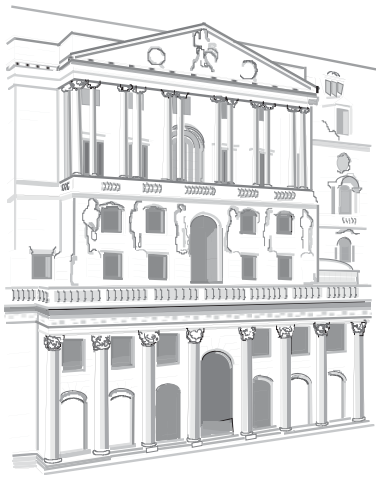
Bank of England Quarterly Bulletin



August 1998

Volume 38 Number 3

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Printed by Park Communications

ISSN 0005-5166

The Quarterly Bulletin and Inflation Report

Inflation Report
(published separately)

The *Inflation Report* reviews developments in the UK economy and assesses the outlook for UK inflation over the next two years or so in relation to the inflation target. The *Report* starts with a short overview section, while the second investigates money and financial markets, including the exchange rate, and the following three sections examine demand and output, the labour market and pricing behaviour respectively. The concluding sections present a summary of monetary policy since the May *Report*, an assessment of medium-term inflation prospects and risks, and information about non-Bank forecasts.

Markets and operations
(pages 189–205)

Sterling markets showed quite marked movements at times during the second quarter, in response to both international and domestic influences. Internationally, continuing problems in the Japanese economy and financial sector, and the associated weakness of the yen, were the major influences. The main domestic factors were the rise in official rates—the Bank's Monetary Policy Committee raised the repo rate by 25 basis points on 4 June—and stronger-than-expected macroeconomic data. UK and US equity markets mostly traded in a narrow range during the quarter, after very sharp rises in Q1. Continental European equity markets continued to outperform others, as markets anticipated faster economic growth and higher corporate earnings.

The international environment
(pages 206–19)

This article discusses developments in the international environment since the May 1998 *Quarterly Bulletin*. The main news is: the slowdown in Asia has spread to more countries. Japanese output fell for the second successive quarter in 1998 Q1. The Japanese authorities have announced further plans to tackle financial instability. Growth in the United States rose strongly in the first quarter of 1998. Recovery in the prospective euro area continued. Inflation remained low throughout the United States, the prospective euro area and Japan. Equity prices remained buoyant in most major markets, with the exception of Japan. Official interest rates were unchanged in the major industrial economies. Bond yields have fallen in the major markets, though are little changed in Japan, where yields remain low.

Research and analysis
(pages 220–73)

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

The UK personal and corporate sectors during the 1980s and 1990s: a comparison of key financial indicators (by Glenn Hoggarth of the Bank's Financial Intermediaries Division and Alec Chrystal of the Bank's Monetary Assessment and Strategy Division). This article draws together some key indicators of financial conditions in the personal and corporate sectors, which may provide interesting insights into aspects of the behaviour of the UK economy during the course of the two most recent business cycles. Although the main focus is retrospective, this analysis could also help to assess the likely future course of important components of aggregate demand.

Are prices and wages sticky downwards? (by Anthony Yates of the Bank's Structural Economic Analysis Division). In this article, Anthony Yates examines the theoretical and empirical evidence for prices being sticky downwards—in other words, for the existence of downward nominal rigidities. This evidence has most commonly been cited in the context of wages—if downward nominal rigidities exist and prevent wages from adjusting fully to a

shock to demand or supply, then such a shock may affect levels of employment. He concludes that the theoretical and empirical cases are both at best unproven.

Why has the female unemployment rate in Britain fallen? (by Phil Evans of the Bank's Structural Economic Analysis Division). In this article, Phil Evans examines recent trends in male and female unemployment, and finds that the fall in aggregate unemployment between 1984 and 1993 is wholly accounted for by a decrease in female unemployment. This lower female unemployment rate is almost fully explained by a fall in the rate at which women become unemployed; this fall is uniform across skill groups and is particularly significant among women with young children. He suggests that increased workplace assistance to women with young children has reduced the frictions in the female labour market, and may have lowered the natural rate of female unemployment.

Testing value-at-risk approaches to capital adequacy (by Patricia Jackson and William Perraudin of the Bank's Regulatory Policy Division and David Maude of the Bank's Monetary Assessment and Strategy Division). This article looks at the nature of whole-book value-at-risk models, and describes how the Bank of England set out in 1995 to assess their performance in accurately predicting risk and in providing a basis for reliable trading-book capital calculations.

The cyclicality of mark-ups and profit margins: some evidence for manufacturing and services (by Ian Small of the Bank's Structural Economic Analysis Division). This article reviews how price-cost mark-ups and firm profit margins in UK manufacturing and services behave over the business cycle, to see whether they move pro-cyclically. Movements in mark-ups and margins are important because of their effect on prices: pro-cyclical changes might suggest that price pressures increase during recovery periods and decrease during recessions. The article presents some empirical evidence that suggests that mark-ups and profit margins do both move pro-cyclically.

Markets and operations

- *The Bank's repo rate was raised by 25 basis points to 7.5% on 4 June.*
- *Sterling markets showed marked movements at times during the second quarter of 1998, in response to both international and domestic influences.*
- *The yen weakened sharply.*
- *Some minor, mainly technical, adjustments were made to the procedures for the Bank's open market operations.*

Overview

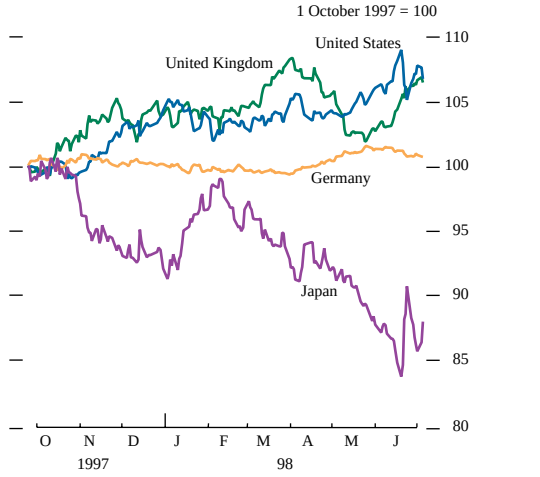
Sterling markets showed quite marked movements at times during the second quarter, in response to both international and domestic influences. Internationally, continuing problems in the Japanese economy and financial sector, and the associated weakness of the yen, were the major influences (see Chart 1). As the yen weakened, other currencies in the Asia and Pacific region also came under pressure at times. Financial market pressures were experienced in China, Pakistan, Russia and South Africa. Australia, Canada and New Zealand were also affected by the Asian crisis and by falls in commodity prices.

These international influences had two effects. First, the potential deflationary effect of slower growth in parts of the Asia and Pacific region led to a fall in international bond yields. Second, concern about financial fragility and credit considerations in some countries led to a 'flight to quality' to government bonds in western countries, as investors sought the safety and liquidity that these securities offered.

The sterling markets were affected by these international influences, especially during the first half of the quarter. For most of June, however, sterling markets were more affected by domestic factors—the rise in the Bank's repo rate and stronger-than-expected macroeconomic data.

UK and US equity markets mostly traded in a narrow range during the quarter, after very sharp rises in Q1. Continental European equity markets continued to outperform others, as markets anticipated faster economic growth and higher corporate earnings.

Chart 1
Effective exchange rate indices: United Kingdom, United States, Germany and Japan



Market developments

Short-term interest rates

The sterling money markets were relatively calm during the first two months of the quarter, with little change in actual or expected short-term interest rates. In June, however, sterling markets were unusually volatile, as they digested the news of a rise in the Bank's repo rate on 4 June, from 7.25% to 7.5%, and a number of

Chart 2
UK three-month Libor cash and futures markets

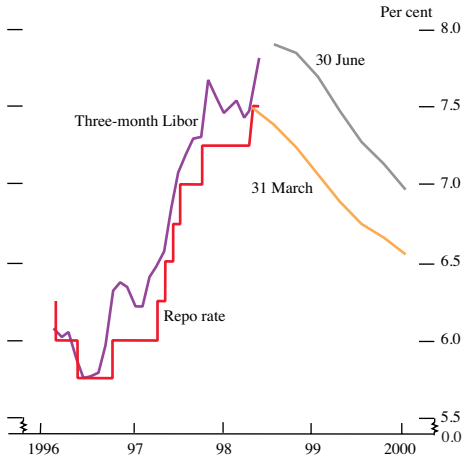


Chart 3
Interest rate announcements: change in nearest short sterling contract

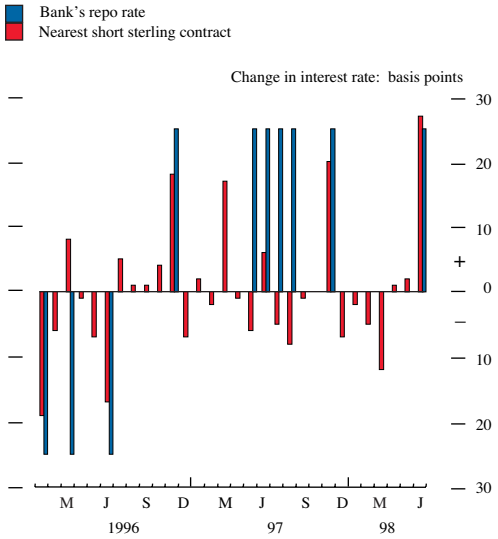
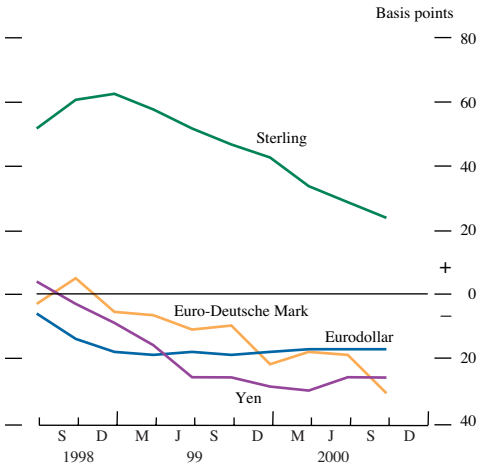


Chart 4
Changes between end March and end June in three-month interest rates implied by futures contracts



stronger-than-expected macroeconomic data releases later that month. Subsequently, interest rate expectations for the end of the year, derived from short sterling futures prices, rose by some 60 basis points. Chart 2 shows how much the short-term money-market yield curve moved up in the quarter.

