	1.5492	2.2200
17 January	61/2 60/22	613/32	65/16	69/32	6.05 5.72	6.68 6.55	7.32	7.66	3.57	83.2	1.5295	2.2390
31 January	69/32	615/64	67/64	65/64	5.89	6.80	7.48	7.80	3.63	83.1	1.5230	2.2370
7 February	69/32	65/32	63/64	61/32	5.81	6.91	7.61	7.94	3.68	84.4	1.5385	2.2728
7 March	63/32	63/64	63/64	63/32	5.91	7.10	7.82	8.14	3.74	83.7	1.5302	2.2619
8 March	63/32	67/64	61/8	67/32	6.10	7.36	8.03	9.30	3.83	83.7	1.5255	2.2634
29 March	6	63/64	61/8	63/8	6.08	7.51	8.13	8.37	3.81	83.4	1.5262	2.2531

Close-of-business rates in London.

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

Middle-market rate

(d) Implied future rate: June 1996 contract.

The expected standard deviation of annualised movements in the respective government bond (1)futures prices, as implied by options prices

the adverse effect that low rates were having on pensioners' incomes; by further Bundesbank comments suggesting that German short-term rates were already at the correct level for sustainable growth; and by FRB Chairman Greenspan's Humphrey-Hawkins testimony which was also interpreted to suggest that the current level of US short-term rates was consistent with sustainable growth.

However, at the beginning of March, markets began to anticipate the possibility of a cut in UK official rates, as domestic data releases were taken to increase the prospect of low inflation. Sentiment was particularly influenced by a Purchasing Managers' Index which suggested weakening growth. Rates were cut by 25 basis points on 8 March, but gilts by this stage were unmoved, with even some profit-taking in the short end of the yield curve ahead of the announcement. But events earlier that day were entirely overshadowed by the most influential market event of the quarter; US non-farm payrolls for February rose by 705,000 compared with market expectations around 300,000. The US long bond fell by nearly three points on the data release, with gilts falling in consequence by more than two points. US long-bond yields rose to technical resistance around 6.70%, and implied volatility in the Treasury market increased by 1% to nearly 7.25%, reflecting renewed uncertainty as to the actual and prospective state of the US economy. Hopes for further US rate cuts diminished dramatically, and the money-market futures strip, which had previously implied falling rates out to December 1996, steepened sharply, with losses all along the curve and upward shifts in rate expectations of over 50 basis points in the 1997 contracts.

Bond markets stabilised later in March, although volatility remained high in Treasuries, while returning to pre payrolls data levels in gilts and bunds. With both the Bundesbank and Federal Open Markets Committee (FOMC) leaving rates unchanged at the end of March, markets awaited further evidence of real economic activity to give direction. Ten-year gilt yields finished the quarter at over 8%, compared with around 7.4% at the end of December.

UK money markets

The two 25 basis-point reductions in UK official interest rates during the first quarter provide an interesting contrast. The first move-on 18 January-was not generally expected by market participants, whereas that on 8 March was widely discounted. Nevertheless, it was the first move which would appear to have been more readily accepted by the market despite the element of surprise in the precise timing. To judge the state of the market's expectations prior to each cut, a wide variety of sources are available; the most commonly quoted is the three-month futures price. On 17 January, the March 1996 contract, which matured a little over two months from then, was trading at an implied rate of $6^{1/16}$ %, reflecting an expectation of one 25 basis-point reduction in official rates by mid-March. That this reduction was not expected imminently can be seen from prices for three-month forward rate agreements (FRAs) prior to the move, which implied three-month rates of 6¹¹/₃₂% in mid-February, compared to the then current level of three-month rates of 6¹³/₃₂%. The monthly Monetary Meeting that had taken place on 17 January was followed the next morning by retail sales and retail price figures for December and market expectations were broadly undisturbed by these events. The







UK, US and German three-month

announcement at 9.45 am of a 25 basis-point reduction in rates, to 6.25%, produced a downward shift in the entire futures curve of about 7/32%. At this point the market's expectation was that three-month rates might reach a trough of $5^{3}/_{4}\%$ in the third quarter of this year, but this expectation did not hold for long.

The reduction in rates on 8 March, in contrast, was almost fully priced into the market. The March futures price had been steady for several days at an implied rate of $6^{1}/_{16}$ % which, given the tightness of short-dated money up to that point, can be fairly said to represent considerable confidence in an impending cut (the contract actually settled at an implied rate of 61/8% on 20 March). Prices in FRAs projected three-month rates of around 6% in the period immediately after that month's Monetary Meeting (on 7 March) and three-month money in the cash market had also declined to $6^{1/16}$ % in the days ahead of the announcement. But, whereas in January the money market rallied powerfully on the announcement of the cut, in March the markets were weak before the move and, after a brief bounce immediately after the move, continued to deteriorate. This muted response was partly due to weakening international markets around that time; poor German M3 numbers had been released on 5 March, reducing the prospects of an early reduction in key German rates. In addition, overnight ahead of the reduction in rates to 6%, the latest CBI survey was sufficiently strong to cast some doubt about the merits of a further reduction in rates.

Reaction to the reduction in official rates to 6% on 8 March was, however, overwhelmed later in the trading day and on the following Monday by the international market response to the release on 8 March of exceptionally strong non-farm payroll figures in the United States, described above. Over the course of 8 and 11 March, implied rates from the short-sterling curve rose sharply: by 45 basis points at December 1996 and 60 basis points at December 1997. Although these movements were a somewhat dramatic example of the market's sensitivity to international developments, sentiment was frequently shaped during the quarter by changing prospects for monetary easing elsewhere. Early in the quarter, the weakness of the German economy had led to expectations that German Lombard and discount rates would be reduced in the near future and these expectations were further fostered at times by cuts in the Bundesbank's repo rate, although strong growth in German M3 served to dampen the most bullish expectations. And in the United States, expectations of a reduction in the target for the federal funds rate, which had waned during the quarter, were extinguished by the economic data towards the end of the quarter.

The exchange rate was often a strong influence on the sterling money market during the quarter, but rarely a source of concern. Among domestic influences, the political background was an occasional source of concern. And, although the overall picture of domestic economic activity and inflationary pressures provided support for the market, there were persistent concerns about the significance of rapid growth in the broad monetary aggregates.

By the end of the quarter the short-sterling futures curve was upward sloping throughout, with three-month money expected to rise to $6^{21}/_{32}$ % by the end of this year and 8% by the end of 1997. This compares to the end of the previous quarter when three-month rates were expected to reach $6^{5}/_{32}$ % and $6^{7}/_{8}$ % at the end of 1996 and Table B Influences on the cash position of the money market

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

	1995/96	1996		
	AprDec.	Jan.	Feb.	Mar.
Factors affecting the				
market's cash position				
Under/overfunding (+/-) (a)	3.9	-4.7	-3.8	5.1
Other public sector net				
borrowing from banks and				
building societies (-) (b)	0.9	0.5	0.4	-0.1
of which, local authorities'				
deposits with banks and buil	ding			
societies (+)	0.8	0.2	0.3	-0.4
Currency circulation (-)	-3.1	3.2	-0.3	-1.5
Other	5.1	-6.0	2.3	-1.6
Total	6.9	-7.0	-1.4	2.0
Increase (\perp) in the stock of				
assistance	23	3.8	0.7	3.1
Incroses () in f Tracury	2.5	5.0	-0.7	-5.1
hills outstanding (a)	0.1	3.1	2.1	1.2
bills outstanding (c)	9.1	-3.1	-2.1	-1.2
Increase in bankers'				
balances at the Bank	0.1	_		0.1
		1		

From 1993/94 central government net debt sales to banks and building societies (a)

From 1993/94 central government net debt sales to banks and building societies are included in funding. From 1993/94 banks' and building societies' transactions in 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)

1997 respectively. This deterioration in sentiment resembled that seen in the United States over the same period although it was rather greater in the sterling curve. Parallels were drawn by some commentators between developments in the US and UK economies, so that just as the United States was seen to be moving fairly swiftly out of a period of sluggish growth, so the United Kingdom was thought likely to do, at least by the second half of this year. In contrast, with the German economy still seen to be in a period of very slow growth, the curve of three-month German futures rates was still modestly lower for 1996 than it had been at the end of Q4 and implied rates by end-1997 were no more than 28 basis points higher.

Technical conditions in the money market were difficult at times during the quarter, particularly ahead of the March reduction in official rates. Somewhat larger daily shortages, reflecting normal fluctuations in the stock of assistance, coincided with expectations of an easing in official rates, which tended to make market participants less willing to sell paper to the Bank. The Bank responded in a variety of ways. The Treasury bill tender had already been reduced from £1,500 million per week to £800 million during the last quarter of 1995, in anticipation of tighter money-market conditions. The Bank continued the process seen in the previous quarter of increasing the pace at which it injected liquidity during the course of each day and progressively reducing the market's recourse to late-lending operations. The twice-monthly gilt repo facility continued to play an important part in helping to maintain appropriate money-market conditions and the Bank was content to respond to a continued high level of interest in the facility by allowing money allocated to the market through this means to increase from £4 billion at end-December to £5.4 billion in the period from mid-January to early March. At the 13 February rollover, however, the Bank declined to increase the allotment of funds, since its projections of the stock of assistance in the weeks ahead suggested that to do so would not necessarily leave the Bank in a position to maintain appropriate day-to-day money-market conditions over that period.

Some commentators interpreted the increased size of the shortages in the run up to the March Monetary Meeting (they averaged £1.35 billion in the week before the meeting against an average for the quarter as a whole of £870 million) as an attempt to restrain the market's interest rate expectations. However, the cause of the increased daily shortages was the intractability of many of the shortages and the fact that very short-term bills were offered to the Bank or that assistance was taken in the form of substantial (overnight) late lending which significantly increased shortages in following days. Immediately following the reduction in rates on 8 March, conditions eased as the bills offered for purchase in daily operations increased in maturity and recourse to late lending was reduced. And this easing of conditions resulted in a reduced demand for funds from the gilt repo facility, with the total amount outstanding falling back to £4.9 billion on 7 March and £3.1 billion on 21 March.

The Bank also made one technical change to its bill dealing rates at the time of the reduction in rates on 8 March. Although Minimum Lending Rate was reintroduced for the day at ¹/₄ percentage point below its level on 18 January, the rates at which the Bank purchased short-term bills in its daily operations were reduced by

Ten-year yield spread of France over Germany^(a)



Table C The 1995/96 PSBR funding requirement and outturn

£ billion

	Original remit	Summer forecast	Budget forecast	Outturn
PSBR forecast/outturn Net change in official	21.5	23.6	29.0	32.1
reserves				-0.2
Gilt redemptions	4.1	4.1	4.1	4.1
from 1994–95 (a)		1.6	1.4	1.4
Funding requirement	25.6	29.3	34.6	37.5
Funded by				
Assumed/outturn net natio	onal	2.5	2.0	5.0
savings inflow	2.5	2.5	3.0	5.3
other public debt etc		0.2	0.5	-0.5
Gilt sales required for full funding	23.1	26.6	31.1	32.7
Actual gilt sales	_	—	_	30.7

(a) Overfunding outturn known only after the original remit was published.

only $3/_{16}$ % (from $6^{1}/_{8}$ % to $5^{15}/_{16}$ %). This was necessary since the Bank's bill dealing rates are rates of discount, whereas the interbank rates that the Bank seeks to influence are simple yields. In consequence, as the level of rates falls, the Bank's discount rate needs to fall by a slightly smaller amount. Experience has shown that money-market management is easier if the dealing rates are kept closely aligned with the aim for interbank rates.

Underperformance of the gilt market against Europe

Gilts significantly underperformed core European bond markets over the quarter, with the bulk of the widening in the spreads coming in March. At ten years, gilts had initially yielded around 160 basis points more than bunds, until mid-February, when the spread briefly dipped below 150 basis points as hopes for further German discount rate cuts diminished. But this level was not held and, with political uncertainties increasing in the United Kingdom (including those resulting from the release of the Scott report), the spread began to widen again. There was further underperformance in the gilt market with concern over the possible PSBR and balance of payments effects of bovine spongiform encephalopathy (BSE) at the end of March.

At the height of BSE concerns, the ten-year gilt/bund spread widened to over 180 basis points, wider than at any time since immediately after the United Kingdom's exit from the exchange rate mechanism in September 1992. Spreads at shorter maturities moved even more strongly, with the five-year gilt/bund spread widening to around 235 basis points from under 200 basis points at mid-February, and the two-year spread widening by over 50 basis points in the same period to 300 basis points. The greater underperformance at the short end of the UK yield curve may also have reflected uncertainty over the course of economic policy in the run up to, and beyond, a general election. Supply effects may also have played a role; there was no UK ten-year conventional gilt issuance in the first quarter of this year but there were two short gilt auctions. German issuance by contrast (both government and corporate) in the first quarter was concentrated at ten years, with just one five-year auction.

Underperformance was greater against French OATs as spreads between bunds and OATs narrowed. At the beginning of the year the ten-year OATs had yielded 60 basis points more than bunds; but by the end of March the spread had fallen to under 20 basis points. Anticipation of European monetary union may be an increasing influence on gilt/bund/OAT spreads. The OAT market was also supported by a period of relative political stability following last year's elections and industrial action, a stronger franc and by Banque de France rate cuts.

Gilt funding

Gross sales of gilts during the final quarter of the financial year totalled £10.4 billion, bringing the total for the financial year as a whole to £30.7 billion. The increased pace of funding in the final quarter reflected the extra auction added to the original schedule (of two per quarter) at the time of the upwards revision to the gilt sales target announced in the November Budget. Table C shows the evolution of the gilt sales target during the year; as can be seen, the final total of £30.7 billion gilt sales represented a small underfund on the Budget target. The current estimate for the cumulative

Table D Issues of gilt-edged stock

	Amount issued (£ millions, nominal)	Date issued	Price at issue (per £100 stock)	Yield at issue	Cover (a) at auctions	Tail (b) at auctions (basis points)	Yield when exhausted	Date exhausted (c)
Auctions								
8% Treasury 2000	3,000	1.2.96 (d)	£105.00000	6.76 (e)	1.96	2		
8% Treasury 2021	3,000	29.2.96 (d)	£98.53125	8.14 (e)	1.48	5		
7% Treasury 2001	3,000	28.3.96 (d)	£96.78125	7.71 (e)	2.64	4		
Taps								
4 ³ / ₈ % Index-Linked 2004	150	24.1.96	£116.81250	3.30 (f)			3.51 (g)	7.2.96
2 ¹ / ₂ % Index-Linked 2013	100	24.1.96	£143.06250	3.49 (f)			3.65 (g)	7.2.96
21/2% Index-Linked 2003	100	23.2.96	£174.00000	3.48 (f)			3.69 (g)	14.3.96
21/2% Index-Linked 2024	150	23.2.96	£118.87500	3.67 (f)			3.67 (g)	23.2.96
21/2% Index-Linked 2009	150	19.3.96	£161.81250	3.76 (f)			3.77 (g)	27.3.96
21/2% Index-Linked 2020	150	19.3.96	£139.68750	3.84 (f)			3.85 (g)	27.3.96

Total of bids divided by the amount on offer. Difference in gross redemption yield between the weighted average of successful competitive bids and the lowest accepted competitive bid. Taps are exhausted when the issue is no longer operating as a tap. Details of the stock to be auctioned are announced nine days, and the auction is held on the day, before the stock is issued.

(c) (d)

(e) (f) Gross redemption yield, based on price at issue. Real rate of return, based on price at issue and assuming 5% inflation

Real rate of return, based on price at exhaustion and assuring ming 5% inflation



underfund carried forward into the new financial year, taking account of the estimated PSBR overshoot, is £2.0 billion.

Three gilt auctions of £3 billion each were held in the first quarter of 1996. Given the targets in the remit, the pattern of auctions earlier in the financial year meant that two of these were of short maturity stock (8% Treasury 2000 in January, 7% Treasury 2001 in March) and one was for a long stock (a new 25-year gilt, 8% Treasury 2021 in February).

The market was unsurprised at the extension of the 'old' five-year benchmark (8% Treasury 2000), and to a lesser extent at the extension of the 'new' five-year benchmark (7% Treasury 2001). While some in the market had anticipated a new strippable 2002 stock, it was felt that the existing 2001 gilt was liquid enough to act as a benchmark. Both stocks are very liquid and they have seen good demand both from asset-swapping traders and from the banking/building society sectors. Both gilts have, on occasion, traded tightly in the stock-lending and gilt repo market, becoming difficult to borrow and, with repo rates falling, making the stocks more expensive to acquire. Both auctions were well covered, although the tails were relatively long for short auctions. (A German auction on 22 February also had a long tail, of around 25 basis points.) Long tails can indicate that the price discovery mechanism has not worked well in the immediate run-up to the auction process.

February's auction stock was a new 8% Treasury 2021 issue, the longest maturity and longest duration conventional gilt in issue (excluding small amounts of undated stock). The stock met with demand from domestic institutions such as life assurance companies and pension funds, who need to match long duration liabilities. It also brought the United Kingdom further into line with other major international bond markets such as the United States (where a very liquid 30-year bond is well traded), and Germany (where a long bond experiment has however been less successful, perhaps because of a different institutional savings structure). With the strips⁽¹⁾ market expected to begin in the first half of 1997, such a long gilt will provide principal strips of long duration, and the shorter coupon strips will add liquidity all the way along the curve. A

Strips separate a standard coupon bond into its constituent interest and principal payments, so that they can be separately held or traded as zero-coupon instruments. See 'Plans for the official gilt (1) strips facility', Bank of England, January 1996.

The Government's financing requirement and remit to the Bank of England for 1996/97

Published as part of HM Treasury's Debt Management Report 1996/97.

The 1995/96 Borrowing Requirement

As set out in the joint Treasury and Bank of England Report of the *Debt Management Review* (July 1995), from 1996/97, the Government will aim to sell sufficient gilts, of any maturity, Treasury bills and National Savings products to finance the Central Government Borrowing Requirement (CGBR) plus maturing debt and any net increase in the foreign exchange reserves.

Any over or underfund of the PSBR in 1995/96,⁽¹⁾ calculated on the previous basis, will be carried forward and incorporated in the target for sales of gilts in 1996/97.

The CGBR for 1996/97 is forecast to be \pounds 24.1 billion. Some \pounds 11.5 billion of gilts are expected to mature in market hands and need to be refinanced. It is not possible to forecast net changes over the year in the foreign currency reserves and so these are assumed to remain unchanged.

The financing requirement for 1996/97 is therefore currently forecast to be around £35.6 billion, subject to any over or underfunding carried forward from 1995/96 and to any changes in the foreign exchange reserves. Table 7 (of the *Debt Management Report 1996/97*, see below) gives full details of all the financing instruments the Government intends to use to achieve this in 1996/97. The Government does not intend to finance the

The 1996/97 financing requirement

(Table 7 in the *Debt Management Report 1996/97*)

CGBR forecast Expected net change in the official reserves Gilt redemptions Under/overfund from 1995/96	24.1 	*
Financing requirement	35.6	
Less net financing from:		
Department for National Savings	3.0	
Certificates of Tax Deposit (a)		
Remaining debt sales required	32.6	
Made up by not sales of:		
Made up by net sales of: Treasury hills and other short-term debt (b)	_	
Made up by net sales of: Treasury bills and other short-term debt (b) And gross sales of:	—	
Made up by net sales of: Treasury bills and other short-term debt (b) And gross sales of: Ultra-short Conventional Gilts (1–3 years)	_	
Made up by net sales of: Treasury bills and other short-term debt (b) And gross sales of: Ultra-short Conventional Gilts (1–3 years) Short Conventional Gilts (3–7 years)	9.2	
Made up by net sales of: Treasury bills and other short-term debt (b) And gross sales of: Ultra-short Conventional Gilts (1–3 years) Short Conventional Gilts (3–7 years) Medium Conventional Gilts (7–15 years)	 9.2 9.2	
Made up by net sales of: Treasury bills and other short-term debt (b) And gross sales of: Ultra-short Conventional Gilts (1–3 years) Short Conventional Gilts (3–7 years) Medium Conventional Gilts (7–15 years) Long Conventional Gilts (15+ years)	9.2 9.2 9.2	
Made up by net sales of: Treasury bills and other short-term debt (b) And gross sales of: Ultra-short Conventional Gilts (1–3 years) Short Conventional Gilts (3–7 years) Medium Conventional Gilts (7–15 years) Long Conventional Gilts (15+ years) Index-linked Gilts	9.2 9.2 9.2 9.2 4.9	
Made up by net sales of: Treasury bills and other short-term debt (b) And gross sales of: Ultra-short Conventional Gilts (1–3 years) Short Conventional Gilts (3–7 years) Medium Conventional Gilts (7–15 years) Long Conventional Gilts (15+ years) Index-linked Gilts not yet known.	9.2 9.2 9.2 9.2 4.9	

(a) Certificates of Tax Deposits (CTDs) are deposits made by taxpayers with the Inland Revenue in advance of potential tax liabilities. Changes in the level of CTDs act as a financing item for Central Government. The working assumption at the beginning of each year is that the level of CTDs remains unchanged.
(b) The level of net Treasury bill issuance may fluctuate in-year as a result of money-market operations.

1996/97 CGBR through the issue of Treasury Bills or gilts of less than three years maturity.

National Savings

The net contribution of National Savings to financing (including accrued interest) is assumed to be around $\pounds 3.0$ billion (with gross sales of around $\pounds 10.5$ billion). This is not a target, but an estimate based on experience in previous years and forecasts for 1996/97.

Other debt sales

Net sales of central government debt instruments other than gilts and National Savings are expected to make a negligible contribution to financing. In particular, the intention is that net Treasury bill issuance will not contribute to financing the CGBR, although the stock of Treasury bills and the pattern of issuance will fluctuate in the light of the needs of money market management.⁽²⁾

Quantity of gilt sales

The Bank of England, as the Government's debt manager, will aim to meet the remainder of the financing requirement by selling gilts to the private sector. On the basis of the Budget forecast, this means gilts sales of approximately £32.6 billion, plus or minus any over or underfund carried forward from 1995/96,⁽¹⁾ and any net change in the foreign currency reserves.

Nature of stocks

The Government will continue to have available the full range of financing instruments. Within conventional stocks, the Government will aim for liquid benchmark issues in the 5-year, 10-year and long-dated maturity areas. There may also be floating rate gilt issuance. The aim will be to issue index-linked gilts across the maturity spectrum.

In order to build up the liquidity of the gilt strips market, the Government intends issues in 1996/97 of new benchmark stocks in the medium and long maturity areas will be strippable when the market begins. The strippability of new short maturity benchmarks will be kept under review.

Pace of gilt sales

The Bank will aim to sell gilts at a broadly even pace through the year. Within year seasonal fluctuations in the pattern of Central Government expenditure and revenue will be met by other financing means, including changes to the weekly Treasury bill tender.

Since the remit was published, the underfunding in 1995/96 has been estimated at £2.0 billion.
 Treasury bill issuance is used to drain the money market so as to provide a basis for the Bank of England's open market operations implementing monetary policy.

Maturity structure of gilt issues

Over the year as a whole, the Bank of England will aim to make approximately 15% of its sales in index-linked stocks with the remainder in conventional stocks spread across the maturity ranges, with approximately one third of issues in each of the short (3–7 years), medium (7–15 years) and long-dated (15 years and over) bands.

Auctions

Auctions will constitute the primary means of conventional gilt sales. No index-linked gilt auctions are planned for 1996/97. The authorities plan to hold conventional gilt auctions on a monthly basis, toward the end of each month on the calendar set out below. Up to three dual auctions are planned instead of single auctions, in July and October 1996, and January 1997, subject to confirmation in the quarterly announcement. In the case of dual auctions, the two stocks will be offered in successive auctions on the Tuesday and Thursday of the week indicated.

Auction calendar 1996/97

Wednesday 24 April 1996

Wednesday 29 May 1996

Wednesday 26 June 1996

Tuesday 23 July 1996 and Thursday 25 July 1996 (a)

Wednesday 28 August 1996

Wednesday 25 September 1996

Tuesday 22 October 1996 and Thursday 24 October 1996 (a)

Late November/December 1996 (b)

Tuesday 28 January 1997 and Thursday 30 January 1997 (a)

Wednesday 26 February 1997

Wednesday 26 March 1997

(a) If a single auction is held instead of a dual stock auction, it will be on the

(a) If a single autom is needed.
 (b) This auction date will depend on the timing of the Budget. It will be published in the relevant quarterly auction announcement (see below).

These auction dates may be altered to avoid data releases or monthly monetary policy meetings between the Chancellor and the Governor of the Bank of England.

Each single auction is planned to be for between £2 billion and £3 billion of stock. A dual stock auction will be for between £3 billion and £4 billion of stock in total with individual auctions between $\pounds 1^{1/2}$ billion and $\pounds 2^{1/2}$ billion.

At the beginning of each calendar quarter, the Bank of England will announce the intended maturity range of stock to be sold at auctions scheduled to be held that quarter, and confirm whether dual stock auctions will be held. The announcement will also give details of progress to date with the gilt sales, any changes to the

Government's financing requirement and any changes to the gilts auction programme.

The Bank will announce at 3.30 pm on 3 April the maturity ranges for auctions in the first quarter of 1996/97.

Full details of these, and subsequent auctions, will be announced at 3.30 pm on Tuesday of the week preceding the auction.

Reviews to the issuance programme

The issuance programme, and in particular the timing and nature of auctions (ie single or dual stock), the allocation between maturity bands and the allocation between conventional and index-linked gilts, may be varied during the year in the light of substantial changes in the following:

- the Government's forecast of the CGBR;
- the level and shape of the gilt yield curve;
- market expectations of future interest and inflation rates:
- market volatility.

Any revisions will be announced.

Tap sales

The programme of conventional gilt auctions may be supplemented by official sales of stock by the Bank of England 'on tap'. Taps of conventional stocks will be used only as a market management instrument in conditions of temporary excess demand in a particular stock or sector or when there is an exceptionally sharp general rise in the market. In 1996/97, it is envisaged that conventional tap issuance will not constitute more than about 10% of expected total issuance.

In 1996/97, it is envisaged that all index-linked gilts issues will be made through tap sales.

After an auction, the Bank will generally refrain from issuing stocks of a similar type or maturity to the auction stock for a reasonable period and will do so only if there is a clear market management case.

Coupons

So far as possible, coupons on new issues of gilts will be around gross redemption yields at the relevant maturity, at the time of issue.

Conversions

In order to build up the pool of strippable stocks further, the Bank of England may, from time to time, make offers for the conversion of unstrippable stocks into strippable ones of similar maturity. Any programme of conversion offers is unlikely to be extensive. Details of any such offers will be announced in due course, in the light of market conditions.

Table EOfficial transactions in gilt-edged stocks

£ billions: not seasonally adjusted

	1995/96	1996		
	AprDec.	Jan.	Feb.	Mar.
Gross official sales (+) (a) Redemptions and net	20.3	0.6	6.4	3.4
within a year of maturity(-)	3.4	0.7	_	_
Net official sales (b) of which net purchases by:	16.9	-0.2	6.4	3.4
Banks (b)	3.0	-0.6	1.9	1.1
Building societies (b)	-0.8	0.1	1.3	-0.3
Overseas sector	4.1	1.3	0.6	-0.1
M4 private sector (b)	10.5	-0.9	2.5	2.1

 (a) Gross official sales of gilt-edged stocks are defined as official sales of stock with over one year to maturity net of official purchases of stock with over one year to maturity apart from transactions under purchase and resale agreements.
 (b) Excluding transactions under purchase and resale agreements. 30-year bond was considered, but the view was eventually taken that a 25-year gilt would be easier to trade and hedge.

The 2021 stock traded at around a 7–8 basis points premium to the longest-existing (dated) gilts ahead of the auction—the new part of the yield curve was inverted, although the premium had slightly narrowed by the end of March to some extent. The auction was covered nearly 1.5 times, with a five basis-points tail (which possibly reflected market uncertainty in pricing a new long bond).

There was no conventional tap issuance in the first quarter. Conventional taps are brought only for purposes of market management, in conditions of temporary excess demand in a particular stock or sector or when there is an exceptionally sharp general rise in the market.

Auctions raised 80% of funding for the year, conventional taps raised 5%, and index-linked taps raised 15%. Within conventional funding, short-dated stocks accounted for 35% of sales, mediums for 33%, and longs for 32%. The composition of funding therefore met the remit to the Bank for 1995/96, which stated that index-linked gilts would constitute approximately 15% of issuance while each maturity band would account for approximately one third of conventional issuance.

Net official sales of gilts during January-March amounted to £9.7 billion. Of this, the monetary sector (banks and building societies) purchased around 40%, somewhat higher than their share in the previous three months and in marked contrast to their overall net sales in the nine months before that. The banks' and building societies' share of total gilt holdings was only 10% at December 1994.⁽¹⁾

Over the financial year as a whole, the bulk of net purchases was by the UK private sector excluding banks and building societies, but including the institutional investors. ONS statistics show that in the final quarter of calendar 1995, institutions increased sharply their net investment in gilts; figures are not yet available for the first quarter of 1996 and not therefore for the financial year. In calendar 1995, institutional net purchases amounted to £14.7 billion. This was below the record levels of 1994, but reflects a continuing significant shift into gilts by pension funds in particular.

On 27 March the Treasury published the *Debt Management Report* including the remit to the Bank of England for 1996/97 (see the box on pages 136–37). The gilt sales requirement for the coming year was forecast to be £32.6 billion but, as noted above, an estimated underfund of £2.0 billion carried forward from 1995–96 will increase this. The Bank will aim to make 15% of sales in index-linked stocks and the remainder by sales of conventional gilts spread across the maturity ranges. The maturity ranges for the stocks to be auctioned in the first three auctions of the new financial year were announced by the Bank on 3 April as 2005–07 (for April), 2020–21 (for May) and 2000–02 for June; it is planned, subject to confirmation, that the last stock should be a floating-rate gilt. The April auction was later specified as of £3 billion of $7^{1/2}$ % Treasury Stock 2006.

(1) Figures for end-1995 from the Central Gilts Office Survey will be available in June.

Spread between 2¹/₂% Index-Linked 2020 yield and FTSE Actuaries All-Share dividend yield^(a)



Yield on British government stock 2¹/₂% Index-Linked 2016







Index-linked gilts

The pace of index-linked issuance also increased in the final quarter of the 1995/96 financial year. Prices of index-linked stocks fell during the quarter, while those of equities rose on balance. This brought the dividend yield on equities, which had been 20 basis points higher than the yield on index-linked gilts at the beginning of the year, down to equality by March. This may be explained by two factors-upward revisions to expected economic growth and relative supply. The market may have been expecting few equity rights issues, but greater index-linked supply, at least until the announcement in the remit on 27 March that there will be no index-linked auctions in the financial year 1996/97. This decision was taken after consultation with the gilt-edged market-makers, end-investors and other market participants: while some had been in favour of an experimental auction programme, others believed that a pilot programme would be risky at the current stage of the market's development. Nevertheless, an experimental auction programme in index-linked gilts has not been ruled out for future financial years.

Market expectations of inflation

Marginal expectations of inflation as derived from gilt yields increased markedly during the first quarter. Calculated expectations of inflation five and ten years hence reached lows of just under 4% and just under 4.6% respectively in the middle of January. However, following the 1/4% UK rate cut on 18 January, the market's implied inflationary expectations began an upward trend which continued throughout the quarter. Inflationary expectations also saw a sharp upward movement on the day of the 8 March 0.25% rate cut, but it is difficult to separate the impact of the cut itself from the apparent 'news' about international inflation contained in the exceptionally strong US employment data released on the same day. In the quarter as a whole, nearer-maturity inflation expectations saw larger increases than longer maturities: five-year expectations rose by 0.65% over the quarter to 4.75%, while ten-year expectations increased by just 0.3% to 5.0%. Implied 'expectations' of inflation can include indistinguishably increased risk premia associated with increased uncertainty about future inflation, rather than a rise in mean expectations of future inflation. Given increased uncertainty in bond markets (as proxied by implied volatility in conventional bonds), risk premia may have increased in the first quarter.

Foreign exchange markets

Currency markets were generally calmer than government bond markets during 1996 Q1. The US dollar traded in a reasonably narrow range between DM 1.4400–1.4950 and short-run measures of historical (actual) volatility generally remained subdued and below longer-run measures. Similarly, implied volatility on Deutsche Mark/US dollar options continued to decline over the period as a whole to levels last seen in January 1995 (prior to the dollar's precipitous decline in February/March 1995). However, the fact that volatility increased in all the major government bond markets may have served to limit the impact on the foreign exchange markets, with the evolution of the Deutsche Mark/US dollar exchange rate being influenced in the main by short-term interest rate expectations, which moved in favour of the dollar during 1996 Q1.

Dollar/Deutsche Mark exchange rate and the three-month eurodollar/euro-Deutsche Mark interest rate spread



UK and US effective exchange rates



The dollar, which started the year at DM 1.4403, strengthened against the Deutsche Mark from 10 January following the release of weaker-than-expected German economic data (December unemployment, pan-German Q4 GDP) which fuelled expectations that German interest rates would be lowered further. The Bundesbank subsequently cut its repo rate steadily over the course of the next three weeks until the downward movement in German money-market rates was halted on 1 February when a fixed-rate repo was introduced at 3.30%. The dollar tested resistance at DM 1.4950 on 1 February (above the dollar's November/December 1995 trading range and its highest level since September 1995), but was unable to breach this level, and retreated slightly the next day after the release of US non-farm payrolls data for January which showed a sharp fall.

In the first week of the New Year, the dollar strengthened against the yen, as market attention continued to focus on Japanese financial fragility when Tokyo financial markets reopened on 4 January. The dollar, which had twice failed to breach resistance at around ¥104.50 in September and November, broke through this level to close at ¥106.05 on that day. And, although it subsequently drifted lower, strong technical support was now apparent at ¥104.50.

Sterling was largely sidelined during January, with sterling's movements generally tracking those of the dollar. Sterling began the year at DM 2.2173 and at 82.9 on the effective exchange rate index. Sterling strengthened with the dollar against the Deutsche Mark from 10 January as market attention focused on the prospects for German monetary policy (although the extent of sterling's appreciation was limited as it slipped below a long-term support line against the dollar at \$1.54). By 17 January, sterling had reached a high of 83.5 on the effective exchange rate index before the release of PSBR and average earnings data, which supported expectations of an interest rate cut, caused it to fall by 0.5 points to 83.0 over the next 24 hours. In the event, sterling reacted calmly to the actual rate reduction on 18 January and it ended the day unchanged at 83.0 on the index. It continued to track the major currencies for the remainder of January and, although it briefly slipped below \$1.50 before the end of the month, it finished up 0.4 points on an effective basis at 83.3 due to the currency's gains against the Deutsche Mark.

In the first half of February, sterling appreciated further against the Deutsche Mark and January's losses against the dollar were also partly reversed. Factors which contributed to sterling's rise were the relative outperformance of UK gilts and the closing of speculative short sterling/long US dollar positions by US investment funds. Sterling reached a high of DM 2.2735 on 7 February, its best level against the Deutsche Mark since October 1995, and 84.4 on an effective basis; the currency also tested resistance above \$1.5390. With the major currencies rangebound, sterling continued to trade around these levels until nervousness ahead of the publication of the Scott report on arms sales to Iraq caused it to weaken slightly. Uncertainty lessened following the report's actual publication on 16 February.

However, sterling subsequently came under pressure as a result of international factors. The dollar weakened abruptly against the yen from 15 February, following comments by Japanese Minister Kubo

which were interpreted as implying that Japanese interest rates might be raised sooner than had previously been expected. The dollar, which had been trading comfortably above ¥106 since late January, fell as low as ¥104 by the close of London trading on 19 February. This helped sterling to reach a six-week high of \$1.5509 but it was unable to hold its ground against the Deutsche Mark, which benefited from flows out of the dollar, amid speculation that January M3 data would be stronger than earlier estimates. Sterling closed at DM 2.2323 (a loss of nearly three pfennigs on the previous day's London close). On 20 February the dollar rallied strongly on reports of yen sales by the Bank of Japan, regaining ¥106 and DM 1.45. But the dollar subsequently drifted as low as ¥103.3 in London trading on 27 February before reports of further intervention by the Bank of Japan helped the dollar to recover to ¥104.5 by the close of London trading. The dollar was unable to make any further progress until the release of a weaker-than-expected Tankan survey on 1 March calmed market fears about an early increase in the Bank of Japan's official rates. The dollar stabilised against the Deutsche Mark from 23 February, following the release of German M3 data for January which were below some market estimates. It recovered back above DM 1.46 on 28 February following the release of higher-than-expected US CPI data for January, which-taken together with the earlier release of strong US housing starts data—were viewed as reducing the chance of any further cut in the Federal Reserve's target federal funds rate. Sterling was aided by the dollar's recovery and the currency ended the month at DM 2.2501 and 83.5 on the ERI.

During March, short-term interest rate expectations continued to move in the dollar's favour and the spread between ten-year US Treasuries and Bunds narrowed further following the release of much stronger than expected US non-farm payrolls data on 8 March. These movements proved to be helpful in supporting the dollar. The US currency moved higher again testing resistance at DM 1.4950 on 11/12 March, but the dollar was again unable to break out of its recent trading range, remaining stuck between DM 1.47–1.48, for the remainder of the month.

Sterling strengthened with the dollar, reaching DM 2.2670 ahead of the UK rate reduction on 8 March; it ended the day unchanged at 83.7 on the index. After the weekend, sterling weakened slightly, but strong technical support was evident above DM 2.24 (near the 200-day moving average) and it subsequently strengthened against a range of currencies aided by a favourable technical picture. The currency reached a high of 84.1 on the index on 22 March before weakening as attention focused on BSE and the possible implications for the PSBR and the trade balance. But the cutting of long-sterling positions was short lived, and the currency quickly recovered to finish March at 83.4 on the index, compared with January's opening figure of 82.9.

The gilt repo market

The introduction of gilt repo trading from 2 January this year was the most significant change to the structure of the gilt-edged market since Big Bang in 1986. It is now possible for anyone to repo⁽¹⁾ gilts to anyone else for any purpose; and, in parallel, the gilt-lending market has been liberalised, so that gilt holders now have a choice of lending their stock via intermediaries or directly to borrowers. The Bank has been monitoring the development of the new market, which seems so far to be characterised by steady growth. An early development was a fall in the cost of both inventory finance and the 'covering' of short positions in particular stocks. Although there are no market-making obligations in gilt repo, several large banks and some discount houses are reported to make two-way prices which extend out to one year. Individual trades have grown in size, and are frequently £100 million or more.

The gilt repo market was facilitated by the decision of the authorities to remove various rules limiting who could borrow stock for what purpose; through the development of a market standard legal agreement and a Code of Best Practice; through adjustments to the service provided by the Central Gilts Office (CGO) settlement system; and by changes to the withholding tax arrangements for gilt dividend (coupon) payments. Most wholesale market participants are eligible to hold their gilts in a CGO STAR account and receive gross dividend payments, subject to quarterly accounting for holders of gilts who are taxable in the United Kingdom. Over 130 such accounts have been opened, in which more than £100 billion of gilts are held. From 4 March, the Bank of New York, Cedel and Euroclear each began offering settlement services as members of CGO, which has added to the range of services available to the gilt market.

Market structure

Gilt repo is so far predominantly a wholesale professional market. It is believed that about 100 organisations have completed the new gilt repo legal documentation. The main participants are clearing banks, major European banks, the discount houses, gilt-edged market-makers (GEMMs), and international securities houses. More recently, building societies have been among those joining the market. A number of institutional investors-life insurance companies and pension funds-now have gilt repo legal agreements in place, and have started to participate in the market, but most continue to lend their gilts rather than use repo. Non-GEMMs, including banks, are now using the freedom the new market gives them to go short of gilts. A

name-passing broking service in gilt repo is provided by several of the brokers listed by the Bank under Section 43 of the *Financial Services Act*. Lending via intermediaries has continued but there has also been growth in lending directly to the GEMMs and other participants. Some market participants believe that institutional investors will increasingly use repo once they have, or delegate, cash management functions.

One structural change which has resulted from the new market is that there are no longer any stand-alone Stock Exchange Money-Brokers (SEMBs)—the stock-lending intermediaries in the gilt market prior to the advent of open gilt repo-under the Bank's supervision. They have merged with discount houses, merchant banks or securities houses, or have continued as stand-alone money-brokers under Securities and Futures Authority supervision; one former SEMB wound down its activities and ceased to trade.

Size of the market

The Bank has begun to collect data on levels of activity in both the repo and stock-lending markets on a quarterly basis. At the end of February, more than 60 participants contributed; these included all major market professionals, but only a cross-section of institutional investors, many of whom are known to be active in stock lending. Although the data collected do not, therefore, give a fully comprehensive view of stock lending, the picture given for repo is thought to be nearly complete.

Table 1 suggests that, measured in terms of outstanding amounts reported, combined gilt repo and stock lending activity had reached around £50 billion⁽²⁾ by the end of

Table 1 Outstanding amounts^(a) at end-February by practitioner

£ billions

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	Banks (b)	Securities houses and others (c)	Total (d)
Repo	21.3	15.1	36.4
Stock lent	1.9	2.0	3.9
Sell/buy back (e)	1.0	0.3	1.3
Total out	24.2	17.5	41.7
Reverse repo	22.6	11.7	34.2
Stock borrowed	9.1	2.7	11.8
Buy/sell back (e)	1.0	0.6	1.6
Total in	32.7	15.0	47.7

(a)

Transactions entered into, but for which the second leg has not yet settled. Transactions are reported gross of other, similar transactions with the same coun Including discount houses, and, in some cases, other parts of the banking group. Including GEMMs and all other reporters. me counterparty (b)

(d)

Sell/buy and buy/sell transactions conducted under an annex to the Gilt Repo Legal Agreement are included under repos and reverse repos. (e)

A gilt repo is a sale and repurchase agreement under which Party A sells gilts to Party B with a legally binding agreement to purchase equivalent gilts from Party B at an agreed price at a specified future date. Each repo must, by definition, give rise to a reverse repo, and each stock loan to a stock borrow, etc. Therefore, differences between the reported totals of each matching pair is an indication that our sample does not capture the whole population of participants using the market. Adding together the larger figure from each pair gives the most complete estimate we can make of the total market size. (2)

February, of which around £36 billion was in gilt repo. The relative totals for repos and reverse repos suggest that the reporting institutions cover nearly all of this market.

In contrast, the £7.9 billion difference between the data reported on gilt stock lending and borrowing illustrates the extent to which some of the main stock-lending institutions are not yet reporting (although several have indicated that they plan to start to do so at the end of May). Stock is borrowed by, among others, the discount houses (which now incorporate some of the former SEMBs), who may then repo, lend or sell it on to other market participants, including the GEMMs. As Table 1 and Chart A show, banks (including discount houses) have a large share of the new gilt repo and stock-lending activity.

Chart A Outstanding amounts at end-February by practioner



This evidence for the growth of the repo market is corroborated by the monetary statistics published by the Bank, which showed that gilt repo contributed to strong rises in both M4 and lending to the M4 private sector in January. It is difficult to estimate the proportion of the rises in M4 and M4 lending carried solely by the emergence of the new market, because to do so would require us to know the extent to which repo business substituted for existing borrowing and lending; these issues are discussed in the May Inflation Report. At the end of January, gilt repos and reverse repos outstanding on banks' balance sheets amounted to some £15 billion and £22 billion respectively. Although the repo market continued to expand in February and March, the impact on M4 and lending was modest, as most of the growth was in interbank repo business which is excluded from M4. At the end of March, gilt repos and reverse repos outstanding on banks' and building societies' balance sheets were some £25 billion and £30 billion respectively.(1)

Table 2 shows the maturity breakdown of outstanding transactions reported to the Bank. Activity is mainly at shorter maturities, with around 65% of repo transactions reported having a maturity up to one week. But over 18% of repo and over 26% of reverse repo transactions reported are at maturities greater than one month. Stock lending is more concentrated at shorter maturities, which is consistent with the traditional practice of lending stock on call which prevailed prior to the start of gilt repo.

Table 2

Outstanding amounts at end-February by maturity £ billions

r billion

	On call and next day	2–8 days	9 days– 1 month	1–3 months	3–6 months	Over 6 months	Total (a)
Repo	15.2	8.6	6.1	5.3	1.3	_	36.2
Stock lent	3.4	0.1	0.3	0.1	_	_	3.9
Sell/buy back	0.3	0.3	0.3	0.2	0.1		1.3
Total out (a)	19.0	9.0	6.7	5.6	1.4	—	41.7
Reverse repo	13.7	7.1	4.5	7.3	1.5	0.1	34.2
Stock borrowed	9.7	0.4	0.6	0.8	0.4		11.8
Buy/sell back	0.3	0.4	0.3	0.6	0.1	0.1	1.6
Total in (a)	23.7	7.9	5.4	8.7	1.9	0.1	47.7

(a) Numbers do not always sum because of rounding

The data collected show that turnover in gilt repo and stock lending during January and February as a whole exceeded £550 billion, or an average of around £12 billion per day, but this average no doubt conceals heavy concentrations in February once the bulk of the new gilt repo legal agreements were in place. Around 80% of reported turnover was under the new gilt repo legal documentation (including documented buy/sell trades), around 20% under stock lending documentation, and less than 1% in undocumented buy/sell trades. The Bank does not regard undocumented transactions as a secure basis for a repo market; the Gilt Repo Code of Best Practice, which was drawn up by a working party of market practitioners and regulators under Bank of England chairmanship, stresses the strong desirability that transactions be conducted under an appropriate legal agreement.

Turnover statistics collected by the London Stock Exchange (LSE) provide some support for the market's perception that the introduction of gilt repo trading has already increased the depth and liquidity of the cash gilt market. Turnover in gilts in the first quarter of 1996 rose to an average daily value of £8.1 billion, compared to £6.2 billion for 1995; as gilt repo trades are transacted off-Exchange, they should not themselves be included in the LSE's data. LSE data also suggest that the average size of gilt trades has increased in the first quarter of 1996: customer bargain sizes averaged £2.0 million, compared with £1.7 million for 1995.

The CGO service has handled the establishment and operation of the new STAR accounts and with the increase in member-to-member deliveries. Adjusting to the extended CGO timetable, however, initially proved difficult for some

⁽¹⁾ The definitions used in the banking statistics differ in some respects from those adopted for reporting to the Bank for market monitoring purposes. For example, the latter are always reported gross, but in the banking statistics offsetting repo and reverse repo obligations may in some cases be reported to the Bank on a net basis. Both sets of statistics, however, are given here including banks' repo liabilities under the Bank of England's twice-monthly repo facility.

market participants. CGO responded to these difficulties by staying open slightly later when necessary to facilitate late deliveries. The Bank has been reviewing with the market how best to instil market discipline and to ensure that delivery instructions are input into CGO as early as possible.

Both member-to-member deliveries and deliveries-by-value (DBVs) have been used to settle repo trades, the latter being frequently used for overnight and one-week trades (see Chart B). An overall decline in DBVs is attributable to reduced intermediation in the stock lending market, in which DBVs were a common means of passing collateral.





The pricing of gilt repo and stock lending

Some market participants think that the repo market will over time attract business from the unsecured interbank market, although figures for January and February show no decline in the latter. Gilt repo is, by definition, secured on gilts, and credit considerations alone suggest that repo rates should be below unsecured interbank rates. Charts C and D show the spreads between rates in the unsecured interbank

Chart C





market and in the gilt repo general collateral market (that is, a repo of a gilt or a parcel of gilts having no 'special' value—see above). Chart D shows the emergence of lower rates in the repo market at a maturity of three months, but there is less evidence of a trend in the divergence of the respective overnight rates.



Three-month interbank rates minus three-month gilt repo general collateral rates (middle rates)



Repo has reduced the cost of financing gilt holdings for many gilt market participants, particularly the GEMMs. Reduced financing costs should increase the attraction of the gilt market to traders and investors and, over time, help to reduce the borrowing costs of the government. Previously, the rate at which GEMMs might have expected to finance their gilt positions was at least Libor; but they, and other holders of gilts requiring finance, can now repo out their gilts and receive cash at Libid minus a margin.

There has also been a fall in gross stock lending fees to 10 basis points or less compared to around 25 basis points previously. If stock is reversed-in rather than borrowed, the cost is reflected in a loan of cash to the original owner of the stock at an interest rate lower than that for general collateral. The standard discount to general collateral will reflect the implicit fee for borrowing a specific gilt. In repo markets, specific stocks can go 'special', meaning that the discount to general collateral is large, reflecting an excess demand for borrowing/reversing-in that particular stock. There has been activity in the specials market, particularly in stocks which had previously been described as occasionally difficult to borrow in the stock lending market; such stocks as, for example, 6% Treasury 1999, 8% Treasury 2000 and 7% Treasury 2001. So far, however, gilt 'specials' rates have not been as low as those found in repo markets overseas, this being attributed to the previously-established and efficient network of contacts which has facilitated the supply of stock to the market. Extreme specials rates have been very short lived. Some market participants believe that specials activity will increase as the market develops. The Bank does not discourage specials market activity, but reserves the right to

bring a tap issue of stock for market management purposes if, for example, an issue were squeezed. There has been no evidence of a false or disorderly market in any particular stocks.

The gilt repo and liberalised stock lending markets are still developing. The evidence suggests that repo activity continues to grow steadily, but it is difficult to predict the extent of future growth. Some think that by the end of the year the number of participants may have risen to as many as 200, and daily turnover to perhaps double present levels. It seems that more participants are planning to enter the market, and that some are gradually concluding the necessary legal agreements. There is talk of the corporate sector becoming involved, and of the possibility of fund managers establishing money funds based on the repo market. The Bank will continue to monitor the market, and stands ready to help where practicable.

Given the depth in trading which has developed, the gilt repo market has already proved a useful addition to the secured money market and to the techniques for borrowing stock, and the generalised ability to short and borrow specific gilts has been welcomed.

The international environment

This article considers economic developments in the European Union, North America and Japan since the February 1996 Quarterly Bulletin. These countries account for about half of world GDP, but three quarters of UK external trade.

Two topics are considered separately in boxes: the relative performance of services and manufacturing output in the G7 economies; and fiscal consolidation in Europe.

- GDP in the major six (M6) international economies barely grew in the last quarter of 1995. Activity in continental Europe weakened further. There were signs of recovery in Japan, but it was not broadly based. The US economy was affected by several special factors over the winter, but underlying growth was probably near its long-run trend.
- Inflation remained at around 2% a year in the M6 economies in the year to February 1996. Consumer price inflation fell noticeably in Germany and Italy at the start of 1996.
- Official interest rates were unchanged in the United States and Japan. The United Kingdom, France, Spain, Canada and the Scandinavian countries all cut their rates in March. The Bundesbank cut rates in Germany by ¹/₂% in mid-April; several European central banks followed suit. Yield curves steepened over 1996 Q1, reflecting market perceptions of a turning point in interest rates.

Table A GDP growth

Percentage change over previous quarter

		United States	Canada	Japan	Germany	France	Italy	Major six (a)
1994	Q3 Q4	0.9 0.8	1.4 1.1	0.6 -1.1	0.6 0.6	0.9 1.0	1.6	0.9 0.4
1995	Q1 Q2 Q3 Q4	$\begin{array}{c} 0.1 \\ 0.1 \\ 0.9 \\ 0.1 \end{array}$	0.3 -0.2 0.3 0.2	$\begin{array}{c} 0.1 \\ 0.6 \\ 0.6 \\ 0.9 \end{array}$	0.3 1.1 0.1 -0.4	0.7 0.1 0.1 -0.4	1.5 	0.3 0.3 0.7 0.1

(a) UK trade-weighted average

Chart 1

Business investment and non-business investment output in Germany



GDP fell in Germany, France and Italy in the final quarter of 1995

The weakness of the German economy (see Table A) is of particular concern, because some of the causes are structural rather than cyclical, and because of the importance of the German economy in Europe. While German exports picked up strongly during 1995, reflecting the softening of the Deutsche Mark since spring 1995, this has not, as in the past, fed through to investment, employment and consumption. Business sentiment was successively weaker in January, February and March 1996. Direct investment abroad has been strong, but domestic investment remains well below levels usually associated with the current stage of the business cycle (see Chart 1). Structural problems have contributed to an upturn in unemployment since autumn 1995. An end to the construction boom, exacerbated by bad weather in January, pushed unemployment up further. Seasonally adjusted unemployment reached 4.0 million in March. The sharp rise in unemployment may explain why tax cuts in January have not yet affected spending; the possibility of tax increases ahead may be another factor.

In France, GDP fell by 0.4% in the last quarter of 1995, following two weak quarters—an identical pattern to that seen in Germany. Depressed household consumption and a reduction in stocks—particularly in the strike-affected fourth quarter—were the main contributions to the weakening in domestic demand (see Table B). The first quarter in 1996 is likely to have been stronger,

Output growth in the G7 countries by type of activity

Since 1990, the service sector has grown more quickly than manufacturing in the United Kingdom, as the chart shows, and construction has fallen. Manufacturing and construction grew relatively quickly during 1994 and then much slower during 1995. This note examines experience elsewhere in the major economies of Europe and the United States.



As the table shows, the UK experience is similar to that of other economies. In all countries other than Germany, construction has been the slowest-growing sector of the economy; and in all countries other than Italy services have been the quickest growing. But within this period, manufacturing and construction performed particularly poorly during the recession. When economic recovery started, manufacturing picked up, growing temporarily more quickly than services, but construction remained weak. In 1994, construction grew quickly everywhere. In 1995, however, there was a general slowdown in manufacturing and construction—with the exception that in Italy manufacturing continued to grow strongly.

Output growth by sector 1990 Q1-95 Q3

Per cent			
	Service	Industrial	Construction
United Kingdom	7.8	5.8	-12.1
Germany	23.5	-16.9	-9.2
France	7.5	2.4	-9.6
Italy	8.6	9.4	-11.1
United States	17.6	2.0	-6.1

What explains this? Sectoral growth has been closely linked with economic activity, but services are much less cyclical than the rest of the economy. This is for several reasons: the counter-cyclical parts of government spending are centred in services, and manufacturing is much more accurately measured than services in the national accounts: if people trade down in services in times of recession it might not be reflected by the statistics. This begs the question of why growth in the major economies slowed in 1995. Real interest rates were very low during 1993 and early 1994, but fears of incipient inflationary pressures, especially in the United States, led to a sharp rise during 1994. This resulted in slower growth in residential investment and consumption during 1995. The Deutsche Mark appreciated sharply in early 1995, and German business competitiveness was further eroded by large wage rises. This aggravated the slowdown in Germany and resulted in a rise in unemployment, which in turn has led to very weak demand. In France continuing high unemployment and fiscal tightening, driven by the need to reduce the fiscal deficit, have aggravated low confidence and weak demand.

In addition to its effect on demand, the rise in interest rates may have led to a greater slowdown in the industrial than in the service sector. This is because industrial firms are typically more capital intensive, and so are more prone to being unable to service their repayments in times of high interest rates. Construction work is very interest sensitive, and the rise in interest rates explains much of its slowdown.

There are also long and short-term trends. Services have grown more quickly than industrial output on average throughout the post-war period in Western Europe and North America. This is partly because of growing incomes and wealth, which have led to a relative increase in demand for leisure services, and partly due to the comparative advantage in industrial production in Japan and more recently the NIEs. The information technology revolution has recently led to fast growth in communications, which in the short run will favour services, but in the long term is likely to raise output throughout the economy.

An important influence on the relative performance of different countries' sectors is the real exchange rate. If a country's real exchange rate has appreciated, it will hit the manufacturing sector—which produces a higher proportion of tradables—harder than the service sector. This largely explains the relatively poor performance of manufacturing in Germany and its relatively good performance in Italy over the last few years, as illustrated in the table.

In 1996, growth in continental Europe may remain weak during the first half, but could strengthen towards the end of the year. This means that industrial activity and construction may remain relatively weak. In the United States, growth could be around trend, with services growing slightly more quickly than the other sectors.

Table BContribution to growth in GDP in 1995 as awhole

	United States	Germany	Japan	France
Stocks	-0.4	-0.1	0.2	0.1
Investment	0.9	0.4	0.1	0.6
Net trade	-0.1	0.3	-0.7	0.2
Government	_	0.4	0.2	0.2
Consumption	1.6	1.1	0.9	1.1
Total (a)	2.0	2.1	0.9	2.2

(a) Totals may not sum due to rounding.

Chart 2 Business confidence



Chart 3 Quarterly change in US non-farm employment



Chart 4 US employment and productivity



in part reflecting a rebound from the strikes. But, in addition, there have been one or two encouraging signs. The survey of investment intentions in January predicted an 11% rise in investment in the year. Even if investment turns out somewhat lower, it will nevertheless contribute significantly to growth. Household consumption of manufactured goods in January also increased by 5.1%, with car purchases particularly robust. In February, however, industrial production fell sharply. Over 1996 as a whole, growth in real personal disposable income may be limited, if fiscal consolidation continues and wages growth is restrained. With unemployment on the increase, consumption is unlikely to be an engine of growth.

The fall in GDP in Italy in the last quarter of 1995 was surprising, given the exceptionally strong third quarter. The data are volatile, however, and so too much weight should not be given to a single quarter. A deteriorating external outlook and slower growth of domestic demand may result in some slowdown this year in GDP growth this year.

In Europe as a whole, lower interest rates, low inflation and growth in the rest of the world point to some recovery in activity later in the year. The need for further fiscal consolidation is likely to hold back growth, however, and confidence has yet to recover (see Chart 2).

US economy seems to be growing near long-run trend

The exceptionally large increase in non-farm employment (see Chart 3) in February supported the notion that the softness in the US economy during the winter months was largely due to temporary factors such as strikes, bad weather and government shutdowns.

Recent data suggest that output growth is returning to around its long-run trend of about 2.2% (see Chart 4). Even though the economy is in its fifth full year of expansion, there appear to be none of the imbalances which usually characterise the peak of a cycle. Indeed the balance of risks to growth may be on the upside.

The high level of consumer indebtedness is probably the main downside risk to continued expansion in the United States. The ratio of consumer indebtedness to personal disposable income reached a new peak in the fourth quarter, and there is some evidence that defaults on mortgage and other consumer debt have been rising, albeit from very low levels. But consumption should be supported by continued growth in incomes and by the rise in equity prices.

The Japanese economy picked up in the fourth quarter

In Japan, GDP grew by 0.9% in the fourth quarter, and third quarter growth was revised up to 0.6%. Growth came entirely from public sector investment—reflecting the fiscal packages announced in September—and residential investment. Other components of domestic demand were more subdued, and net external trade made a negative contribution to growth. Data in early 1996 were mixed.

Chart 5 GDP in the major economies





Chart 7 Price of Brent crude



The recovery in the Japanese economy may continue during 1996, as the effects of the fiscal stimulus announced last September continue to feed through. The main risk is that the momentum may falter as this effect comes to an end in the latter part of this year. Financial sector fragility also remains a concern, with progress in tackling the jusen (housing corporation) problems proving difficult.

Inflation—the short-term outlook is benign

The annual rate of consumer price inflation in the M6 overseas economies has remained around $2\%-2^{1/4}\%$ over the past two years. Differences between areas persist, however; recorded consumer prices in Japan were around $^{1/4}\%$ lower in February 1996 than a year earlier (the statistics almost certainty underestimate the extent of the fall in prices) and around $2^{3/4}\%$ higher in the United States. In Canada, core inflation, which excludes food and energy, was 1.6% in the year to February, well within the Bank of Canada's 1%-3% target.

Consumer price inflation in Germany fell further to around $1^{1/2}$ % in the first couple of months of 1996, and the increase in prices in France, that had been expected following earlier tax increases, proved modest. In Italy, consumer price inflation has moderated considerably since November. Technical factors, including a reweighting and a rebasing of the consumer price index, together with tax increases being removed from the index, brought consumer price inflation down to 4.5% a year in March (see Chart 6). This was still above the Banca d'Italia's inflation objective of 4% for 1996, but the consensus among private sector forecasters in April was that inflation would fall to 4% in Q3.

There is little sign of immediate upward pressure on inflation in the pipeline. On the latest figures, producer prices were lower than a year earlier in Japan, France and Germany and producer price inflation fell in Italy and Canada. Producer price inflation picked up a little in March, but this largely reflected temporary rises in the prices of seasonal foods and energy.

Oil prices rose sharply in March, (see Chart 7), but this appeared to be a short-term supply problem; certainly the futures markets indicated that the high prices were not expected to persist. A surge in demand due to cold weather in the United States and Europe was one factor pushing up prices. Further ahead supply may increase if UN negotiations with Iraq are resolved.

Looking further ahead, however, the upside risks to inflation have increased since the February Quarterly Bulletin

In the United States, the main risk comes from the labour market. The possibility of above-trend output growth as the stock cycle ends could push unemployment lower, and put pressure on wage costs. Unemployment has been close to estimates of its natural rate for some time, and wages growth has been stable. A further reduction in unemployment could lead to escalating wage costs. There has already been some pick up in average hourly earnings, (see Chart 8) but this probably reflects a shift towards more skilled employment. The recent acceleration in unit labour costs may lead to an increase in inflationary pressure.









Chart 10 UK implied bond market volatility^(a)



Expectations of inflation further ahead may have increased

Nominal bond yields in the United States, the United Kingdom, Canada, Germany and Italy have been rising steadily since mid-January, with the increasing perception that the global cycle of interest rate cuts might be coming to an end (see Chart 9). The upwards drift in yields accelerated sharply in the United States following publication of the much stronger-than-expected employment data. Elsewhere bond yields rose by less.

What explains the rise in bond yields? Historically financial markets' inflation expectations have been the main influence on nominal long bond yields. In the United Kingdom about two thirds of the rise in long bond yields to mid-March was attributable to an increase in implied forward inflation rates, and the remaining third reflected an increase in the real rate of interest. (This decomposition is based on analysis of yield differentials between conventional and index-linked gilts.) It is not possible to break down nominal yields in other countries in this way, but, given that real interest rates tend to be determined by global factors, it would not be surprising if the rise in real interest rates had been similar. This would imply a general increase in implied forward inflation rates, which could reflect higher inflation expectations and possibly an increase in the risk premia demanded by investors. The increase in implied bond market volatility since the start of the year (see Chart 10) provides some evidence that uncertainty has increased. This is only likely to account for a small part of the rise in implied forward inflation rates, however. Most of the rise is likely to be due to higher inflation expectations.

Both narrow money and broad money growth accelerated

Growth rates of narrow and broad money aggregates have been increasing in most of the G7 countries since the end of 1994 or early 1995 (see Charts 11 and 12). In the fourth quarter of 1995 average broad money growth reached its highest rate since end 1991. Over the past 20 years narrow, and, to a lesser extent, broad money growth have been relatively good leading indicators of inflation in the majority of the G7 countries, although the relationship between money growth and inflation has weakened in the 1990s. In the case of narrow money, this may reflect a change in velocity associated with a lower inflation environment. Alternatively, the fall in inflation expectations may have lengthened the transmission lags from money growth to inflation. If the latter explanation were true, it would imply that inflation will pick up in the future.

Narrow money

Japan had the highest growth rate of narrow money in 1995 Q4; M1 grew by 12.9%, in part reflecting the Bank of Japan's measures to boost liquidity. In February M1 accelerated again (to 16.1% annually), probably reflecting the extremely low interest rates offered on deposits.

In Germany, currency in circulation accelerated in Q4 1995, though its growth rate is still low compared with the average over the post-unification period. M1's growth rate increased from 3.5% in Q3 to 6.3% in Q4. Narrow money growth in France continued to be erratic, especially in December when three-month annualised growth was 29.0%. January's growth rate, however, was more

Chart 11 Average narrow money growth in the G7



Chart 12 Average broad money growth in the G7







modest. Italian M1 increased by 1.4% annually in 1995 Q4, but its growth fell again slightly in January.

In the United Kingdom, annual growth was 5.7% in 1995, but rose to 6.0% in February again.

In contrast, the annual growth rate of currency in circulation in Canada and the United States has continued to slow down—to 2.7% in Canada and 5.4% in the United States.

Broad money

Among the G7 countries, broad money grew most strongly in the United Kingdom in the fourth quarter of 1995, with a growth rate of 9.9% for M4. This was well above the 3%–9% monitoring range. From January 1996, M4 outturns include the effects of the open gilt repo market, which may increase the volatility of M4 monthly growth rates. But the general picture, is one of continuing strength. Broad money growth also rose in the United States, indeed M3 growth exceeded its range of 2%–6%, at the end of 1995. Canada's M2+ growth rate was relatively stable over the period under review at 4.4%. German M3 picked up strongly in Q4, and continued to grow well above target in the first three months of 1996. Lending to the private and public sector increased, whereas monetary capital formation slowed down as investors became uncertain about the future level of interest rates.

In France, M3's annual growth rate fell slightly, but M2 increased strongly after an exceptionally high figure for December. Broad money in Italy continued its recovery (+3.1% in Q4).

Interest rates

Official interest rates have been unchanged in Japan and the United States since the February Quarterly Bulletin was published on 14 February 1996. France trimmed both its intervention rate and five to ten-day repo rate by 10 basis points on 7 March and the United Kingdom cut base rates by 1/4 percentage point the following day. Spain reduced its 10-day repo rate by 50 basis points on 12 March, and by a further 50 basis points on 3 April. All the Scandinavian countries reduced their official interest rates in March, though by varying amounts ranging from 10 basis points in Denmark to 75 basis points in Sweden. On 18 April the Bundesbank cut both the discount and Lombard rates by 50 basis points, to 2.5% and 4.5% respectively, citing the fall in inflation as the reason for the cut. The German move was immediately followed by cuts in interest rates in Austria, Belgium, Denmark and the Netherlands. Greece, Ireland and Portugal cut their rates the following day.

Fiscal policy

The French and German governments responded to the decline in consumer confidence and rise in unemployment (see Chart 13) with a series of measures.

The German government announced details of a 50 point 'Action Programme for Investment and Jobs'. The objectives, which are to be met by the year 2000, are to halve unemployment, reduce state spending from 51% to 46% of GDP and reduce social security contributions. The package is a series of supply-side measures to

Fiscal developments in the European Union

The marked slowdown in GDP growth in the second half of 1995 has implied a slower-than-anticipated reduction in fiscal deficits across the European Union. This box assesses general government debt and deficit outturns in 1995 and considers the progress being made by Member States towards the criteria set out in the Maastricht Treaty⁽¹⁾.

In autumn 1995, the European Commission forecast that the average general government fiscal deficit in 1995 for the European Union as a whole was expected to be 0.8 percentage points lower than in 1994, at 4.7% of GDP. This compares with the estimate of 4.5% of GDP made early in 1995. According to the most recent data, the average deficit was reduced by only 0.5 percentage points, to 5.0% of GDP.

Table A shows that the general government deficit to GDP ratios continued to vary widely across the European Union in 1995. Compared with 1994, the deficit to GDP ratio fell by more than two percentage points in Greece and Sweden and between 0.7 and two percentage points in the United Kingdom, Belgium, Denmark, France, Italy and Finland. Smaller reductions were made in Spain, and Ireland. The ratio rose slightly in the Netherlands and by one percentage point or more in Germany and Austria. In Luxembourg, the fiscal surplus fell by one percentage point.

Table A

Deficit outturns in EU Member States(a)

As a percentage of GDP

	1995	1994	1993	1992	1991
Belgium	4.5	5.3	6.7	7.1	6.5
Denmark	1.5	3.5	3.9	2.9	2.1
Germany	3.6	2.6	3.5	2.8	3.3
Greece	8.9	11.4	12.1	11.7	11.6
Spain	5.8	6.2	7.4	4.1	4.9
France	5.0	5.9	5.9	3.9	2.2
Ireland	1.9	2.0	2.2	2.4	2.2
Italy	7.2	9.0	9.6	9.5	10.2
Luxembourg	-1.1	-2.2	-1.7	-0.8	-1.9
Netherlands	3.7	3.2	3.2	3.9	2.9
Austria	6.1	4.5	4.1	1.9	2.6
Portugal	5.2	5.7	6.9	3.6	6.4
Finland	5.6	6.3	8.0	5.9	1.5
Sweden	7.8	10.8	12.3	7.8	1.1
United Kingdom	6.0	6.8	7.8	6.3	2.6
European Union	5.0	5.5	6.2	5.0	4.1

(a) Shading shows where the Maastricht criterion has been satisfied.

In 1995, the average ratio of general government expenditure to GDP across the European Union declined to 50.9%, compared with 51.5% in 1994 and a peak of 52.5% in 1993. The ratio of current and capital expenditure and transfer payments fell. But the ratio of interest payments to GDP continued to increase as a result of the rapid debt accumulation in recent years. The ratio of general government receipts o GDP rose marginally, from 45.9% in 1994 to 46.2%. This reflects a minor increase in receipts from direct taxes and social security contributions. The ratio of indirect tax receipts to GDP was unchanged, although several countries raised indirect tax rates in 1995.

Comparing these results with the Maastricht Treaty criteria, only one Member State, Luxembourg, met the reference values for both the deficit and government debt ratio in 1995 (Table B). In Ireland, the deficit remained below 3% of GDP but the debt level was 86% of GDP: the Irish debt ratio has, however, been falling for several years, from 118% in 1986. In Denmark the deficit ratio was reduced below the 3% reference value, while the debt ratio fell for the second consecutive year, reaching 72% of GDP. In Germany, France and the United Kingdom, deficit ratios were above 3% and in these countries, debt ratios were rising but remained below the reference value of 60% in 1995. In all other countries, both the deficit and debt ratios exceed the reference values specified in the Treaty.

Table BGross debt in EU Member States(a)

As a percentage of GDP

	1995	1994	1993	1992	1991			
Belgium	133.8	136.0	137.9	131.5	130.1			
Denmark	72.1	76.0	80.1	68.7	64.6			
Germany	58.1	50.4	48.2	44.1	41.5			
Greece	114.5	113.0	114.5	91.6	86.1			
Spain	65.2	62.6	60.1	48.0	45.8			
France	52.2	48.4	45.4	39.7	35.8			
Ireland	85.4	91.7	98.0	95.0	96.9			
Italy	125.1	125.4	119.4	108.4	101.3			
Luxembourg	5.8	5.7	6.2	5.2	4.2			
Netherlands	78.7	79.1	81.1	79.4	78.8			
Austria	69.2	65.0	62.8	58.3	58.7			
Portugal	71.4	70.0	67.7	63.7	70.2			
Finland	59.4	59.5	57.3	41.5	23.0			
Sweden	76.9	79.3	76.0	67.1	46.9			
United Kingdom	54.3	50.5	48.5	41.9	35.7			
European Union	71.7	68.2	66.0	59.1	54.7			
Source: Member States' data or submissions to the European Union Commission (March 1996), 1995 data provisional								

(a) Shading shows where the Maastricht criterion has been satisfied

While some progress has been achieved in fiscal retrenchment, deficits are still high and debt ratios have risen further for the European Union as a whole. The fact that deficits were not reduced below the reference value in 1995 illustrates the magnitude of the adjustment task which remains, as well as the extent to which weaker-than-expected growth affects fiscal targets.

(1) Economic criteria for the evaluation of budgetary and debt developments are given in Maastricht Treaty Articles 104c(2) and 103c(3) in connection with Article 1 of the Protocol on the excessive deficits procedure. The reference values for general government deficits and debt are 3% of GDP and 60% of GDP, respectively.

promote enterprise, cut taxes and reform social welfare. But many of the measures are no more than proposals at this stage, and several will require parliamentary approval before they can be implemented.

In France, the objective was to increase employment and boost consumption. Initiatives included tax relief on consumer credit and subsidies on housing renovation and a reduction in the rates of interest on certain deposit accounts. It is too early to assess the effect of these measures. There may be stronger effects in certain sectors, such as housing and cars, than in others. On the other hand the measures may be partly offset by an increase in savings, particularly if the expected future value of pensions has fallen. This would account for the recent upsurge in the take-up of life insurance.

Employers in France have been requested to ensure that 50% of new recruits are aged under 25. Subsidies are also being provided to employers taking on apprentices. The most successful measure to boost employment seems to have been the reduction in the cost of unskilled workers over the recent past. By contrast, some surveys have suggested that subsidies to firms taking on particular groups of unemployed workers (such as the young or long-term unemployed) have not increased employment overall.

The structural reforms needed in both economies are made more difficult by the continued need to reduce fiscal deficits. Germany has announced that its general government deficit for 1995 was around 3.5%, overshooting the Maastricht target of 3%. In France the central government deficit was near its target at 4.2% of GDP. This was partly due to an inflow at the end of the year of non-fiscal receipts, such as dividends from state-owned enterprises. More details are given in the box on page 152.