The change in interest rate sentiment during June was particularly sharp. Before the monetary policy committee (MPC) meeting on 3–4 June, very few economists or traders thought that the repo rate would rise. Chart 3 shows one measure of the extent to which June's rate rise came as a surprise to the market: the nearest short sterling futures contract price fell—and so rate expectations rose—by more than the whole 25 basis point rise in the repo rate.

After the repo rate rise, the market was particularly nervous for the rest of the month, and rate expectations rose sharply in the next few weeks in response to stronger-than-expected data. The market also focused on comments and speeches by MPC members. The response of market interest rates to news depends on the market's perception of the significance of that news, and how it expects that the MPC might respond to it. There was a particularly sharp change in interest rate expectations in response to the RPI data, released on 16 June, and the average earnings data, released on 17 June. The accompanying box on pages 192–93 looks at the effect of other data releases on short-term interest rate expectations over a longer period.

The rise in short-term UK interest rate expectations in the quarter contrasted with falls in rate expectations in most of the other major international economies (see Chart 4). The fall in US rate expectations during the quarter reflected the market's interpretation of three developments: the weakness of the yen (which in turn reflected the market's view of the weakness of the Japanese economy and the likelihood of policy action); the effect of the Asian economic crisis; and the relatively low level of US inflation. The markets perhaps felt that, with the yen falling sharply during the quarter, and with the prospect that the Asian crisis might spread to other countries in the region, the US authorities would be unlikely to raise interest rates in the short term. Relatively benign domestic inflation data reinforced that view, although a number of commentators suggested that, on purely domestic grounds, the Federal Reserve was close to the point when rates might need to rise.

The focus of European short-term interest rate expectations continued to be the level at which EMU countries' rates would converge at the beginning of 1999. Overall, rate expectations for March 1999 (the first contract after the start of EMU) fell by about 5 basis points during the quarter, with three-month rates now expected to converge at, or just below, 4%.

Long-term interest rates

Government bond markets in most of the major countries benefited from further 'safe-haven' flows in the second quarter as a result of the problems in East Asia, Russia, South Africa and Pakistan. Disappointment about Japan's measures to stimulate its economy, reflected in the depreciation of the yen, raised concerns about China's possible response and the deflationary impact on western economies. Economic problems in Russia and South Africa also

Chart 5
International ten-year bond yields

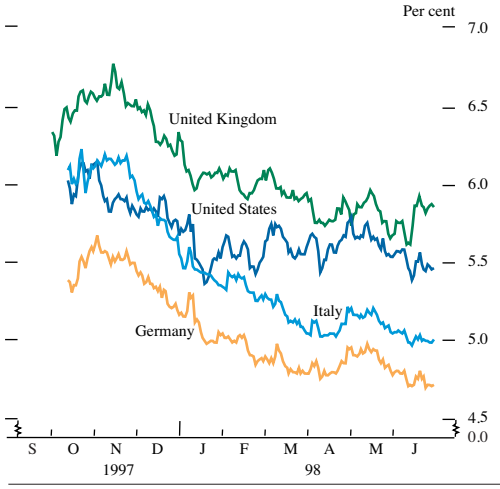


Table A
Official transactions in gilt-edged stocks

£ billions: *not seasonally adjusted*

	1997/98	1998		
	Apr.–Mar.	Apr. (a)	May	June
Gross official sales (+) (b)	25.8	0.2	3.4	0.2
Redemptions and net official purchases of stock within a year of maturity (-)	-19.5	-0.9	-1.0	0.0
Net official sales (c)	6.3	-0.7	2.4	0.2
of which net purchases by:				
Banks (c)	-7.7	0.4	1.2	0.0
Building societies (c)	0.4	-0.2	0.1	0.0
M4 Private sector (c)	10.5	-1.4	-0.5	-2.3
Overseas sector	2.7	0.4	1.3	1.1
LAs & PCs (d)	0.4	0.0	0.3	1.4

(a) From April 1998, gilt sales are no longer measured net of changes in holdings by the Issue Department and Banking Department of the Bank of England. This follows the creation of a central bank sector in the UK statistical framework, under the 1995 European System of Accounts. Transactions by the central bank sector are included with those by banks.
(b) 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.
(c) Excluding transactions under purchase and resale agreements.
(d) Local Authorities and Public Corporations.

weighed on confidence. As a result, bond yields fell further (see Chart 5).

In the United States, the ten-year par yield ended the second quarter around 15 basis points lower, at 5.44%. During June, the ten-year yield had reached a record low of 5.36%. US yields have fallen most at long maturities, causing the yield curve to flatten further. This has also been a feature of other bond markets: the UK yield curve inverted further and the German curve flattened. A box in the May 1998 *Quarterly Bulletin* discussed some of the implications of this.(1) In short, yield-curve flattening, which has been a feature of the UK (and US) bond markets for the past year, is consistent with a view that the market expects a slowdown in economic growth in the coming year in the United Kingdom and United States.

In the ERM countries, long-term interest rates also fell modestly. The successful negotiation of an eleven-member EMU at the beginning of May led to a greater expectation of interest rate reductions in some countries (Spain, for example, cut its repo rate immediately after the agreement). But uncertainty remained about whether interest rates would need to rise in lower interest rate countries, and consequently the convergence in long-term interest rates was more limited in the second quarter than in the first. For example, German ten-year par yields fell by 25 basis points to 4.60%, and the comparable yield on Italian bonds fell by 9 basis points to 4.95%.

Gilt-edged market

Both international and domestic factors supported gilts prices during the second quarter. Safe-haven flows, related to the Asian crisis, were mainly into the short end of the gilt market, where yields are highest. Gilts continued to be supported by lower prospective gilt supply: in April, there was a net repayment by the public sector of £3.3 billion; and the Chancellor's June *Economic and Fiscal Strategy Report* forecast that the debt to GDP ratio would continue to fall in the next few years. Reflecting these plans, the UK Debt Management Office (DMO) announced the cancellation of an auction scheduled to take place in November/December this year. The redemption of some £8.2 billion of 7¼% Treasury Stock 1998 also led to greater demand for other gilts, as market participants reinvested the proceeds from the redemption. These factors helped the ten-year par gilt yield fall to 5.60%, its lowest since the 1960s. The strength of sterling has also encouraged buying of gilts by international investors for much of the year, though as sterling began to fall in April and May, this influence began to fade.

Domestic macroeconomic factors became more prominent in the gilts market toward the end of the quarter. The MPC's decision to raise rates in June was not expected by the market, and yields rose at shorter maturities. However, longer-maturity gilts remained well supported. Subsequently, strong data releases in June led to a greater expectation that the MPC might raise rates in July, causing gilt yields to rise across all maturities, but especially at the short end. These factors led to earlier price rises being partly reversed near the end of the quarter, and the ten-year par gilt yield ended the quarter 8 basis points lower, at 5.82%.

(1) See the May 1998 *Quarterly Bulletin*, page 105.

News and the sterling markets

There were some large daily movements in UK interest rates in June 1998, particularly after the MPC's announcement of a rise in the Bank's repo rate and after publication of the RPI data. This box considers how unusual these movements were, and which news items have tended to move the markets in recent years.

Market movements

Table 1 shows the distribution of daily changes in the three-month interest rate implied by the nearest short sterling contract.(1) The table covers the period since the beginning of 1996, and shows the distribution of changes: (a) on all working days, (b) on days on which selected data series were published by the ONS—retail sales, industrial production, RPIX, average earnings, producer prices and GDP, and (c) on days on which interest rate announcements were made (including 'no change' announcements) following Chancellor/Governor or MPC meetings.

Table 1
Percentage distribution of daily changes in rates(a)

Percentages, except for the number of days

	All working days	Selected data days	Interest rate days
Rate rose by 25 basis points or more	0.2	0.0	3.0
Rate rose by between 15 and 25 basis points	1.8	2.4	10.0
Rate rose by between 5 and 15 basis points	5.0	9.5	0.0
Rate moved within plus or minus 5 basis points	86.1	76.8	70.0
Rate fell by between 5 and 15 basis points	6.1	8.3	16.7
Rate fell by between 15 and 25 basis points	0.6	3.0	0.0
Rate fell by 25 basis points or more	0.2	0.0	0.0
Number of days in sample	620	168	30

(a) Implied by nearest short sterling contracts.

On most days, rate movements are confined within a band of plus or minus 5 basis points, but that this is less true of days when data are published or when interest rate announcements are made. Large changes (in this period, large upward changes) have tended to be concentrated on days when rate announcements are made.