Financial market developments

- International bond issuance rose sharply in the first quarter of 1996 and yields in major bond markets began to rise.
- The rise in equity prices was interrupted in the first half of the quarter, but resumed by the end of March.
- The sharp increase in turnover on derivatives exchanges may, like that in the first half of 1994, be a short-lived reflection of interest-rate uncertainties.

Background

The long rally in bond prices ended in the first quarter; but neither this, nor slowing growth in some of the major economies at the end of last year, prevented a sharp rise in international bond issuance. The average spread between ten-year AAA-rated corporate debt and government bond yields narrowed-in the United States by 13 basis points and in Germany by 20 basis points. In the first half of the quarter, equity prices also fell back-although in this case the reversal appears to have been temporary. The publication of exceptionally strong US non-farm payrolls data on 8 March—which had not been anticipated by the markets-may be part of the explanation for the turnaround in bond yields. The underlying inflation background is currently very different to that at the time of the last major turnaround in bond prices in February 1994. Concerns late last year over the US government's budgetary problems and the Japan premium have receded.

After widespread reductions towards the end of 1995, there were fewer changes in official interest rates in the G7 economies during the first quarter. Estimated ten-year nominal spot rates reached a low-point around 18 January; thereafter they began to rise in the major bond markets. But the scale of the rise varied considerably. By the end of the quarter, they had risen by around 70 basis points in the United Kingdom and United States and by 49 in Germany (Chart 1).⁽¹⁾ But in France and Japan they were actually down slightly at the end of the quarter, albeit having risen initially for a time during January and February. The implied volatility in futures markets of several major government bonds rose during the first quarter. This broadly coincided with the increase in ten-year bond yields.

Spreads against ten-year German government bond yields did not move decisively in one direction in the first quarter.

Chart 1 Estimated ten-year nominal spot rates Per cent United Kingdom Germany United State <u>۲</u> Oct Nov Dec 1995 96

The United Kingdom, United States and Canada saw spreads worsen against Germany, while Japan, France and Italy registered quite large improvements-the spread between Italian and German government bond yields narrowed by 42 basis points compared with the end of the fourth quarter. Despite rising during February, spreads against Germany in some of the higher-yielding EU economies had fallen by the end of March. In Sweden spreads fell 28 basis points; they declined by 63 basis points in Spain, although this was influenced by the result of the general election.

Primary bond markets⁽²⁾

International issues

Merger and acquisition activity and, until recently, a secondary market rally, helped to support issuance in the international bond markets. Issuance of all major forms of international bonds rose in the first quarter of 1996 to a record \$191.9 billion-an increase of 49.0% since the fourth quarter and 70.2% since the same period last year (see

⁽¹⁾ (2)

See the article 'G7 yield curves' by Neil Cooper and Jim Steeley on pages 199–208 of this *Bulletin*. This issue of Financial Market Developments contains bond issuance and syndicated credits data from the IFR database, replacing the Bank's ICMS database. Fuller coverage in IFR means that the back data differ in some cases, particularly for US data and most especially for syndicated credits where the recorded flows are now substantially larger.

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

\$ billions; by announcement date

	1994		1995	1995				
	Q3	Q4	Q1	<u>Q2</u>	Q3	Q4	Q1	
International bond i	issues							
Straights	83.8	83.8	88.6	91.9	100.2	97.7	143.4	
Equity-related	5.9	4.0	3.0	7.6	7.7	5.8	11.7	
of which:								
Warrants	1.0	1.4	1.3	0.7	1.5	3.2	4.0	
Convertibles	4.9	2.6	1.7	6.9	6.1	2.6	7.7	
Floating-rate notes	29.5	29.3	21.0	23.5	30.4	25.2	36.8	
Total	119.2	117.0	112.7	123.0	138.3	128.7	191.9	
Credit facilities (and	ouncem	ents)						
Euronote facilities of which:	53.6	64.1	71.9	70.3	68.8	64.6	78.1	
<i>CP</i> (b)	10.9	6.2	6.8	8.9	6.4	18.6	23.3	
MTNs	42.7	57.9	65.1	61.4	62.4	46.0	54.8	
Syndicated credits	145.2	158.6	172.4	202.3	131.9	182.7	163.5	
Total	198.8	222.7	244.3	272.6	200.7	247.3	241.6	
Memo: amounts outs All international	standing							
Bonds (c)	2.020.8	2.036.3	2.188.5	2.225.3	2.199.7	2.224.9	2.230.4	
Euronotes(b)	378.7	406.1	461.6	517.1	555.8	595.2	647.5	
of which, EMTNs	259.4	292.0	347.1	397.5	426.4	461.0	504.6	
Sources: IFR, Euroclear	BIS							

(a) Maturities of one year and over. The table includes euro and foreign issues and publicised 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.

(b) Euroclear figures.
 (c) BIS-adjusted figures, including currency adjustment. Includes issues of fixed-rate bonds and floating-rate notes.

Table A). US entities were the largest borrowers, accounting for 17.3% of all new issues. The first quarter is generally strong, with 10% to 15% of issuance attributable to a seasonal increase in activity (fourth-quarter issuance is normally 10% down for similar reasons). Adjusting for seasonal factors, the increase in the first quarter of 1996 was more subdued—but still of the order of 20%. The size of the increase compared with the same period last year is surprising—particularly given the uncertainty that the end of the rally may have created for both issuers and investors. It is also interesting to note that issuance was not concentrated in the early part of the quarter—before the rally ended—but fairly evenly distributed through January, February and March.

The sharp increase in issuance compared with the same period last year was widely distributed across the major categories of borrower: central governments increased issuance by just over 100%, companies by 79.8% and banks by 56.3%. Banks remained the largest single class of issuer in absolute terms, accounting for 40.2% of total international issues in the first quarter. The average maturity of all new issues was little changed, remaining around $6^{1/2}$ years which has been typical during the 1990s. Compared with the same period of last year, issuance of new floating-rate notes (FRNs) rose by 75.1% to \$36.8 billion. Issuance of straights has also increased sharply over the past year, so the ratio of FRN to fixed-rate bond issuance rose only slightly to 25.7%.

The long rally in 1995 boosted use of the euromedium-term note (MTN) markets, with issuance up 48.4% on 1994 as a whole. In line with the heavy issuance of international

bonds, activity in the MTN market was fairly strong in the first quarter of 1996 reaching \$54.8 billion. On average, around 90% of the notes issued are denominated in US dollars. One of the world's largest borrowers, the US government-sponsored enterprise Sallie Mae, set up a global MTN programme worth \$20.0 billion in February.

Emerging markets

After the collapse in emerging-market issuance in the first quarter of 1995, issuance recovered during the remainder of last year to reach \$19.2 billion in the final quarter. Possibly linked to the uncertainty characterising bond markets in early 1996, emerging-market issuance was up only 4.5% to \$20.1 billion in the three months to March. For the second consecutive quarter, Argentinian entities were the largest group of borrowers, and Mexico has been among the three largest borrowers in this sector since the third quarter of last year. The relative weakness of emerging-market issuance so far in 1996 contrasts with the strength of international bond issues more generally and suggests that these markets are more vulnerable to increased uncertainty-even though new techniques are being developed by emerging market issuers to deal with currency conversion and settlement risk. For example, some new US dollar eurobonds have coupon and principal linked to the zloty/dollar exchange rate. Since the beginning of last year, Salomon Brothers' Brady bond index has risen steadily, reaching a peak in January this year. Over the first quarter as a whole, the index rose by over 11.2%; it increased by 43.3% compared with the depressed figure in the first quarter of last year.

Table B

Currency composition of international bond issues

Per cent

Currency denomination	1994	1995					1996
	Year	Year	<u>Q1</u>	Q2	Q3	Q4	Q1
US dollar	38.4	39.2	36.5	36.7	40.8	42.2	37.8
Yen	17.2	18.4	13.8	22.8	19.1	17.2	11.8
Deutsche Mark	10.9	13.9	12.6	16.4	11.7	15.0	16.4
Sterling	6.5	4.3	5.7	4.0	3.5	4.3	7.7
French franc	5.4	2.7	4.2	2.9	1.7	2.3	5.9
Swiss franc	4.5	6.1	6.5	5.8	6.8	5.3	4.5
Italian lira	3.6	2.4	4.9	1.6	1.5	1.7	2.8
Ecu	1.6	1.8	2.6	0.2	2.7	0.2	0.8
Other	11.9	11.2	13.2	9.6	12.2	11.8	12.3
Total (US\$ billions)	482.0	502.6	112.7	123.0	138.3	128.7	191.9
Sources IED Omenikase							

ource: IFR Omnibas

Issuance currencies

Among the major currencies, the sharp rise in primary market activity in the first quarter was reflected in higher issuance in Deutsche Marks, sterling and French francs, although the share of US dollar and yen issuance declined. Deutsche Mark issuance, in particular, was driven by the continuing existence of attractive swap rates for five-year maturity issues. Yen issuance, on the other hand, was depressed by unattractive swap rates, among other things. In Japan, capital market liberalisation continued with the introduction of an asset-backed securities (ABS) market and the announcement of a bond repo market. These markets are not entirely new to Japan: ABS transactions in Japan had been done previously, but tended to involve off-shore,

Developments in the UK asset-backed securities market in 1994/95

This box reviews developments in the UK asset-backed securities (ABS) market during 1994/95.(1) These instruments-securities supported by a pool of loans (or other receivables such as leasing proceeds)-transform otherwise illiquid loans into marketable securities. The interest and principal payments on the underlying pool of loans provide the cash flow required to pay interest to the holder of the security and to redeem it on maturity. A major attraction of such issues is that, provided certain regulatory criteria are met,⁽²⁾ they allow the institution that originated the loans to remove the assets from its balance sheet.

The first UK issue of asset-backed securities was made in 1985. The market has developed erratically since then and, as Chart A shows, the past two years have been no exception. In value terms there were a record number of new issues in 1994. The 18 launched were worth £4.7 billion, although this figure includes one lease-backed issue of almost £1 billion supported by aircraft receivables. During 1995, the value of new issues fell dramatically: the 15 issues were worth only £1.3 billion. As a result, the value of securitisation issues outstanding had fallen to just over £5.4 billion by the end of 1995.

This fall reflected changes in the source of securitisation over the past two years. During the early 1990s, several major banks and building societies developed the records and monitoring systems necessary to undertake securitisation. This development process culminated in several large issues in late 1993 and during 1994.

Chart A



However, as Chart B shows, these originators have refrained from using the market in 1995. Other originators, including some corporates, have taken their place, although with much smaller issues.

The lack of issues originated by the major banks and building societies during 1995 probably reflected, among other things, their increasing capital strength. This reduced the incentive to develop alternative sources of finance such as securitisation: although it had the advantage of increasing the return on capital,(3) it

special-purpose vehicles. Also, the established Gensaki market in Japan fulfils a similar role to repo, but is subject to a trading tax.

Sterling issues

The first quarter of 1996 saw substantial issuance of sterling bonds. Total fixed-rate and zero-coupon issuance (including EMTNs) in the quarter was £4,993 million, compared with total issuance in 1995 as a whole of £10,100 million. £4,884 million of this issuance was in Eurosterling form, of which £1,276 million was short-dated, £2,418 million was medium-dated, and £1,190 million at the long end. Over half of this was by banking institutions, with £2,009 million issued by non-bank entities. There were only three domestic bond issues over the quarter, totalling £109 million; £50 million of this was a special-purpose vehicle issue, secured on a loan stock issued by Manchester City Council.

The quarter saw the first bond issue related to the Private Finance Initiative for £165 million by Road Management Consolidated plc. The bond will fund the design and construction of the upgrade of two trunk roads; coupons on the bonds will be covered by the receipt of shadow tolls based on traffic usage. Since the project is an upgrade rather than a new build, the bond issue has been enabled by the existing known levels of demand for these roads. The issue is guaranteed by a US insurance company and is rated AAA. A £228 million issue in four tranches was launched by a special-purpose vehicle secured on the lease payments underlying the assets of one of the former British Rail rolling stock companies.

Floating-rate issuance was high in the first quarter at £3,730 million, compared with £4,269 million in 1995 as a whole; this in part reflected market uncertainty about the direction and volatility of interest rates, as FRNs are more actively issued and traded in such circumstances.

See the article 'Asset-backed securitisation in the United Kingdom' by C Ian Twinn in the May 1994 Quarterly Bulletin, pages 134-43. (1)

For the purposes of this box the term asset-backed securities is again taken to include mortgage-backed and lease-backed securities. For banks, these criteria are laid out in the Bank's notices BSD/1989/1, BSD/1992/3 and S&S/1996/8. Since, if the assets are removed from the balance sheet, no capital is required but fee income is still generated from origination and



remained relatively expensive in terms of the marginal cost of funds, as Chart C shows. Nevertheless, the fact that these lenders carried out issues is important given that they hold the majority of assets that might be securitised and there are significant sunk costs involved in undertaking a first issue.⁽⁴⁾

Perhaps the most significant other development was the launch during 1995 of the first issues backed by credit-card receivables. This created the opportunity for institutions in the UK credit-card market to securitise large parts of their lending. The recent removal of the general limit on the volume of revolving-credit assets that may be treated, for supervisory purposes, as taken

Chart C Cost of marginal funding

Margin over three-month Libor, percentage points



off a bank's balance sheet, could provide further impetus to this.(5)

Anecdotal evidence suggests that the demand by investors for securitisation issues remained healthy, albeit among a still relatively specialist investor base. Some companies have continued to buy shorter-maturity ABSs as substitutes for money-market instruments while pension funds and insurance companies have continued to invest in longer-maturity securities. But the secondary market has remained illiquid possibly reflecting the bespoke nature of UK issues.

The volume of new ABS issues will probably remain limited in the short term, with growth being concentrated in a few asset types such as credit-card receivables. However, the involvement of some of the major high street banks and building societies in recent years may presage more broadly-based growth in the future.

The recent takeovers of some of the centralised mortgage lenders—such as Nationwide's purchase of UCB's mortgage arm and Abbey National's purchase of FNFC and HMC—may be significant for similar reasons. The relaxation is one of the changes to the Bank's policy concerning the securitisation of revolving credits outlined in its amending notice on the subject issued in April (S&S/1996/8). (4)

(5)

£1,400 million floating-rate issuance was in the form of mortgage-backed securities issued by special-purpose vehicles; £1 billion of this was in several tranches to refinance the purchase of a centralised lender's mortgage book by a subsidiary of Birmingham Midshires Building Society. All other FRN issuance over the quarter was made by banks and building societies.

Part of the demand for fixed-rate bonds came from corporate-bond PEPs, where more substantial purchases have been seen this quarter. The first quarter saw sales of £515 million, up from £290 million in the previous quarter; sales of £225 million came in March, as investors make their tax dispositions before the end of the tax year. Otherwise, issuance volumes were driven in part by issuers making use of advantageous swap rates to fund in desired currencies or to meet interest-rate targets, in part for acquisition funding, and also as part of the ongoing restructuring of the utilities' balance sheets.

The Bank sought market views during the quarter on a proposed liberalisation of the sterling commercial paper and MTN regimes, whereby issues of debt securities may be made exempt from the deposit-taking prohibition in the Banking Act. Key features of the proposed regime include the removal of the five-year maximum maturity limit, and removal of the £100,000 minimum denomination requirement where the securities to be exempted are themselves listed on a European Economic Area exchange and have an initial maturity of more than three years. In the first quarter, total outstanding sterling commercial paper rose by £733 million to £7.1 billion. Outstanding sterling MTNs rose by £1.3 billion over the quarter to stand at £17.1 billion at the end of March.

Ecu issues

In the United Kingdom, regular monthly tenders of one billion of Ecu Treasury bills continued during the first

quarter of 1996, comprising ECU 200 million of one-month, ECU 500 million of three-month and ECU 300 million of six-month bills. The tenders continued to be strongly oversubscribed, with issues being covered by an average of 2.8 times the amount on offer, compared with an average of 2.4 times during 1995. Bids were accepted at yields up to 19 basis points below the Ecu Libid rate of the appropriate maturity. There are currently ECU 3.5 billion of Treasury bills outstanding which have been sold to the public. Secondary-market turnover in the first quarter averaged ECU 1.9 billion per month; turnover for 1995 as a whole averaged ECU 2.2 billion per month, which was very similar to the average levels in 1993 and 1994.

ECU 500 million of a new three-year Ecu Treasury Note, the fifth in the programme of annual new issues, was auctioned on 16 January. Cover at the auction was 4.3 times the amount on offer and accepted bids were in a tight range of 5.18%–5.21%. The settlement date for the new issue coincided with the redemption of the second Ecu Treasury note, which had ECU 2.0 billion in size outstanding with the public. The total of notes outstanding with the public under the UK note programme thus fell from ECU 6.5 billion to ECU 4.5 billion over the first quarter.

The French Government issued ECU 1.6 billion in bonds and notes during the fourth quarter, taking its outstanding debt up from ECU 21.2 billion to ECU 22.8 billion (excluding stock bought back or held for repo purposes) by the end of the first quarter of 1996. The Italian government issued ECU 1 billion of notes, but the total outstanding fell from ECU 22.6 billion to ECU 21.6 billion by the end of the first quarter of 1996. In addition, the total of Italian government Ecu eurobonds outstanding remained at ECU 7.4 billion.

International syndicated credits

In contrast to the high levels of activity on the international bond markets, syndicated credit activity appears to have weakened in early 1996. In the first quarter, provisional estimates suggest that total international syndications fell by 10.5% to \$163.5 billion. As in the bond markets, seasonal patterns can be identified in the data. These suggest that credits tend to rise in the first half, but will be depressed in the second—particularly in the third quarter. However the size of seasonal fluctuations quarter to quarter are much smaller than in the bond markets; for example, the seasonally adjusted flow of credits in the first quarter is only about 3% less than the unadjusted data.

The decline in business in the first quarter of 1996 may have reflected a lack of suitable lending opportunities. Moreover, the signs are that spreads, which fell to very low levels last year, levelled out in the first quarter of 1996 and the market may have been providing access for lower credit-rated borrowers. The availability of low-margin lending is linked to the continued strong capitalisation of the banks. Nevertheless, the decline in first-quarter business may have reflected a lessening of enthusiasm by banks for business with such low profitability.

Equity markets

Prices

US equity prices, as measured by the Standard & Poors' 500 index, rose 4.8% during the first quarter (Chart 2). Strong



⁽a) End-week prices; data to 29 March 1996

company earnings reports and economic data, which pointed towards a cut in interest rates, boosted prices through January and February. The index climbed to a series of all-time highs, culminating in a high for the quarter of 661.45 on 12 February. The second half of the quarter saw increased uncertainty over the prospects for the economy and for a further rate cut, especially following the announcement of a much higher-than-expected increase in non-farm payrolls on 8 March: the S&P index fell 3% on that day alone. But this reversal proved short-lived and much of the loss had been recovered by the end of March.

In contrast with the stronger US market, the FT-SE 100 share index rose only 0.3% over the first quarter. Although partly affected by movements in overseas markets, the UK equity market was influenced more directly by domestic factors, with both positive and negative implications for prices. Prices were boosted by buying of potential bid targets, fuelled by a number of takeovers and mergers announced during the quarter. However, sentiment was dampened by worries over the political outlook and by the implications of a public health alert in the beef industry towards the end of

Dividend yields and future equity returns

A considerable body of evidence suggests that the level of equity dividend yields, in the United States, can help predict future returns on equity, with low current yields being associated with low future equity returns.⁽¹⁾ Although both the reasons for, and significance of, this relationship in the United States has been the subject of much debate, there has been little study of this phenomenon in other countries.

Work in the Bank has examined the historical relationship between equity prices and dividend yields using long runs of data for the five major economies. Although one might believe that different markets behave very differently, the results across countries were remarkably similar. For all countries, the current level of dividend yields did seem to have some ability to predict future equity returns, and that ability increased the longer the return horizon used (ie dividends predicted returns over the following twelve months better than they predicted one month ahead returns).

Another result that seemed to be consistent across countries was the non-linearity of the relationship between dividends and future returns. The charts for the United Kingdom and United States below (results for Japan, Germany and France were similar) show a scatterplot of dividend yields versus equity returns over the subsequent twelve months, along with a curve of best fit (fitted using non-parametric estimation techniques). The curves indicate that it is only very high and very low dividends which are associated with high/low future returns: at intermediate levels, there is little or no relationship (ie the curves are flat).

Why do yields help predict future price movements? There are a number of theories to explain why low yields help predict future equity prices, but the two main themes are either that yields help capture information about required returns (ie that when yields are low it indicates that investors require lower returns in the future—perhaps because of lower risk premia) or that they help indicate when market sentiment has moved equity prices away from 'fundamentals' and so a correction is necessary. Unfortunately, it is not yet possible to distinguish between these two explanations, though the non-linear relationship shown here may give clues as to the most plausible explanation.







Chart B United States: dividend yields and returns



(1) See for example Fama, E & French, K (1988), 'Dividend yields and expected stock returns', Journal of Financial Economics, 22, pages 3–25.

the quarter. A reduction in UK official interest rates of 25 basis points on 18 January surprised the equity market and the FT-SE 100 rose 1.2% on the day. A second cut in UK interest rates on 8 March was overshadowed by the downturn on that day in the US bond and equity markets.

Japanese equity prices, as measured by the Nikkei 225 index, rose 7.7% over the quarter. The index rallied late in the quarter, led by a perception among domestic investors

that the government would resolve the financial uncertainty surrounding problems in Japan's housing loan companies.

The continental European equity markets were generally buoyant during the first quarter, with all the major continental indices, except those in Italy, outperforming the FT-SE 100 over the quarter. In Germany, the FAZ index rose 8.1%, on expectations that monetary policy in the near future was likely to be expansionary, and with a stronger dollar improving the prospects for German exporters. The French equity market, also encouraged by hopes of lower interest rates in Germany, rose 9.2%. Italian and Spanish equity markets focused on domestic political developments, the Italian Comit index falling 1.5% and, in Spain, the General index rising by 6.7%. The Swiss and Dutch markets which, due to the international nature of their listed companies, tend to be more sensitive to US markets, rose by 10.6% and 9.5% respectively, with the Swiss market also boosted by the merger of Ciba and Sandoz, two large pharmaceutical companies.

Turnover

Equity turnover worldwide increased markedly throughout 1995. This increase is particularly striking when the fourth quarter of 1995 is compared with the fourth quarter of 1994 (Chart 3). The New York Stock Exchange saw turnover

Chart 3





some 50% higher than in the fourth quarter of 1994; one reason for this may have been buying by mutual funds, which was reported to have been high. NASDAQ saw an even bigger increase, with turnover up nearly 70%. Turnover on the Tokyo Stock Exchange increased by some 50%, with foreign-investor interest reported to be strong. The London Stock Exchange recorded an increase of 30% in equity turnover, evenly balanced between domestic and foreign shares. Continental exchanges also recorded improved volumes, albeit from relatively low bases; turnover on the Swiss Exchange was particularly notable, with a rise of nearly 70% from the fourth quarter of 1994 to the fourth quarter of 1995.

Equity issues

\$41 billion of international tranches of equity issues were placed in 1995, but 45% of these were placed in the fourth quarter alone. The disappointing performance in the first three quarters compared with 1994 was attributed to difficult issuing conditions in the emerging markets and a slowdown in privatisations in western Europe. However, privatisations in the OECD countries are increasingly being placed internationally: almost 50% of privatisations brought to the markets were sold to international investors in 1995, compared with 28% in 1994. In particular, there was an increase in issues from large German corporates in an attempt to tap the equity markets before the privatisation of Deutsche Telekom.

In the United Kingdom, net issues of international bonds by companies in 1995 totalled \$4.2 billion compared with a net redemption of \$0.5 billion in 1994. In contrast, equity issues were down in 1995 to \$10.3 billion from \$15.1 billion in 1994 (Chart 4). Total net issues of domestic bonds were also down from \$2.4 billion in 1994 to \$0.6 billion in 1995.

Chart 4

Net issues of domestic bonds, international bonds and equities by UK companies



In the first quarter of this year, £2,153 million was raised in further equity issues by UK companies, of which £856 million was raised in rights issues. Thirty-nine companies joined the Official List, of which 21 raised capital totalling £876 million. £126 million was raised in further and new issues by Alternative Investment Market (AIM) companies in the first quarter—more than was raised on this market in its first six months, and an encouraging further step forward for this fledgling market.

The UK financial sector has provided the largest number of companies for the Official List over the last ten years, with the majority of these being new investment funds. The general trend in the United Kingdom has been a large number of small listings. Over the past ten years, companies capitalised at up to £50 million represented about two thirds of the total new listings, and companies capitalised at £20 million or less represented 25% to 50%. In particular, in 1995 there were a number of transfers to the Official List from the Unlisted Securities Market.
Other developments

On 11 January, the London Stock Exchange issued a consultation document, which sought views from its members and other interested parties on the introduction of an electronic order book in some, or all, stocks. The document outlined three broad options for consideration: an order book, together with the provision of a block trading mechanism for larger transactions; an order book for some stocks and a quote book for others; or some combination of the current market-making system interacting with an order book. In the light of the diversity of responses received, the Exchange announced on 21 March its intention to consult further on the details of the implementation of an order book with a parallel block trading mechanism, initially for FT-SE 100 stocks only, but to be extended to other liquid stocks subsequently if there is market demand. This second round of consultation will be launched in May for completion in early summer. The 'Sequence 6' technology is expected to be on-stream from 27 August as planned, but the new trading services will not be introduced until at least Spring 1997 to allay market concerns about the concentration of IT development demands.

During the first quarter, Tradepoint Financial Networks plc ('Tradepoint')-the competing exchange launched in September—announced three initiatives to increase its capital base and widen its market reach. On 31 January, Tradepoint and Bloomberg signed an agreement whereby authorised Bloomberg terminal users worldwide will be able to trade directly on Tradepoint, subject to regulatory considerations; on 14 March, Tradepoint announced its intention, subject to market conditions, to seek admission to AIM in April via a placing to new and existing institutional investors; and on 25 March, it announced an increase in the number of UK equities tradable on the market to over 900. Trades on Tradepoint during February totalled £31.8 million, compared with £8.6 million in October 1995, its first full month of operation.

Derivatives markets

Turnover on the major derivatives exchanges in the first quarter of 1996 rose markedly compared with the previous quarter, reflecting uncertainty regarding the future direction of interest rates in the US and European markets. It is unlikely that this sharp increase in turnover will be sustained in the second quarter: the underlying growth in volumes is probably more subdued and, as in early 1994, the surge in turnover can be linked to short-run turbulence in the bond markets.

Total volumes on the London International Financial Futures Exchange (LIFFE) increased by 56% during the first quarter with all LIFFE's major contracts posting increases. Reflecting the increased uncertainty associated with the end of the bond-market rally, LIFFE traded 18 million contracts in February, a record month for the exchange with a 53% increase on February 1995. Indeed, other than in the first quarter of 1994, LIFFE traded more actively than in any previous quarter (Chart 5); and the

Chart 5 Quarterly turnover on major derivatives exchanges



exchange's Bund futures contract became Europe's most actively traded contract.



Turnover in the major futures contract listed on the CME, CBOT, LIFFE, DTB, MATIF and TIFFE.

Elsewhere, turnover on the Deutsche Terminborse (DTB) rose 49% during the quarter, whilst volumes on Marché à Terme International de France (MATIF) rose only 7%. During the quarter, the DTB overtook MATIF to become the second largest exchange in Europe in volume terms. The DTB also became the first overseas exchange to receive approval to install terminals in the United States, enabling DTB products to be traded directly from outside Europe. Access will only be possible during normal DTB hours. Plans for closer co-operation between the German and French stock and derivatives exchanges-based on the French equity trading system (Nouveau Système de Cotation) and the DTB's electronic system for the futures market-will not now go ahead. However, MATIF members will continue to have remote access to DTB German government bond futures and options contracts.

In the United States, volumes on the Chicago Mercantile Exchange (CME) and the Chicago Board of Trade (CBOT) rose 30% and 20% respectively, over the quarter. Turnover in the CME's Eurodollar futures contract rose 42%, proportionally more than the CBOT's T-Bond futures contract, which rose 26%, to retake its position as the world's most actively traded contract. Despite the historic rivalry between the two Chicago-based exchanges, current cost pressures led to the forming of a Joint Strategic Initiatives Committee to discuss closer collaboration, for example on common banking facilities. But the possibility of a full merger, although more probable now than has ever been the case, still remains unlikely.

In the East Asian time zone, volumes on TIFFE, Japan's largest derivatives exchange, rose 47% on the previous quarter. The CME and SIMEX, the Singapore International Monetary Exchange, extended their mutual offset agreement to encompass SIMEX's Euroyen futures contract. This is seen as a response to the LIFFE/TIFFE link, which started in April, and will enable LIFFE to trade TIFFE's Euroyen contract in the European time zone.

During the quarter, LIFFE started to list Euromark and short-sterling interest-rate contracts for March 1999 delivery. The new contracts, based on three-month deposit rates, will mature after the planned introduction of the single European currency. Provision has therefore been made for settlement against euro interest rates upon each respective currency's possible participation in EMU. If EMU is delayed, or if a particular country is not a full participant, the relevant contracts will settle as now. The new contract specification will also apply to LIFFE's Eurolira contract in due course. MATIF has also made provisions for its PIBOR futures contract. The movement towards a single currency is probably the biggest single challenge facing Europe's derivatives exchanges. The transition will mean a loss of 'first mover' advantage for exchanges and could lead to intense competition to capture market share of contracts based on the new currency. The introduction of a single currency would obviously also have implications for the OTC derivatives markets.

OTC derivatives markets

The most recent International Swaps and Derivatives Association's (ISDA) survey indicated rapid growth in the

Table C OTC derivatives

Active UK banks' credit exposures at end period (£billions)

Percentages in italics

	1993		1994		1995	
	H1	H2	H1	H2	H1	H2
Interest rate related contracts: Notional principal Replacement cost (a) <i>as a percentage of notional principal</i>	1,849 34 1.8	2,333 44 1.8	3,300 37 1.1	3,356 38 1.1	3,927 51 1.3	3,783 61 1.6
Credit equivalent exposure (b) as a percentage of balance sheet	39 4.9	49 6.6	46 5.3	47 5.6	62 7.3	70 8.1
Credit risk (c)	10	12	11	12	15	17
as a percentage of risk-weighted assets	2.3	2.9	2.5	2.6	3.5	4.0
Foreign exchange related contracts: Notional principal Replacement cost (a) <i>as a percentage of notional principal</i>	1,141 31 2.7	1,066 23 2.2	1,447 39 2.7	1,400 27 1.9	1,428 39 2.7	1,404 32 2.3
Credit equivalent exposure (b) as a percentage of balance sheet	48 6.1	40 5.3	62 7.2	50 6.0	63 7.3	57 6.7
Credit risk (c)	12	11	15	12	16	14
assets	2.9	2.5	3.4	2.8	3.8	3.4

The current market value of contracts (when positive). The sum of the replacement cost and the potential future exposure. The credit equivalent exposure weighted according to counterpart risk weighting.

OTC markets in 1995. The survey showed that notional outstandings in interest rate swaps, currency swaps and interest-rate options at end-1995 totalled \$18 trillion, an increase of almost 60% compared with the end-1994 figure and an increase of almost 30% compared with end-June 1995. However, aggregate statistics on UK banks active in derivatives markets (Table C) show more modest year-on-year growth than the ISDA survey figures: the combined notional principal in interest-rate and foreign-exchange related contracts increased only 9.1% over 1995 and actually fell by 3.1% in the second part of last year.

In the first quarter of 1996, indications are that turnover in the OTC derivatives markets grew in line with exchange-traded derivatives. European markets were reportedly particularly active, in anticipation of interest rate cuts. However, volumes in fixed-income instruments subsided towards the end of the quarter after the release of US economic data. These figures caused a change in the previously bullish market sentiment to one of 'wait and see'. Activity remains concentrated in 'plain vanilla' products (swaps, FRAs and so on) as opposed to 'exotics'.

Understanding broad money

By Ryland Thomas of the Bank's Monetary Assessment and Strategy Division.

Broad money is at the heart of the monetary transmission mechanism and consequently plays an important role in the assessment of inflationary pressures. This article examines the factors behind stronger broad money and credit growth in 1995, using recent econometric research undertaken at the Bank.

Broad money has played an important role in the formulation of monetary policy in the United Kingdom over the past 25 years. Between 1976 and 1986, targets were published for various definitions of broad money. And within the current monetary framework (announced in October 1992) there is a monitoring range of 3%–9% for the annual growth of the M4 measure of broad money.⁽¹⁾ The role of broad money is primarily to provide information about future movements in nominal demand and inflation along with a wide range of other indicators. So, for example, Section 2 of the Bank's Inflation Report pays close attention to developments in broad money and credit in the context of the government's inflation target.

During 1995 the twelve-month growth rate of broad money increased steadily, rising above the upper limit of the M4 monitoring range. Recent Inflation Reports have identified this as a source of upside risk to the government's inflation target should such growth persist. This article analyses in more detail the factors underlying broad money growth in 1995,⁽²⁾ and the wider role of broad money in the transmission mechanism of monetary policy. It uses recent Bank research on the determinants of M4 to address these issues.

Broad money and its sectoral components and counterparts

The measure of broad money used by the UK authorities, M4, consists of holdings by the 'M4 private sector'(3) of sterling notes and coin and of sterling deposits (including certificates of deposit and similar bank and building society deposits) held at banks and building societies in the United Kingdom. At the end of December 1995, the stock of M4 totalled £623 billion, roughly equal to one year's nominal GDP and almost 30 times the size of the stock of sterling notes and coin in circulation.⁽⁴⁾

The relationship between the growth of M4 and the growth of nominal activity has been quite variable over the past

³⁰ years. The income velocity of M4, which measures the ratio of nominal GDP to the stock of M4, has shown several distinct phases (see Chart 1). In the period before 1980,



velocity did not exhibit any consistent trend. But it declined steadily during the 1980s when-in response to financial deregulation and liberalisation-banks' and building societies' balance sheets expanded more rapidly than nominal income.⁽⁵⁾ Between 1991 and 1994, M4 velocity was fairly stable. But during 1995 velocity started to decline once more, raising the issue of whether this indicates incipient inflationary pressures or is simply a reflection of further changes in the structure of the financial sector.

Within M4, there have also been some interesting patterns in sectoral money holdings. Chart 2 shows a breakdown of M4 holdings by sector. At the end of 1995, the personal sector was the dominant holder of M4 assets, accounting for roughly two thirds of the stock of M4. Of the remainder, 14% was held by industrial and commercial companies (ICCs), and 18% by other financial institutions (OFIs).

Data for the first quarter of 1996 are discussed in the May 1996 *Inflation Report*, together with the impact of the open gilt repo market on broad money and credit. All UK residents except the public sector, banks and building societies. See Janssen, N (1996). See Bank of England (1986).

Chart 2 Sectoral holdings of M4 (percentage of total M4)



The pattern of growth for each of these three sectors has been quite different over the past 20 years (see Chart 3). Personal sector M4 growth has been much less volatile than the growth of corporate sector holdings (both ICCs and OFIs). In particular, OFIs' M4 holdings have grown at a considerably faster and more erratic rate than those of either ICCs or persons. Thus, although personal sector holdings are important in determining trend movements in M4, shorter-term fluctuations in M4 are typically dominated by changes in corporate sector money holdings. That was again true in 1995.

Chart 3 Growth in M4 by sector



Another way of decomposing M4 holdings is to look at its 'counterparts' on the bank and building society sector balance sheet.⁽¹⁾ As Chart 4 shows, the most important counterpart to M4 growth has been sterling lending to the M4 private sector—'M4 lending'. This too has exhibited interesting sectoral patterns over the recent past. Chart 5 shows that corporate sector (ICCs and OFIs) borrowing, like corporate sector M4 deposits, has historically been more volatile than personal sector borrowing; it has also been the most important factor driving recent fluctuations in M4 lending. In particular, there has been a rapid turnaround in

(1) See Bank of England (1987).

Chart 4 M4 and M4 lending



Chart 5 Growth of M4 lending by sector



the position of ICCs from being net repayers of debt for much of 1992–94 to substantial net borrowers during 1995. The growth of personal sector borrowing, by contrast, has remained subdued for much of the 1990s.

Money, credit and the transmission mechanism

In general, movements in M4 will depend on both the *demand* for broad money and on its *supply*. The second of these can be linked to developments in the credit market, given the way in which banks and building societies typically manage their balance sheets.

Looking first at the *demand* side, broad money balances are held for two main reasons. First, they serve as a medium of exchange, since banks' and building societies' deposit liabilities are generally accepted as a final means of settlement, in much the same way as cash. Second, bank and building society deposits can serve as a store of value. A large proportion of M4 is interest bearing, so agents will hold broad money as part of a diversified wealth portfolio alongside other financial (such as equities) and real (such as houses) assets. Taken together, these two roles suggest that the aggregate demand for broad money is likely to be determined by real spending, prices, wealth and the opportunity cost of holding money (the difference between the return on money and the return on non-monetary assets, real and financial). Over the longer term, these determinants of broad money holdings can be thought to define a target level of money balances-the long-run demand for broad money. But, over the short term, agents may also accept higher or lower money balances as a (possibly very temporary) means of bridging a gap between payments and receipts whose timing are uncertain. And agents will then adjust money positions over time towards their desired longer-run level. This is known generally as the buffer-stock theory of money demand.⁽¹⁾

The *supply* of broad money depends on the behaviour of banks and building societies. A useful approach in this context is to think of the banking system as managing its liabilities. The banking system undertakes profitable lending opportunities at the prevailing level of interest rates and this, in turn, determines the extent to which it needs to bid for deposits from the rest of the private sector. This implies that conditions in the credit market determine the supply of broad money. The demand for credit-borrowing from banks and building societies-is likely to depend on the current and expected future level of activity in the economy, (real) borrowing rates and the difference between the cost of credit from banks and building societies and other forms of finance, such as retained earnings or capital market issues. For certain types of borrowers, most notably small businesses and consumers, substitution possibilities between borrowing from banks and building societies and other forms of finance are likely to be limited. The amount of lending will then also depend on the willingness of banks and building societies to provide credit. Ultimately, it is the interaction of these demand and supply-or money and credit-factors which determine holdings of broad money at any one time.

So what role do money and credit play when assessing inflationary pressures? Since the price level is conventionally defined as the relative price of a consumption bundle in terms of money, the interaction between the demand and supply of money is clearly at the heart of the inflationary process. But the precise transmission mechanism through which money and credit affect activity and inflation, and vice versa, is not well understood; it is still the subject of much disagreement among economists. And, as demonstrated in Chart 1, finding a stable and predictable relationship between movements in broad money and nominal activity is often problematic. Changes in transactions technology and financial structure affect the velocity of broad money in ways that are often difficult to predict. This implies that it is not sensible to steer monetary policy by reference to the money and credit aggregates alone, but to use them as part of a wider range of indicators of economic conditions.

Broadly speaking, money and credit can fulfil one of two roles when used as indicators. These encapsulate competing theoretical views on the role of money and credit within the transmission mechanism. First, money and credit may provide only *corroborative* information on the economy; that is, they offer information which helps support or reject the signals emerging from alternative indicators. This would be the case, for example, in a world where money and credit flows were entirely demand determined or where relative financial yields moved rapidly to equate the supply and demand for money.⁽²⁾ Every time a (real or nominal) disturbance hit the economy, agents would immediately reshuffle their asset portfolios so that money holdings remained in equilibrium. Money and credit would then serve as purely passive indicators of movements in demand, wealth and interest rates in the economy-the arguments entering the long-run money demand functions; they would not have any explanatory power in their own right. M0 is an example of a monetary aggregate which is very largely demand determined. Hence, over the short run, it is used as a corroborative indicator of cash-financed spending. Even in a world where money and credit balances are always in long-run equilibrium, however, they may still offer better signals of impending inflationary pressures than other indicators because data on them are available in a more timely fashion and are much less subject to revision.

Second, money and credit may provide incremental information about the economy, offering signals which are not immediately observable in other indicators. There are a variety of mechanisms through which this could occur.

One is if money and credit are used as short-run buffers, insulating agents' real decisions from shocks to the economy. In these circumstances, disturbances do not bring about an immediate adjustment of money balances back into line with long-run equilibrium holdings. Instead, in the short run, agents accept higher (or lower) money balances as a temporary abode of purchasing power. Equilibrium is then restored only gradually, as individual agents attempt to eliminate their 'excess' money holdings through purchases of goods and real and financial assets. This process will continue until nominal spending has risen sufficiently to bring the aggregate demand for money back into line with its supply. Under this scenario, money balances may generate a dynamic of their own. Both money and credit would no longer be passive indicators of nominal demand but instead may be an independent cause for inflationary concern.

Another such mechanism could operate if banks play a 'special' role in the provision of credit to some sets of agents-such as small firms and households who are not able to access non-bank forms of financing. The behaviour of banks when they supply credit to these agents could then have direct effects on spending—a 'credit channel'.(3)

See Laidler, D (1984) and Milbourne, R (1988). See Kaldor, N (1970), Moore, B (1988) and Howells, P (1995). See Dale, S and Haldane, A G (1993) and Bernanke, B and Gertler, M (1995) for a survey.

These two roles for money are not mutually exclusive. In practice, there will be a continuum of speeds at which agents adjust their portfolios following a shock. Agents demanding deposits for portfolio reasons-such as OFIsare likely to re-equilibrate their portfolios very quickly. Others-such as households-may let their money and credit balances cushion them from shocks, thereby giving rise to prolonged and pronounced deviations from equilibrium holdings. Both of these stories have a role to play when accounting for the recent behaviour of broad money and credit.

Research on broad money

The above discussion highlights the challenges facing empirical researchers in explaining movements in broad money and in modelling its wider role in the transmission mechanism. Previous research at the Bank has concentrated on the estimation of money demand models, in keeping with the large academic literature in this area.⁽¹⁾ Different vintages of the Bank's money demand models have focused on a variety of important issues:

- Measuring the opportunity cost of money. Prior to the 1970s, the long-term bond rate was the term typically used to proxy the relative rate of return on M4 deposits.⁽²⁾ This seemed to show a stable relationship with M4 velocity, at a time when bank deposit (and lending) rates were largely administered.⁽³⁾ But with Competition and Credit Control in the early 1970s, and the rapid process of financial liberalisation after 1980, a new approach was necessary, since deposit rates were determined increasingly by the banking system's need to fund its expanding loan business. The studies of broad money in the mid-1970s consequently began to include an explicit own-rate of return on M4 assets, often using a certificate of deposit rate in this role.⁽⁴⁾ During the 1980s, as a much wider range of financial instruments became available to both the personal and corporate sectors, researchers began to include a variety of alternative opportunity cost terms too, such as overseas interest rates and the rate of return on equity.⁽⁵⁾ Overall, however, the ability of these various proxies to pick up shifts in expected rates of return has been limited, with interest elasticities typically small and poorly determined.
- The role of wealth. Prior to the 1980s, measures of GDP were largely sufficient for picking up trend movements in M4 holdings. But in the 1980s financial liberalisation led to the payment of interest on a wide variety of bank and building society liabilities. This increased the attractiveness of M4

as a savings instrument, particularly for the personal sector. Consequently, M4 holdings came increasingly to be viewed as part of a wider wealth portfolio. Indeed, this phenomenon seems largely responsible for the steady decline in M4 income velocity during the 1980s observed in Chart 1. A number of studies at the Bank have confirmed that using wealth, in addition to a measure of transactions, does indeed explain much of the trend in M4 velocity through the 1980s.⁽⁶⁾ This is consistent with agents' money holdings being dictated by their permanent—current plus expected future-income, rather than by current income alone.

- Joint modelling of money with other variables. The discussion above suggests that money, credit, nominal income and interest rates are in practice likely to be jointly determined. This calls for M4 to be modelled as part of a wider system of variables, if any information about the transmission mechanism is to be recovered. Recently, this has been done for both narrow and broad measures of money.(7) Such an approach allows the interaction between money and its explanatory variables to be identified explicitly. In particular, it helps in identifying how money and activity are likely to move in response to different types of (real and nominal) disturbance.
- Sectoral modelling of broad money balances. Most early studies at the Bank and elsewhere concentrated on modelling M4 at an aggregate level. But recent research suggests that this may conceal important sectoral differences.⁽⁸⁾ This is readily apparent from the diverse patterns in sectoral broad money growth. Different agents are likely to have very different motives for holding money. In particular, persons and some ICCs are likely to hold a larger proportion of their money balances as a transactions medium than OFIs, for whom a portfolio-based model is likely to be more appropriate. Identifying these sectoral demands for broad money separately is thus likely to improve our (statistical and behavioural) understanding of them. And, as a by-product, it may make the channels within the transmission mechanism clearer and easier to understand.⁽⁹⁾

The Bank's most recent work on M4 tackles all of these issues. We consider money demand at a sectoral level, modelling sectoral money holdings jointly with sectoral measures of spending, together with wealth and appropriate interest rate differentials. This offers an illustrative set of behavioural models of sectoral money demand, which can be used as a framework for assessing the interaction between monetary and real magnitudes and hence the

See Cuthbertson, K (1991) for a survey. See Kavanagh, N and Walters, A (1966). See Artis, M and Lewis, M (1984). See Haache, G (1974). See Hall, S G, Henry, S G B and Wilcox, J B (1989). Hall, S G, Henry, S G B and Wilcox, J B, op cit. See Hendry, D and Mizon, G (1993) and Fisher, P G and Vega, J L (1993). See Fisher, P G and Vega, J L, op cit. Dale, S and Haldane, A G, op cit, for example, found that sectoral measures of money and credit responded quite differently following a shock to interest rates interest rates

implications of recent strong M4 growth. The Appendix provides some technical details on the estimation of these models.

Personal sector

For the personal sector, M4 holdings are modelled jointly with consumption-so we have equations for both personal sector money holdings and consumption. Personal sector money holdings are modelled in such a way as to encompass their role as both a medium of exchange and as a store of value. In the long run, money holdings are determined by disposable income, gross wealth (measured as the value of personal sector financial and tangible assets) and two opportunity cost terms. The first is the interest differential between the own-rate on personal sector M4 and a three-month rate of interest (Treasury bill yield); the second is the inflation rate, which proxies the relative rate of return on money versus real assets. The long-run consumption function relationship is standard, with consumption depending on income, wealth and short-term real interest rates, plus a 'precautionary saving' effect proxied by the change in the unemployment rate.

One interesting feature of the model is the short-term interaction between money and consumption. In the money equation, there is a *negative* short-run correlation between money and consumption. So, for given income and wealth, an increase in consumption will be financed initially by running down money balances. This suggests money is used as a buffer against short-term fluctuations in spending. In the consumption function, there is a *positive* short-term relationship between money and consumption. So a short-term rise in money balances leads to a rise in consumption. These short-run interactions between money and consumption occur simultaneously. And this simultaneous interaction yields interesting results when the model is subject to nominal and real disturbances—that is,

Chart 6

Response of money and consumption to a disturbance to the money equation



when there is an unexpected change in the money and consumption relationships. Charts 6 and 7 show the effects

Chart 7 Response of money and consumption to a disturbance to the consumption function



of a temporary 1% disturbance to the money equation and a temporary 1% disturbance to the consumption function, respectively.

A 1% disturbance to the money equation tends to raise both money balances and consumption in the short run. We might think of this as a one-off increase in the provision of credit by banks and building societies, which in the first instance leads to higher personal sector deposits as accounts are credited with the funds. But households have not borrowed to hold money but to spend it. And as they start spending consumption rises, while personal sector deposits fall back as funds flow into the corporate sector. Over time, both money and consumption return to their initial equilibrium levels.

A 1% disturbance to the consumption function, on the other hand, leads to a negative correlation between money and consumption in the short run. This would be the effect of a one-off fall in precautionary saving, for example. For given income and wealth, higher spending tends to reduce personal sector balances in the short run, as funds flow out to the corporate sector. But money balances are then gradually built back up to their initial level.

The simulations represent only a partial analysis of the effects of nominal and real disturbances. In reality, income, wealth and other variables are also likely to change as money and consumption change. This is likely to restore equilibrium somewhat faster than implied by Charts 6 and 7. But these simulations show how personal sector money balances, in conjunction with other real-side variables, can act as a barometer of the disturbances hitting the economy. If we observe money and consumption moving in the same direction in the short run this makes it more likely that there has been a monetary disturbance of some kind. If, on the other hand, they are moving in opposite directions, this suggests there has been a real expenditure disturbance. More complicated correlations can arise from disturbances which affect both variables, such as those to disposable income.

Corporate sector: ICCs and OFIs

Corporate sector M4 has historically been more volatile than personal sector M4. This may be because corporates hold M4 assets principally for portfolio reasons, so shifts in firms' perceptions of the relative rates of return on various assets may have large effects on their M4 holdings. But because firms' expectations of asset returns are unobservable and difficult to proxy, this limits our ability to model their money holdings. In previous Bank research, M4 holdings were modelled for the corporate sector as a whole. But our more recent research has found significant differences in the motives for holding money by ICCs and OFIs.

(a) ICCs

ICCs' holdings of M4 are modelled jointly with investment (whole-economy gross fixed capital formation) and a measure of the real cost of capital. ICCs' money holdings are modelled both as a transactions balance and as a store of value. So, in the long run, they depend on investment spending, gross financial wealth, and various rates of return on money and alternative assets including the cost of capital. Interestingly, the real cost of capital has a negative effect over the long term on money holdings. When the real cost of capital is high this suggests that firms' profit streams are high relative to their valuation. This provides an incentive for some firms to increase their take-over activity, part of which it is optimal to finance out of money balances. The long-run determination of investment is entirely standard, depending on GDP, the real cost of capital and a proxy for the capital-output ratio (capacity utilisation). The real cost of capital reverts to a constant in the long run.

Again, the interesting features of the model are its dynamic properties. In particular, the effect of a temporary positive 1% disturbance to the money equation (see Chart 8) is to create a deviation between short-run holdings of money and desired long-term holdings. These 'excess' money balances

Chart 8

The effect of a 1% disturbance to the money equation on investment and the cost of capital



in turn have a negative effect on the real cost of capital which could be the case, for example, if firms shed excess liquidity by buying up other companies rather than by investing directly. But, by reducing the cost of capital, this raises investment expenditure over the longer term.⁽¹⁾ As can be seen from the chart, the effects are significant, if not large. A 1% disturbance to the money equation has at its peak just over a 0.2% effect on investment.

Again this is very much a partial analysis. But there is some evidence of a corporate sector monetary transmission channel working through 'liquidity' effects on the real rate of return on capital and, ultimately, on the level of investment spending. Indeed, since a falling real cost of capital is likely to imply higher stock market prices and higher wealth, this may lead to further indirect effects on aggregate demand which are not picked up in this model.

(b) OFIs

For OFIs, our research suggests a simple two-equation portfolio model, reflecting the demand for and supply of OFIs' M4 balances. In the money demand equation, OFIs' M4 holdings depend on wealth, and three relative rates of return: a 'money-market' spread, which is the own-rate on corporate sector M4 less the three-month Treasury bill rate; an 'equity market' spread, which is measured by the own-rate less the ex post three-month holding period return on the FTSE ordinary share index; and the ex post real deposit rate, which proxies substitution between money and real assets. All three rates of return are clearly only rough proxies for the true expected returns that govern OFIs' portfolio decisions. The long-run supply of M4 equation is a simple deposit rate setting function. Deposit rates are tied to money-market rates reflecting the close substitutability between wholesale deposits and other money-market instruments. A term in the scale of OFIs' deposits picks up the trend effect of financial liberalisation on money-market spreads.

The two equations in the model together give a flavour of the interaction between banks' and building societies' management of their liabilities and OFIs' portfolio allocation decisions. But the model reveals little about any direct role in the transmission mechanism for OFIs' M4 deposits; it is difficult to find any significant direct link between them and real activity variables. This, of course, may reflect our inability to model OFIs' M4 adequately—in particular, our inability to pick up shifts in relative rates of return.

Overall, the three sectoral models indicate that broad money contains significant information about the nature of the disturbances hitting the economy at any one time and about the underlying determinants of each sector's demand for monetary assets. They also give an illustration of the channels through which various disturbances may be transmitted to the rest of the economy and the patterns which we might observe in the behaviour of monetary and

(1) This provides a structural interpretation of the leading indicator properties of ICCs' M4 over investment found by Astley, M and Haldane, A G (1995).

real variables as all these effects work through the system. This is important if we are to interpret money movements meaningfully at a conjunctural level-in particular, when seeking to understand the recent strength of broad money growth and its implications for inflation over the longer term.

Explanations and implications of broad money growth in 1995

The twelve-month growth rates of both broad money and credit picked up sharply during 1995. The twelve-month growth rate of broad money increased from 4.4% in December 1994 to 9.7% in December 1995-above the upper limit of the M4 monitoring range (see Chart 9). But

Chart 9 Growth rate of M4



many other indicators, especially those from the real side of the economy, appeared to be more consistent with a slowdown in economic growth during 1995. So how best can we interpret the recent signals from money and credit?

Tables A and B show the contributions by sector to the increases in broad money and credit during 1995, in both absolute and percentage terms.

Table A					
Private sect	or M4 ^(a)				
	Persons	c 1 · 1	ICCs	OFIs	Total M4
		of which, individuals			
Quarterly flows in	n £ millions; se	asonally adjuste	d		
1995 Q1	8,001	4,877	1,396	6,361	15,758
1995 Q2	5,586	6,495	-35	5,391	10,941
1995 Q3	7,818	7,458	536	5,084	13,438
1995 Q4	6,904	5,956	3,456	4,790	15,150
1994 average	3,057	2,434	1,530	1,420	6,006
1995 average	7,077	6,197	1,338	5,407	13,822
Contributions to q	uarterly growth	(percentages)			
1995 Q1	1.4	0.9	0.2	1.1	2.8
1995 Q2	1.0	1.1	_	0.9	1.9
1995 Q3	1.3	1.3	0.1	0.9	2.3
1995 Q4	1.1	1.0	0.6	0.8	2.5
(a) Rows may not	sum to totals due	to rounding.			

Over half of the increase in M4 deposits in 1995 was accounted for by the personal sector, most of which

Table B Private sector credit(a)

	Persons (unincorp businesse	(excluding orated es)	Unincorporated businesses	ICCs	OFIs	Total M4 lending		
	Secured	Unsecured						
Quarterly flow	vs in £ mi	llions; seas	onally adjusted (b)				
1995 Q1 1995 Q2 1995 Q3 1995 Q4 1994 average	4,661 4,379 4,034 4,147 5,250	1,525 1,364 1,493 1,860	495 295 314 404 -36	6,101 2,187 3,327 5,901 -379	4,539 2,868 3,684 3,175 2,248	17,320 11,094 12,851 15,487 8,147		
1995 average $4,305$ 1,561 377 $4,379$ $3,567$ 14,188 Contributions to quarterly growth (percentages) (c)								
1995 Q1 1995 Q2 1995 Q3 1995 Q4	0.7 0.6 0.6 0.6	0.2 0.2 0.2 0.2	0.1 0.1	0.9 0.3 0.5 0.8	0.7 0.5 0.8 0.5	2.6 1.7 2.0 2.2		

(a) Rows may not sum to totals due to rounding

Excluding the effects of securitisation and other loan transfers. (c) Including the effects of securitisation and other loan transfers

represented deposits by individuals. Most of the remaining increase in deposits was from OFIs, except in the final quarter of 1995 when ICCs also built up their deposits.

Personal sector lending is split into secured and unsecured lending. The growth of secured lending to persons (mostly mortgage lending) weakened steadily throughout 1995 and its contribution to overall lending growth was small given that it amounts to around half of the total stock of bank and building society lending. Unsecured borrowing by persons was strong in 1995, with twelve-month growth rates well above 10%. But most of the growth in M4 lending in 1995 was attributable to the corporate sector (ICCs and OFIs).

The February Inflation Report offered two explanations of the aggregate-and sectoral-pattern of broad money and credit growth during 1995. The first focused on the weakness of the economy in 1995. Heightened employment uncertainty and the continued weakness of the housing market may have caused the personal sector to increase their precautionary saving, partly in the form of higher M4 deposits. As a counterpart to this, firms may have experienced an unexpected fall in demand and may have responded by maintaining their output by building up stocks which were financed through increased borrowing from the banking system.

The second explanation was based on the strength of merger and acquisition activity and the marked increase in equity prices during 1995. This could explain the strength of the corporate sector's (both ICCs and OFIs) demand for credit, with ICCs borrowing to finance acquisitions and OFIs borrowing to finance positions in equities and other securities. This expansion in credit was funded through increases in both personal and wholesale deposits: in part as agents held (perhaps temporarily) in the form of M4 deposits the receipts from sales of shares in companies which were acquired for cash; and in part as banks and building societies bid up the relative rate of return on M4 in order to attract deposits.

These two explanations are best explored by examining the position of each sector, drawing on the results of the research described above.

Personal sector

On the latest estimates, the saving ratio rose from 9.2% in 1994 Q4 to 10.5% in 1995 Q4. The earlier analysis suggests that a negative disturbance to real spending would be consistent with a pattern of slower growth in consumption and stronger growth in personal sector M4. One possibility is that increased employment uncertainty (relating to a slowdown in the rate at which unemployment was falling) and continuing weakness in the housing market may have led households to increase their saving for precautionary purposes, part of which was in the form of higher money balances.

Another factor contributing to stronger personal sector M4 growth is the possibility of a rise in the personal sector's long-run demand for money. Growth in deposits from this sector might then represent an adjustment towards a higher desired long-run level of money holdings. The two most likely sources of this shift are the rise in equity prices throughout 1995, which raised the value of private sector wealth, and the rise in disposable income, both of which would increase the desired level of money balances.

The model presented above can be used to estimate the relative contributions of these factors to the growth of personal sector M4 in 1995. For the first three quarters of 1995 the fall in unemployment slowed significantly and our estimates suggest that the higher employment uncertainty implied by this slowdown may have reduced real consumption by an average of 0.3% a quarter up to 1995 Q3 and raised nominal personal sector deposits by an average of 0.2% a quarter. When unemployment started to fall faster in 1995 Q4 some of these effects were partially reversed. Nevertheless, the model slightly underpredicts the growth in personal sector M4 in 1995, which in part may be due to factors other than employment uncertainty influencing households' precautionary saving.

Chart 10 indicates that the effects from higher precautionary saving and other short-run influences have meant that personal sector money holdings have remained higher than their equilibrium level (denoted by M4* in Chart 10) throughout 1995, despite an estimated average rise of 1.1% a quarter in the long-run demand for money from the growth in wealth and disposable income. The gap between actual and equilibrium M4 holdings amounted to roughly 2% in the fourth quarter of 1995, equivalent in nominal terms to just under £10 billion or just over 2% of annual consumption. The chart also indicates that personal sector money balances tend to be above long-run equilibrium when consumption is below its equilibrium level (denoted by C* in Chart 10). Together this suggests some overhang of liquidity which, if past evidence is any guide, could potentially be translated into higher future consumption if consumer uncertainty subsides.

Chart 10 Personal sector money and consumption relative to long-run equilibrium



A further possible influence on personal sector deposits is that well-publicised conversion and merger and acquisition activity in the building society sector led to strong inflows into building societies in search of windfall gains. The November 1995 Inflation Report indicated that there was some evidence of this having a net impact on personal sector M4, with a slight strengthening of inflows into building societies at the expense of unit trusts and national savings in the first half of 1995. And there may have been a 'lock-in' effect with depositors reluctant to withdraw funds from the relevant societies even though returns on alternative assets may have been favourable. But some of the funds flowing into these building societies are likely to have come from other accounts within M4-from banks and other building societies. Moreover the fact that individuals' bank deposits also grew strongly in 1995 suggests that speculative inflows can, at best, provide only a partial explanation of stronger personal sector M4 growth.

Turning to the demand for credit by the personal sector, the most interesting development in 1995 was the strong growth in (unsecured) consumer credit, while the growth rate of (secured) mortgage lending remained relatively subdued.



(a) Stock of debt as a proportion of quarterly disposable income

Chart 11 Secured and unsecured debt-income ratios^(a)

Chart 11 shows the stock of secured and unsecured personal sector M4 lending as a proportion of disposable income. The personal sector's secured debt burden has increased during the 1990s, albeit at a much slower rate than during the 1980s. The unsecured debt-income ratio, on the other hand, declined in the early 1990s, but has since started to rise again. The faster growth in consumer credit in 1995 may reflect a desire to restore unsecured borrowing to the ratio existing prior to the late 1980s.

Unsecured lending flows are quite small relative to overall consumer spending-the stock of unsecured lending amounts to just over 12% of the total stock of personal sector M4 lending (excluding unincorporated businesses). Since consumer credit consists largely of credit card borrowing and personal loans it is most likely to be related to spending on durable goods. Chart 12 shows that the ratio of durables expenditure to income is indeed quite closely correlated with the unsecured borrowing ratio (the flow of unsecured borrowing as a proportion of disposable income). This may in part be related to anticipated income arising from building society mergers and maturing TESSAs. Agents may have brought forward purchases of durable goods financed by unsecured credit, perhaps on low (zero) interest terms, with the intention of using windfalls or maturing TESSAs to pay off this debt.

Chart 12





Chart 12 also shows, however, that most recently the unsecured borrowing ratio has grown somewhat faster than would have been expected from the durable goods to income ratio. Unsecured borrowing may have substituted for borrowing which would previously have taken a secured form—such as second mortgages or, more generally, borrowing against 'positive equity'(the difference between the value of a property and the amount of the first mortgage against it).

Bringing together the deposit and borrowing behaviour of the personal sector during 1995, there is also a puzzle as to why deposits and unsecured borrowing both grew so rapidly. Part of the answer may be that the data reflect (at least) two types of household, one of which increased deposits in response to greater uncertainty, while the other may have increased both deposits and borrowing in response to higher current and anticipated income and wealth.

Corporate sector: ICCs and OFIs

(a) ICCs' M4

ICCs' deposits were very weak during the first three quarters of 1995. This may have reflected an adjustment to the strong build-up in deposits in 1993 and early 1994. Chart 13 shows the gap between ICCs' money balances and





their long-run equilibrium levels (denoted by M4* in the chart) using estimates from the model presented earlier. It shows that the earlier build-up of deposits by ICCs led to a large divergence between actual and long-run equilibrium holdings (although if inflation effects in the model are treated as long-run influences on the demand for money the degree of 'excess' liquidity is not so large). Any divergence between actual and equilibrium money holdings at the end of 1994 may have acted as a brake on the growth of ICCs' deposits throughout 1995-as Chart 13 shows, the gap was partially reversed during the first three quarters of the year. This divergence may also have been a contributory factor to higher equity prices in 1995, as was suggested by the model. The stronger growth in ICCs' deposits of £3.5 billion in the final quarter of 1995 may reflect the liquidity generated by lending for mergers and acquisitions. Some ICCs may be holding the proceeds of equity sales temporarily on deposit prior to purchasing other (real or financial) assets.

(b) OFIs' M4

The model for OFIs' M4 holdings suggests that relative rates of return and wealth are the most important determinants of OFIs' deposits. Chart 14 shows the most important relative rate of return used in the model—the

Chart 14 Spread of own-rate on corporate sector deposits over Treasury bill rate



own-rate on corporate sector deposits less the three-month Treasury bill rate. The own-rate on corporate sector deposits rose marginally relative to the bill rate during 1995 but the spread remained small (since wholesale deposits and other money-market instruments are close substitutes). In addition, recent gains in the stock market may have increased the expected return on equities, reducing the incentive for OFIs to hold deposits.

OFIs' increased demand for money balances in 1995 may therefore have been a response primarily to increased wealth (stronger stock and bond prices). Chart 15 plots OFIs' deposits as a proportion of wealth (gross financial assets), which shows that although money balances rose slightly faster than wealth in 1995, the ratio of money to wealth is not high by recent historical standards. But since OFIs hold only a small proportion of their assets in the form of money balances, small shifts in this ratio imply a large impact on broad money.

Chart 15





(c) ICCs' and OFIs' borrowing

The major problem in interpreting the strength of ICCs' borrowing during 1995 has been the pattern in real-side

activity data. GDP growth slowed in 1995 and stockbuilding made a major contribution to the growth which did occur, while whole-economy investment expenditure was rather subdued. One possibility is that the increase in stocks was the result of an unanticipated slowdown in demand growth and that firms who maintained output in the face of that downward shock to demand (and firms' income) might have borrowed to finance their increased stocks.

Table C shows a selection of sources and uses of funds by ICCs. It shows that the undistributed income (retained earnings) of firms weakened in 1995, which may have put pressure on firms to raise external funds. Table C also indicates that the value of the physical increase in stocks was not large enough to explain the turnaround in ICCs' borrowing. But if stock appreciation is considered in addition to the physical increase in stocks, the figures then become more comparable with the growth in credit. The replacement cost of the existing level of stocks rose throughout the first three quarters of 1995, most probably due to the rise in raw materials prices up until the middle of 1995. To the extent that stocks need to be turned over quite rapidly, this would have created an additional need for finance by the corporate sector. But it would also imply that physical stockbuilding was largely voluntary, in anticipation of future input price rises.

Table CSelected sources and uses of funds by ICCs in 1995

	Uses				Sources		
	Fixed invest- ment	Invest- ment in UK company securities	Physical stockbuild ing and work in progress	Stock - apprec- iation	Undistri- buted income (less stock apprec- iation)	M4 lending to ICCs	Net sterling capital issues
Quarterly flov	vs in £ n	nillions; se	asonally ad	justed			
994 average 995 average	11,617 12,754	1,059 4,377	839 997	884 1,017	16,234 14,708	-379 4,378	3,225 2,878
1995 Q1 1995 Q2 1995 Q3 1995 Q4	11,449 13,425 12,953 13,189	7,866 570 4,369 4,703	180 1,268 1,671 869	1,328 1,195 1,123 423	14,605 15,880 14,966 13,382	6,101 2,187 3,327 5,901	2,606 2,310 3,059 3,538
Sources: Bank of	of England	d and ONS.					

It is less easy to link stronger M4 lending to ICCs (and large net capital issues) to the weakness of whole-economy investment in 1995. But this weakness masks important sectoral differences. In particular, as Table C shows, nominal investment by ICCs picked up markedly in 1995. Chart 16 shows that comparing the four-quarter growth rates of ICCs' nominal investment with M4 lending to ICCs reveals a reasonable degree of correlation during 1994 and 1995, so that part of M4 lending may also be explained by stronger nominal investment by ICCs. Much of this higher nominal investment activity appears to have been due to capital goods price inflation, with the whole-economy investment deflator rising by 5.1% in 1995, while part was also due to lower sales of land and existing buildings by ICCs to other parts of the private sector than in 1994.

Chart 16 ICCs—annual growth in bank and building society borrowing and nominal investment expenditure



Lending to both ICCs and OFIs may also have picked up because of the strength of mergers and acquisition activity in 1995. This was associated with a more general rise in the stock market. Table C shows a large investment by ICCs in UK company securities throughout 1995 and Chart 17 shows that the value of both total and cash-financed mergers and acquisitions activity rose to record levels (although part of the increase in the reported figures represents the inclusion of mergers and acquisitions activity in the financial sector for the first time). The initial rise in such activity and the stock market will not only have led to higher borrowing by firms undertaking the take-overs but may also have encouraged other firms, both OFIs and ICCs, to take positions in shares and other securities financed by bank borrowing.

Chart 17 Value of mergers and acquisitions activity in the corporate sector^(a)



Behaviour of banks and building societies

Broad money growth may reflect changes in the provision or 'supply' of credit by banks and building societies to both the private and public sectors. There is some evidence of an increased willingness by banks to lend to the private sector over recent quarters. Spreads between lending and deposit rates narrowed significantly in the first half of 1995, especially to UK corporates. For example, average spreads on banks' syndicated loans to large companies are estimated to have fallen by around 10 basis points to about 55 basis points between 1994 and 1995. This might reflect lenders becoming generally more optimistic about creditors' ability to repay debt, as indicated by the lower provisions made against domestic loan books over the last two years. Alternatively, or additionally, lower spreads may reflect greater competition among banks and building societies, especially in areas such as the mortgage market and lending to large corporates. Narrower spreads and margins are likely to increase the volume of intermediation undertaken by banks and building societies-and thus to increase M4. Meanwhile, data for the large British banks⁽¹⁾ show that over recent years they have increased significantly the amount of capital they hold as a proportion of their risk assets, so they are not currently constrained by capital requirements from expanding their lending in response to an increased demand for borrowing.

Banks and building societies also took up a significant amount of public sector debt (Treasury bills and gilts) during 1995 (see Table D). The government's borrowing from the banking system increases M4 in a similar way to private sector borrowing (assuming no changes in the other counterparts to M4), as banks and building societies bid for deposits to finance the expansion in their assets. This made a significant contribution—in an accounting sense—of nearly 2% to M4 during 1995.

Table D

Increase in holdings of government debt by banks and building societies in 1995

£ billions; percentages in italics

	Banks	Building societies	Total ba building (increase percent of M4)	ank and g society se as a age of stock
Gilts Treasury bills	2.9 6.7	-1.6 2.8	1.3 9.5	
Government debt	9.6	1.2	10.8	1.9

All of these factors suggest that changes in the willingness to lend to both the private and public sectors may have had some role to play in accounting for the expansion of banks' and building societies' balance sheets in 1995.

Summary

Broad money continues to be an important variable in the assessment of inflationary pressures. But the message it conveys is often difficult to disentangle, because the transmission of both nominal and real shocks to the rest of the economy involves a complex interaction between money, credit, interest rates and nominal activity. Our econometric research suggests that analysing money at the sectoral level—and the joint modelling of sectoral money holdings with other variables—makes this interaction clearer, in particular because the determinants of money holdings and their relationship with other variables differ across the personal and corporate sectors. This approach goes some way towards explaining developments in sectoral holdings of broad money during 1995 and illustrates the possible links between these holdings and future nominal demand. This is discussed further in the May *Inflation Report*, in the light of the sectoral money and credit data for the first quarter of 1996.

Appendix

Econometric relationships

As outlined in the article, our most recent research suggests that M4 holdings should be modelled by sector and jointly with other real and financial variables as a system of equations. The methodology used to estimate the structural models is the 'encompassing VAR' approach⁽¹⁾ which first estimates a statistical representation (reduced-form representation) of the system, in the form of a linear vector autoregression or VAR. A variety of structural models can subsequently be tested against this to see if they can encompass this statistical representation. This procedure involves placing and testing different 'identifying' restrictions on both the short and long-run relationships between the variables, based on different theoretical hypotheses.⁽²⁾ This framework also allows exogeneity hypotheses to be tested, which may permit the modelling of a simpler 'conditional' or 'partial' system of variables with some variables not needing to be modelled.⁽³⁾

Since the time series properties of the data suggest that a large number of the variables used in the estimation are non-stationary across the sample period, efficient estimation requires the analysis to be carried out in two stages. First, the number of long-run relationships are estimated and identified using the Johansen full information maximum likelihood (FIML) procedure.⁽⁴⁾ Second, a dynamic (error-correction) simultaneous equation model is derived, which requires further identifying restrictions to be tested. Simplifying exogeneity restrictions are tested between the two stages.

Personal sector

For the personal sector a system of eight variables was initially estimated, consisting of real personal sector M4 (deflated by the consumer price deflator) (M4p/Pc); total real consumption spending (C); real personal disposable income (Y_d); the own-rate of interest on personal sector deposits (i_{dp}); the three-month Treasury bill yield as an alternative rate of return (i); the quarterly rate of consumer price inflation (π_c); real gross financial and tangible wealth of the personal sector (Wp/Pc); and the change in the unemployment rate (Δu). All data were seasonally adjusted and all were logged except the interest rates, the inflation rate and the change in the unemployment rate, which were defined as proportions (ie 10% = 0.1). The sample runs from 1977 Q1 to 1994 Q4. Two long-run relationships were found to be present in the data, which could be identified as a money demand relationship and a consumption function given by:

 $LnM4p/Pc = 0.5 LnY_d + 0.5 LnWp/Pc + 0.44 (i_{dp} - i) - 6.4 \pi_c$

 $LnC = 0.9 LnY_d + 0.1 LnWp/Pc - 0.64 (i - 4\pi_c) - 1.21 \Delta u$

where *i* - $4\pi_c$ is the three-month *ex post* real interest rate.