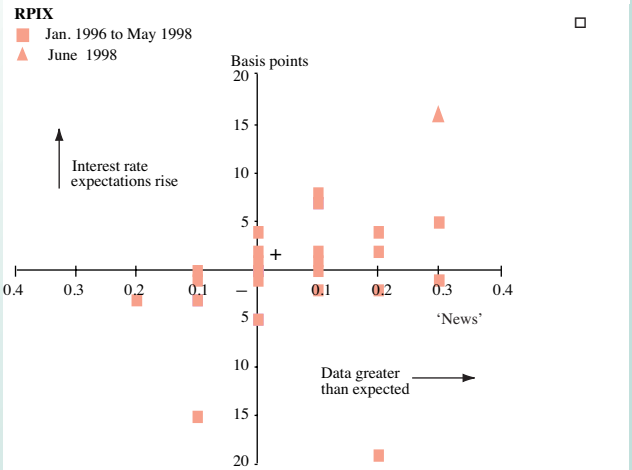
The rate used in the table moved by 27 basis points on 4 June after the MPC announcement; the first row of the table shows that this was the only occasion when the rate rose by more than 25 basis points in the entire period since the start of 1996. The rate moved by 16 basis points on the day that the RPI data were announced; the table shows that even on data days, movements of more than 15 basis points are rare.

Market surprises

The market ought not to react to data that come out as expected. But the scale of reaction to any 'surprises' may vary, as the market takes particular indicators more or less seriously. So the market reaction to a piece of news is not in itself an adequate measure of its surprise. To get an independent reading, it is possible to compare the outturns for particular indicators with the median market expectation.(2)

The scatter diagram, Chart A, plots (horizontally) this measure of surprise for announcements of the twelve-month change in RPIX against the movement in the rate implied by the nearest short sterling contract (vertically). Plots to the right of zero indicate that RPIX was stronger than the market had expected. Plots in the top half of the chart indicate that interest rate expectations rose. There is a clear tendency for bad inflation news to be associated with higher interest rate expectations. The chart helps to put in context the market reaction to the June RPIX data (the triangular plot in the NE quadrant). These data were a big surprise to the market (against the benchmark of its past forecast errors for this series); the plot is on the far right of the chart. But the market also reacted more strongly to this surprise than to earlier surprises of the same magnitude.

Chart A
Effects of data releases on interest rate expectations: RPIX from January 1996 to June 1998(a)



(a) 'News' is measured as data outturn less expectation. Interest rate expectations are measured by nearest short sterling contract.

Reproducing this chart for the other five data releases over the period 1996–98 shows that RPIX, average earnings and retail sales have more impact on rate expectations than PPI, industrial production and GDP.

Charts of this kind involve a number of choices. Some data are always published as part of a package. For

(1) These contracts mature on the third Wednesday of March, June, September and December. Because contracts tend to lose liquidity just before they mature, we switch contracts at the beginning of the final month. For example, we take the September contract as the 'nearest' from 1 June, even though the June contract has a short while still to run.
(2) From a survey by Bloomberg News of around 20 City economists, taken before the data are released each month.

example, the labour market data include average earnings, employment and unemployment; the market currently focuses most on the earnings figures. Similarly the choice between using market forecasts of monthly, quarterly or annual growth was made on the basis of a judgment as to which rate of change the market typically focuses on for each series from month to month. The chart uses close-of-business rates, but on some days, rate expectations are affected not only by UK data releases but also by other influences such as MPC minutes, US data releases in the afternoon, or policy speeches. Although the scatter diagrams can pick up general tendencies, one extension of this work would be to look at changes in interest rate expectations within a few minutes of each announcement to try to avoid some of the 'noise' from other factors.

In addition, though Chart A allows us to show the impact of one series of data releases at different points in time, it does not really allow a comparison across different data releases on a like-for-like basis. A forecast error of, say, 0.2 percentage points is more significant for a series such as annual RPIX inflation than for the more volatile monthly industrial production. This can be seen from Table 2, which shows the standard deviation of past surprises in the six data releases looked at here. Dividing each surprise by the standard deviation of surprises in that series gets round this problem. Chart B, showing the impact of data releases this June, is drawn up on this basis. Outturns for retail sales and for RPIX were both big surprises, but RPIX appeared to have a much bigger impact on rates.

Table 2
Standard deviation of data surprises

Series	Change	Standard deviation of past surprises since Jan. 1996 (a)
Average earnings	12-month	0.25
RPIX	12-month	0.12
PPI	12-month	0.19
Retail sales	1-month	0.47
Industrial production	1-month	0.48
GDP	Quarterly	0.09

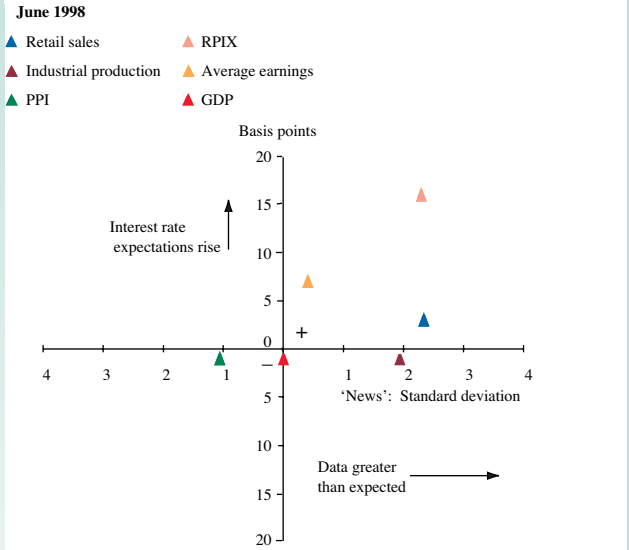
(a) Standard deviation of actual outturn less expectation.

Have reactions changed over time?

The question arises as to whether the response of interest rate expectations to data releases has changed over time, if for example markets learn about the reaction function of policy-makers to data releases.

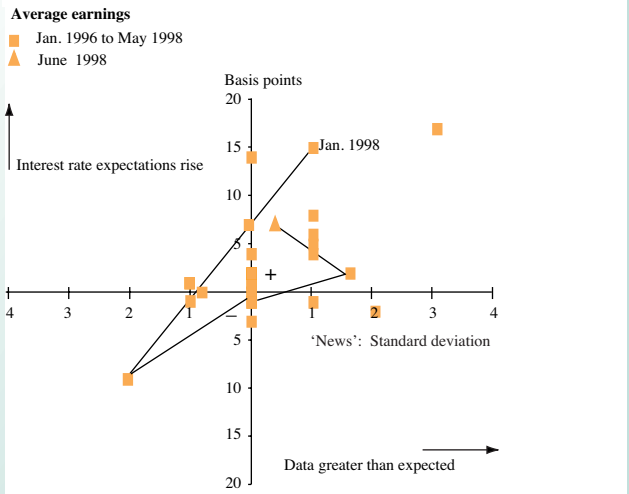
One test of this is to see whether markets have become more sensitive to average earnings data, given that recent MPC minutes, the *Inflation Report* and other statements of policy have all pointed to the importance of average earnings data for the interest rate outlook. Chart C shows a scatter plot of average earnings surprises (scaled by their standard deviation) and the change in short sterling. The large triangle again represents June's data. The dots for the latest six months are joined up in chronological order. There is no obvious pattern to the latest six observations—it is not clear that the impact of average earnings has increased over this very short time span.

Chart B
Effects of data releases on interest rate expectations: six data releases for June 1998(a)



(a) 'News' is measured as data outturn less expectation, divided by standard deviation of past errors. Interest rate expectations are measured by nearest short sterling contract.

Chart C
Effects of data releases on interest rate expectations: average earnings from January 1996 to June 1998(a)



(a) 'News' is measured as data outturn less expectation, divided by standard deviation of past errors. Interest rate expectations are measured by nearest short sterling contract.

Summary and conclusions

The market appears to take RPIX, average earnings and retail sales releases more seriously than other data releases. But on the measures used here, the market's apparent reaction to news in the data is in no case completely uniform from month to month. It is hard to detect changes in the relative importance that the market attaches to different indicators, although RPIX seems to have become more important since the Bank was given operational independence in May 1997.

Table B
Gilt issuance

Auctions

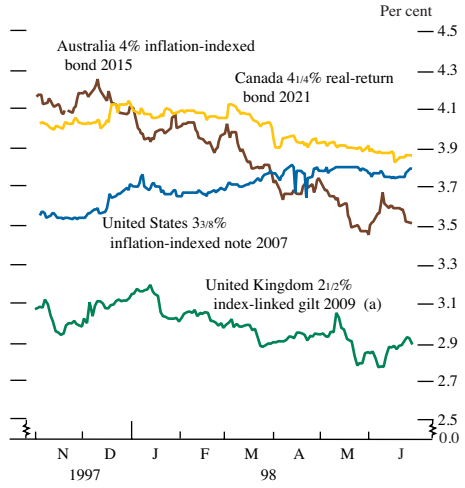
Date	Stock	Amount issued (£ millions)	Non-competitive price	Yield at non-competitive price	Average yield	Cover	Tail (basis points)
20. 5.98	6% Treasury Stock 2028	3,000	103.03125	5.79%	5.79%	2.26	0

Taps

Date	Stock	Amount issued (£ millions)	Issue price	Issue yield	Price at exhaustion	Yield at exhaustion	Average yield	Exhaustion date
3. 4.98	2½% Index-linked 2024	150	151.0625	2.85	151.375	2.84	2.84	3. 4.98
21. 5.98	2½% Index-linked 2016	150	184.8125	2.90	185.250	2.88	2.88	21. 5.98
12. 6.98	4⅛% Index-linked 2030	150	159.8750	2.53	160.750	2.50	2.50	12. 6.98

Note: Real yields are calculated using a 3% inflation assumption.