Weak exogeneity tests based on these long-run relationships suggested that we could proceed to model just money and consumption simultaneously. This yielded a two-equation simultaneous error-correction model with error-correction terms *ECMm* and *ECMc* defined as the deviations of actual money holdings and consumption from their long-run levels:

$$\Delta LnM4p / Pc_{t} = -\underbrace{0.61}_{(0.21)} \Delta LnC_{t} + \underbrace{0.39}_{(0.13)} \Delta LnM4p / Pc_{t-1} + \underbrace{0.18}_{(0.08)} \sum_{i=0}^{1} \Delta LnY_{dt-i} - \underbrace{0.15\Delta^{2}}_{(0.10)} i_{dpt} + \underbrace{0.06}_{(0.03)} \Delta LnWp / Pc_{t}$$

$$- \underbrace{1.2}_{(0.15)} \Delta \pi_{ct} - \underbrace{0.11}_{(0.02)} ECMm_{t-1}$$

$$\Delta LnC_{t} = \underbrace{0.46}_{(0.09)} \Delta LnM4p / Pc_{t} + \underbrace{0.41}_{(0.13)} \Delta LnM4p / Pc_{t-1} + \underbrace{0.12}_{(0.08)} \Delta \pi_{ct-1} + \underbrace{0.12}_{(0.05)} \sum_{i=0}^{1} \Delta LnY_{dt-i} - \underbrace{0.24}_{(0.06)} \Delta i_{t} + \underbrace{0.12}_{(0.06)} \Delta i_{t} + \underbrace{0.12}_{(0.06)} \Delta \pi_{ct-1} + \underbrace{0.12}_{(0.05)} \sum_{i=0}^{1} \Delta LnY_{dt-i} - \underbrace{0.24}_{(0.06)} \Delta i_{t} + \underbrace{0.12}_{(0.06)} \Delta i_{t} + \underbrace$$

$$+ \underbrace{0.09}_{(0.05)} \Delta i_{t-1} + \underbrace{0.09}_{(0.03)} \Delta LnWp / Pc_{t-1} - \underbrace{1.92}_{(0.37)} \Delta^2 u_t - \underbrace{1.07}_{(0.38)} \Delta^2 u_{t-1} - \underbrace{0.20}_{(0.04)} ECMc_{t-1} - \underbrace{0.20}_{(0.04)} ECMc_{t-1}$$

Figures in parentheses are coefficient standard errors.

175

See Hendry, D F and Mizon, G E, *op cit.* See Bårdsen, G and Fisher, P G (1993) and Johansen, S and Juselius, K (1994).
 See Urbain, J (1995).

 ⁽³⁾ See Urbain, J (1995).
 (4) See Johansen, S (1988)

The model also contained a constant and two dummy variables for 1979 Q2 (1,-1 in Q2 and Q3) and 1988 Q3 (1,-1 in Q3 and Q4). The equations are stable under recursive estimation and pass all misspecification diagnostics at the 5% level. The residual standard errors are 0.70% and 0.59% respectively. The equations are estimated by FIML and the structural model passes the encompassing VAR test.⁽¹⁾

ICCs

For ICCs, a system of nine variables was considered: real personal sector M4 holdings by ICCs, deflated by the GDP deflator (M4i/Pg); real whole-economy gross fixed capital formation (I); real GDP (Y); a weighted own-rate on corporate sector deposits (i_{dc}) ; the three-month Treasury bill rate as an alternative rate of return (i); the real cost of capital (c_k) ; ICCs' real gross financial wealth (*Wi/Pg*); the rate of inflation given by the quarterly change in the log of the GDP deflator (π_e); and a term in capacity utilisation (cu)—the percentage of firms reported to be working below capacity from the CBI survey. This last variable is used to proxy the effect of the existing capital stock on investment. Similar proxies have been used in other investment studies.⁽²⁾ Again all data were seasonally adjusted and, except the interest rates and inflation, were all logged. The sample runs from 1977 Q1 to 1994 Q4. Three long-run relationships were apparent in the data which could be identified as:

 $LnM4i/Pg = 0.5 LnI + 0.5 LnWi/Pg + 2.9 (i_{dc} - i) - 5.66 c_k$

 $LnI = LnY - 3.23 c_k$

 $c_k = \overline{c}_k$

The cost of capital was found to be stationary around a constant mean. The exogeneity tests suggested that we could proceed with a three-equation model of money, investment and the cost of capital. The full structural error-correction model was given by:

$$\begin{split} \Delta LnM4i / Pg &= 0.42 \ \Delta LnM4i / Pg_{t-1} - 0.47 \ \Delta LnI_t - 0.31 \ \Delta LnI_{t-1} + 0.68 \ \Delta i_{dct} - 0.90 \ \Delta i_{dct-1} - 0.73 \ \Delta i_{t-1} \\ (0.29) \ \Delta i_{dct-1} - 0.73 \ \Delta i_{t-1} \\ (0.29) \ \Delta i_{dct-1} + 0.84 \ \Delta LnY_t - 1.93 \ \pi_{gt-1} - 1.41 \ \Delta \pi_{gt} + 0.84 \ \Delta \pi_{gt-1} - 0.18 \ ECMm_{t-1} \\ (0.30) \ \Delta LnI = - 1.4 \ \Delta c_{kt} - 0.95 \ \Delta i_{dct-1} + 0.15 \ \Delta LnWi / Pg_t + 0.66 \ \sum_{i=0}^{1} \Delta LnY_{t-i} - 0.15 \ cu_{t-1} + 0.4 \ \Delta \pi_{gt} \\ + 0.65 \ \Delta \pi_{gt-1} - 0.22 \ ECMi_{t-1} \\ (0.30) \ \Delta m_{gt-1} - 0.09 \ \Delta LnWi / Pg_{t-1} + 0.13 \ \sum_{i=0}^{1} \Delta i_{dct-i} - 0.06 \ ECMm_{t-1} \\ - 0.29 \ ECMc_{kt-1} + 0.03 \ ECMi_{t-1} \\ (0.07) \ (0.02) \ \Delta m_{gt-1} - 0.29 \ ECMi_{t-1} \end{split}$$

Figures in parentheses are coefficient standard errors.

with ECMm, ECMi and ECMck the deviations of actual money balances, investment and the cost of capital from their respective long-run levels. A constant and two dummy variables for 1983 Q3 (1,-1 for Q3 and Q4) and 1984 Q2 (1,-1 for Q2 and Q3) were also included. None of the three equations showed any signs of instability and all passed a range of misspecification tests, although the cost of capital equation did show some faint signs of heteroscedasticity. Overall the model does not fit the data as tightly as the personal sector model, perhaps reflecting the difficulties in proxying holding period rates of return on alternative assets available to the corporate sector.

OFIs

Initially a system of six variables was considered consisting of real OFIs' M4 using the GDP deflator (M4o/Pg); real total financial assets of OFIs (Wo/Pg); the own-rate on corporate sector deposits (i_{dc}); a three-month Treasury/commercial bill rate⁽³⁾ (i_b) ; a three-month holding period return on equities, calculated as the dividend yield plus the three-month percentage change in the FTSE actuaries all-share index (i_k) ; and the inflation rate given by the three-month change in the log of the GDP

See Hendry, D F and Mizon, G E, *op cit.* See Bean, C (1981).
 The choice made little difference to the results.

deflator, (π_g). The sample period of the data was from 1978 Q1 to 1994 Q4; all data were seasonally adjusted and both money and wealth were logged. The Johansen procedure suggested that two long-run relationships were present in the data, which could be identified as the demand for M4 by OFIs and a deposit rate setting relationship for banks and building societies, which might best be interpreted as an 'inverse' supply relationship for OFIs' M4.

$$LnM4o/Pg = LnWo/Pg + 21.3 (i_{dc} - i_b) + 1.5 (i_{dc} - i_k) + 6.0 (i_{dc} - 4\pi)$$

 $i_{dc} = 0.93 i_b + 0.008 LnM4o/Pg$

The elasticity of money demand with respect to the 'money-market' spread is large, suggesting that only a small change in relative rates of return is necessary to induce a large increase in the demand for money by OFIs. Exogeneity tests suggested that only money and deposit rates needed to be modelled together. Again two *ECM* terms were defined for the deviations of actual M4 holdings and deposit rates away from their equilibrium values—*ECMm* and *ECMi_{dc}*. The dynamic structural model was given by:

$$\Delta LnM4o / Pg = 3.305 \Delta i_{dct} + \underbrace{0.43}_{(0.12)} \Delta LnM4o / Pg_{t-1} - \underbrace{0.8}_{(0.58)} \Delta i_t - \underbrace{1.5}_{(0.37)} \Delta \pi_{gt} + \underbrace{0.09}_{(0.03)} \Delta i_{kt-1} - \underbrace{0.06}_{(0.01)} ECMm_{t-1} - \underbrace{0.12}_{(0.01)} ECMm_{t-1} - \underbrace{$$

$$\Delta i_{dc} = \underbrace{0.05}_{(0.013)} \Delta LnM4o / Pg_{t-1} - \underbrace{0.22}_{(0.07)} \Delta i_{dct-1} + \underbrace{0.48}_{(0.04)} \Delta i_t + \underbrace{0.26}_{(0.07)} \Delta i_{t-1} - \underbrace{0.09}_{(0.05)} \Delta \pi_{gt} - \underbrace{0.01}_{(0.005)} \Delta i_{kt} + \underbrace{0.02}_{(0.01)} \Delta LnWo / Pg_t - \underbrace{0.48}_{(0.08)} ECMi_{dct-1}$$

Figures in parentheses are coefficient standard errors.

A constant and two dummies for 1985 Q1 (1,-1 in Q1, Q2) and 1987 Q1 (1,-1 in Q1, Q2) were also included. The fit of the model is satisfactory and there were no signs of instability or failure of the diagnostic tests. But given the volatility of OFIs' deposits the model above should be considered as an illustrative rather than definitive specification for OFIs' M4 holdings.

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How do UK companies set prices?

By Simon Hall, Mark Walsh and Tony Yates of the Bank's Structural Economic Analysis Division.

In the autumn of 1995, the Bank conducted a survey of price-setting behaviour in 654 UK companies that maintain regular contact with the Bank's Agents. The survey was inspired by the work of Alan Blinder in the United States. The survey has made available much new information. For example, companies do not regard the direct costs of changing prices as being particularly important, although prices are typically changed infrequently, on average only twice a year. Preserving customer relationships is very important for firms in making decisions about prices. And there are many differences among firms about which factors influence price changes. These results throw light on how monetary policy—which is focused on the control of inflation-affects the economy. The article describes the survey results and how they compare with other information about UK price setting.⁽¹⁾

Section 1 of the article explains why price setting is important to a central bank concerned with controlling inflation and section 2 describes how the survey was carried out. Section 3 discusses different theories of price setting, and how the survey results relate to them. The remaining sections look at other questions about price setting: section 4 looks at how often companies review and change prices; section 5 considers what factors influence pricing decisions; and section 6 examines whether prices are more sticky downward than upward. Section 7 discusses what companies say they would do in response to a demand boom. Section 8 draws together the conclusions of the survey.

Why is price setting important? 1

Understanding how companies set prices is important for the Bank's advice on controlling inflation, since price-setting behaviour determines how decisions about monetary policy-on interest rates, money and inflationaffect the economy. Early theories about the macroeconomy assumed that monetary variables had no impact on real variables. These theories were based, at least in part, on the idea that price changes were costless and instantaneous. But anyone who has bought or sold something knows that in reality prices are set by buyers and sellers and that it costs time and money to calculate the right price of any product, or how prices should respond to a change in the market. And evidence suggests that changes in money and prices (nominal quantities) can and do affect output and employment (real quantities), at least in the short run.

It is important to explain how monetary policy affects the economy. An understanding of the monetary transmission mechanism is central to the efficient execution of monetary policy itself. There are many reasons why monetary policy might affect the economy. Economists have long suspected that at least part of the reason might be that prices are slow to adjust, or 'sticky'. One purpose of the survey was to find out whether this is true. As section 3 reports, there are many reasons why prices might be sticky: interaction between companies, cost conditions, company-customer relations and the costs of changing prices could all lead to prices not changing very much or very frequently. So the survey was intended not only to measure the extent of price stickiness in the United Kingdom, but also to explain it.

2 The survey

There have been many attempts to investigate price-setting behaviour using aggregate data.⁽²⁾ But studies using data on individual products and companies are rare. In the United States, Blinder (1992) surveyed 72 companies and asked questions about different pricing theories. Carlton (1986) analysed data collected by Stigler and Kindahl (1970) on individual product prices and looked at the frequency of price changes and the duration of company-customer relationships. Cecchetti (1986) studied the frequency of price adjustment of magazines sold on newsstands. Kayshap (1995) also looked at evidence based on retail catalogues. In the United Kingdom, there seems to be even less company or product-level evidence. An early study by Hall and Hitch (1939) surveyed 38 manufacturing companies in the United Kingdom about their pricing behaviour. More recently, the Workplace Industrial Relations Surveys of 1984 and 1990 asked questions about whether prices would respond to changes in demand;⁽³⁾ and the Lloyds Bank Small Business Research Trust published a

The authors would like to thank those companies who responded to the survey. They would like to thank Alan Blinder and Alan Kirman for their advice on the questionnaire.
 For example, Ball, Mankiw and Romer (1988), and later Yates and Chapple (1996), observe a cross-country correlation between the level of

For example, Bair, Mainki and Kongel (1986), and hater rates and Chappie (1996), loserve a closs-county correlation between the level of inflation and the output-inflation trade-off, and use this to infer that there are significant costs in changing prices that decline in importance as inflation rises. Ball and Mankiw (1995), Rae (1993) and Cabral, Hall and Yates (1996) all examine the correlation between mean inflation and the skewness of inflation across sub-components of the aggregate price index to make inferences about price stickiness.
 For descriptions of the survey see the source books by Milward and Stevens (1986) and Milward *et al* (1992); for analyses of the questions on price responses see Yates (1994) and Haskel, Kersley and Martin (1995).

survey of price setting in 350 small companies in the United Kingdom.

The Bank of England's survey was carried out by the Bank's Agents and its Business Finance Division, who approached some 1,100 industrial contacts across the country. The survey was then carried out by sending a questionnaire to those who agreed to participate. The sample was neither random nor fully representative of all companies in the United Kingdom. In particular, respondents to the survey tended to be established rather than new companies, and this meant that companies in the sample were likely to be larger than average. For example, while large companies (with more than 500 employees) account for 37% of employment in the United Kingdom,⁽¹⁾ in the Bank survey they accounted for 96% of total employment of the firms which responded. Chart 1 shows

Chart 1

Company size by number of employees

Percentage of companies in each category



Labour Force Survey data on hours worked by part and full-time workers in the economy as a whole.

Chart 2

Sectoral composition of companies in the survey

Percentage of companies in each category



The sectoral allocation is based on the 1992 standard industrial classification manufacturing (Division D), construction (Division F), retailing Note (Division G) and other services (Divisions H to O)

the size of companies in the survey. Partly because of this large-company bias, the sample was dominated by manufacturing companies (see Chart 2): 68% of the sample were manufacturing companies, compared with only 12% for the country as a whole.⁽²⁾

The survey also asked questions about market structure. As discussed later, the number of competitors in a company's market (Chart 3), a company's market share (Chart 4) and



Percentage of companies in each category



Chart 4

Market share of companies in survey



the length of customer relationships (Chart 5) are all likely to affect pricing decisions.(3)

Why might prices be sticky? 3

The first part of the survey applied the work of Alan Blinder (1992) to the United Kingdom by asking companies to distinguish between different theories of price setting. The Blinder and Bank surveys outlined a number of these theories and asked companies to assess their importance.

Dale and Kerr (1995) report employment shares by firm size based on data contained in the Inter-Departmental Business Register. The Bank questionnaire may have induced an additional bias in the responses because it asked respondents to focus on the pricing of a specific, main product. This may have been appropriate for manufacturing companies, but was potentially less suitable for service and construction companies, whose 'product' may vary with every new transaction. For this kind of company, it might have been more appropriate to ask about the factors determining charges for labour time. The survey also asked companies about organisational structure, trade union arrangements, new product pricing, market location, discounting and customer markets. This information is not used in this discussion but will be considered in subsequent work on the survey results.

(3)

Table A The recognition and importance of different pricing theories(a)

Percentages in italics

U	Bank survey (UK)			Blinder's survey (US)		
	Percentage recognition	Mean ra (orderin	ank (b) Ig among	Mean ra	ink (b) is)	
Constant marginal costs	53.8	3.1	6	2.44	10	
Cost-based pricing	47.1	2.3	2	1.28	3	
Implicit contracts	45.4	2.9	5	1.48	4	
Explicit contracts	43.7	2.2	1	1.71	5	
Procyclical elasticity	35.3	3.3	9	2.03	7	
Pricing thresholds	34.4	2.8	4	2.03	8 (c)	
Non-price elements	24.2	3.3	8	1.14	1	
Stock adjustment	22.9	3.1	7	2.28	9	
Co-ordination failure	22.0	2.5	3	1 1 5	2	
Price means quality	18.5	3.6	10	2.55	11 (d)	
Physical menu costs	7.3	3.8	11	1.72	6	

These theories are explained in the text. The bands divide the theories into five groups. Statistical tests show that within each group the proportions recognising each individual theory as important are not significantly different from each other, but are significantly different from the proportions recognising theories from the other groups. Low numbers indicate that a theory is important. The Bank survey is on a scale of 1–7, Directed theory is important. (a)

(b) Blinder's on a scale of 1-4

(c) Blinder ranks pricing thresholds below procyclical elasticity because a smaller percentage of companies gave this theory a rank of '3' or higher.
(d) Blinder ranked this 12th below another theory, 'hierarchies', which we did not investigate.

The results of the Bank and the Blinder surveys are summarised in Table A. The Bank survey first asked whether a company recognised a particular pricing theory as being important for its activities. If a theory was recognised, the company then ranked how important it was on a scale of 1 (high) to 7 (low). The 'mean rank' given by those companies which recognised the theory can then be calculated, and is shown in the second column of the table. To make detailed comparisons with Blinder's survey, the third column shows the scores given by Blinder's respondents in the United States. It should be noted that the mean scores for the Bank survey and Blinder's survey are calculated using different scales and cannot be compared directly. In the Bank survey, low numbers are important (on a scale of 1–7). In Blinder's original rankings, high numbers were important (on a scale of 1-4), but to make these rankings more comparable to the Bank numbers, they have been subtracted from four in Table A. Figures in italics show the priority companies gave to the different theories, with 1 being the highest and 11 the lowest priority.

Constant marginal costs and cost-based pricing

Two related theories of price stickiness are constant marginal costs and cost-based pricing. Constant marginal costs means that variable costs per unit of output are more or less constant for a company when production levels change. If a company bases prices on costs, then a company with constant marginal costs has no reason to change prices when production changes. Changes in demand may still influence prices, but as Hall (1986) pointed out, if there was a boom in demand and output increased, prices would increase by less than if variable costs per unit were rising as the company moved towards full capacity. Cost-based pricing, on the other hand, refers to companies which do not take changes in demand into

account when setting prices. Companies operating cost-based pricing will only change prices if charges for raw materials or wage rates or some other costs change. Gordon (1981) and Blanchard (1983) showed how cost-based pricing can lead to considerable inertia in the supply chain as a whole, since one company's rigid final price becomes another's fixed-price, raw material cost.

The results on constant marginal costs offer one of the most marked contrasts between Blinder's survey and the Bank's. The theory of constant marginal costs did not get much support from Blinder's respondents (it came bottom of their list). But in the Bank survey, this theory received the most recognition, cited as important by 54% of respondents, although as Table A shows, those that did recognise the theory as important did not rank it particularly highly (constant marginal costs was ranked sixth out of the eleven theories).

There was significant variation in the recognition of constant marginal costs across broad industrial groups. 61% of manufacturing companies recognised constant marginal costs as important, which was statistically significantly different from the proportions in construction (35%), retail (34%) and other services (46%). If the costs of production in manufacturing are less flexible than in other industriesif production is, for example, more capital intensive-then it would make sense that constant marginal costs turn out to be more important, since in capital intensive industries, marginal costs will rise less rapidly with output up to the point of full capacity. But company size does not seem to have any significant impact on the importance of constant marginal costs; and there is only slight evidence that market structure affects the importance of this theory.⁽¹⁾ This is surprising, since we might have expected industries consisting of a few large companies, exploiting economies of scale, to be more likely to have relatively constant marginal costs than industries where production is less concentrated.

Cost-based pricing comes second in the Bank's league table of theories, in terms of recognition and rank, with 47% of respondents citing it as important, and assigning it a rank of 2.3. In Blinder's survey, cost-based pricing was also important (third in his league table). The importance of cost-based pricing in the United Kingdom may exacerbate any price rigidity resulting from the prevalence of constant marginal costs, also identified in the survey.

There is some evidence that cost-based pricing is more widespread in small companies: 58% of small companies recognised cost-based pricing as important, compared with 45% of medium-sized companies and 44% of large companies. If there were economies of scale in devising sophisticated systems for monitoring market conditions, then smaller companies might opt for simpler (perhaps cost-based) rules to guide price setting.

Respondents were asked to estimate the number of competitors in the market for their main product or service. 60% of companies with up to five competitors recognised constant marginal costs as important, while 48% of those with more than eleven competitors thought this theory was important. However, these differences were not evident when companies were asked about their market share, nor when mean rankings were (1)compared across market structures

Explicit or implicit contracts

A third reason for rigidity in prices is that transactions between companies and customers may involve either explicit or implicit contracts (formal or informal understandings). Such contracts deliver stable prices, which provide insurance against uncertainty in market conditions, and allow companies and customers to plan ahead without the threat of sudden changes in costs or prices. Even so prices will not necessarily be rigid under either implicit or explicit contracts, since both can be renegotiated.

Stiglitz (1984) argued that the prevalence of long-term relationships between companies and customers (which the Bank survey confirms) was evidence that these kind of contracts exist. Instead of inferring their existence, the Bank survey asked about such contracts directly (see Chart 5). Both implicit and explicit contracts were

Chart 5

Proportion of companies surveyed with customer relationships lasting over five years

Percentage of companies falling into each category



recognised as important. In rank terms, explicit contracts turned out to be the most important theory. In Blinder's sample, implicit and explicit contracts came fourth and fifth in his league table of theories.

There was also some interesting variation in the importance of contracts across industries. Recognition of explicit contracts was particularly high in the construction sector (at 73%) and particularly low in retailing (25%). This is as expected. Construction projects take a long time to come to fruition, and may be affected by uncertainties like the weather and the price of raw materials. Companies in retailing, by contrast, often sell goods that can be inspected by the buyer before money changes hands, so there is little benefit from the insurance provided by an explicit contract. Perhaps because of the prevalence of explicit contracts, recognition of implicit contracts in construction was correspondingly lower (at 16%) than in the other sectors.⁽¹⁾ There is some evidence that companies involved in

longer-term relationships with customers attach greater importance to explicit contracts: companies with over 75% of their customer relationships lasting for longer than five years ranked the theory at 1.8, compared to 2.3 for those with less than 40% of customers in such long-term relationships. This does not accord with the spirit of Carlton's (1986) work, which showed that prices were more rigid when firm-customer relationships were shorter. He suggested that both parties were more prepared to enter into fixed-price contracts early in their relationship, when there had been no time to build up trust, although he did not have any data on whether prices were governed by contracts or not.

Co-ordination failure

Collusive behaviour between companies, even if it is only implicit, may also make prices sticky. What economists have called co-ordination failure occurs when no company wants to be the first to change prices, even if it is in response to a genuine change in costs or demand. Each company worries that it might spark off a price war and that it might be worse off as a result.⁽²⁾ Blinder's study found this theory to be very important, ranking second in his list. But in the Bank study, the results were less clear: only 22% of respondents recognised co-ordination failure as important, though those that did so ranked it quite highly at an average of 2.5, putting it third in importance among the theories.

Economic theory suggests that companies in very competitive industries take their prices from the market, and cannot engage in price wars with other companies, so there is no co-ordination failure. Companies in very concentrated markets with few competitors may well engage in strategic behaviour, jostling with other companies for market share. But it should be relatively easy for this activity to be co-ordinated, without sparking off a price war. So theory expects co-ordination to be most likely to fail in industries between these two extremes. But, it is unlikely that a relationship as subtle as this would show up in our survey.(3)

We did nevertheless find that companies in less competitive markets do not seem to experience more problems with co-ordination failure: only 11% of companies with more than 40% of the market recognised co-ordination failures as important, compared with 30% of those with 5% or less of the market. An explanation might be that market leaders do not have to worry about triggering price wars if they can count on other companies falling into line. Co-ordination failure was less of a problem where there were many customers in long-term relationships.⁽⁴⁾ This is as expected: price wars between companies are much less likely to succeed if there is a high degree of customer-company loyalty.

⁽¹⁾ (2) (3) Manufacturing: 47%; retailing: 48% and other services 46%. These ideas were articulated in theory by Stiglitz (1984), Ball and Romer (1987) and Cooper and John (1988). Especially since we looked only at bivariate correlations. In future, multivariate analysis will be used to test for the links between competition and

⁽⁴⁾

co-ordination failures more thoroughly. For example, 14% of companies with more than 75% of customers in relationships longer than five years recognised co-ordination failures as a problem, compared with 27% of companies with up to 40% of customers in these relationships. This difference was significant at the 5% level.

Procyclical elasticity

Rotemberg and Saloner (1986) and Shapiro (1988) put forward a theory suggesting that strategic interactions between companies could depend on the state of the business cycle. When demand falls, some companies may go out of business. If the number of companies falls significantly, this may increase companies' ability to co-ordinate their prices as well as reducing price competition. This theory is known as procyclical elasticity, since it explains why the responsiveness (elasticity) of prices to changes in demand may dampen in a cyclical downturn. Procyclical elasticity was recognised as important by 35% of the sample, but was not scored highly by those that did. Blinder did not find that procyclical elasticity was rated highly either: it came seventh in his list of theories.

Pricing thresholds

Pricing thresholds may also inhibit companies from changing prices. For example, many companies price at £4.99 or £9.99 instead of £5 or £10. Companies might do this if they believe that increasing prices above these thresholds would lead to falls in demand that are out of proportion to the price increase. Pricing thresholds ought to mean that prices are more sticky upwards than downwards. Kayshap (1995) tested the importance of this phenomenon in the United States. He found some weak evidence that pricing thresholds were important. He observed that price changes tended to be slightly smaller when they crossed over 50-cent thresholds. In the Bank survey, pricing thresholds were recognised by 34% of companies, with a mean rank of 2.8. This places it fourth in the list of theories-more important than in Blinder's survey, where pricing thresholds ranked eighth.

Pricing thresholds were recognised much more widely in retailing (69%) than in all the other industry groupings, where recognition was recorded at 29% for manufacturing, 38% for construction and 30% for other services. In retailing, most transactions are conducted with final consumers. Elsewhere, buyers tend to work for companies, so they might be less responsive to psychological factors like pricing thresholds. Pricing thresholds might also be less important as customer loyalty increases, but the survey found no evidence of this.

Non-price elements

Another possibility is that although observed prices are sticky, the real underlying price varies as companies instead change quality, or delivery times, or the amount of after-sales service. These non-price elements were thought important by Carlton (1990), and Blinder's survey found them to be the most important factor for his respondents. The Bank survey is much less supportive, recording a 22% recognition of non-price elements and a mean rank of 3.3, which puts it eighth in the list of theories. Non-price elements were much less widely recognised by construction companies (11%) than by companies in manufacturing (29%). As discussed above, explicit contracts were much more important for construction companies than for the other industrial groupings: if prices are more rigid because of this, delivery, after-sales service and quality might be the dominant mechanism through which companies compete and adjust to demand conditions. And if these other elements are not flexible either (perhaps because explicit contracts rule this out), then changes in market conditions are more likely to result in construction companies experiencing larger swings in output and employment than other companies. This scenario accords with the above-average variability of construction employment and output in the whole economy.

Stock adjustment

Companies could respond to changes in market conditions not by changing prices but by adjusting stock. This idea is usually attributed to a paper by Blinder (1982). In some ways, stock adjustment encompasses the other theories: companies can react to a change in market conditions in a number of ways, including leaving the market, changing prices or, in the short run, adjusting stocks. 23% of respondents recognised this as an important factor in their price setting and as in Blinder's survey, stock adjustment did not rank highly relative to the other theories. This is slightly perplexing, given the high levels of support for other price-stickiness theories, since stock adjustment is probably a symptom of other forms of price stickiness, rather than a cause in its own right.

Price means quality

If companies think customers buy on the basis that price means quality, they may be unwilling to cut prices for fear that buyers will think the product has declined in quality.⁽¹⁾ Quality signalling might well be relevant for the luxury car market, or perhaps certain niche markets for clothes or food, but is unlikely to be of widespread importance for most products. Blinder's survey and the Bank's confirmed this: quality signalling was recognised by 18.5% of Bank respondents, ranking it tenth in the list of theories. In Blinder's survey, this theory was the least important of all.

Physical menu costs

Menu costs theories derived originally from the idea that restaurants might be reluctant to change prices in response to a change in supply or demand because of the cost of re-printing menus. These costs could be called physical menu costs, as they refer to the resources needed to implement price changes.⁽²⁾ Menu costs were found to be of little importance in Blinder's sample, and were even less so in the Bank's, with only 7% of companies citing them as important. Part of the reason may be that there are other information costs that companies have to bear: for example,

This idea was put forward in a paper by Stiglitz (1987).
 They were first discussed explicitly by Sheshinski and Weiss (1977), and then developed by Mankiw (1985) and Akerlof and Yellen (1985a).

the costs of being sufficiently aware of prices in the market and of anticipating consumer and competitor reaction to pricing policies. The survey did not ask about these directly, but they are described in the next section.⁽¹⁾ The survey showed that physical menu costs were much more widely recognised in retailing than in other sectors; 22% of retailers thought they were important, compared with 5% for manufacturing, 3% for construction and 9% for other services. Since, as discussed below, retailers tend to change prices most frequently, this result is not surprising.

The survey's questions on pricing theories, which were designed to match those asked by Blinder (1992), gave some interesting results. In the Bank survey, constant marginal costs were important for respondents, while non-price elements were not. Blinder found the opposite. The Bank survey also found that, except in retailing, physical menu costs did not seem to be important.

4 How often are prices reviewed and changed?

Other questions in the survey asked more directly about price setting: about the frequency of price reviews and price changes. On price reviews, the survey asked 'How frequently are pricing decisions actively reviewed?' On price changes, it asked 'In the last twelve months, how many times have you actually changed the price of your main product?' Charts 6 and 7 compare the frequency of price reviews and price changes.

Chart 6 **Frequency of price reviews**



Informational menu costs

The frequency of price reviews reveals something about informational menu costs-the costs of collecting the data needed to decide whether the current price is right or notas distinct from physical menu costs-the costs of implementing the outcome of a price review-discussed





earlier. For example, if price reviews were entirely costless, companies would conduct them continuously, to pick up every change in market conditions as it occurred. For the 80% of companies in our sample which review prices less than once a day, price changes are probably not costless; the expected gains from reviewing prices continuously are not large enough to justify the costs. Indeed, these costs are such that 28% of companies said that they reviewed prices only once a year.

Time and state-dependent pricing

Companies were asked whether they normally reviewed prices at a particular frequency and/or whether prices were reviewed 'in response to particular events'. These questions can help distinguish between two different theories of price setting-time-dependent and state-dependent pricing rules.

In time-dependent pricing models⁽²⁾ because price changes are costly, companies choose to review prices at discrete time intervals. The length of this interval tends to depend on the rate of inflation, since this determines how quickly the company's own relative price falls. When inflation is high, and a company's relative price is falling rapidly, profits fall quickly and it will review prices more frequently to compensate. State-dependent pricing models,(3) however, are based on the assumption there is no routine price reviewing. Instead, prices will be fixed until there is a sufficiently large shift in market conditions to warrant a change.

Both theories predict that prices will remain unchanged for periods of time and then move in discrete jumps. But they may have different implications for macroeconomic policy. Under time-dependent pricing rules, the interval between price changes rises as inflation falls. As Ball, Mankiw and

The theoretical literature on menu costs stresses that quite small menu costs can have large effects on economic welfare. Mankiw (1985) and Akerlof and Yellen (1985b) were the first to make this point. If a firm faces small menu costs, and prices are slightly more sticky than otherwise, the costs to the firm are incurred by changing output back and forth as demand changes. But the costs to the economy also include those incurred by a firm's customers, who cannot fully satisfy their demand for the firm's good because the price is rigid. So although menu costs do not seem to be important in the Bank sample, menu costs could still explain some of the observed real effects of monetary policy in the United Kingdom. The early time-dependent pricing models (such as Fisher 1977) were generally applied to the labour markets but subsequent models (such as Ball and Romer 1989) have extended the principle to product markets. State-dependent pricing rules were first articulated by Barro (1972) and developed in a series of papers by Sheshinski and Weiss (1977, 1983), Caplin and Sheshinski (1987), Caplin and Spulber (1987) and Caballero and Engel (1991). (1)

⁽²⁾

⁽³⁾

Romer's (1988) menu-cost model shows, the effects of a monetary shock on real activity may therefore be larger and persist for longer at lower rates of inflation. With state-dependent pricing rules, any effects from nominal variables-interest rates, prices and money-on the real side of the economy are less likely to vary with the rate of inflation.⁽¹⁾ If this is the case, then all other things being equal, a higher incidence of companies operating time-dependent price reviews could mean that the real effects of nominal shocks would increase at lower rates of inflation. But all other things are not equal, and set against these possible effects of disinflation, are the substantial costs of inflation.⁽²⁾ In particular, at higher rates of inflation the variance of (and hence the size of shocks to) the price level may be higher. If this higher variance implies greater uncertainty and more difficulty for companies in assessing market conditions, then higher rates of inflation could imply greater real effects of monetary policy shocks. And, with higher rates of inflation, there will tend to be more changes in the price level and companies will have to incur more frequently the menu costs of price changes.

The survey suggested that time-dependent pricing was more common than state-dependent pricing, with 79% of the respondents reporting that they reviewed their prices at a specific frequency. 11% of companies said that they reviewed prices 'in response to a particular event', placing them in the state-dependent camp. 10% of companies implied that they operated both time and state-dependent pricing. This was not unexpected since the theories are not mutually exclusive; it is plausible to think of companies reviewing prices annually, but conducting additional reviews in response to extraordinary events. Kayshap (1995) found more support for state-dependent, rather than time-dependent rules in the United States. But the findings of Carlton (1986) and Cecchetti (1986) for the United States were consistent with either type of price setting.

Price reviews versus price changes

Charts 6 and 7 show that, in the year to September 1995, price changes were much less frequent than price reviews. The median number of times that prices were changed was twice a year, while the median company reviewed prices every month. So companies often reviewed prices but decided not to change them. Prices were possibly left unchanged because market conditions were unchanged. But perhaps prices were unchanged because, even once companies had decided to incur the informational costs of reviewing prices, they thought there were extra costs of changing price lists (physical menu costs), or risks of sparking off a price war, or of breaching implicit or explicit contracts with loyal customers. So comparing the frequency of price reviews with price changes suggests that informational costs are not the only

significant cost of changing prices: other theories are important too.

The results make interesting reading when compared with previous research on the frequency of price changes. Respondents to the Bank survey changed prices on average at around twice the frequency of respondents to previous surveys, which were mostly conducted for the United States. A rough calculation from Cecchetti's (1986) data reveals that, on average, magazine prices over the period 1953-79 remained fixed for about five years. Carlton's (1986) study of Stigler and Kindahl's (1970) data implies an average period of price rigidity of around ten months. Blinder (1992) found that the typical firm changed prices once a year. Kayshap's (1995) study of retail mail order catalogues found that, on average, prices remained fixed for fifteen months. Dahlby (1992) found that the mean length of pricing period in Canadian insurance premiums was about 13 months. Table B summarises their results.⁽³⁾

Table B The frequency of price changes

Author	Period	Prices	Frequency (implied number of changes every five years) (a)
Carlton	1957–66	US industrial	6
Cecchetti	1959-73	US newsstands	1
Blinder	1991	72 US companies	5
Kayshap	1953-87	US retail catalogues	4
Dahlby	1974-82	Canadian insurance	4
This survey	1995	654 UK companies	10

(a) Bank calculations from the other authors' published articles.

How do companies' circumstances and characteristics affect price reviews and price changes?

Table C shows how the frequency of price reviews varied by sector. As expected, the average frequency of price reviews was much higher in retailing than in manufacturing. But in construction and other services, where many products take time to deliver, the high frequency of reviews was surprising. One explanation might be that the 'product' tends to vary with each new transaction and that respondents are interpreting this as a price review.⁽⁴⁾ Statistical significance tests⁽⁵⁾ found that the median price review frequency for construction and retailing was weekly, and significantly different from manufacturing (quarterly) and other services (monthly). Differences also occurred in the average number of price changes in industries: for example, the average for manufacturing was two changes a year, while for retailing it was three. Differences between industries are broadly consistent with the survey of small companies published by the Lloyds Bank Small Business Research Trust.

Table C also shows that large companies reviewed prices more often than small companies: this difference was

Although, if firms operate a form of state-dependent pricing called an Ss rule, where there are upper and lower bounds within which they make no adjustment to prices, lower inflation could reduce the likelihood that the upper bound is breached when there is, for example a positive shock to money supply. This method of pricing may therefore also imply that the real effects of any nominal shock may be higher at lower rates of inflation. For an overview, see Briault (1995). (1)

As we have already discussed, the frequency of price changes could well be affected by the prevailing rate of inflation, as well as by factors

 ⁽a) For the construction and services sectors, a question about charging out of particular factors, like labour time to clients, may have been more
 (4) For the construction and services sectors, a question about charging out of particular factors, like labour time to clients, may have been more

Table C Factors influencing the frequency of pricing reviews

	Frequency of:	
	Price reviews (median)	Price changes (median) (a)
Whole sample	Monthly	2
Industry Manufacturing Construction	Quarterly Weekly	2 3 or 4
Retail Other services	Weekly Monthly	3 or 4 1
Company size Small	Quarterly	1
Large	Monthly	2
Number of competitors 0–5 6–10 > 11	Quarterly Monthly Monthly	1 2 2
Market share Up to 5% 5%-20% 20%-40% > 40%	Monthly Quarterly Quarterly Quarterly	2 2 2 1
Percentage of long-term rela <40% (b) 40%-60% 61%-75% > 75%	tionships Monthly Monthly Monthly Quarterly	2 2 2 1

Note: As before, small companies are defined as those with less than 100 full-time equivalent employees, medium between 100-500 and large companies with more than 500 such employees

(a) Number of changes during the previous twelve months(b) Includes those companies responding 'not applicable'.

statistically significant, although there was no significant difference in the average number of price changes. The findings confirm those of Blinder (1992), who reported very little support for a pricing theory that he called 'hierarchies', which suggested that large companies' prices would be more rigid because of bureaucratic sluggishness. The observation that small companies review prices less frequently is interesting. At face value, it reveals something about the balance between two forces that economic theory predicts influence small companies. One theory says that small companies may be prevalent in an industry because the technology is such that their costs rise more steeply with output. So the penalty for not changing prices in response to a change in costs is large. In these circumstances, prices would be more sensitive and reviewed more frequently than in larger companies. A second theory says that monitoring market conditions and devising pricing policies is something done more efficiently by large companies, which can spread the cost over many units of production. The finding that small companies review prices less frequently is supported by our earlier finding that cost-based pricing is important for small companies: cost-based pricing implies that companies ignore fluctuations in demand, which should mean that prices are reviewed less frequently.

Companies operating in more competitive markets reviewed and changed prices more often: this held when looking at the number of competitors, or at market share.⁽¹⁾ A possible explanation is that the consequences of charging the wrong price are more serious in a competitive industry-since

demand is more sensitive to price-and so companies have a greater incentive to check the appropriateness of their current price and are more sensitive to changes in market conditions. This finding is consistent with the work of Carlton (1986), who observed that US industrial prices were more rigid in concentrated industries. But other studiesusing more aggregated data to look at the speed, rather than the frequency, of price adjustment—give conflicting results. For example, Weiss's (1993) study of Austrian manufacturing found that more concentrated industries adjusted prices more slowly in response to changes in costs, but more quickly in response to changes in demand. Kraft (1995) examined data on German manufacturing prices and found that prices in more concentrated industries adjusted more quickly to changes in costs or demand. Geroski (1992), using UK data, found the opposite.⁽²⁾

The results also showed that companies with a greater proportion of customers involved in long-term relationships reviewed and changed prices less frequently than the others: these differences were statistically significant. This ran counter to the work of Carlton (1986), who found that prices tended to be more flexible the longer the buyer-seller association. Carlton argued that customers involved in shorter relationships with suppliers were more likely to use fixed-price contracts because of the fear that companies may exploit them by price changes. The Bank survey found the opposite: as discussed above, explicit contracts tended to be more important for companies with a greater proportion of long-term customers.

There were several key results from the questions on the frequency of price reviews and price changes. First, although physical menu costs were thought to be unimportant by respondents, companies changed prices only about twice a year on average, suggesting there were some costs associated with pricing decisions. Second, time-dependent pricing rules predominated. Third, in line with Carlton (1986), greater competition increased the number of price changes: but, counter to his work, companies with a greater proportion of long-term customers changed prices less frequently than other companies.

5 How are prices determined?

The survey also asked what factors influenced companies' pricing decisions. This gave a useful cross-check on earlier questions. The first set of questions asked companies to rank only theories of price stickiness: subsequent questions, as described below, allowed companies to express their views on how prices are determined.

Companies were asked to rank alternative methods of pricing of their main product. Table D summarises the results. The most popular response was that prices were set

With respect to the number of competitors, all differences between price review frequencies were significant at the 5% level, while for price changes, companies with 0–5 competitors changed prices significantly less than the others at the 5% level. For market share, there is a statistically significant difference between price reviews of companies with less than 5% of the market and those with more than 40%, and we found that those companies with more than 40% market share also changed prices less than all other categories, with these differences significant at the 5% level.
 For a summary of other studies, see Weiss (1993) and Kraft (1995).

Table D How are prices determined?

Percentages in italics

e							
	1st		2nd		3rd		
Market level	257	39	140	21	78	12	
Competitors' prices	161	25	229	35	100	15	
Direct cost plus variabl	e						
mark-up	131	20	115	18	88	14	
Direct cost plus fixed							
mark-up	108	17	49	8	42	6	
Customer set	33	5	52	8	47	7	
Regulatory agency	11	2	3	1	5	1	

with respect to market conditions. The top preference⁽¹⁾ for almost 40% of respondents was that prices were set at the highest level that the market could bear. An additional 25% of respondents stated that they set prices in relation to their competitors-this was the second choice most popular among companies. The popularity of market-led pricing might seem to contradict our earlier findings on cost-based pricing strategies, and on the frequency of price changes. But it is possible to reconcile the findings by recognising that market and cost-based strategies co-exist. For example, we found earlier that some companies appeared to operate both time and state-dependent pricing rules. It could be that periodic (time-dependent) price reviews take both demand and cost conditions into account, but that actual price changes are particularly dependent on market conditions (ie are state-dependent).

Retailing and manufacturing companies were particularly conscious of rival prices, which may explain the high ranking of co-ordination failure as a cause of price rigidity in these sectors. Companies in more concentrated markets were more likely to look to their competitors' prices when determining their own. The importance of competitors' prices in the decision to change price was confirmed elsewhere in the survey (see below). Construction companies suggested that the market level was by far the most important factor in price determination but, surprisingly, gave less weight to competitors' prices.

The survey also confirmed the importance of company-specific factors. The first preference of about 20% of respondents was that the price was made up of a direct cost per unit plus a variable percentage mark-up. This was consistent with the importance which companies placed on cost-pricing theories of sticky prices and on the importance of material costs in price changes (see below). A further 17% of companies, particularly retailing companies, stated that they priced on the basis of costs plus a fixed percentage mark-up.

Cost plus mark-ups tended to be more important for small companies, and market conditions much less so. This may suggest that the cost mark-up 'rule of thumb' for pricing is more suitable for small companies, which cannot afford expensive market research. This is consistent with the

finding that small companies were also likely to review prices less frequently than large companies, and with the result in section 3 that small companies were more likely to recognise cost-based pricing as an important factor in their own price setting.

Only 5% of companies reported that their prices were set by their customers; this was more a feature of manufacturing and services than other sectors. This method of pricing was more important for companies with a larger proportion of long customer relationships. It was also more prevalent in companies operating in more concentrated markets. This is puzzling, since companies with fewer competitors ought to have more power over their consumers, who have fewer alternative suppliers if they are dissatisfied.⁽²⁾

6 What factors drive prices up and down?

A key question is whether, faced with upward or downward shocks of similar magnitude, companies are more reluctant to cut prices than to raise them. If prices are more sticky downward than upward, then this would mean that a tightening in monetary policy could have a larger, short-run impact on unemployment than a loosening of policy of the same size.(3)

Previous work on price asymmetries used mostly aggregated data and produced conflicting results. For example, DeLong and Summers (1988) inferred from their results in the United States that prices were more sticky downwards than upwards. Cover (1992) confirmed this using the same US data. But Ravn and Sola (1995) found no evidence of asymmetry for the United Kingdom. Other international work showed that it took larger output losses to eliminate each extra unit of inflation. This is consistent with asymmetries in the response of prices to upward and downward shocks.(4)

Evidence using data on individual prices is also conflicting. Carlton (1986) found no evidence of excessive downward stickiness in the US price data collected by Stigler and Kindahl (1970). Blinder (1992) found that the speed of adjustment to positive and negative demand and cost shocks was no different. Using New Zealand data, Rae (1993) found no evidence of downward stickiness in product prices. Cabral et al (1996) and Yates (1995) supported this for prices and wages (respectively) in the United Kingdom. One of the few studies that showed evidence of downward rigidities was a survey of employees in the United States by Kahneman, Knetsch and Thaler (1986) which reported that respondents preferred money wage increases of 5% with 12% inflation, to money wage cuts of 7% with no inflation.

The Bank survey asked companies to rank those factors most likely to push prices up or down. It found that there were substantial differences between the factors that

Companies were able to choose more than one response as their top preference. This means the total percentage of companies expressing first preferences for all of the explanations of price determination exceeds 100%.
 However, firms with fewer competitors might also have fewer buyers, in which case the buyers could exercise more power. The survey did not include questions that would reveal this.
 Downward stickiness may itself be generated by periods of prolonged inflation: if prices always tend to go up, then price cuts may be hard to interpret or accept. If this is the case then the best cure for downward stickiness is price stability.
 See Ball, Mankiw and Romer (1988); Yates and Chapple (1996) and Laxton, Meredith and Rose (1995).

influenced price increases and those that influenced price decreases (Table E). First, many more companies said that cost rises were likely to push prices up than said that cost reductions were likely to push prices down. Second, a rise in demand seemed less likely to lead to a price increase than

Table E Factors leading to a rise or fall in price

Percentages in italics

Rise	Number (a)		Fall	Number (a)	
Increase in material costs	421	64	Decrease in material costs	186	28
Rival price rise	105	16	Rival price fall	235	36
Rise in demand	101	15	Fall in demand	146	22
Prices never rise	26	4	Prices never fall	75	12
Increase in interest			Decrease in interest		
rates	18	3	rates	8	1
Higher market share	14	2	Lower market share	69	11
Fall in productivity	5	1	Rise in productivity	22	3

Note: Top preferences only

(a) Numbers citing a scenario as most important

a fall in demand was to lead to a price cut. These asymmetries may, to an extent, provide information about the relative incidence of changes in costs and demand. For example, if a company has not recently experienced cost decreases, it might be less likely to suggest that cost decreases could lead to a fall in prices.

The asymmetries also point to the importance companies place on strategic interaction with competitors and on their desire to preserve market share.

The importance of strategic interaction with competitors suggests that when contemplating a price cut, companies need to consider the chance of sparking off a price war. If changes in costs are either specific to each company and/or harder to monitor by other companies in the market, then a price reduction prompted by a fall in costs is more likely to be interpreted as an aggressive act to gain market share by competitor companies, and a price war might be more likely to result. So companies might be more reluctant to cut prices. On the other hand, demand changes may be more common to all companies and/or easier to monitor, so price cuts in response to a fall in demand might be easier to implement without threatening a price war. The finding that companies were much more likely to match rival price falls than they are to follow rival price rises appears to support the importance of strategic behaviour.⁽¹⁾

The importance of preserving market share suggests that when contemplating a price increase, companies focus on the effect on their customer base. If there are significant company-customer relationships, then companies might find it easier to bargain for price increases that result from cost increases, which the company cannot do anything about, than from demand increases, which are to do with the tastes and incomes of its customers. Companies are also more likely to cut prices in response to a fall in market share, than they are to raise prices to exploit a higher market share.

Two other asymmetries emerge from the survey. First, there is weak evidence from Table E that interest rate rises are more likely to lead to price rises than interest rate falls are to lead to price reductions.⁽²⁾ And finally, three times as many companies stated that prices never fall as stated that they never rise. This could indicate that prices are sticky downward, but more probably it reflects the fact that because inflation has been positive throughout recent history, price falls are less likely.

This question not only permitted us to assess the extent of asymmetry in the response of prices to shocks, but also provided information on how prices were set more generally, and a cross-check on earlier questions about pricing theories. The most striking feature of Table E is that four times as many respondents cited cost increases as most likely to provoke a price rise, as cited the next most popular scenario: an increase in the rival price. This result confirm the popularity of cost-based pricing observed earlier, which came second in the league table of pricing theories. It also accords with other work which found that prices were more sensitive to cost than demand conditions.⁽³⁾ The survey result might not be indicative of the sensitivity of prices to costs or demand, but may instead reflect the relative variability of costs and demand at the time the survey was conducted. But the result is still very striking.

7 How do companies respond to demand booms?

Section 3 observed that 24% of companies recognised non-price elements as an important factor in price setting: that is, rather than change prices, they might change delivery times, for example. The survey asked about these factors more directly by posing the question: 'What action do you take when a boom in demand occurs and this demand cannot be met from stocks?' Table F summarises the results.

Table F

Response to demand booms^(a)

Percentages in italics

	1st		2nd		3rd	
More overtime	408	62	69	11	15	2
More workers	80	12	206	32	90	14
Increase price	75	12	38	6	47	7
More capacity	51	8	90	14	88	14
More subcontractors	44	7	81	12	74	11
Longer delivery	44	7	71	11	83	13
Other	28	4	7	1	5	1

(a) Number of companies assigning a particular rank

By far the most popular response was to increase overtime working. Only 75 companies (12%) said that increasing prices would be their most important response. This concurs with the responses to the Workplace Industrial Relations Survey (WIRS) question (on which the Bank's question was based): Haskel, Martin and Kersley (1996) reported that 8% of WIRS respondents would change prices in response to an increase in demand. 51 respondents (8%)

We might have expected these effects to increase as firms experienced less competition, where strategic interaction between firms becomes more (1)

 ⁽i) We mgin have expected uses there as a minis experience resistomperior, where stategic increation retween minis becomes more important, but there was no evidence of this.
 (2) The direct effects of interest rates on company costs may to be a more immediate influence on individual company prices than the more general effects of monetary policy on economic activity.
 (3) Sweezy (1939); Neild (1963); Coutts, Godley and Nordhaus (1978); and more recently Geroski (1992).

said that increasing capacity would be their most likely response to a shift in demand. Perhaps companies interpreted the term 'demand boom' as a permanent increase in demand rather than a temporary one, which would mean that, in the long run, we might expect some combination of price, capacity and employment increases, depending on the cost conditions in each industry.

This question makes a very broad statement about the extent of price stickiness in general, but it can also be used in the discussion of why prices might be sticky. Table F shows that there is as much (if not more) flexibility in overtime, employment or capacity as there is in prices, even though the short-term costs of changing overtime, employment or capacity are probably greater than the menu costs—physical and informational—of changing prices. The fact that prices still seem to be rigid means that other factors, perhaps related to competition with other companies or implicit/explicit contracts with customers, must also be more important than menu costs.

8 Conclusions

The Bank survey found that implicit and explicit contracts were thought to be very important for companies and that cost-based rather than market-led pricing was widespread. Although physical menu costs did not seem to be important, the more general costs of changing prices were important, because companies seemed to change prices, on average, only twice a year. In contrast to Blinder's survey, constant marginal costs were very important for Bank respondents' pricing decisions, but non-price elements were not. Companies typically reviewed prices regularly rather than responding to particular events. The survey showed that competition increased the frequency of price reviews, as did Carlton (1986), but that long-term relationships with customers might reduce price flexibility. The survey found substantial differences between the factors that pushed prices up and those that pushed prices down: price setting was asymmetric, although the degree of flexibility up or down was unclear. Most companies seemed likely to increase overtime and capacity in response to a boom in demand, rather than change prices, which suggests that factors other than direct physical menu costs are important to companies' decisions to change prices or quantities.

The combined effect of company and market characteristics on price setting will be reviewed in future research. There are also responses to other questions in the survey that we have yet to consider: about wage-bargaining arrangements, about discounting policies and about the procedures for pricing new products. But the material presented so far helps demonstrate that the economy does not behave as though markets were costlessly and instantaneously cleared, and that taking account of short-run price frictions could be important in explaining macroeconomic performance. The value of a survey of individual companies is that it can help resolve some of the theoretical disputes between economists, particularly when these theories generate similar predictions for aggregate data. If these theories imply different macroeconomic and microeconomic policy responses, then surveys of this kind are even more important.

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The valuation of sub-underwriting agreements for UK rights issues

By Francis Breedon and Ian Twinn of the Bank's Markets and Trading Systems Division.

Most equity issues in the United Kingdom are underwritten—that is, a group of financial institutions guarantees to buy any unsold shares at a pre-arranged price. The pricing of this guarantee affects the cost and efficiency of industry's capital raising. Earlier studies in a number of countries, including the United Kingdom, have suggested that underwriting fees are much higher than can be accounted for by fully competitive pricing. This article explores some modifications to those previous calculations and concludes that, while a rather larger part of the fee may be accounted for, there remains a margin still to be explained.

Most equity rights issues in the United Kingdom are underwritten, with a lead underwriter, supported by up to 400 sub-underwriters, undertaking to buy any shares that remain unsold. For some years there has been a vigorous debate over the fees (currently a flat 2% of the offer) charged for this service. Some have argued that 2% is excessive, pointing to the fixed-fee structure as evidence of inefficiency. Others have argued that the fees are a fair reward for the risks borne and that the fixed fee is simply a convenience that allows underwriting to be arranged quickly. They note that, although the fee is a fixed percentage, the discount at which the issue is offered is open to negotiation and this can be used to adjust for differences in risk between issues. The debate matters since, if sub-underwriters overcharge, raising new equity-and so capital itself-may be needlessly expensive.

The debate led the Office of Fair Trading to commission Professor Paul Marsh of the London Business School to estimate the economic cost of sub-underwriting and compare it with the fee charged. He found that the fee did indeed seem to be higher than the cost and so judged the fees to be excessive.⁽¹⁾ But, in order to estimate these costs, Marsh made a number of assumptions which some have argued were inappropriate and might have caused him to underestimate the true cost of sub-underwriting. This article describes some extensions to Marsh's research undertaken in the Bank⁽²⁾ which attempt to allow for some of these factors.

Rights issues in the United Kingdom

In a traditional UK rights issue, the issuer will normally use an issuing house—usually a merchant bank—and a broker. As well as preparing offer documents and advising on the timing and the price of the offer, the issuing house will usually act as lead underwriter. The broker acts as an agent for the issuing house by securing sub-underwriting commitments from other institutions such as insurance companies, pension funds and banks.

Timing does vary, but the issuing house, broker and company will normally agree the issue price at a meeting held at close of business on the day before 'impact day'. If the issue is being underwritten—as about 95% of all rights issues are-the issuing house will also sign the lead underwriting agreement in which, subject to an overnight reserve, it guarantees to buy any part of the issue that is not taken up. The next day the issue is publicly announced, the rights (typically) are allocated to shareholders and the issuing house instructs the broker to arrange sub-underwriting for some or, more usually, all of the issue. The broker sends out letters of invitation at 9.00 am on impact day, giving the sub-underwriters a few hours to respond, usually by mid-day. The sub-underwriters are typically given a 'take it or leave it' offer, based on the terms arranged by the issuing house. The number of sub-underwriters is usually quite large: 100-150 for small offers and 300-400 for large ones. Shareholders are usually given three to six weeks to take up their rights, with the underwriters obliged to take up any shares remaining unsold at the end of that period (the 'stick').

By custom, underwriting fees are usually a flat 2% of the offer, though lower fees have been negotiated for privatisations. Of this 2%, 0.5% goes to the issuing house, 0.25% to the broker and 1.25% to the sub-underwriters. If the period of the issue exceeds 30 days, the sub-underwriters' fees are increased by 0.125% per week.

Valuing sub-underwriting—Marsh's study

Since sub-underwriters do not supply advice or other services to the firm, the value of the service they provide insurance—is relatively easy to value. Marsh used two measures of the cost of this insurance for a sample of

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 Described in detail in Breedon, F J and Twinn, C I (1995).

691 issues carried out between 1986 and 1993. The first measure was simply the average losses incurred by sub-underwriters when they were required to buy unsold shares. The second was the notional value of the implicit option sold to the firm by the sub-underwriters: the underwriting commitment is analogous to the sub-underwriters selling the company a put option, since it gives the company the right (but not the obligation) to sell the issue to the underwriters. This option can, in principle, be valued using a standard option-pricing formula.

As Table A shows, Marsh found, using both methods, that the fee charged by sub-underwriters was substantially higher (at an average of 1.43% for his sample) than the economic cost of sub-underwriting. But there are a number of problems with both approaches.

Table A Marsh's results

Per cent

	Economic cost (a)	Excess return (b) (fee minus cost)
Average loss method	0.69	0.74
Average loss method (excluding 1987 crash)	0.18	1.25
Option value method	0.20	1.23
(a) Costs weighted by value of issue ar(b) Average fee in this sample was 1.43	nd expressed as a percentage 3%	e of it.

The average loss method, despite its intuitive appeal, has two major problems. First, it makes no allowance for the cost of capital employed by the sub-underwriter: underwriting, irrespective of whether the issue is fully sold or not, involves the underwriter in risking part of their capital and they might reasonably expect compensation for this. Second, as Table A shows, the results of this method are highly dependent on the sample period chosenexcluding the 1987 crash from the sample reduces the estimated cost by 0.51 percentage points. This is a problem since there need be no correspondence between the expected costs on which the underwriters base their fees and the realised costs actually borne during a limited sample period.

Marsh's second method—option pricing—in principle solves both these problems, because using option pricing generates the expected rather than actual value and should allow for the cost of capital. As a result, Marsh's study focuses on the results calculated using this method rather than the average realised loss. But pricing sub-underwriting using option-pricing models in turn requires certain assumptions to be made. Many have argued that some of these assumptions are unrealistic, in the case of sub-underwriting, so using the option-pricing method gives an underestimate of the true cost of sub-underwriting.⁽¹⁾ Our research has therefore attempted to adjust Marsh's option-pricing approach to take account of these factors.

Valuing sub-underwriting—evidence from the traded options market

Our work attempts to allow for three factors which may have caused Marsh to underestimate the true cost of sub-underwriting using his option-pricing approach. In particular, by using data from the traded equity options market, we have attempted to identify the price of options actually trading in the market (which also reflect the expected cost of hedging) instead of a theoretical price derived from an option-pricing formula. The drawback of the approach is that it limits the number of rights issues that can be analysed to those companies for which a traded option also exists. This reduces the usable sample dramatically, from 671 to 31. In addition, the companies on which options are traded also tend to be larger, with more liquid stocks and bigger rights issues.⁽²⁾

The three factors considered in our work were:

- Measures of volatility. When pricing an option, an estimate of the underlying asset's expected price volatility during the life of the option is required. Marsh used a measure of historic volatility, based on share price movements over the 60 months prior to the rights issue. But there are good reasons why this volatility might change during the offer period: for instance, uncertainty-either about the value of the proposed use of funds or about the issue's likely success-may increase volatility during the offer period. If, however, the firm's management and advisors reveal all impending 'news' when the issue is announced, the share price's volatility might actually be lower during the offer period than normally. To take account of these possibilities our work used the actual volatility implied by the price of the relevant option traded on LIFFE.
- Transactions costs. Despite being based on the idea of riskless, fully hedged positions, the standard option-pricing formulae used by Marsh (Black-Scholes, 1973) does not include any adjustment for the transactions costs of creating and adjusting the hedging position. Many studies⁽³⁾ have shown that, once these costs are allowed for, the 'fair' price of an option is significantly higher than conventional formulae imply. To allow for these costs, our research valued the option at the ask price that would prevail in the traded options market.
- Measuring the current share price. Marsh used the share price on the day before the rights issue. Although he allowed for the possible dilution effect of a rights issue on the share price, this approach does not allow for any other effects the rights issue might

For a detailed discussion, see Breedon, F J and Twinn, C I (1995). The average value of the issues in the LIFFE sample was £332 million (compared with an average size of only £20 million for the issues in Marsh's study)—although Marsh found the largest profit was on these bigger issues and replicating the Marsh approach for our sample yields a value-weighted return of 91% not dissimilar to the 86% return found by Marsh. (2)

value-weighted return of 91%, not dis See, for instance, Figlewski, S (1989) (3)

have on the market's valuation of the firm. Since rights issues tend to have an adverse effect on the firm's perceived value, Marsh's approach may overstate the current share price and so may lead to the option being undervalued. To overcome this problem, in pricing the option our research used the share price at the close of business on the 'launch' day. This assumes that any fall in the share price caused by the rights issue occurs before noon (the time by which sub-underwriters must undertake to buy the issue). As Chart 1 shows, for one of the issues in our study,⁽¹⁾ this does indeed appear to be the case.

Chart 1 Intra-day share price on announcement day



Table B shows the effect of adjusting for these three factors. It shows that, although they substantially reduce the unexplained margin, it is not eliminated altogether.

Excess return (a)
Excess return (a)
(fee minus cost)
1.14
0.93
0.87
0.49

Our method is, of course, also based on assumptions that are open to criticism. The most important is that spreads in the traded option market are comparable to the possible transactions costs incurred by sub-underwriters. As Chart 2 shows,⁽²⁾ turnover in the traded options market is small in comparison with a rights issue, and underwriting could not in practice be replaced by-or hedged with-the purchase of a traded put option. But the fact that the two markets are not comparable in size is not necessarily important, as long

Chart 2 Open interest in the traded options market relative to the size of the share issue



as transactions costs per share are fixed. The evidence on how transactions costs vary with deal size does not give clear results, though it does suggest that the costs increase slightly as deal size increases. But there are two other effects which mean that our research is unlikely to have underestimated trading costs. First, our measure is based on quotes rather than actual dealing costs and there is evidence that quoted spreads are substantially wider than dealing spreads in most markets.⁽³⁾ Second, most of the evidence for transactions costs increasing with deal size suggests that dealing costs only increase if the information content of a large trade is high. Hedging associated with a pre-announced rights issue is unlikely to have any information content and so it is unlikely that deal costs will increase in trade size in this case. Taking these two effects together suggests that the figures for transactions costs used in our study may, if anything, overestimate the true costs involved.

The rights issue puzzle

It is difficult to reconcile these results with the known features of the market.

First, it is difficult to argue that there is a lack of competition in the market for advice on rights issues: companies have a choice over both the method of issuance and the underwriter, if they choose to use one. One possible explanation of why the present level of charges might nevertheless persist is that the alternative methodsdeep-discounted⁽⁴⁾ and book-built⁽⁵⁾ offers—are close but not perfect substitutes. They may involve some costs that makes the firm's management willing to pay a premium to have the issue underwritten. For instance, there may be a possible capital gains tax liability for investors in deeply

Commercial Union, 1994. Commercial Union, 1994, op cit. For instance, Board and Sutcliffe (1995) estimate the quoted spread in the traded option market to be over 10% greater than the actual dealing (1)(2)(3)

Spreads. Where the shares are offered to existing shareholders but at a big discount to the current share price. In this case the shares are offered to all comers with the lead broker creating a book of the demand from potential investors and pricing the issue at the market clearing price in response to these bids.

discounted offers; other firms may be willing to pay a premium for the certainty of underwriting (for example, because they need to secure the money to complete a takeover) or to avoid the financial and reputational costs of an issue which is not fully taken up.

The second reason why the apparent profitability of sub-underwriting is difficult to understand is shown in Table C: similar results have been found in every country studied, despite the fact that the underwriting process itself differs between countries.

Table C

Dan aant

International estimates of excess returns to sub-underwriting

Per cent		
Author	Country	Excess return
Marsh (1980) McCulloch and Emanuel (1993) Kunimura and Iihara (1985)	United States New Zealand Japan	1.08 0.67 1.89

In fact the US case is even more puzzling than the British one. In the United States there are three main types of equity issues; *uninsured* issues, with no underwriting; *standby* issues, where underwriters agree to purchase all unsubscribed shares; and *firm commitment underwritten* issues, where the entire issue is sold directly to the underwriters. A number of studies have established that the last of these is the most expensive for the company.⁽¹⁾ Even so, over the last 40 years, US firms have increasingly moved to the firm commitment method. In the period 1933–55, approximately half of all issues used firm commitment, while in the period 1963–1981 firm commitments accounted for more than 95% of all US issues. In fact by 1981, other issue methods had almost completely disappeared.

The US evidence suggests that the choice of equity issuance technique by companies is not based solely on direct cost considerations and that other elements must play a part in these decisions. So it seems reasonable that these unidentified elements may be important in the UK context too. One possibility is that the method of issue is taken by potential investors as a signal of the issue's value. If underwriting is interpreted as a signal from the underwriting institutions that the issue is worthwhile, this might reduce the premium required by potential investors to compensate them for, for instance, the possibility of trading against more informed investors (who know better which offers to invest in and which to avoid).

Conclusion

Although our work points in the same direction as the Marsh study, it finds a smaller discrepancy between fees and measured costs. But it is not possible to conclude from this that there is inadequate competition in this market, since firms do have a choice both of issuance technique and of underwriter. The US evidence of firms moving from a seemingly cheap issuance method to a more expensive one indicates that the factors determining firms' choices are not yet fully understood.

⁽¹⁾ See, for example, Smith, C W (1977).
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Bank of England Agents' summary of business conditions

a new Bank of England publication

Alongside this edition of the *Quarterly Bulletin*, the Bank is publishing, for the first time, a quarterly summary of the reports of its Agents on current business conditions.

The Bank of England has had a regional presence through its Branches, headed by Agents, for over 150 years. Recently, the focus of the Agents' work has shifted away from managing banking and note issue business and has increasingly concentrated on gathering economic information. Through their widespread contacts with companies, both large and small, and other organisations covering all sectors of the economy, the Agents obtain a first-hand picture of economic conditions in their regions. In total, the Agents have direct contact with around 350-400 businesses and other organisations each month, drawn from a pool of some 4,000 contacts. The information derived from the Agents' reports is regarded by the Bank as an essential input to its interpretation of the state of the economy. In particular, the information may provide up-to-date insights into developments and trends which help in the interpretation of conflicting or unclear statistical evidence. The Agents are part of the Bank's Monetary Analysis function and their regular reports, supplemented by ad hoc reporting as appropriate, play a significant role in shaping the advice which the Governor gives to the Chancellor at their monthly meetings to consider monetary conditions and the appropriate level of interest rates. The Agents' reports also contribute to the analysis which appears in the Bank's quarterly *Inflation Report*, which is published with the *Quarterly Bulletin*.

Since 1992, when the current system of inflation targeting was introduced, it has been the view of both the Governor and the Chancellor that the conduct of monetary policy is enhanced if it is carried out in an open framework in which the reasoning behind policy decisions is publicly disclosed. This approach is aimed at making monetary policy decisions more transparent and predictable, thereby enabling the economy as a whole to adjust more smoothly. It is within that spirit that the Bank now considers it appropriate to publish a quarterly summary of the Agents' reports.

The Bank's Agents are presently based in Birmingham, Bristol, Glasgow, Leeds, Liverpool, Manchester, Newcastle and Winchester as well as London. Although it has been possible to cover all the geographical areas of the United Kingdom from these offices, their regional boundaries have not accorded in every case with the UK standard regions. New Agencies in Cardiff and Nottingham and a second Agent based in London have recently been announced; these will allow coverage to be more closely in line with the standard regions in the future.

The summary published today is based on information gathered by the Agents between mid-January and mid-April.

G7 yield curves

By Neil Cooper and Jim Steeley of the Bank's Monetary Instruments and Markets Division.

In November 1994, the Bank of England adopted a new method for estimating yield curves from the gilt-edged market. The curves are used for measuring expectations of future interest rates and inflation. Recently the Bank used the same method to estimate the yield curves of the other G7 countries' government debt. This article describes these yield curves and explains how the estimation method was adapted to each particular market.

Introduction

Yield curves obtained from government bond prices may contain valuable information about market expectations of future interest rates. For instance, measurements from yield curves may indicate whether interest rates are expected to rise, fall or to stay the same.⁽¹⁾ Yield curves can also indicate by how much market participants expect interest rates to change. Such information is useful when judging the form and timing of monetary policy interventions.

Moreover, comparing the yield curves of different countries' government debt can indicate whether interest rate differentials between countries are expected to rise or fall. It also provides a measure of how monetary policy varies between countries and can provide information on whether these variations are expected to persist.

This article continues a series on the estimation and interpretation of yield curves. Previous articles⁽²⁾ in the series outlined the Bank of England's approach to estimating the UK yield curve in both the conventional and index-linked bond markets, and considered both the interpretation and the forecasting power of the expectations derived from those yield curves. The Bank has recently used the same technique⁽³⁾ to estimate nominal yield curves in the government bond markets for each of the other G7 countries. This article describes the resulting estimated yield curves. It begins by highlighting the different factors, including institutional characteristics, that have to be considered when estimating yield curves. A section for each country describes the domestic bond market and estimated yield curves for that market.

Estimating yield curves

The zero-coupon yield curve, estimated from the prices of coupon-bearing bonds, represents the term (or maturity) structure of spot interest rates in that bond market. Spot interest rates are the rates at which the individual cash flows arising from a coupon-bearing bond-the coupon and redemption payments-are discounted to determine the price of the bond today. Related to these spot interest rates are a set of implicit forward interest rates. The spot rate for payments arising at date t+1 represents the average rate of return between today and date t+1, while the forward rate associated with date t+1 represents the one-period rate of return implicit in the difference between the *t*-maturity spot rate and the (t+1) maturity spot rate.⁽⁴⁾

In principle, recovering the underlying term structure of spot interest rates from coupon bond prices is straightforward. The set of spot interest rates define a set of discount factors—the value today of £1 to be paid at date t. The price of a coupon-bearing bond is equal to the sum of each cash flow arising from that bond multiplied by the discount factor applicable to the date of that cash flow. If a group of bond prices are written in this way, a huge system of linear simultaneous equations is generated, where the only unknowns are the discount factors common to all the bonds in the group. The values of the discount factors can be found by solving the equation system using matrix algebra. The spot and forward interest rates can then be recovered from the discount factors.

This procedure has two limitations. First, a necessary condition for solving this equation system is that the number of bonds in the group exceeds the number of payment dates. Second, the method produces discount factors only for dates when coupons are paid: it is unable to 'fill in' the rest of the curve. For these reasons, sophisticated mathematical techniques are introduced to estimate the complete discount function-the set of discount factors at all maturities.

The intended use of the yield curves is central to the decision on the type of estimation technique to be used. For example, there is less need to know the precise shape of the yield curve for macroeconomic policy, than for pricing interest rate instruments. A method that captures the

The most widely used measure is the set of implied forward interest rates. It is recognised, however, that risk premia and the convexity of yield curves can introduce a wedge between forward interest rates and market expectations of future interest rates. Deacon, M P and Derry, A J (1994a); Bank of England (1994); King, M A (1995); Breedon, F J (1995). Some of the estimated forward rate curves have appeared in previous editions of the *Quarterly Bulletin* and *Inflation Report*. The Bank estimates forward rates based on a six-month interval. Further details of the differences between spot and forward interest rates can be the restincted forward rate of the *Quarterly Constant*. found in Deacon, M P and Derry, A J (1994b).

fundamental features in a smooth curve is more desirable. Having tested different yield-curve estimation techniques, in November 1994,⁽¹⁾ the Bank adopted the method proposed by Lars Svensson⁽²⁾ to estimate yield curves for monetary policy purposes. Further details are given in the May 1995 Quarterly Bulletin.⁽³⁾

Data considerations

For comparative purposes it is important to have a set of yield curves estimated using a common technique for each country. Although the estimation method accommodates differing institutional factors, such as the calculation of accrued interest, comparisons may be difficult where the number of bonds and the maturity ranges in the markets are very different. The overall definition, or quality, of the estimated curve will reflect both the availability of bonds in general and how they are spread along the maturity range. For example, while the UK market has conventional bonds distributed out to 25 years with relatively few gaps, other countries such as Germany and Italy have relatively few bonds beyond ten years. Differences between the United Kingdom and Germany can be seen in Charts 1 and 2. Although a paucity of long bonds will tend to reduce definition at the long end of the yield curve, the Svensson technique has the advantage of ensuring that the estimated curves will settle down to a fixed level at long maturities.