Chart 6
Real yields on index-linked securities



(a) Assuming 3% inflation.

Chart 7
UK and US ten-year breakeven inflation rates since 1 February 1997(a)

(a) Derived by comparing conventional and index-linked bond yields.

Index-linked yields and inflation expectations

Yields on index-linked gilts fell further in the second quarter. Continued strong institutional demand, combined with an expectation by the market that the outlook for the supply of index-linked gilts would be limited, contributed to these falls. The amount of index-linked gilts outstanding in the market rose by £450 million in the quarter, as the DMO made three successful 'taps' of long-maturity index-linked gilts (see Table B). These taps met with strong demand, and encouraged buyers into the market. The revised financing Remit in June maintained the absolute level of funding intended for the index-linked sector, by increasing the target for index-linked issuance to 30% of overall gilt issuance in 1998/99, though the target issuance of £3.6 billion is lower than issuance in the recent past. Partly as a result, long-term real yields fell: the 25-year index-linked gilt yield fell from 2.91% at the beginning of the quarter to 2.57% at the end. The real yield curve, derived from index-linked gilts, became more inverted this quarter, as short yields rose. The rise in short yields partly reflected selling of the 2½% Treasury Stock 2003 index-linked gilt, once the stock dropped out of the over 5 years' index. This lengthened the duration of the basket, and 'index-matchers' were obliged to switch longer to match the indices against which their performance is measured.

Real yields in Australia and Canada also fell in the quarter, as Chart 6 shows, while US yields were broadly unchanged. The fall in Australian real yields partly reflected fear of a slowdown in activity associated with weak Asian markets.

Inflation expectations derived from the gilt market were broadly unchanged during the quarter at, or just below, 3%. Chart 7 compares the ten-year breakeven inflation rate in the United Kingdom and United States (the breakeven rate is the rate needed for investors to be indifferent between holding nominal or index-linked bonds). On these calculations, US inflation expectations have fallen relative to those in the United Kingdom. Relatively benign price indicators in the United States, commentary from the Federal Reserve—for example, Chairman Greenspan's testimony to Congress on 10 June—that was interpreted by the market as implying that inflation appeared to be under control, and the continuing East Asian crisis, all appear to have put downward pressure on derived inflation expectations in the United States. (However, consumer surveys of US inflation expectations are much higher than expectations derived from financial markets.)

Real yields and the RPI

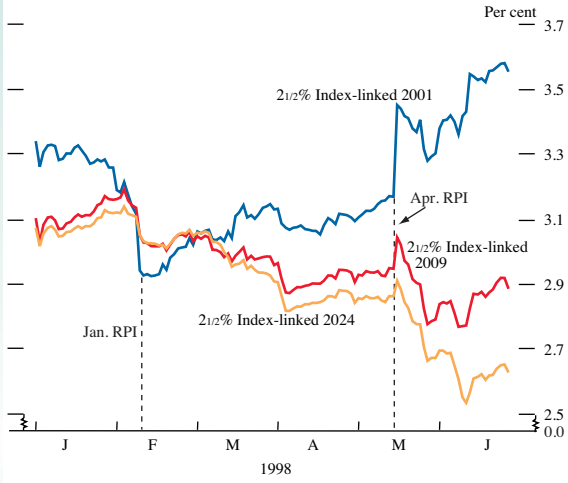
Real yields on index-linked bonds are affected by inflation releases. This may influence the interpretation of real yields and derived inflation expectations. This box explains why.

To calculate the real yield on an index-linked gilt, an assumption must be made about the rate of inflation between now and the maturity of the gilt, because for the eight months before the date on which they are due, the cashflows have no inflation protection. Index-linked gilts (IGs) are indexed to RPI inflation, so the assumption is made about RPI inflation, not RPIX inflation. The current market convention is to assume an RPI inflation rate of 3%, roughly equivalent to a monthly rate of 0.25%.[1] This assumed rate is used to project the value of future coupons and the final redemption value. The assumed coupon and capital uplift are calculated by taking the latest known value of the RPI and compounding that by projected 0.25% monthly increases. Once a new RPI figure is released, the new known level is used in the calculation, so the inflation uplift is calculated from a new known figure. So unless the monthly change in the RPI turns out to be 0.25%, then the reported real yield will change for any given price of the stock. (It is worth noting that the RPI is not seasonally adjusted, and that the assumed 0.25% per month increase makes no allowance for seasonality.)

The January RPI was released on 10 February, revealing a fall in the RPI of 0.3%. A fall has been quite rare recently—the last fall was in July 1996. So the actual RPI in January turned out 0.55 percentage points lower than had been 'assumed' the day before it was released. The inflation uplift started from a lower base, and that led to a fall in calculated real returns. By contrast, the April RPI, released on 19 May, rose by 1.1%. That led to a sharp rise in real yields.

The effect is larger for shorter-maturity than longer-maturity IGs, because the eight-month unprotected period is a larger proportion of the overall period to maturity. That was borne out on 10 February and 19 May, as the chart shows.

Real yields on UK index-linked bonds



Note: Real yields are calculated assuming 3% inflation.

The announcement of an RPI figure is of course 'news' to which financial markets may be expected to react. The assumed 0.25% rise in the RPI is a technical assumption, not a forecast by analysts or economists of the expected change in the RPI. In the case of the April RPI, the market was expecting a rise of 1.0%, mainly because changes in excise duty were known about in advance. So the release of the data was barely 'news' and, as a result, index-linked prices hardly changed on the day. Nevertheless, the conventionally-calculated real yield rose on the 2001 index-linked gilt yield by 28 basis points. This shows that real yields need to be interpreted carefully when the RPI turns out to be materially different from the 0.25% assumption.

(1) Strictly, $\left(\sqrt[12]{1.03}-1\right)$, ie 0.2466%.

The published real yield on UK index-linked bonds can move sharply on the days when the retail prices index is released. This means that interpretation of published real yields and any inflation expectations derived from them needs to be treated carefully. The box above explains the relationship between real yields and RPI releases.

Credit indicators and spreads

In the final few weeks of June, bond market credit spreads for UK corporate borrowers widened by about 10–15 basis points at ten years. Spreads had widened initially in 1997 Q4 as fears about the Asian crisis increased; spreads narrowed in the first quarter as concern about Asia lessened.

Chart 8
Equity indices

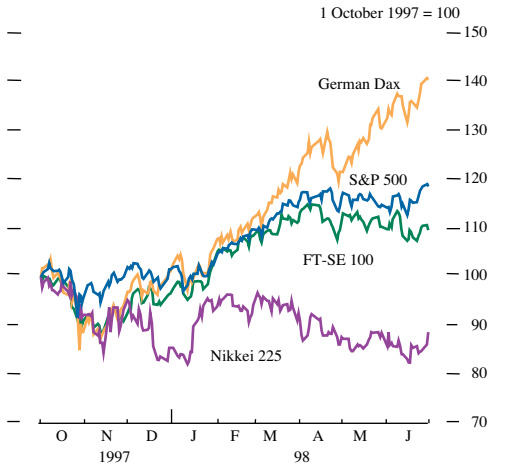


Chart 9
Japanese yen exchange rates

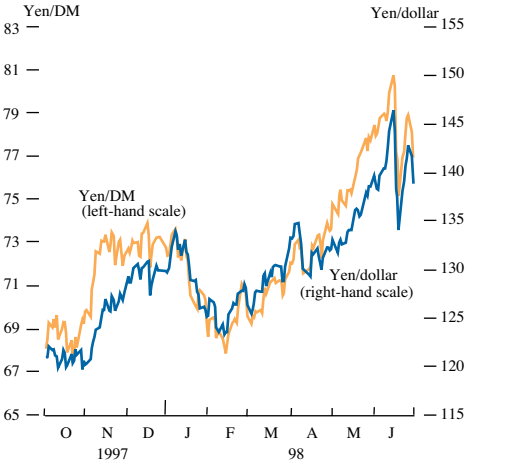


Table C
Exchange rates and effective exchange rate indices

	1992	1996	1998		Percentage changes between 31 Mar. and 30 June 1998
	15 Sept.	1 Aug.	31 Mar.	30 June	
£ ERI	99.5	84.7	108.8	107.0	-1.7
£/DM	2.78	2.29	3.10	3.01	-2.8
£/$	1.89	1.56	1.67	1.67	-0.4
$/DM	1.47	1.47	1.85	1.81	-2.4
$/Yen	123.8	106.8	133.3	138.8	4.1
$ ERI	93.7	95.6	110.7	112.2	1.4
¥ ERI	113.5	135.6	117.2	112.0	-4.4
DM ERI	103.1	109.5	102.4	103.7	1.3

The widening in credit spreads toward the end of Q2 reflected higher swap spreads. Swap spreads show the rate at which fixed-rate funding may be transformed into floating-rate, and depend on banks' credit risk—since banks are often the counterparties to the swap—as well as the demand and supply of fixed-rate payers/receivers in the swap market. So as bank risk deteriorated in June, due to concern about Japanese/emerging market bank risk, swap spreads (and hence credit spreads) widened.