Bonds with 'special' features are not included in the estimation process, since these features will tend to distort the prices of these bonds. These bonds include callable and convertible bonds whose prices reflect the embedded options. This has the most noticeable impact in the US Treasury market where there are no non-callable securities with maturities between 10 and 18 years; see Chart 3. All outstanding Japanese government bonds are callable. Since none has ever been called and the market does not appear to expect any to be called, the bonds are

Chart 2 German redemption yields

8 March 1996









treated as conventional for the purpose of estimating a yield curve.

For all countries apart from the United Kingdom, the data were collected from a wire-service feed, not directly from the exchanges. Difficulties were experienced in collecting a complete set of price data for periods in 1993 and 1994 for most of the countries. This means that during these periods, definition of the estimated curves is reduced, because some of the bonds normally included in the estimation process were absent temporarily from the data set. This explains some of the volatility observed in the estimated yield curves during this time.

Tax effects

The tax treatment of coupon-bearing bonds is one of several factors to be considered when estimating yield curves. If coupon income and capital gains on the value of a bond are subject to different tax rates, then some bonds will contain a

⁽¹⁾ (2)

See Bank of England (1994). Svensson, LE O (1994). This technique is an extension of a technique proposed in Nelson, C F and Siegel, A F (1987). A simplified version of the Nelson and Siegel method is used to fit the UK real yield curve. Other techniques have been developed by, for example, Steeley (1991), and Fisher, Nychka and Zervos (1995).

⁽³⁾ See Breedon, F J (1995)

price premium over others. Those investors facing relatively high marginal income tax rates would tend to favour bonds whose payment stream was skewed towards capital gains rather than income, such as low-coupon stocks. If such investors form a large proportion of the participants in the market, low-coupon stocks could carry a price premium. If this premium is not recognised during yield curve estimation, it could cause the estimated curve to be biased downwards.

Two approaches have been developed to adjust the measured yield curve for these tax effects. The first approach⁽¹⁾ recognises that yield curves are tax-specific, so that investors in different tax brackets face different after-tax returns, and would therefore optimally choose to invest in different bonds. Yield curves are then estimated using only those bonds that are 'optimal' for any given tax bracket. The second approach controls more generally for the bias in the yield curve caused by the differential tax treatment of coupon income and capital gains. This approach is characterised by two methods. The first method⁽²⁾ estimates the yield curve subject to the coupon payments being down-weighted by a fixed proportion, which is estimated along with the yield curve. This fixed proportion is called the 'effective tax rate'. The second method, used by the Bank,(3) recognises that taxes will affect the yield of some bonds more than others and introduces three further parameters to model this relationship and the tax adjustment more accurately.

In all of the G7 countries, at least some participants face different tax treatment of capital gains and coupon income in the domestic bond markets. The bond markets in the United Kingdom, Germany and Japan, for example, illustrate this issue. In the United Kingdom before April 1996, a substantial proportion of investors in gilt-edged securities were subject to income tax on coupons received but were exempt from tax on capital gains. During and after April 1996, the tax treatment of gilt-edged securities changed with some classes of investors being liable to capital gains tax on the price change in a given period, in addition to their existing liability for income tax on coupon interest.⁽⁴⁾ Other classes of market participants, such as private investors, continue to be exempt from capital gains tax on gilts, while some participants, such as pension funds, continue to be exempt from all tax in respect of gilts. In Germany, coupon income is subject to a flat-rate withholding tax, while capital gains on bonds held in excess of six months are free of this tax. For bonds held for less than six months, capital gains are taxed at the personal (progressive) rate of income tax if, in combination with coupon income, certain thresholds are exceeded. In Japan, there is a particular preference for low-coupon stocks. This may in part reflect the tax treatment of capital gains, but the market's preference for current-coupon stocks is generally thought to be the main explanation. For all G7 countries, the Bank's

tax model is used to adjust for the effects of tax-related premia.

Other factors

The Bank's yield-curve estimation procedure requires the calculation of redemption yields. This is the rate of return offered on a bond if the bond is purchased at the current market price and held until redemption. Redemption yields are calculated from gross bond prices, that is, a price that includes accrued interest. Accrued interest (AI) is calculated as.

 $AI = (d/n) \ge C$

where:

d is the number of days between the previous coupon date and the settlement date,

n is the assumed number of days in a year, and

C is the coupon rate.

The different rules regarding the values of d and n used in the calculation of accrued interest are summarised in the table.

Different rules used in calculating accrued interest by country

Country	Settlement date	d	n	
United Kingdom	Next business day	Actual (a)	365	
Germany	(b)	(c)	360	
France	Next business day (d)	Actual	365	
United States	Next business day	Actual	(e)	
Japan	(f)	Actual	365	
Italy	+3 business days	(c)	360	
Canada	+5 business days (g)	Actual	365	

d is the number of days between the previous coupon date and the settlement date. n is the assumed number of days in a year.

(a) This is the actual number of days between the last coupon date and the settlement date.
 (b) Exchange-traded bonds settle at +2 business days, OTC-traded bonds settle at

(b) Exchange-traded bonds settle at +2 business days, OTC-traded bonds settle at +3 business days.
(c) If the last coupon date is dd/mm/yy and the settlement date is DD/MM/YY, then d = Min(DD, 30) - Min(dd, 30) + 30 (MM-mm) + 360 (YY-yy).
(d) Some bonds have a 3-day settlement period.
(e) The number of days in a year is assumed to be double the number of days between the semi-annual coupon dates, and can range from 362-68.
(f) Settlement dates are published in advance of the corresponding trade date and can be variable.
(g) This recently changed to +3 business days.

Bonds in the United Kingdom trade ex-dividend; that is, bonds are purchased in a certain period without the right to the forthcoming coupon. In the ex-dividend period, accrued interest is calculated using the settlement date and the next coupon date, and will be negative.⁽⁵⁾ Furthermore, for newly issued bonds, the first coupon may be adjusted if the issue date did not fall on one of its semi-annual coupon dates. This added technicality is overcome by excluding from the estimation process all bonds that have yet to receive their first coupon. This 'infant-bond rule' rarely excludes more than six bonds from the estimation procedure.

The yield-curve estimation technique used by the Bank introduces two further tax parameters. If bonds trade ex-dividend, then the preferential tax treatment of capital gains can induce a further price premium. Purchasing bonds

Schaefer, S M (1981). McCulloch, J H (1975). See Mastronikola, K (1991).

However, capital losses on gilts may be offset against capital gains arising elsewhere Further details are given in, for example, Fage, P (1986).

ex-dividend will remove the liability to income tax on the next coupon payment, making them particularly attractive to high-rate taxpayers. One parameter permits the accrued interest calculation to be weighted differently according to whether bonds trade cum or ex-dividend. The other parameter accounts for the FOTRA (Free Of Tax for Residents Abroad) status of some gilts, which could impart a price premium to those bonds.

The UK yield curve

There are currently 72 conventional gilt-edged securities, with coupons ranging from 2.5% to 15.5%. These include a group of callable bonds, a group of undated bonds and a convertible bond.⁽¹⁾ The yield curve is estimated using around 43 single-dated conventional bonds and some undated bonds to assist in the definition of the long end of the curve. The United Kingdom also has a market in inflation index-linked bonds. Comparisons of conventional and index-linked yields can be used to generate measures of inflation expectations.⁽²⁾ The estimated spot and forward curves for the UK nominal government bond market on 8 March 1996 are shown in Chart 4.⁽³⁾





Time-series plots of two, five and ten-year spot and forward rates over the period from January 1992 to March 1996 appear in Charts 5 and 6. Interpreting the behaviour of spot and forward curves over time, and comparing with our knowledge of economic events, can help to validate the yield-curve estimation technique. For instance, periods of relatively high volatility may be attributable to sudden changes in market conditions, such as the departure of sterling from the ERM. But they may also reflect other factors, such as data limitations, that may distort the shape of the estimated curve. The charts show that the UK spot-rate curve has been upward sloping since October 1992. Prior to this, although the curve was inverted, it was

Chart 5 Two, five and ten-year spot rates estimated from UK government bonds



Chart 6

Two, five and ten-year implied forward rates estimated from UK government bonds



relatively flat. This suggests that interest rates in the near and longer term were expected to remain at broadly the same level. Since then, movements in the curve suggest that there have been three turning points; for example, the increase in yields around February 1994 coincided with the general rise in bond yields following the Federal Reserve's tightening of monetary policy.⁽⁴⁾ In general, the spread between the five and ten-year spot rates has been more variable than the spread between the two and five-year rates. This may suggest that changes in expectations of long-term interest rates have been more variable than changes in expectations of short-term interest rates.

The German yield curve

The market in conventional, coupon-paying bonds comprises four groups of instruments, distinguished by their initial time to maturity. Bundesanleihen have an initial maturity of between 10 and 30 years. Bundesobligationen

depicted in the charts. See Ganley, J and Noblet, G (1995) (4)

This also includes a single floating-rate bond which pays a variable coupon on a quarterly basis. See Breedon, F J (1995). Estimation difficulties mean that we do not place reliance on the fitted curve for maturities of less than two years. Consequently this segment is not (2) (3)

have an initial maturity of five years. Bundesschatzanweisungen have an initial maturity of four years and are currently the shortest-maturity debt instrument. In addition, there are a group of special issues: Bundespost, Bundesbahn and Fonds Deutsche Einheit bonds, with initial maturities of 5–15 years. About 120 bonds are used to estimate the yield curve. The estimated spot and forward interest rate curves on 8 March 1996 are shown in Chart 7.





As with the United Kingdom, the German yield curve has been upward sloping since the beginning of 1993: see Chart 8. Prior to this, the curve was initially inverted and

Chart 8





stable before becoming relatively flat while shifting down. Since March 1993, changes in German yields have been broadly similar to the United Kingdom, although the two to ten-year spread has widened rather than narrowed. The high volatility, particularly in the forward rates (see Chart 9), around the end of 1993 and the beginning of 1994 most probably reflects missing price data in our data set rather than any particular economic event, although 1994

Chart 9

Two, five and ten-year implied forward rates estimated from German government bonds



represented a period of higher volatility in major bond markets (see the reference in footnote 4 on page 202).

The French yield curve

French government debt is classified by initial time to maturity. BTFs (Bons du Trésor à taux Fixe et intérêt précompté) are zero-coupon bonds with residual maturities of one year or less. BTANs (Bons du Trésor à taux fixe et intérêts ANnuels) are coupon-bearing bonds with either a two or five-year initial maturity. OATs (Obligations Assimilables du Trésor) are longer-term, coupon-bearing bonds with an initial maturity of up to 30 years. Only the coupon-bearing bonds are used in the yield-curve estimation procedure. While the zero-coupon bonds could be included to improve the curve definition at the short end, their exclusion permits an independent check to be made on the short end of the yield curve. About 30 bonds are typically used to estimate the yield curve and the estimated spot and forward rate curves appear in Chart 10. The relatively low number of issues in France reflects the issuance strategy. As





well as creating new issues, the French government issues a considerable portion of new debt in the form of tranches of existing stocks, a process known as *Assimilation*. The relatively small number of distinct securities are not however concentrated at particular maturities, although some gaps begin to appear at longer maturities. None of these gaps would be filled by including the omitted zero-coupon bonds.

Movements in French spot and forward rates, plotted in Charts 11 and 12, show a similar pattern to movements in both the UK and German curves. The two to ten-year spread widened in 1995, by roughly the same amount as the German curve. Implied forward rates appeared relatively volatile during 1993, although as explained above, this may reflect a reduction in available data in this period.

Chart 11

Two, five and ten-year spot rates estimated from French government bonds



Chart 12





The US yield curve

The market in long-term US Treasury securities comprises Treasury Notes, which have an initial maturity of two to ten years, and Treasury Bonds, which have an initial maturity of more than ten years. There are around 170 Treasury Notes and Bonds. The most recently issued US Treasury securities are known as On-the-Run bonds. These benchmark securities tend to be the most heavily traded securities in the market and are thought to enjoy a liquidity premium. Since the Bank's yield curve estimation technique does not include bonds until they pass their first coupon date, some of the On-the-Run securities are excluded. Chart 3 shows the redemption yields for the Treasury securities used in the estimation (around 155 securities). While the US Treasury market is distinguished by the large number of its marketable securities, it can be seen that there are no non-callable issues in the ten to eighteen-year maturity range. Nevertheless, the spot and forward rates for these maturities were not found to be unusually volatile. Chart 13 shows the estimated spot and forward-rate curves for 8 March 1996.

Chart 13 US spot and forward rate curves 8 March 1996



Unlike the yield curves considered so far, the US curve has remained upward sloping for the entire sample period. The two to ten-year spread has narrowed over the sample period



Chart 15 Two, five and ten-year implied forward rates estimated from US government bonds



as the curve has flattened out. The movements of the estimated spot and forward curves are shown in Charts 14 and 15.

The Japanese yield curve

There are currently around 120 Japanese government bond issues outstanding. Secondary market activity is typically concentrated into one liquid sector of the market at ten years. Within this sector, liquidity is concentrated in the ten-year benchmark bond and those bonds deliverable under the ten-year futures contract. The benchmark issue accounts for around 80% of trading volume and has not been excluded from the estimation process despite the existence of an associated price premium. The remaining relatively illiquid stocks are purchased and held for their long-term yield premium by insurance companies and trust banks. Some of the illiquid bonds may not trade on a particular day and when this occurs they are excluded from the estimation process, to prevent bias from 'stale' price information. Although there are

Chart 16



potentially few gaps in the maturity spectrum up to 20 years, the number of bonds used to calculate the yield curve can differ substantially between consecutive business dates, due to lack of trading. As an example, Chart 16 shows the number of bonds used to calculate the yield curve for 1 and 2 May 1995. The chart shows that on 1 May, relatively few bonds at the long end of the curve were traded. This comparison is typical of the sample as a whole.

Chart 17 shows the estimated spot and forward rate curves for 8 March 1996. The time-series plots of spot and

Chart 17

Japanese spot and forward-rate curves 8 March 1996



forward rates, Charts 18 and 19, show that the Japanese yield curve has been upward sloping throughout the sample period.

Chart 18 Two, five and ten-year spot rates estimated from Japanese government bonds



The two to ten-year spread in spot yields has remained broadly constant for most of the period shown, although in recent months it has been historically wide.

Chart 19





The Italian yield curve

The Italian Treasury issues various types of lire-denominated debt instruments. BOTs (Buoni Ordinari del Tesoro) are zero-coupon bonds issued with three, six and twelve-month initial maturities. BTPs (Buoni del Tesoro Poliennali) are conventional, coupon-paying bonds with an initial maturity range of between 3 and 30 years. CCTs (Certificati di Credito del Tesoro) are variable-rate instruments indexed to BOT yields. The initial maturity range is five to ten years. CTOs (Certificati del Tesoro con Opzione) are callable Treasury notes with an initial maturity range of three to ten years. The Italian yield curve is estimated using the conventional BTPs—around 40 bonds. Chart 20 shows the estimated spot and forward curve for 8 March 1996.





The relative scarcity of long-maturity bonds, and a gap between 10 and 28 years in the maturity spectrum, mean that it is particularly difficult to obtain satisfactory estimates of long-maturity spot and forward interest rates in the Italian government bond market. Prior to the Italian Treasury's introduction of a 30-year BTP at the end of 1993, the estimated yield curve beyond ten years was entirely determined by extrapolating the yield curve estimated over maturities shorter than ten years. As the curve was not being fitted to any data at longer maturities, the long end of the curve was highly sensitive to relatively small changes in redemption yields up to ten years out. This consideration is not peculiar to the Italian bond market; for example, as mentioned above, the German bond market also has few long-maturity bonds. However, the long end of the German yield curve is much less volatile than the Italian curve. While this may in part reflect lower volatility in interest rate expectations in Germany, it could also be a consequence of the smaller number of bonds in the Italian market. Also, the difficulties in obtaining price data were particularly severe for the Italian bond market.

The volatility induced in the yield curve by the limited data is evident in Charts 21 and 22 of the spot and forward rates. In general, the curves moved roughly in line with other European countries. The volatility around September 1992 may in part reflect the departure of the lira from the ERM.





Chart 22

Two, five and ten-year implied forward rates estimated from Italian government bonds



The Canadian yield curve

The Canadian government issues fixed-term, coupon-paying bonds, with initial maturities of 2–30 years. In general, around 80 bonds are used to estimate the Canadian yield curve. Chart 23 shows the estimated spot and forward rate curve for 8 March 1996. The distribution of Canadian debt shares similarities with the structure of the UK debt market, with relatively few gaps and a relatively well-defined long end. The Canadian government, like the United Kingdom's, issues index-linked bonds but, since there are only two outstanding index-linked stocks in Canada, it is not possible to estimate a real yield curve in the same way as for the United Kingdom.

Chart 23





The time series plots of spot and forward rates, Charts 24 and 25, indicate that the Canadian yield curve moved broadly in line with the US yield curve over the sample period. But the extent to which the two to ten-year

Chart 24

Two, five and ten-year spot rates estimated from Canadian government bonds



Chart 25 Two, five and ten-year implied forward rates

estimated from Canadian government bonds



yield spread narrowed was less pronounced in the Canadian market.

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Seasonal adjustment of UK monetary aggregates

By Marco Bianchi of the Bank's Monetary Instruments and Markets Division.

This note describes a study recently published by the Bank on ways to adjust monetary aggregates for seasonal variation.⁽¹⁾

The aim of the research is to provide illustrations of various possible seasonal adjustment methods; it is hoped that this will stimulate comments from official and private-sector readers. The study is confined to technical considerations and does not seek to make recommendations in favour of a particular method. The choice of method needs to take into account other factors such as risks of disruption, maintenance costs, availability of support, and compatibility with techniques used by other agencies.

Four methods of seasonal adjustment are considered in the paper. These are GLAS (the current Bank method), STAMP (a method developed by Professor A Harvey and his collaborators at the London School of Economics). STL (a method developed at AT & T's Bell Laboratories, New Jersey) and X-11 ARIMA (a method developed by Statistics Canada from the original X-11 method developed by the US Census Bureau and recommended by the UK Government Statistical Service). The performance of the different methods was in part evaluated in a 'live test', by monitoring the results of adjusting the monthly M4 series over the period October 1994-June 1995.

The study shows that the different methods generate broadly similar estimates of the seasonal factor, although significant



Results of different methods for estimating the seasonal factor in the monthly change in M4^(a)

Annualised rates of change in M4

Percentage points

		1994			1995					
		Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
		Three	e-month	change						
G G* S	(a) (b) (c)	2.60 2.54 2.13	4.99 4.89 4.97	6.24 5.18 5.74	5.61 5.54 6.32	5.19 5.41 6.43	8.75 9.58 9.93	7.79 9.08 9.66	9.24 10.5 10.3	8.96 7.88 8.23
		Six-month change								
G G* S		2.53 2.46 1.83	4.17 4.12 3.59	4.27 4.33 4.14	3.96 3.87 4.40	4.83 4.86 5.77	7.25 7.35 7.99	7.33 7.68 8.16	7.75 8.20 8.50	8.73 8.90 8.93
		Twelve-month change								
G G* S		3.97 3.97 3.82	4.43 4.43 4.33	4.46 4.45 4.32	3.89 3.88 4.22	4.12 4.13 4.46	5.27 5.29 5.22	5.08 5.10 5.16	5.97 6.04 6.09	6.58 6.62 6.58
(a)	G = GL	AS with	out tradin	g-day eff	ects remo	oved.				

(b) G* = GLAS with trading-day effects removed.
 (c) S = STAMP without trading-day effects removed.

differences may occur at certain times (see the chart and table). The study also highlights the potential significance of trading-day effects, due to the varying proportion of particular days of the week in different months, for some monetary series (for example the 'sterling lending to M4 private sector' series, one of the counterparts of M4).

Looking ahead, the Bank intends to carry out new tests using an improved version of GLAS, an improved version of STAMP, and the improved version of X-11 ARIMA known as X-12 ARIMA (which has just been officially released by the US Census Bureau). Particular attention will be given to the scope for removing trading-day effects and the compatibility of this with maintaining the balancing constraint—that is, the requirement that the seasonal factor obtained when adjusting the aggregate series must equal the sum of the seasonal factors used to adjust the components, on the grounds that the same logical relationships should remain after adjustment. The Bank is also considering estimating and possibly publishing trend series, since these are likely to be of particular interest to policy-makers. Finally, the seasonal adjustment of the weekly (Wednesday-observed) M0 series, which has not been considered in the present study, may be examined in future work. Written comments on the paper would be most welcome and should be sent to Marco Bianchi, Monetary Instruments & Markets Division, Bank of England, Threadneedle Street, London, EC2R 8AH.

(1) Bianchi, M (1996), 'A comparison of methods for seasonal adjustment of the monetary aggregates', Bank of England Working Paper No 44.

EMU—considerations for British membership

The **Governor** of the Bank, Eddie George, discusses⁽¹⁾ the economic aspects of the debate on European Monetary Union. He explains that while there are potential benefits from EMU undertaken in the right conditions, there are economic risks which could, if EMU goes wrong, become a serious source of political discord. The **Governor** notes that what matters fundamentally is not that convergence is achieved by a particular date, but that it is expected to be sustainable over the longer term. He questions the wisdom of moving ahead with EMU until there is more evidence of how unemployment is being addressed in different potential members. The **Governor** suggests that fears of competitive devaluation by the 'outs' are overstated. Looked at another way, opting out of EMU would not be a soft option.

You have invited me to speak specifically about British membership of EMU—and I will. But it is impossible to divorce that question from the question of EMU in relation to Europe more widely, so I will begin with some more general remarks.

The first is to recognise that EMU is about much more than economics. For some it is above all a convenient motor to drive to political union. Some of you may think this is to put the cart before the horse—but I couldn't possibly comment. It is in any event intrinsically a political issue because it necessarily involves some deliberate pooling of national sovereignty over important aspects of public policy, monetary and overall fiscal policy, just as the single market involved the pooling of sovereignty over aspects of trade policy for example. Decisions on whether EMU goes ahead, and on whether the United Kingdom participates if it does, will, quite rightly be taken by politicians, who will have to carry their electorates with them.

Now, as you would expect of a central banker, I have nothing to say about the political debate—nothing that is except that it does sometimes seem to be conducted, here and on the Continent, in fairly extreme language. This language shows no sign of moderating as the Maastricht timetable shortens.

But EMU *is* also, of course, about economics, and my main concern is that the political debate should not lose touch with the economic realities. There are certainly potential economic benefits from EMU in the right conditions. But there are also clearly economic risks, and if EMU goes wrong it could become a serious source of political discord within Europe rather than contributing to political harmony.

The economic debate about EMU, too, arouses great passions. Yet there is, I believe, a good deal of common ground. It is common ground, I would think, that the single European market has already made an important contribution to economic prosperity within Europe, and that

(1) In a speech given at the Royal Institute of International Affairs on Wednesday, 13 March 1996.

its further potential will be more fully realised in a macroeconomic environment of stability—including real exchange rate stability between all EU member states. There is, too, a remarkable consensus across the European Union—and even more broadly—on the policies necessary to pursue macroeconomic stability, in each country's national interest as well as the regional economic interest, that is to say responsible overall fiscal policies and monetary policy directed to achieve permanently low inflation. The economic debate about EMU really narrows down to whether, and in what conditions, the irrevocable locking of *nominal* exchange rates—which is what monetary union involves—would help to bring about and maintain macroeconomic stability and to realise the benefits of the single market more fully.

Some very strong assertions have been made in this context recently—that monetary union is absolutely essential to the completion of the single market, and that any delay in introducing it could produce a 'dynamic of disintegration' and threaten the single market's very survival.

I find it difficult to see the issue in such black and white terms. There are no absolutes in any of this—the questions we need to resolve are questions of degree.

The more modest argument made in favour of monetary union is that it could *help* to bring about sustained stability within the European region, and to maximise the benefits from the single market and reduced transaction costs, thereby improving resource allocation. I am inclined to agree that, in the right conditions, there is some substance in that.

It is true in principle that if member states of the European Union were all, individually, consistently successful in maintaining domestic stability, we could achieve much the same outcome without going to monetary union in any formal sense. But our collective past experience is not all that encouraging. If one assumes that the ECB would be more successful than national authorities acting individually in maintaining price stability within the euro area, which is its statutory purpose, then that would certainly represent a powerful discipline in member countries. With no safety valve, in the form of exchange rate adjustment, persistent cost pressures in one part of the union relative to the rest would tend to result more directly in falling activity and rising unemployment in that part of the union. Recognition of that ought to encourage more disciplined wage and price behaviour (though the initial effect could go the other way, if, irrationally, attempts were made to equalise wages across the euro area without regard to differences in labour productivity). In any event, formal monetary union would make a unique direct contribution to the more effective working of the single market by removing permanently uncertainty about intra-European nominal exchange rates as a factor in investment decisions by the business and financial communities. So monetary union could have economic advantages-in the right conditions.

The question then is what *are* those conditions, and what are the risks if they are not met?

Again there is a fair degree of consensus on the need for economic convergence among the potential participants before moving ahead. The convergence criteria in the Maastricht Treaty provide important benchmarks against which convergence should be measured. But, what matters fundamentally—and this is also reflected in the Treaty—is that convergence is not simply achieved at, or by, a particular date, but that it is realistically expected to be sustainable over the longer term. Monetary union is intended to be forever. And I am concerned that the Treaty timetable is producing a sort of sprint to the line by the end of next year, which is not necessarily helpful in terms of its immediate economic effects, and raises a question as to whether the effort can be maintained.

Even without the latest developments, it was always going to be difficult to assess the sustainability of convergence in conditions of high levels of unemployment throughout the European Union and very different levels of unemployment from one member state to another. Most commentators, of course, argue that these labour market conditions reflect structural features of the various European economies, and more and more countries are seeking solutions through deregulation, greater flexibility of labour markets, lower non-wage costs of employment and so on. And I do not for a moment believe that you could hope to resolve the problem of high and differing levels of unemployment within Europe simply through macroeconomic management and exchange rate adjustment. That is not the point. The point is that unless you assume that the unemployment problem is allowed to persist-which I certainly don'tthen, however it is addressed by individual countries, there are likely to be substantial economic consequencesaffecting both real and nominal economic variables-which will differ from one country to another. Such structural changes could have a significant impact on the sustainable

pattern of real wages and of real exchange rates within Europe. And in these circumstances some independence of monetary policy, and some nominal exchange rate flexibility, could be useful in rebalancing the different national economies. It would certainly be more difficult to achieve through adjustment of relative *nominal* wages in the context of a single monetary policy directed to price stability across the euro area. It is in that context particularly that I foresee potential pressures—in the form of unwelcome migration in search of employment or increased demands for fiscal transfers. In addition there will be a continuing risk of tension because of the possibility of asymmetric shocks of various kinds in the future.

I have to say that recent developments cause me to be more, rather than less, doubtful about the wisdom of moving ahead until we see more clearly just how the unemployment problem is being addressed in the different potential members of the monetary union and what the consequences are likely to be. I understand that failure to go ahead on the basis of the timetable could mean a loss of momentum and a weakening of current efforts to achieve sustainable stability in some countries. But to go ahead—on the basis of an arbitrary calendar—before we were reasonably confident that adequate sustainable convergence had been achieved would also involve risks; and as others have observed, once you go ahead you do not have a second chance to put it right. To put it at its lowest, the interpretation of the convergence criteria in the Treaty 'Maast-be-strict'.

Our economic interest is the same as that of our European partners, that is to say that monetary union should go ahead only if we are sufficiently confident that it will be successful. That is far and away the most important economic consideration for British membership. If we had serious doubts about that at the appropriate time, and it went ahead anyway, then I am not at all convinced that it is a club we should wish to join—but it is certainly not in our interests that it should fail.

In saying this I am assuming, of course, that we would be eligible for membership-and it is enormously important that we should be. The timetable for meeting the Maastricht criteria is, for the United Kingdom, wholly consistent with the policies that we need to pursue in our national economic interest. We would-rightly-be far more severely punished, both by financial markets and in terms of business investment, if we gave up on those polices, than if we persisted in them but still chose to stand aside from EMU. In fact we are as likely to meet the criteria-on the public deficit and debt ratio and on inflation and interest ratesas our major partners, though no-one can be sure at this stage that any of us will meet them by 1997. There is a question about the interpretation of the criterion on exchange rate stability, but I would expect this to be assessed in terms of its substance rather than its technical form given that the ERM has changed fundamentally since the Treaty was agreed. So I would hope that we will have a genuine choice over British participation when the time comes.

There will be a number of other issues that will need to be considered—including whether possible future changes in the world economy are likely to have significantly different effects on the United Kingdom from other members of the union and whether the transmission of monetary policy in this country is substantially different from elsewhere. Differences of this kind might mean that we would be adversely affected by tying our monetary policy to that of our partners. Our present work in the Bank suggests that the differences may be less than some have suggested, but they are certainly important issues to be carefully explored.

The other main consideration will be whether this country can afford to stand aside if others go ahead. This is another area of the debate where emotions run high—with warnings of potentially dire consequences for the United Kingdom if we decide not to take part or are otherwise excluded. The warnings are given in the context both of the debate about the relationship between the 'ins' and the 'outs', and of the continuing attraction of the United Kingdom as a location for business activity, including particularly financial activity. Let me comment briefly on these two aspects in turn.

There is a perhaps understandable fear, on the part of some EU countries that see themselves as strong candidates to join the monetary union from the outset, that countries on the outside will somehow use their policy freedom to steal a competitive march. There is a lot of talk in particular about the potential for 'competitive devaluation', with the implication that such behaviour would lead to defensive measures by the 'ins' and the erosion of the single market. In my view this fear overstates the risks of such predatory behaviour, which most countries nowadays would not see as in their own long-term interest. This applies in particular to 'competitive devaluation'. I don't believe that you can explain any recent falls in exchange rates as 'competitive devaluation'. People are far too well aware that any short-term advantage is likely to be rapidly eliminated by higher domestic inflation and would damage financial market credibility. But there is no doubt that all EU member countries-with or without monetary union and whether 'ins' or 'outs'-have a collective interest in ensuring that they all pursue policies directed to economic, monetary and exchange rate stability. Provided that they do, then, in the case of monetary union, the 'ins' would have no reason-and certainly no right under any European legislation-to seek to disadvantage the 'outs' or vice versa. I can well see that *all* sides nevertheless have an interest in mutual policy surveillance and co-ordination, which could take a variety of forms, not necessarily or exclusively through a collective exchange rate arrangement. I see no difficulty with that. Indeed it would be eminently sensible

and entirely normal for all EU countries to be involved in such arrangements whether or not monetary union goes ahead. In short, given rational economic behaviour, there is no reason to suppose that relationships between 'ins' and 'outs' will necessarily be a problem; we would be shooting ourselves in our collective foot if we allowed it to become one.

I take a somewhat similar view in relation to the location of economic and financial activity. I can well see that businesses might feel it safer to operate elsewhere within Europe if they thought that the British authorities would behave erratically outside monetary union, generating instability and inviting defensive action by the 'ins'. But there would be no reason for them to do so assuming that they expected us to continue to behave responsibly. There are a host of reasons why businesses choose to locate in one country rather than another-and while the prospect of a wildly fluctuating exchange rate may be a significant factor for some types of business, the difference between reasonable stability outside monetary union and precise nominal stability inside seems unlikely to me to be decisive. So the answer here too is essentially in our own hands. What we clearly need to do in any event is to equip ourselves with the technical capacity to trade at the wholesale level in the euro, as we trade at present in all major currencies; and that we are in the process of doing.

Let me conclude.

I do not underestimate the political determination on the Continent to move ahead to monetary union. I can only hope—as I have said often before—that this political aspiration does not run ahead of the economic realities. We in this country, when the time comes, will need to make up our own minds whether the necessary condition of sustainable convergence has been met by those who plan to move ahead. If we conclude that it has then I hope we will seriously consider our own participation. But if we have serious doubts about the chances of success of the monetary union without significant tensions, and this country decides to stand aside, we will need to continue to pursue responsible macroeconomic polices, both in our economic self-interest, as well as in the interests of preserving and increasing the economic benefits that we and the rest of Europe derive from our involvement in the single market. Opting out would not be a soft option for the United Kingdom, and if we fail to recognise that then I suspect we would be in for a hard landing. But with that proviso there is no particular reason in my view to suppose that the British economy would be damaged by exercising that option.

Some thoughts on financial regulation

The Governor considers⁽¹⁾ the objectives of financial services regulation, and the extent to which regulation can be expected to provide protection in today's financial markets. He notes the trade-off between the tightness of regulation and cost, not just direct costs but also the resulting constraints on competition in financial markets from tighter regulation. The Governor stresses that there will be failures of financial intermediaries under any conceivable regulatory regime, and that these need not imply a failure of regulation. In the end, it comes down to how much risk society wants to see in the financial system, although we must of course constantly strive to improve the quality of regulation. On the institutional structure of regulation, the Governor notes that it is necessarily complex, though no more so in the United Kingdom than in other developed markets. There are many variants on the structure, and no structure can be set in stone because market conditions can evolve.

It is hard to remember a time during the past 20 years or so when there was not public debate about some aspect or other of financial services regulation. But it is equally hard to remember a time when that debate embraced just about *every* aspect of financial services regulation—banking, securities and insurance as well as market regulation—as it does now. I welcome the present debate, because I agree with those who argue that getting the regulatory system right is of crucial importance to the future of one of our key industries, both in this country and south of the border.

But, if we *are* to get it right, the debate needs time. Much of the present discussion—as so often in the past—is in reaction to concerns about particular regulatory incidents. There are, too, concerns about the complexity of the regulatory structure, which causes frustration both to the regulated and to those whom regulation is intended to serve. Certainly there are important questions that need to be addressed. But I should like to start this evening by standing back a bit from these more immediate questions and ask what it is in fact that we are trying to achieve through financial services regulation—the reasons for public intervention in this area—and to consider the extent of the protection that regulation can reasonably be expected to provide in today's financial markets.

What then is financial regulation trying to achieve? There is in fact an increasing number of distinct objectives.

Historically, the first objective was *protection against systemic risk*, that is the risk that the failure of one financial intermediary would infect others, creating more general financial instability and economic disruption. Essentially, this is a problem of externalities. Particular institutions, in managing the risks in their own businesses, would not necessarily allow for the damage to the economy at large that would result from their individual failure, nor bear the costs themselves. This provides the basis for public

intervention—in practice, the setting of minimum prudential standards for individual intermediaries, supported by the possibility of last resort financial assistance where prophylactic supervision fails and where systemic damage might otherwise result.

Traditionally, this concern related solely to banks, which were particularly vulnerable to the effects of contagion because of their distinctive role in maturity transformation (with short-term liabilities matched by longer-term and typically non-marketable assets) and in the payments system. Nor are such threats limited-as is often assumed-to the failure of very large institutions: in fact in recent UK experience, systemic threats to the banking system, ultimately requiring multiple lender of last resort assistance-in the early 1970s and again the early 1990s arose in the small-bank sector, although that has not necessarily been the experience elsewhere. For the time being at least, these distinctive characteristics of banks largely remain. But it is a real possibility that, in today's far more complex and highly integrated financial markets, systemic threats can also arise from the failure of other types of financial institution and in almost any part of the world.

A second, distinct, objective of financial services regulation is a degree of protection of individual depositors—or investors or insurance policy-holders or pensioners—against loss in the event of the failure of their particular financial intermediary. This too in practice involves the setting of minimum prudential standards, supported in this case by collective protection schemes. Typically such protection is limited in amount, with the essentially *social* purpose of shielding retail consumers who may be ill-placed to assess the financial soundness of particular intermediaries without at the same time providing an outright incentive to place funds with whoever promises the highest return, regardless of risk.

 In a speech at a joint meeting in Edinburgh of the Edinburgh Finance and Investment Seminar, and the Glasgow Discussion Group on Finance and Investment on Wednesday, 28 February 1996. Now the question in relation to prudential regulation-for either of these purposes—is just how far it should go in seeking to reduce the risks of failure of individual intermediaries. All forms of finance necessarily involve risk, and the willingness of financial intermediaries to take on, and to manage, risk is the essence of their contribution to the economy. Prudential regulation is designed to protect the financial system and individual depositors and investors and so on, by limiting 'excessive' risk-taking by financial intermediaries. But there is a trade-off. The tighter the regulation the greater the costs-not just the direct costs of regulation itself, but more importantly the effect of the constraints imposed on the ability of intermediaries to compete by offering cheaper and more innovative and varied products and services-which would ultimately be to the detriment of the consumers of those products and services generally.