Two other factors have also led to wider swap spreads in the past year. First, lower government bond supply has pushed down gilt yields relative to corporate/bank yields in the bond market. Second, there has been a preponderance of fixed-rate payers in the swap market, caused by the continuing demand for fixed-rate mortgages. Because banks' and building societies' liabilities are mainly floating-rate, they have entered the swap market to hedge these new fixed-rate assets.(1)

Money-market credit spreads also widened toward the end of June. Heightened concern about the Japanese banking sector led to a rise in the funding premium paid by Japanese banks in the sterling interbank market, to about 50 basis points. However, in contrast with Q4 last year, the gap between unsecured interbank rates and secured repo rates in the money market as a whole was not affected much by credit concerns about Japanese banks. The secured/unsecured spread did widen in Q2, however, in response to pressures at the end of the half year.

Equities

Equity prices in the United Kingdom and United States traded in a relatively narrow range in the second quarter, after rising sharply in Q1. By contrast, continental European markets continued to rise and the Japanese market drifted down (see Chart 8).

UK and US markets were reportedly affected by expectations of slower corporate profits growth, as these two countries entered a period of cyclically slower growth. (Expectations of rising interest rates may also have dampened market sentiment.) The stronger performance of continental European markets mainly reflected the cyclical recovery in growth prospects for European countries, and also the finalisation of the arrangements for EMU at the beginning of May. Within Europe, stock markets in Ireland, Spain and Portugal—where short-term interest rates are expected to fall to converge at the lower levels of other EMU members—have risen particularly strongly. The Japanese market drifted down after the Japanese year-end in March, but rose toward the end of June after the yen's sharp fall was arrested.

Foreign exchange

(i) International background

The yen dominated developments in the foreign exchange markets in the second quarter, as in the first. With little sign of a recovery in the Japanese economy, continuing concerns about the stability of the Japanese financial sector, and uncertainties about fiscal policy, the yen continued to weaken (see Chart 9). Table C shows the

(1) These two factors have meant that UK swap spreads have been much wider than US swap spreads.

extent of the yen's decline against the dollar. Although it ended the quarter at ¥139 against the dollar, roughly 5½ yen lower than at the end of March, the yen traded in a wide range, between ¥128 and ¥147.

The yen rose in early April to around ¥131, following successful passage of the 1998/99 Japanese Budget, and market belief that a further package of fiscal stimulus measures would be forthcoming. However, Japanese Prime Minister Hashimoto's announcement on 9 April of ¥4 trillion of tax cuts as part of a ¥12 trillion stimulus package disappointed the market. The yen weakened until intervention by the Bank of Japan led to a recovery to around ¥130 against the dollar. With most of the European market closed on 10 April for Good Friday, the Bank of Japan again intervened in support of the yen. Large sales of dollars by the Japanese authorities took the yen to its firmest for the quarter—¥127½ against the dollar. But by the close, the dollar had recovered, ending Tokyo trading at ¥129. Daily turnover in the Tokyo market reached $41.3 billion on the day.

This bout of intervention succeeded in introducing greater 'two-way risk' into the market, but was unable to alter the downward trend of the yen significantly, mainly because the market saw little change in economic fundamentals. Investors, though nervous of the possibility of further intervention by the Japanese authorities, continued to sell the yen. The yen fell gradually during the following month, eventually moving back beyond the pre-intervention level against the dollar. The yen continued to weaken in May and early June, with its downward path stemmed only by occasional fears of further intervention.

Co-ordinated intervention by the Bank of Japan and the New York Federal Reserve Bank on 17 June put a significant brake on the yen's depreciation. By 15 June it had fallen to an eight-year low of ¥147. Profit-taking had helped the yen to recover ground against the dollar, reaching ¥142 in afternoon trading on 17 June. The Federal Reserve Bank sold dollars against the yen at this level, acting both as agent for the Bank of Japan and on its own account—the first concerted intervention in the foreign exchange markets since August 1995. Simultaneously, Japan announced measures designed to restore confidence in the Japanese financial system. The yen strengthened immediately, closing at ¥138 against the dollar and ¥77 against the Deutsche Mark, 6 and 3 yen firmer respectively on the day.

Dollar/yen is one of the two most actively traded currency pairs in the world. Many other rates in the rest of Asia are related to, and affected by, the dollar/yen rate. In fact, the exchange rate of Korea held up well during the quarter, while the exchange rates of Malaysia and Thailand fell less far than in previous quarters (see Table D). Yen weakness seemed mostly to affect the Australian and New Zealand dollars, both of which fell sharply during the quarter.

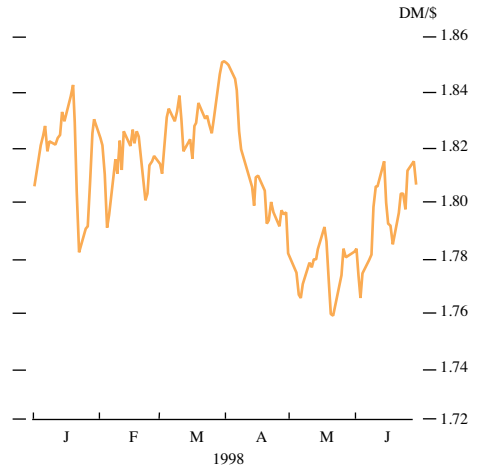
Indonesia's currency depreciated sharply (by around 40%), mainly because of domestic problems. Social unrest brought the country's financial system to a halt on 13 May. Markets remained closed until 18 May, when limited trading in the rupiah resumed, but spreads remained very wide and the currency continued to weaken.

Table D
Emerging market currencies versus US dollar

	1997		1998		Percentage changes between 31 Mar. and 30 June 1998
	1 July	31 Dec.	31 Mar.	30 June	
Indonesian rupiah	2,432	5,402	8,500	14,650	-42.0
Thai baht	24.4	47.0	38.9	42.1	-7.6
Korean won	888	1,600	1,384	1,370	1.0
Malaysian ringgit	2.53	3.88	3.64	4.13	-11.9
Philippine peso	26.4	39.5	37.7	41.5	-9.2
Singapore dollar	1.43	1.68	1.61	1.69	-4.7
Russian rouble (a)	5,782	5,958	6.12	6.20	-1.5
South African rand	4.53	4.85	5.03	5.92	-15.0
Australian dollar	0.75	0.65	0.66	0.62	-6.6
New Zealand dollar	0.68	0.58	0.55	0.52	-6.1

(a) The Russian rouble was devalued against the US dollar (effective from 1 January 1998). On that day, the rouble/dollar rate was rescaled with the new rate equivalent to the old rate divided by 1,000.

Chart 10
Deutsche Mark/dollar exchange rate



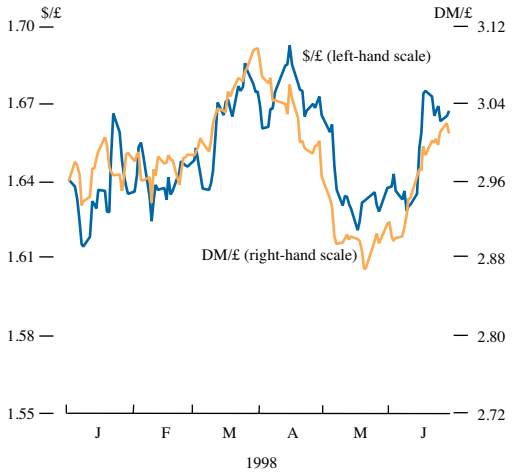
The US dollar weakened against the Deutsche Mark in the second quarter (see Chart 10), ending the period 4 pfennigs lower at DM 1.80½. Increasing optimism about the euro, and signs of increasing German economic activity, supported the Deutsche Mark during April and May. While weaker-than-expected US payroll data in early April led the market to revise down its interest rate expectations, the dollar weakened against the German currency in the first two months of the quarter, trading down from DM 1.85 at the beginning of April to a low of DM 1.75½ on 21 May. But the dollar recovered ground in June, as concerns about Russia's financial stability grew, weakening the Deutsche Mark. Germany is Russia's largest trading partner among the industrialised economies, and also has sizable banking and direct investment exposure to the region.

EU member states met on 2–3 May to decide which countries would join the single currency at the beginning of 1999, and at what bilateral rates. Immediately before that weekend, demand for the Deutsche Mark increased, as the market started to anticipate an orderly start to the single currency, and market participants 'traded back' into Europe. As a result, the Deutsche Mark gained 3 pfennigs against the dollar between 30 April and 6 May, to around DM 1.76½.

(ii) Sterling

Sterling fell by 1.7% to 107.0 on the effective exchange rate index between the end of the first and second quarters. The pound fell most markedly against the Deutsche Mark, losing nearly 9 pfennigs during the quarter; against the dollar, sterling fell by less than 1 cent. As Chart 11 shows, though sterling fell against both major currencies in the first half of the quarter, it recovered ground in June as market participants reassessed their view of sterling's likely progress, in the light of the increase in the Bank's repo rate at the June MPC meeting.

Chart 11
Sterling exchange rates



Sterling had reached a peak against the Deutsche Mark of DM 3.11 on 31 March, its highest since May 1989, but then weakened steadily during April and May. Profit-taking in early April took the pound lower against both the dollar and Deutsche Mark. Sterling fell further as the market increasingly took the view that the United Kingdom's interest rate cycle might have reached its peak. This view appeared to be confirmed in early April, when an OECD report argued that there was little need for a further rise in UK interest rates.

With rates left unchanged following May's MPC meeting, the pound fell further. But expectations of relative interest rates cannot wholly account for sterling's sharp decline against the Deutsche Mark in May. Between 30 April and 21 May, sterling lost more than 13 pfennigs against the Deutsche Mark, falling below DM 2.87. This may have been because investors had previously purchased sterling as a 'safe haven' while uncertainty about the single currency continued. After the 'EMU weekend', these trades were unwound, pushing the pound lower.

On 4 June, the MPC raised the Bank's repo rate by 25 basis points to 7.5%. The decision had a sharp (intra-day) effect on the pound. Before the announcement, sterling had traded just below $1.63¾ and DM 2.89½; within minutes of the news, the pound had gained more than 1 cent and more than 3 pfennigs to trade above $1.65

Table E
Average daily money-market shortages

£ millions

1996	Year	900
1997	Year	1,200
1998	April	1,400
	May	1,500
	June	700

Chart 12
Noon shortages and SONIA less repo rate

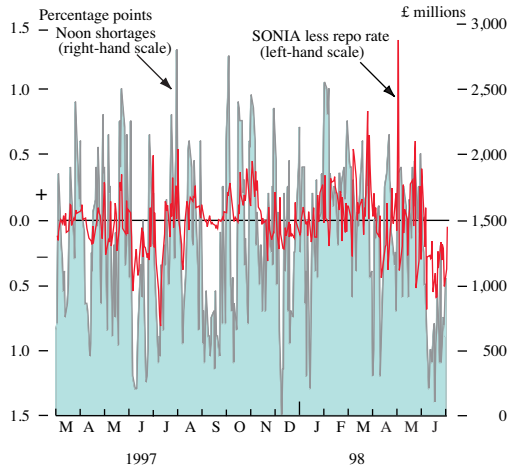


Table F
Influences on the cash position of the money market

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

	1997/98	1998		
	Apr.–Mar.	Apr.	May	June
CGNCR (+) (a)	3.4	-2.7	2.7	6.4
Net official sales of gilts (-) (b)	-6.3	0.7	-2.4	-0.2
National Savings (-)	-1.6	-0.1	-0.1	-0.1
Currency circulation (-)	0.8	-0.6	-1.5	1.6
Other	-4.0	2.6	0.0	0.9
Total	**-7.7**	**-0.1**	**-1.4**	**8.6**
Outright purchases of Treasury bills and Bank bills	1.5	0.2	-0.7	-0.6
Repos of Treasury bills, Bank bills, and British Government stock and non-sterling debt	1.8	-0.6	1.7	-5.9
Late facilities (c)	0.3	-0.2	-0.1	-0.1
Total refinancing	3.6	-0.5	0.9	-6.5
Foreign exchange swaps	0.7	0.8	0.5	-2.0
Treasury bills: Market issues and redemptions (d)	-2.9	0.0	0.0	0.1
Total offsetting operations	**7.3**	**0.2**	**1.4**	**-8.6**
Settlement banks' operational balances at the Bank	-0.4	0.1	6.0	0.0

(a) Central government net cash requirement. Formally known as the CGBR, the CGNCR came into being following the publication of the *Economic and Fiscal Strategy Report* in June. Its definition, however, remains unchanged.
(b) Excluding repurchase transactions with the Bank.
(c) Since 3 March 1997, when the Bank introduced reforms to its daily money-market operations, discount houses and settlement banks have been eligible to apply to use the late facilities.
(d) Issues at weekly tenders plus redemptions in market hands. Excludes repurchase transactions with the Bank (market holdings include Treasury bills sold to the Bank in repurchase transactions) and tap Treasury bills.

and DM 2.93. Volatility on this scale led to a drop in market liquidity in afternoon trading as funds briefly withdrew from the market, having earlier scrambled to close out any positions that they had held. Small-scale sterling sales by the few funds that were able to take profit from the rise led the pound lower in afternoon trading. Sterling closed the day at $1.64^{1}/_{4}$ and DM $2.89^{3}/_{4}$.

The stronger-than-expected macroeconomic data released during June, and the weakness of the Deutsche Mark following concerns about Russia, both helped to support the pound for the rest of the month. Sterling strengthened steadily against the Deutsche Mark, appreciating by 4%, to end the quarter at DM 3.01. However, it rose by less against the dollar. Before the release of May's inflation data, on 16 June, sterling had remained broadly unchanged against the dollar as it firmed against both the yen and Deutsche Mark. But the unexpected increase in UK inflation in May took sterling back above $1.65 against the dollar, $1^{1}/_{2}$ cents up on the day. From that point on, the pound appreciated steadily against the dollar, reaching $1.66^{3}/_{4}$ at the end of the quarter.

Open market operations and gilt repo

Operations in the sterling money market

The short-dated interest rate market was characterised by occasionally tight money-market conditions during the first two months of the quarter and easier conditions in June. The shift reflected changes in the size of money-market shortages and in the stock of refinancing (money-market assets) held at the Bank (see Table E), which in turn reflected shifts in the monthly pattern of government receipts and payments. There was a sharp fall in the stock of refinancing, from £11.9 billion at the end of May to £5.4 billion at the end of June, for example.

Changes in the size of the money-market shortage/stock of refinancing have affected technical money-market conditions at very short maturities in recent years. Chart 12 plots the size of the money-market shortage against the sterling overnight index average (SONIA) less the Bank's repo rate. Large shortages tend to coincide with a high overnight rate relative to the Bank's repo rate (the correlation between the shortage and SONIA less the repo rate is 0.5). On 8 June, there was a large payment of interest on strippable gilts, which reduced the stock of refinancing and market shortages sharply. This led to easier money-market conditions for most of June. This also happened in June last year when the shortages were small.

Earlier in the quarter, when the shortages were larger, there were occasional days when the early round of operations brought few bids. As the discount houses had moved out of transition over the year since the new open market operations (OMOs) began, the capacity to borrow late in the day from the Bank (after the final 2.30 pm round of OMOs) had dwindled. If the system was not cleared by that time, it was susceptible to occasional late spikes in interest rates, though in most cases little trading took place at these higher overnight rates.

The Bank took the opportunity of the extension of CHAPS trading hours, and the phasing out of the discount house facility, to make some minor, mainly technical, adjustments to the procedures for its OMOs. From 1 June, all Bank OMO counterparties have had

Chart 13
OMOs—instrument overview

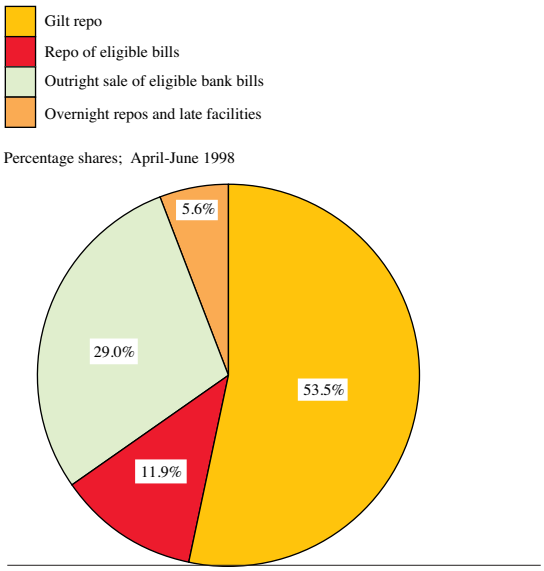


Chart 14
Weekly average stock of refinancing and gilt repo as a share of OMO

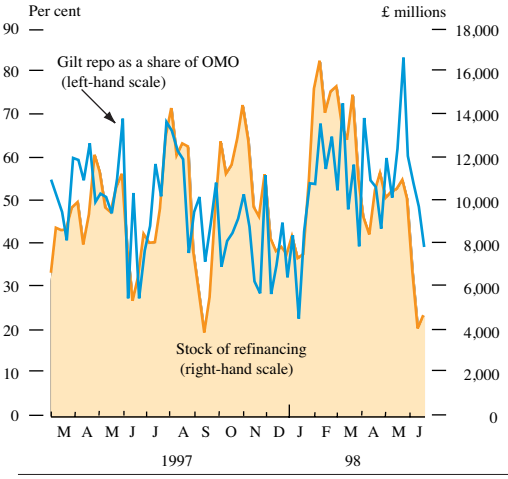
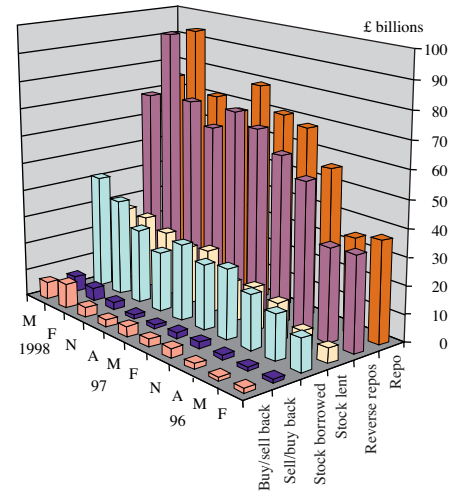


Chart 15
Gilt borrowing and lending markets



access to overnight repo at 3.30 pm without quota restrictions. That is designed to 'cap' any late spike in the overnight rate, caused by the limited access to late lending under the old system. The Bank also introduced higher penalty rates if counterparties borrowed after the normal OMO rounds. The tougher and more transparent late-lending penalties were intended to encourage counterparties to square their positions earlier in the day, and so prevent volatile conditions later. In the first month of the new arrangements, the adjustments appear to have achieved their desired effect: the overnight rate has not traded as high as it occasionally did in the last few months of the transitional arrangements. To simplify its operations, the noon round of the Bank's OMOs was also abolished. The box on page 202 describes the changes in more detail and sets out the new OMO timetable.