Of course this is not meant to excuse the regulator from thoroughly understanding and responding to the increasingly complex risks undertaken by financial intermediaries in today's markets, nor from applying rigorously the prudential standards that *are* established. But it is also important that the public at large should understand that there will be failures of financial intermediaries under any conceivable regulatory regime, and that they need not imply a failure of regulation. Otherwise there is the danger that every incident will simply ratchet regulation a notch tighter, to the point where not only the financial services industry is damaged but also those it serves.

A third objective of financial services regulation is protection against business misconduct on the part of financial intermediaries. This has been a particular growth area over the past decade but it extends potentially across a very wide range of financial business behaviour, and remains especially difficult to pin down with any precision. The justification for intervention in this area, in relation particularly to retail consumers, again rests largely on asymmetry of information-it is essentially a social argument for protecting consumers, who necessarily rely upon purportedly expert financial advice and assistance, against being sold a pup, whether through sheer negligence or incompetence extending through deliberate deception to fraud. Disclosure requirements and requirements to give good advice, taking account of the suitability of particular products or services for the particular customer, and to deliver those products or services at fair prices, do not apply to most non-financial goods and services to the same degree. This is perhaps because of the particular complexity of financial transactions or perhaps because financial transactions-particularly long-term financial transactionsoften involve a high proportion of the consumer's financial assets. The same justification for intervention does not apply in relation to wholesale market transactions between professionals. In this case it probably has more to do with the need for transparency, to ensure that the market has sufficient information to enable it to operate efficiently and is not manipulated. Again this is a question of responding to an economic externality.

In either case, given the diversity of financial transactions and of market participants, there are difficult questions relating to the appropriate forms of intervention-from reliance on disclosure standards, or guiding principles or codes of conduct to detailed regulatory rules; there are difficult questions relating to the range of instruments or services that should be covered by these different forms of regulation; and there are difficult questions concerning the relationship between regulation and adjacent areas of the criminal or commercial law. And underlying all this, there is the extraordinarily difficult question of just how far the system should go in providing protection in all these various areas, or where the balance should be struck between the responsibility of the customer and the responsibility of the intermediary. Here too there has to be a balance. With inadequate protection, or inadequate disclosure, the customer will lack the confidence to use the financial markets. If on the other hand he is encouraged to believe that he will be protected come what may, he will have no incentive to take normal precautions, like shopping around and seeking a second opinion, and intermediaries will be discouraged from offering the range of products and services that they might otherwise because of the uncertain liability that they might then incur.

My own instinct, for what it is worth, is that in this area of business conduct, we are more likely to get the balance right through emphasis on disclosure, and on education and training—both of those working in the financial services industry and of the general public—than through increasingly prescriptive regulation, which would anyway be likely to result in disappointed expectations. I do not under-estimate the demands that this would make on the industry—but so too would increasingly detailed regulation.

This list of objectives is not exhaustive. Financial services regulation is, for example, becoming increasingly concerned with assisting in the *protection of society at large against crime*, through relatively new responsibilities for ensuring that financial intermediaries have adequate systems for detecting and reporting drug monies or other proceeds of organised crime. But it will serve for the purpose of my present remarks.

In a broader sense, of course, *all* the different dimensions of public intervention are designed to maintain public confidence-both international and domestic confidence-in our financial services industry. In this sense I agree that 'good' regulation is good for the financial services industry as well as for its customers. But that doesn't make all regulation good, and at the same level of generality 'bad' regulation will have the opposite effects. In the end I suspect that it comes down to how much risk of various kinds society as a whole wants to see in the financial system. You can go so far in squaring the circle by trying to improve the quality of financial regulation-and that obviously is what we must in any event constantly strive to do. But beyond a certain point less risk is, as I say, likely to mean more cost-in the broad sense I have described, including the effect on the competitive vigour of the

industry. Before we try to reach conclusions about the future shape of the system of financial regulation I would hope there would be more debate about the nature of that trade-off, which is intrinsically a matter of political judgment.

Let me turn now briefly to the less fundamental but also difficult issue of the institutional structure of regulation. What we have now is sometimes criticised as incoherent having just grown up in response to changing social priorities, or grown out of a changing domestic and international market environment, with no overall design. Single firms are regulated for different purposes by different regulators with different particular objectives. Many see these arrangements as unnecessarily burdensome and complex, and look for varying degrees of simplification, ranging from regulatory consolidation in particular areas to radical change to perhaps just one or two regulators across the whole field. It is a tempting thought, but I'm not sure just how easy it will be in practice.

The fact, of course, is that the financial services industry is made up of a number separate industries or functions or activities, notwithstanding the blurring of the boundaries that has taken, and continues to take, place. Individual firms may be involved in any or all of these functions, operating just in this country or increasingly around the world. No-one has suggested, as far as I am aware, that you could sensibly have the same regulatory regime for all the different financial functions; nor different regulatory regimes for the same function. These factors together-or so it seems to me-preclude some of the more obvious forms of simplification of the regulatory structure, such as regulation *purely* by type of institution or regulation *purely* by function. In the first case each institutional regulator would need to apply the business rules appropriate for every function-which would be hugely inefficient in terms of regulatory resources. In the second case functional regulators would be unable to apply prudential rules to the financial institution as a whole (and it is institutions that ultimately fail) unless each function were separately capitalised-and that would be hugely inefficient in terms of the capital that intermediaries required. So what we have at present is something of a matrix structure where, broadly speaking, financial businesses are regulated institutionally for prudential purposes and functionally for purposes of business conduct.

It is—I think necessarily—complex, though no more so than in other developed markets, for example, in the United States. Now it would be possible to put the institutional and functional regulators under one umbrella—or at least fewer umbrellas. But the essence of the matrix problem requiring both institutional and functional regulation would remain. It can only be resolved effectively by close co-operation between different—specialist—regulators (including overseas regulators), whether they wear different institutional labels or simply different 'divisional' labels from within the same regulatory institution. Now that does not necessarily mean that some, further, institutional consolidation of the regulatory structure is not worth undertaking—there are many ways of skinning this particular cat and it may well be that in some areas, consolidation would make co-operation, between some domestic regulators at least, easier to achieve. In any event no structure can be set in stone—the markets continue to evolve and so too must the regulatory structure. But there are limits to what one can expect simply by putting different regulatory activities under the same roof.

An alternative approach in the longer term might be to seek to structure financial regulation on the basis of different regulatory objectives, such as those that I identified earlier in my remarks. In principle this approach could have the considerable merit of clarifying the objectives of different regulators. But I suspect that in practice you would still need specialist institutional and functional regulators, which would, in the interests of efficiency, need to straddle the different objectives in some degree, so that there would still be a need for close practical co-operation between different regulatory interests—again whether they remained institutionally distinct or were divisions of larger groupings.

I don't pretend to know the answers to all these questions, but of one thing I am sure. That is that they will be increasingly put over the years ahead and the way in which they are answered will be of huge importance to the future of the financial services industry—and of its customers. I draw them to your attention to encourage you to involve yourselves in the debate before positions crystallise.

In the meantime, whatever else we do, we must increase our efforts to improve the quality of financial regulation. By that I mean the quality and expertise of the people engaged in regulation but also the extent of practical co-operation between them-both within the United Kingdom and between our people and their counterparts abroad. The Bank is very actively engaged on both these fronts. In the wake of the Barings incident, we have commissioned consultants from Arthur Andersen to help us identify how we can improve our performance and ensure that our standards-throughout the supervisory function at the Bank—are as consistently high as we can make them. And we are involved in active discussions, with other regulators, domestically, in Basle and with IOSCO, within the European Union and across a range of countries bilaterally, directed at intensified cooperation in the prudential regulation of multifunctional and international financial institutions. I know that other UK regulators, including market authorities, are similarly engaged in this process. We need, too, constantly to improve the quality of those employed in the financial services industry-which is an important job for you. And we must all try to improve public understanding of financial risk-what the public can and should reasonably expect in terms of protection against that risk but what is expected also of them as consumers.

Industrial investment—can the market respond?

Howard Davies, the **Deputy Governor** discusses⁽¹⁾ the United Kingdom's investment record. He argues that the single most important factor behind the low level of investment relative to other industrialised nations has been macroeconomic instability. He points out that investment has been slow to recover in this upturn, but that the conditions are now in place for a possible pick-up this year. He argues that although businesses do not face a generalised shortage of finance, gaps remain; particularly for technology-based growth companies and for Private Finance Initiative projects.

The NAPF is run, it would seem, by earnest folk who take a delight in setting their guests difficult examination questions as subjects for their conference contributions.

But in fact the precise examination question set does not seem to me to be particularly taxing. It is more key stage three than doctoral dissertation standard. Because I think it is clear that the market can respond to such demands as industrial companies may make on it in support of their investment intentions now and in the likely future. So those of you who came along in search of a yes/no answer can have it—yes.

But for those who do not have another pressing engagement, I would like to extend my brief a little, and to try to answer a few related questions, which might perhaps be a little more taxing.

First, what has been happening to investment in this recovery? Are there any signs that the United Kingdom is beginning to devote a larger proportion of GDP to investment, or has investment been disappointingly weak?

The next questions rather give the game away on the first, because they are: 'why has investment growth not been stronger in this recovery, indeed why has it been significantly weaker than in the early 1980s?'.

What can we expect from now on? Will investment pick up in 1996 and 1997? What do recent trends in the financing of industrial and commercial companies tell us? Are financial markets performing well in support of industrial investment? Are there market failures we should try to correct?

These are the questions with which the Bank of England's economists wrestle from day to day in their lonely garrets above Threadneedle Street.

The United Kingdom's overall investment record is depressingly familiar (Chart 1). Over a lengthy period we have invested a lower proportion of GDP than our main

(1) In a speech to the annual conference of the National Association of Pension Funds on 21 February.

Chart 1





industrial competitors. Over the last 30 years the UK average is around 18% versus 22% for France and Germany and around 30% for Japan. Even the US share of investment has been slightly higher than the United Kingdom's.

This poor investment record is associated with a lower trend growth rate, though the correlation is not simple and the direction of causation is not entirely clear.

It is common ground that we would like to increase this investment share of GDP. But of course it would only be sensible to do so if we could ensure that the investment generated was productive. And some of the measures advocated to boost investment, associated with tax concessions of various kinds, would not necessarily achieve that happy outcome.

And it is also, of course, vital to look at the composition of investment, to identify the areas in which this shortfall has occurred. There one can see that in recent years much of the difference between Britain and the other comparable western economies over a long period has been found in the lower share of dwellings and non-housing construction, rather than of investment in plant and machinery, where our

Chart 2

Comparison of the United Kingdom with other major industrial nations 1970–94: machinery and equipment^(a) as a proportion of GDP



expenditure has been roughly on a par with Germany and France, and slightly above the United States (Chart 2).

What are the reasons for this weaker overall investment performance in the United Kingdom? Probably the single most important factor behind it has been the United Kingdom's relative instability in macroeconomic terms. We have had a more volatile growth rate and a more volatile inflation rate than many of our major competitors. That volatility is difficult to manage for industrial companies, particularly those with lumpy investment demands, where the business cycle they face amplifies movements in the economy as a whole. It tends to depress all long-term investment, whether by the private or public sectors. Indeed public sector investment can be especially vulnerable, given the impact of downturns on the government's finances. Cutting back on investment projects is one of the easier options when money is tight.

So, in our view, the single most important remedy for an investment deficit is price stability. We believe we are making good progress in that direction. We are now entering our fourth year of inflation in very low single figures, and the Bank's *Inflation Report* published last week shows that we expect to drop down within the Government's target of 2.5% or less during the course of this year. The central projection is that we remain below 2.5% in 1997, too. Of course there are risks around that central projection. But the inflation prospect is as good now as it has been for decades.

Price instability affects investment in a number of ways. Volatile nominal interest rates conceal the real rates available to savers, tending to reduce domestic saving, a decisive influence on investment. The Bank has argued, too, that British companies may have looked for higher returns than companies in other developed countries—using higher hurdle rates to screen investment projects. And research I commissioned at the CBI—with the aim of disproving the Bank's contention—tended unfortunately to support it. Many firms have not yet been persuaded to lower their nominal hurdle rates.

But rather than allowing myself to be diverted into sluggish tributaries of the short-termism debate, let us look instead at what has happened recently. Are there any signs that, against this more stable price background, investment is recovering?

Sadly, no. Indeed the bald figures would suggest that investment growth has been considerably weaker in this recovery than it was a decade ago. In the first three years of the 1980s recovery investment grew by almost 20% more than in the first three years of this upturn. But there are special factors to consider, which may cause us to be less depressed by that conclusion than we might be.

The first point to make is that, in the last recession, whole economy investment did not fall as far or as fast as it did in the early 1980s (Chart 3). In the trough of the most recent



recession, in the first quarter of 1992, investment as a percentage of GDP was 18%, very close to the long-term average, while in the first quarter of 1981 it was only 15.5% of GDP. So it is arguable that investment had more ground to make up in the early 1980s than in the 1990s and 1970s, and therefore recovered more strongly as a result (Chart 4).

Another plausible explanation as to why investment has grown slowly in this recovery relates to capacity. The investment boom of the late 1980s added greatly to industrial capacity. The early 1990s recession was deep and prolonged and as a result created large amounts of spare capacity. That was particularly the case in the service sector where output contracted in 1991 and 1992, the only recorded fall in service output in two consecutive years since the 1940s.

Chart 4 Investment in three recoveries



It may be, too, that the structure of companies' balance sheets at the beginning of the 1990s temporarily held investment back. The investment and takeover boom at the end of the 1980s led to heavy borrowing by companies, mainly from the banks, leaving many with high levels of debt on their balance sheets. It is not surprising, therefore, that companies have used rising incomes in the recovery to reduce their bank borrowings. That trend was very visible, at least until 1995. Net repayments of bank borrowings from 1991 to 1994 were equivalent to 10% of fixed investment over the same period and those years were the only ones in which companies made net repayments to the banking sector, over the last three decades.

These factors go some way towards explaining the profile of investment in the last few years. But two other factors are also worth consideration. One applies particularly to industrial investment in plant and machinery; the other to construction.

Measuring industrial investment and, in particular, adjusting for improvements in quality over time, has always been difficult. Data series which seem straightforward have always embodied within them judgements about changing prices and quality improvements.

And there is some evidence that the uncertainty inherent in all measurement of investment has been even greater than usual in the recent past. One particular reason relates to the prices of computers and other IT equipment. International comparisons suggest that UK statisticians have made less allowance than their counterparts in the United States, for example, for improvements in the quality of computers. The recorded fall in computer prices, used as the basis for assessing the quantity of IT investment, is much greater in the United States than it is in the United Kingdom (Chart 5). Expenditure on computers and related equipment has become more important to industry over the last decade. It is therefore quite possible that a conservative approach to quality adjustment in the United Kingdom has led to some underrecording of constant price investment in plant and machinery.

Chart 5 Price indices for office and computer machinery



Indeed, if we were simply to apply the US price assumptions to UK data, we could produce quite a different picture for the growth of investment in the last four years.

Just how much better the investment profile would look is a matter of conjecture. To make accurate estimates we would need to know more about the composition of investment expenditure in the United Kingdom, which may be somewhat less biased towards information technology equipment than it is in the United States. But the impact could be considerable.

Chart 6 Asset contribution to total investment growth



The last point I would like to make about the recent investment record concerns investment in buildings. Comparing the last recovery and this in asset terms (Chart 6) shows that the biggest difference in investment this time has been seen in buildings, even though vehicles, ships and aircraft, and plant and machinery have, if we can believe the price bases, been relatively weak too. And within the construction sector it is apparent that non-residential building has not picked up at all (Chart 7).

Chart 7 Non-residential constant price building investment as a proportion of GDP



One special factor has been the performance of government construction investment. In the current upturn, expenditure has been temporarily depressed by the Private Finance Initiative. The Government's plans for publicly funded investment to be replaced by privately financed and managed projects have been over-optimistic. While there are welcome signs that the flow of new privately financed investment projects in the public sector may be increasing now, the Initiative has taken some considerable time to get moving. Construction companies have not been reticent in making that point to us, and no doubt to the Treasury.

Putting all this together, how concerned should we be about the performance of investment in this recovery? My conclusion is that the figures do not at this stage justify an argument that we have moved on to a lower investment path. While we, and most other forecasters, had expected a stronger performance, there are many plausible reasons to explain why that did not occur. On the other hand, we are, unfortunately, far from being able to argue that our long-term trend has improved.

But what of the prospect looking forward?

There are some optimistic signs. CBI survey evidence suggests that investment intentions remain strong. Though the January survey showed that the balance of companies planning to invest more in the next year has slipped back a little, it remains significantly above its long-run average.

And bank and building society lending to the corporate sector has been growing strongly. Part of that borrowing may be related to investment in fixed capital. Nominal investment expenditure by industrial and commercial companies increased in 1995 and by the third quarter was almost 8% higher than a year earlier.

But a considerable part of this increased lending to business is certainly associated with more takeover activity, which expanded very sharply in 1995, as you know well. These indications, the investment intentions and the scale of new borrowing lead us to expect a pick-up in investment this year and next, though perhaps not on the scale which we were looking for last summer. That reflects a less optimistic view of output growth and a judgment that construction related investment, in both the private and public sectors, will remain relatively weak.

Against that background, as I said at the start, the answer to the specific question posed seems straightforward. We are not predicting a rapid pick-up in investment overall such as to threaten the capacity of the market to finance it.

But it is nonetheless worth looking briefly at the way in which companies are currently financing investment to try to identify any particular problem areas. The first point to note is that internal funds provide most of the financing needs of industrial and commercial companies (Chart 8), typically around 60%, with the balance coming from banks and other financial institutions, and from the stock market.

Chart 8 Sources of finance for UK industrial and commercial companies



But while that is the case for ICCs' financing needs overall, investment expenditure does nonetheless seem to be quite closely related to bank lending. There is a reasonably tight correlation between the amount of bank lending to

Chart 9

Growth in bank and building society borrowing and nominal investment expenditure by ICCs



companies, and the volume of their investment, over quite a lengthy period (Chart 9). But the process to which I referred earlier, whereby companies used strong internal fund generation in the early 1990s, to pay back bank debt, is evident here, and only in 1995 did companies once again begin to look to the banks for finance on a large scale (Chart 10).

Chart 10





At the same time, companies' dividend payouts have remained at a high level (Chart 11), but there is little sign that these payouts are imposing any strain on corporate balance sheets.

Chart 11 Dividend payout ratio^(a)



This overall picture, demonstrating that there is no systematic shortage of funds for corporate investment, should not, however, cause us to think that the market is operating perfectly. We remain aware of many concerns among smaller firms, particularly high technology startups, about their difficulties in raising finance, notably venture capital. We are now looking at the needs of those companies, trying to assess whether there is a market failure and, if so, how it might be corrected.

There have been some encouraging trends in the small firms sector recently, with reduced reliance on overdraft finance, and more use of term loans. But these medium-term financings tend to be at the shorter end, up to three years. And longer maturities are accessed primarily by the very largest companies through the euro bond markets. The United Kingdom still lacks a high yield bond market, which could be particularly appropriate for technology-based companies, and perhaps for Private Finance Initiative projects, too.

That is another area in which we would like to see innovation. We have seen one PFI-oriented fund launched recently. It would be good to think that more would follow. At the moment, the main route to financing PFI projects is through the contractor or consortium, rather than the project itself. That introduces another element of risk-the cohesiveness of the consortium and the stamina of its members. Perhaps we should be looking of ways to finance the project itself, through an operating company raising its own finance. If that is to happen, then we shall need a secondary market in the financial assets of those projects. It may be that we need new instruments, perhaps in convertible form, which can reflect the varying risks and returns at different stages in a project's lifecycle and offer strategic options to an investor exercisable over time to help balance an institutional portfolio.

Let me briefly summarise the state of our thinking, which I have tried—somewhat discursively—to sketch out for you today.

First, this recovery has been characterised by weak capital expenditure, particularly non-residential building.

But second, we should recognise that investment was at a higher level in the last trough than it was in the early 1980s recession. As a result, investment had less ground to recover in the 1990s.

Third, there are some other plausible explanations for slow investment growth—an overhang of capacity from the boom in investment in the late 1980s, continued uncertainty (though declining) about growth and inflation reflected in high hurdle rates, and a continued process of corporate financial restructuring as companies paid back bank borrowing which they saw as uncomfortably high.

Fourth, there is a reasonable case for saying that investment growth might be underestimated by our present methods of calculation. IT prices adjusted for quality improvements may be falling more quickly than the CSO now estimate.

Fifth, businesses do not seem to face a shortage of overall finance. Internally generated funds are buoyant. Real interest rates have fallen and equity prices have strengthened considerably, some evidence that growth in supply has outstripped demand.

Sixth, and lastly, there nonetheless remain financing gaps, particularly for high technology-based growth companies, and for PFI projects. Those are subjects which we shall be investigating further over the next year, and where we would hope to see increasing innovation.

International regulatory co-operation post-Barings

By Executive Director Michael Foot.

Regulating the world's financial markets is becoming ever more complex, so co-operation between banking supervisors and those who regulate other financial services is vital. This was spelt out by Michael Foot in his first public address (summarised below) as the Bank of England's newly appointed Executive Director for Supervision.

Mr Foot was addressing members of the International Swaps and Derivatives Association at their annual meeting in San Francisco on 7 March 1996.

The objectives of national regulatory bodies are not always uniform and the objectives of banking regulators, securities regulators and those who regulate insurance markets often differ.

Markets are getting ever more global; boundaries between financial products are becoming blurred and modern financial businesses are becoming increasingly complex, both in terms of the instruments used and the diversity of ways—and places in which—they are used. The institutions and their management structures are also becoming much more complex.

The Barings case particularly underlines the points:

- that the control culture of an organisation is critical and if this is not right a whole group can be brought down by the activity of an overseas subsidiary or associate, even though it is supposedly small and does not take risks; and
- that if some regulatory body had pooled the information available to the exchanges in which Barings was operating, the problems would have come to light earlier.

In the Daiwa case, information available to the home supervisor had not immediately been shared with the host regulator.

Primarily as a result of these two cases, regulators worldwide are addressing with renewed vigour the questions of what information needs to be passed between them, how it can be obtained in a timely and efficient manner (and without imposing unacceptable costs on the industries involved) and to whom it should be passed. That has to be good news, as is the fact that insurance as well as banking and securities regulators have become involved.

I recommend 'a clear lead regulator for each group' as is the case with banking supervision. This lead regulator would facilitate the exchange of information among the regulators of individual entities in the group and would take the primary role in managing any emergencies. The detail needs to be filled in.

In conclusion I identify five key elements:

- trust and confidence built up by regular contact and co-operation would help to ensure that decisions are implemented;
- even where trust and goodwill exist, there are many current legal and other barriers to the passage of information—these need to be overcome;
- there may have to be some appraisal of particular points of difference in national law, for example in the treatment of liquidations;
- much has to be done to get present standards of best practice introduced uniformly; and
- the private sector should contribute to the integrity of financial markets as for example ISDA does with its Master Agreements.

The London Approach and trading in distressed debt

The Head of the Bank's Business Finance Division, Michael Smith, discusses⁽¹⁾ how the nature of corporate workouts is changing with the globalisation of financial markets. The involvement of larger, more internationally diverse lending groups means that, in the absence of international harmonisation of insolvency law, the most effective approach to workouts will be some form of international understanding, building in part on the past successes of the 'London Approach'. He describes the London Approach as a flexible framework rather than a detailed set of rules, which can be adapted in line with changing market practices. He sees the development of a secondary market in distressed corporate debt as having a potentially helpful role to play in future workouts and assesses its likely impact. He concludes by stressing the need for an orderly, professional market.

Introduction

There has already been some discussion today about the development of a secondary market in corporate debt here in the United Kingdom and how it compares with the more developed market in the United States. The Bank of England's specific interest in the secondary trading of corporate debt has evolved particularly out of its links with corporate workouts and the impact that debt trading has on the practical application of the London Approach. We also have a more general interest in the development of corporate finance markets and the changing nature of the relationship between the users and providers of finance.

I want to start by explaining some of the main features of the London Approach. To many, this may be familiar territory, but I think it is important to ensure that we all have a proper understanding of the basis for the non-statutory, market-led system which has evolved in the United Kingdom over the last 20 years or so. I then want to go on to highlight the changing nature of corporate workouts, not least as the process of globalisation of financial markets gathers momentum, and to dwell on the challenges facing the London Approach. One of the more significant changes in this respect has been the emergence in the United Kingdom of a market in corporate debt, particularly that of 'distressed' companies. What are the advantages and disadvantages of this new market, and can this new market and the London Approach accommodate each other?

In looking at these questions and issues, I am assuming that corporate workouts in the future will be more international in scope and will embrace an increasingly diverse range of financing techniques. The challenge is to ensure that the flexibility and dynamism of the London Approach, which has been one of its major strengths, can be preserved to accommodate these relatively new developments.

The London Approach

In the course of recent workout discussions we have been aware that some of the firms active in secondary debt trading are less familiar with the London Approach framework than those who have lived with it, especially during the last recession. Let me spend a little time clarifying what the London Approach is, or rather is *not*, and dispelling any misconceptions about the Bank of England's role. I recognise that it can appear to some as rather odd that the central bank has an involvement in such an area. As we are indeed virtually unique among central banks in our participation in company workouts, it is not surprising that our role is sometimes misunderstood.

Our motives for becoming involved in workouts have been fourfold:

- it is economically wasteful if workouts founder simply because lenders cannot agree among themselves;
- it is equally wasteful if companies are consequently liquidated unnecessarily; jobs and productive capacity should be preserved wherever they are viable;
- co-operative behaviour helps to maximise value—or minimise loss for banks and other stakeholders; and
- we are well-placed to carry out a facilitating function, having close contacts with all sides of the financial community.

In this context, it should be remembered that the United Kingdom's insolvency system is very different to that in the United States. Insolvency over here (Receivership and Administration) tends to be a last resort, in contrast to Chapter XI which, I know, is widely used—some would say

⁽¹⁾ In a speech to the International Business Communications Conference 'Trading and Investing in Distressed Debt' in London on 1 February 1996.

over used—for corporate restructuring. This difference between insolvency systems is a point I shall return to.

Description of framework

The London Approach is *not* a set of detailed rules, but is a flexible framework which enables banks and other interested parties to reach well-based decisions about whether and on what terms a company in financial difficulty might be allowed to survive. Its key features are:

- lenders are initially supportive and don't rush to appoint receivers;
- decisions about a company's future are made on the basis of reliable information which is shared among all the parties to a workout;
- such information provides a basis for lenders and other creditors to work together to reach a collective view on whether and how a company should be given financial support;
- pain is shared on an equitable basis.

These are 'common sense' principles which, together with a number of more detailed 'conventions'—for example super priority being afforded to new money—have developed within the banking community to serve their financial and 'reputational' interests.

The Bank's role

I should emphasise that the role the Bank of England has played has changed over the years. My predecessors in the 1970s and early 1980s became very closely involved in individual workouts, virtually taking the lead, for example, in suggesting possible terms for refinancings and persuading lending banks of their merits. Our role during recent years has been very different. We have not sought to be prescriptive, but have responded to requests to help the lenders involved in a workout agree among themselves the terms of a refinancing.

The London Approach is *not* a statutory process and has nothing to do with regulation. I am not speaking to you as a supervisor of banks. The Bank has no statutory powers for what we do as an intermediary in the context of workouts. We rely instead on the authority vested in us by the constituent members of the London banking community who continue to seek our assistance in resolving difficult issues. The London Approach is voluntary and it is widely used because it is seen to work and to be fair.

The Bank does *not* seek to impose solutions, nor do we make decisions on the fate of companies; that is for those with an exposure to decide. Our role is part missionary and part peacemaker. As *missionary*, we advocate the London Approach as a sensible basis for lenders to co-operate, in a constructive way, in deciding the fate of companies facing a cash-flow crisis. As *peacemaker*, we try to help lenders

resolve differences of view which threaten to undermine an attempted workout. We are willing to be approached by any lender which thinks that our involvement would help smooth the path to an eventual agreement on the terms of a workout.

To give you an idea of the scale of our involvement, we were actively involved in some 160 multi-lender workouts during the early 1990s recession and have been kept informed of many others by the banks concerned. There are many others where we were not involved at all—it is up to the lenders involved to approach us if they want to seek our assistance. When we do get involved, our aim is to break log-jams and to seek a solution which represents an acceptable compromise for those concerned. In other words we act as a mediator or 'honest broker'.

Changing nature of workouts/need for an international understanding

Thanks to the London Approach, a large number of UK companies owe their continuing existence to the fact that their bankers and in some cases, bondholders and other creditors have followed its precepts in deciding the terms of a collective restructuring. However, no-one claims the London Approach is perfect. One of its greatest strengths, as I have already mentioned, is its adaptability. It needs to be kept under review to ensure that its effectiveness is not diminished by financial innovations or changing market practices.

For our part, we have been talking in the last six to nine months to a wide range of interested parties including lawyers, accountants and, as you would expect, bankers, to take their mind on the challenges which lie ahead for those attempting to help companies in financial difficulty. The globalisation of financial markets will have an inevitable impact on the nature of future restructurings. Some of the most challenging in the past have been those involving multi-national companies that had raised finance from a diversity of lenders in a diversity of countries: News International, Heron and GPA, to name a few.

Systems of decision-making on the fate of companies differ across countries. Many of you are familiar with the statutory Chapter XI procedure in the United States, although some US workouts are achieved without resort to Chapter XI. Alternatives to statutory insolvency procedures can be found in Japan and Germany where it has been common for a company's *Hausbank* to assume sole responsibility for sorting out any financial difficulties. Here in the United Kingdom, companies have tended to raise their debt finance from a wide range of lenders, mainly banks, necessitating a collective approach. Competitive pressures have made it unrealistic to expect one bank to shoulder the burden and mount a workout alone; neither would one lender willingly assume a competitor's lending.

Some of these approaches are becoming less sustainable as workouts become increasingly international. Statutory

insolvency procedures have limited effectiveness because they are currently national in scope. A few exceptional cross-border examples exist, using a combination of national insolvency procedures—the Maxwell US/UK protocol is a case in point. An ideal response to the globalisation of business and finance would be the international harmonisation of insolvency law. This is, I fear, something of a holy grail, but at least there are some encouraging signs of judicial co-operation as well as potentially successful efforts to achieve mutual recognition of national procedures among EU member states.

Thus, we come to the conclusion that a collective approach is the most appropriate way of tackling the issues which lenders face when a multi-national company runs into financial difficulty. The chances of a successful workout are greatly improved if lenders have a common understanding of how to achieve a shared objective. Just as the London Approach evolved over the years, I firmly believe there is a need to have a similar understanding which is international in application. This is undoubtedly a tall order and requires an understanding of each others' systems and objectives. However, work is underway in this area and we wholeheartedly support current informal efforts to develop such an understanding, especially through a recently formed INSOL Lenders' group here in the United Kingdom.

I know that a few lenders are still unconvinced that such an understanding is necessary. Why can individual lenders not be free to obtain the best deal from their own perspective? Our fear is that such jockeying for position could be disruptive, deflecting attention from the underlying issues. Long-term relationships in the lending community can also be soured by such horse trading and, in extreme cases, a fundamentally sound business could fail.

Evolution of a UK secondary debt market

One of the main developments affecting the London Approach in recent years has been the evolution of the secondary market in distressed corporate debt within the United Kingdom. We first highlighted debt trading as an area of growing importance at the end of 1992. The debate about the pros and cons of debt trading has progressed and the volume of trading has continued to grow.

I see debt trading as having a potentially helpful role to play in future workouts and, in exploring how best to integrate it within the London Approach, we have been asking for ideas and reflecting them back to a wider audience in order to judge the reaction.

I believe the impact of the development of a secondary market in distressed corporate debt here in London will be felt in several ways:

• Drawing a parallel with the secondary market in third world debt, trading corporate debt can introduce liquidity into banks' loan portfolios and be used as a

tool for sound portfolio management. Additionally, a sufficiently deep and well-educated market might provide a useful guide to the extent of provisioning which might be appropriate in individual cases. However, some of the concerns expressed to us, particularly by banks already established in the London market, highlight the potential damage and uncertainty that can arise from poor communication and unfamiliarity with existing practices.

• In the context of corporate workouts, the market represents something of a two-edged sword. Trading can provide a useful exit route for lenders unwilling to participate in what could be a painful restructuring. This leaves those with a genuine desire to add value to agree the terms of a restructuring. On the other hand, it could delay the process of achieving agreement on the terms of a workout, or even undermine it.

There are some potential dangers arising particularly from the lack of consensus on market practices. There needs to be a dialogue to decide how best to incorporate traders of or investors in distressed debt in company workouts to everybody's benefit. Let me explain:

- The timing of trades can have an unsettling effect on restructuring discussions. While it can be helpful in the early stages of a workout, debt trading can bring new faces to the table when discussions are well advanced. This can be disruptive since newcomers will need time to bring themselves up to speed on the situation and may want to go over ground already covered in earlier discussions. This is often not a realistic proposition. Workout discussions have not vet failed as a result of such disruption, but we have come close on a number of occasions. While much of the debt traded in the United States is of companies in Chapter XI, the lack of statutory protection against creditor demands in the United Kingdom introduces a pressure to conclude a workout as quickly as possible.
- There is also the question of the buyer's objectives. While it is possible that some parties may be motivated by short-term arbitrage or the desire to gain access to information, we have seen no compelling evidence that this has been the case. Some may argue that this type of trading does nothing to secure agreement on restructuring terms and should be discouraged, but I believe that those who have bought in the secondary market will find the main objectives of the London Approach and a mutuality of interest as relevant as traditional London-based banks.
- There are also more technical issues which have come to light as the market has begun to develop. There is legal uncertainty concerning the status of trades prior to settlement. Confidentiality of information and the applicability of insider-dealing legislation also need to

be considered. Voting arrangements under sub-participation agreements are another area of uncertainty.

Need for a market-led solution

None of these need block the development of an orderly market in London. In the past it has been suggested that we might seek to prohibit trading in the debt of a company which was the subject of a workout. I must emphasise that we do not see sense in this proposal; neither, I believe, do the majority of the banking community. At the other end of the spectrum is the argument for total freedom of action. This is understandable, but if interpreted literally, could preclude the London Approach itself.

The solution, I believe, is for some form of convention to be drawn up for use when trading the debt of a company which is the subject of a London Approach workout. I am clear it is for the market and *not* the Bank to take the initiative in these areas. Such a convention might include:

- keeping the lead bank informed of all trades during a workout;
- ensuring that buyers of the debt are aware that the company is the subject of a workout and familiarising the buyer with the London Approach if necessary; and
- transferring voting rights only after the trade has been completed.

The aim of these arrangements is not to preclude trading, but to ensure that it does not damage attempts to put together a refinancing. I suspect the market as a whole would also benefit if such a convention increased the willingness of other banks to trade in the market, thus raising liquidity. Standardisation of documentation is another area which could be addressed, helping to reduce transaction costs.

Summing up

Let me draw to a close by summarising our position. Our interest in the development of a secondary debt market in the United Kingdom stems from our long-running involvement in corporate workouts under the framework of principles known as the London Approach. Workouts are changing with the globalisation of financial markets. Larger, internationally diverse groups of lenders will present new challenges. I firmly believe the most effective approach will be some form of international understanding, building in part on the past successes of the London Approach. Such an understanding is likely to take some time in coming to fruition. Meanwhile the London Approach continues to be used as the basis for many workouts here in the United Kingdom.

The development of a debt-trading market in London will also have an impact. We do not seek to prohibit the growth of such a market and we do not have a locus for doing so. We want to see an orderly professional market which will add liquidity to banks' loan portfolios, serve as a useful portfolio management tool and perhaps, when sufficiently developed, act as a guide to levels of provisioning. We want to encourage the market to think for itself of ways to incorporate debt trading into the common sense London Approach framework which has served the lending community and companies alike so well in the past.

Debt trading is undoubtedly here to stay. Agreement among market participants on how to conduct trading within the context of a workout will ensure that the potential problems I have discussed do not materialise and that the advantages which the market can bring will be enjoyed by all. The coming months and years will be challenging for us all and I look forward to continued involvement in the debate.