The share of different instruments in the Bank's refinancing during the quarter is shown in Chart 13. Gilt repo continued to be the dominant source of refinancing, accounting for more than 50%, with outright sales of bills accounting for 29%. The February *Bulletin* noted that gilt repo had taken over from bills as the 'swing' element in the OMOs, because of its flexibility and more widespread availability. Chart 14 supports this by showing how the share of gilt repo varies with changes in the stock of money-market refinancing.

Gilt repo market

The repo market contracted between end February and end May, from £94 billion outstanding to £75 billion, according to the Bank's survey (see Chart 15). The maturity of repo and reverse repo also fell at the 9 day–1 month maturity. Two factors that had boosted the market in February had unwound by the end of May, and account for the fall in outstandings and maturity. First, (seasonally) large shortages in the money market in the early part of the year had required counterparties to 'reverse in' collateral to deal in the Bank's OMOs. Because the Bank's OMOs are at a maturity of two weeks, this may have also boosted the share of repo activity between nine days and one month. By the end of May, however, the shortages were much smaller and that effect was reversed (see Table G). Second, toward the end of February, there had been a lot of repo activity related to 9% Treasury 2008 stock and its delivery into the long gilt futures contract expiring in March.(1) Participants reversing in stock at the end of February would have wanted to span the delivery period for the futures basket, which ran until 9 March. This activity had ceased by the end of May.

Other factors may have played a part in the fall in repo outstandings and the shortening of trades. Money-market rates were tight at the end of May, deterring participants in the market from holding assets that they might normally have funded in the repo or unsecured markets. In addition, the yield curve was flat, reflecting expectations that interest rates would be unchanged for much of the rest of the year. So less use was perhaps made of repo to take interest rate views. The box on page 203 looks at some of the longer-term trends that the gilt repo survey reveals.

A new version of the Gilt Repo Code of Best Practice was issued at beginning of August, and copies are available from the Bank.(2) In

(1) See the May 1998 *Quarterly Bulletin*, pages 111–12.
(2) From the Secretariat at the Bank's Gilt-Edged and Money Markets Division, telephone: (00 44/0) 171 601–3604.

Table G
Maturity breakdown of outstanding repo and reverse repo over time(a)

		Total (per cent)						Total
		On call and next day	2–8 days	9 days to 1 month	1–3 months	3–6 months	Over 6 months	£ billions
Repos								
1996	Feb.	41	24	16	14	3	0	37
	May	20	34	23	15	7	1	35
	Aug.	19	33	33	11	4	1	56
	Nov.	19	36	22	19	2	2	68
1997	Feb.	20	29	33	15	3	0	71
	May	27	23	27	18	4	1	79
	Aug.	25	21	24	24	4	1	67
	Nov.	22	22	19	22	11	4	72
1998	Feb.	16	21	29	18	10	5	94
	May	20	24	19	19	12	8	75
Reverse repos								
1996	Feb.	41	21	13	21	4	0	34
	May	20	30	20	23	6	2	34
	Aug.	22	29	29	14	5	1	54
	Nov.	21	34	21	20	3	2	60
1997	Feb.	18	32	26	21	3	0	67
	May	23	21	30	20	6	1	71
	Aug.	17	20	26	26	6	1	63
	Nov.	17	25	17	25	11	5	71
1998	Feb.	14	30	24	17	10	5	94
	May	22	28	17	13	12	10	69

(a) From the data reported under the voluntary quarterly arrangements.

the preparation of the new version, two of the main areas of debate were partial deliveries and substitutions. On partial deliveries, the emphasis is now to encourage counterparties to agree bilaterally whether or not partialling is acceptable. The new Code also acknowledges more widespread existence of rights of substitution.

Technical developments

Gilt strips(1)

Activity in the strips market has remained low. The total nominal outstanding of strippable stock increased to £89 billion, with the auction of £3 billion of 6% 2028 gilts on 20 May. That means that strippable stocks constituted about one third of the total nominal of gilts outstanding at the end of June. But very little of this stock has so far been stripped—about 2½% by the end of June. As the total nominal outstanding of the 6% 2028 stock has now reached the previously-announced threshold of £5 billion, the new 30-year benchmark is now strippable, and about 3% is held in stripped form. This long-dated stock was not made strippable when first issued, so as to avoid creating small and illiquid long coupon strips.

Turnover in strips has also been low: in the first seven months of this year, weekly strips turnover averaged £190 million, about ½% of turnover in the coupon gilts market.(2)

From 27 April this year, gilt strips have been eligible in deliveries-by-value (DBV) used as collateral in the Bank's daily money-market operations. Before accepting strips in DBVs, the Bank looked at the fluctuation in strips prices once trading began in December 1997. The Bank concluded that, as DBVs are assembled daily for overnight collateral, the 2.5% margin applied to DBVs is adequate to provide for daily price fluctuations.

The Bank now also accepts strips as eligible securities in intra-day repos for liquidity in the real-time gross settlement (RTGS) system. The authorities plan to review experience with strips trading during 1998, and, in the light of the volatility and liquidity of the strips market, may broaden the uses of strips to include them in member-to-member transactions in its money-market operations.

Other issues

HM Government Euro/Ecu issues

On 21 April, the Bank reopened the UK Government Euro Treasury note maturing on 29 January 2001 with a further tender for €500 million, raising the amount of this note outstanding with the public to €1.0 billion. There was strong cover at the auction, of 3.5 times the amount on offer, and accepted bids were in a range of 4.24%–4.29%. The total of notes outstanding with the public under the UK note programme thus rose from €4.5 billion in the first quarter to €5.0 billion in the second quarter of 1998. Further reopenings are contemplated for July and October 1998.

The United Kingdom continued to hold regular monthly tenders of ECU 1 billion of Ecu Treasury bills during the second quarter, comprising ECU 200 million of one-month, ECU 500 million of

(1) For further background on gilt strips, see pages 15–18, 58–59, and 66–67 of the February 1998 *Quarterly Bulletin*, and pages 119–120 of the May 1998 *Quarterly Bulletin*.
(2) For an analysis of factors contributing to low levels of activity in the strips market, see page 120 of the May 1998 *Quarterly Bulletin*.

The Bank of England's operations in the sterling money market

The Bank made minor, and mainly technical, amendments to its operations in the sterling money markets from 1 June. The latest changes built on the reforms that took place in March 1997, which included the use of gilt repo in the Bank's daily money-market operations and the creation of a wider range of counterparties.(1) Those reforms also included the provision of a late repo facility for settlement banks, and the end of the requirement that the discount houses and gilt-edged market makers be separately capitalised specialist intermediaries. The recent adjustments take account of longer trading hours in the money market now that APACS—the umbrella body for the UK payments industry—has extended the period of the day during which members can make use of the facilities of CHAPS, the clearing company responsible for operating a 'same-day' electronic funds transfer system for its members. The recent changes were also intended to further improve sterling market participants' ability to manage their day-to-day liquidity effectively; this should promote efficient and competitive sterling money markets.

Changes to daily open market operations

The Bank has reduced the number of open market operations (OMO) rounds from three to two, by no longer operating at noon. The 9.45 am and 2.30 pm rounds are retained: they are viewed by the sterling market as the times most appropriate for the Bank to operate to meet the market's needs efficiently. The Bank invites its counterparties to bid for funds by repo of gilts, Treasury bills, eligible local authority and bank bills, marketable HM Government foreign currency debt, and/or outright sale of bills. In addition, the Bank extended its operations earlier in the year to include gilt strips in DBVs, following the successful upgrade of the Central Gilts Office and Registrar's systems. The maturity of the Bank's operations in repo remains around two weeks, although minor variations from day to day may occur to help smooth the future pattern of daily shortages/surpluses; the Bank is prepared to purchase outright eligible bills with a residual maturity up to the longest-dated repo invited.

Monetary Policy Committee announcements

The Bank has adjusted its timetable on the days when there is a Monetary Policy Committee announcement on interest rates; there is a round at 12.15 pm instead of 9.45 am, following the MPC announcement at noon.

End-of-day arrangements

The extended trading hours may require the Bank to adjust for any late imbalances in the market, to reduce the need for access to late financing. At 3.30 pm, an overnight repo operation may be conducted if the market still needs liquidity from the Bank; all counterparties will be invited to bid for funds at a rate above the Bank's repo rate, by way of repo of gilts, eligible bills and HM Government foreign currency debt. A form of late overnight repo will be available at 4.20 pm for settlement banks, which provide wholesale payment services to the rest of the market and need to balance their accounts at the Bank at the end of the day. A similar facility, previously available to discount houses in transition, has ceased.

Bank timetable for OMO day

9.45 am	Publish forecast shortage and invite bids.
2.30 pm	Publish revised forecast shortage and invite bids.
3.30 pm	Publish any residual shortage and, if necessary, invite bids.
4.20 pm	Publish final forecast shortage and open settlement bank facility if necessary.

Counterparties

The Bank's range of counterparties was broadened in March 1997, enabling banks, building societies and securities firms that wished to participate in the Bank's daily operations to do so, providing that they met certain functional requirements. These criteria remain unchanged.

Next steps

The Bank continues to be prepared to take on new counterparties that fulfil the criteria at any time. Institutions interested in becoming counterparties should contact the Head of Gilt-Edged & Money Markets Division at the Bank.

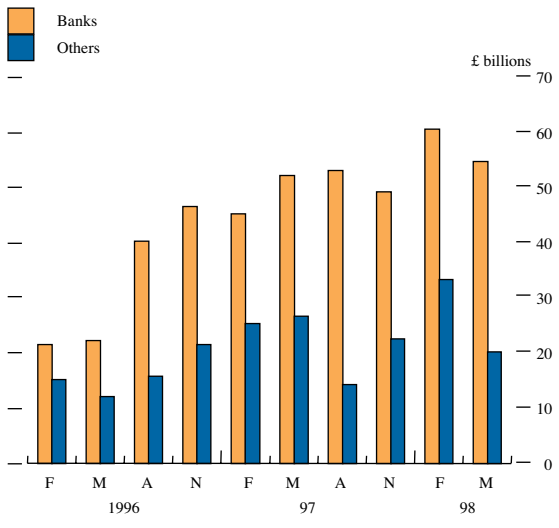
(1) See page 204 of the May 1997 *Quarterly Bulletin*.

The gilt repo market

The Bank started to undertake a quarterly survey of the gilt repo market soon after the market opened in January 1996. More than 80 companies active in the market send data to the Bank, in February, May, August and November. These respondents are banks, securities houses, building societies, GEMMs, fund managers and insurance companies. Chart 15 shows the growth in the various markets since the start of 1996. It shows that repo (and reverse repo) had grown to around £75 billion in May 1998. The minimum size quoted on brokers' screens of a general collateral deal is about £25 million, and the average size of trades is estimated to be around £50 million.

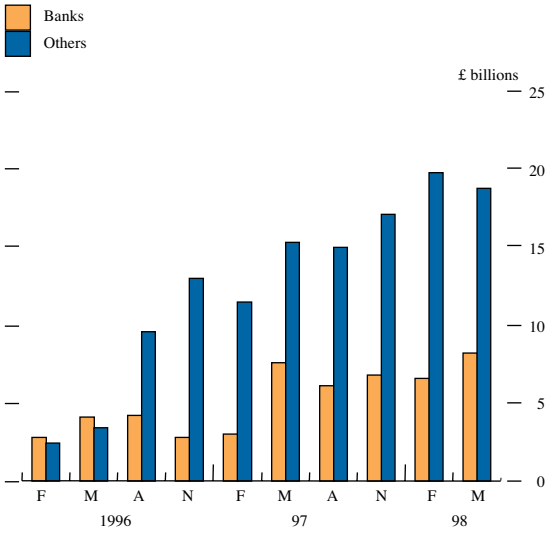
Charts A and B show that banks are still the major players in repo, while the other institutions dominate the stock loan market. This confirms anecdotal evidence that while repo is used to a large extent by banks and securities houses, many end-investors still prefer to use stock lending, which involves a flat fee rather than interest, and therefore requires no continuous market monitoring. One question is whether, and how, holders of stock, such as institutional investors, can become more involved in the market.

Chart A
Repos outstandings at banks and other institutions



The repo market is concentrated among the biggest players: in May, the top ten reporters accounted for 60% of total repo outstanding. Although the maturity of the market has increased since it began

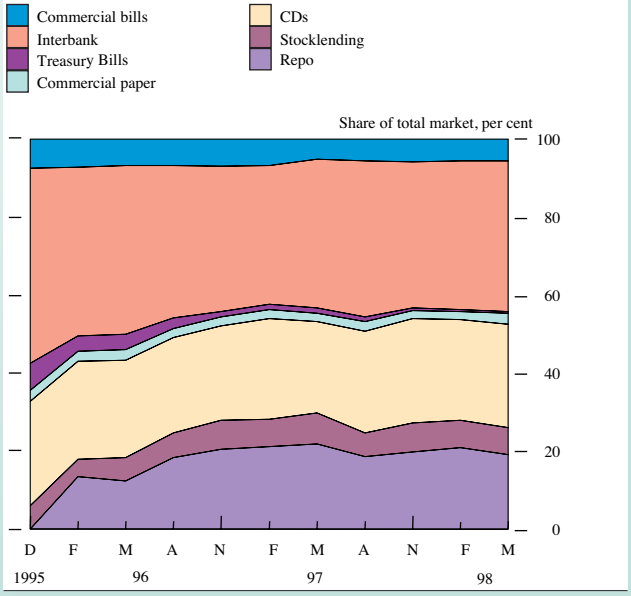
Chart B
Stock lending outstandings at banks and other institutions



in 1996, there is still little liquidity beyond three months.

Repo activity has not replaced borrowing through other money-market instruments such as CDs and interbank lending: both have continued to grow since the start of 1996. But as Chart C shows, the repo market now accounts for about one fifth of total money-market outstandings.

Chart C
Components of the sterling money market



three-month and ECU 300 million of six-month bills each month. The tenders continued to be oversubscribed, with issues being covered an average of 4.8 times the amount on offer in the second quarter of 1998, compared with average cover of 4.3 times during the first quarter of 1998 and 2.9 times in the second quarter of 1997. During the second quarter, bids were accepted at average yields of 11–24 basis points below the Ecu Libid rate of the appropriate maturity. There are currently ECU 3.5 billion of UK Government Treasury bills outstanding. Secondary market turnover averaged just under ECU 0.9 billion a month in Q2, compared with ECU 1.1 billion in Q1.

Following the Bank's consultation with market makers in both the Ecu Treasury bill and Euro Treasury note programmes, the Bank introduced a facility in April 1998 for both bill and note tenders allowing market makers to bid by telephone; the tenders continue also to be open to market makers and non market makers through the hand delivery of application forms. The introduction of telephone bidding has enabled the delay between the close of bidding and the announcement of results to be cut from 1½ hours in both cases, to 1 hour for bills and 45 minutes for notes.

Sterling bond issues

Sterling bond issues fell during the second quarter, after heavy borrowing in Q1. Total fixed-rate issuance in the quarter was £6.2 billion, slightly below that in 1997 Q2 and well below the previous quarter. Short-dated issues amounted to £3.0 billion, while issuance of mediums and longs totalled £1.2 billion and £2.0 billion respectively.

Although sterling fell from its peak of DM 3.11 at the end of March, investor demand for short-maturity fixed-rate bonds remained strong for much of the period, amid expectations that UK interest rates were close to their peak. A number of issuers, notably supranationals, tapped into this demand with short and ultra-short issues. However, the UK rate rise, and subsequent sterling strength, generated further demand for shorter-dated bonds, including a £500 million 14-month bond issued by the US agency FNMA.

Sterling bonds continued to benefit from switching out of prospective euro bonds, as investors sought to diversify their portfolios by buying bonds from currencies that were not in EMU. Ten-year spreads over gilts narrowed before, and just after, the weekend finalising initial EMU membership in early May.

Limited gilt supply provided continued support for longer-dated bonds early in the period. For example, with spreads over gilts remaining tight, KFW and Scottish Power brought large 30 and 25-year deals, which sold well. However, the further inversion of the yield curve following the June rate rise increased uncertainty and widened swap spreads. Although Midland Bank successfully launched a £200 million 25-year bond in June, the renewed strength of sterling and longer-dated gilts triggered profit-taking, notably in supranational issues, further widening spreads. Concerns about Asia also weighed on credit spreads, with Japanese names the worst affected (see earlier section).

Further high-yield bond issues were brought in the quarter by

William Hill, HMV and Middleweb. Although they were launched successfully, these issues resulted in some spread widening in secondary trading of other recently-issued high-yield bonds.

In addition, two convertibles, raising £110 million, and £3.1 billion of floating-rate notes (FRNs), were issued in the quarter. Most of the FRNs issued in the quarter were asset-backed, but straight five-year issues for RBC and Westpac benefited from rarity value.

The international environment

This article discusses developments in the international environment since the May 1998 Quarterly Bulletin. *The main news*[1] *is:*

- *The slowdown in Asia has spread to more countries.*[2] *Japanese output fell for the second successive quarter in 1998 Q1. The Japanese authorities have announced further plans to tackle financial instability.*
- *Growth in the United States rose strongly in the first quarter of 1998.*
- *Recovery in the prospective euro area*[3] *continued.*
- *Inflation remained low throughout the United States, the prospective euro area and Japan.*
- *Equity prices remained buoyant in most major markets, with the exception of Japan.*
- *Official interest rates were unchanged in the major industrial economies. Bond yields have fallen in the major markets, though are little changed in Japan, where yields remain low.*

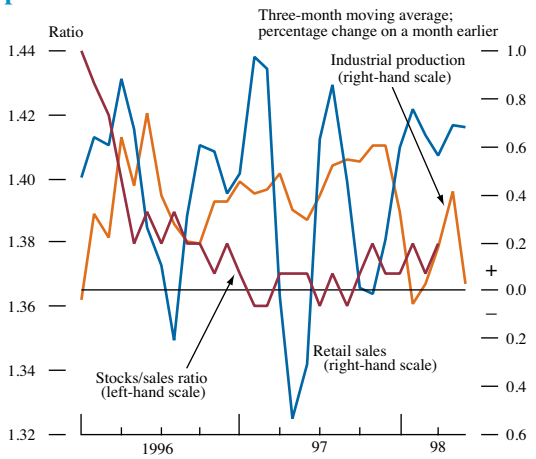
Table A
Quarterly contributions to US GDP growth[(a)]

Percentage points

	1997			1998
	Q2	Q3	Q4	Q1
Private consumption	0.3	1.0	0.5	1.0
Government consumption	0.1	0.1	0.0	-0.1
Investment	0.4	0.4	0.1	0.7
Stocks	0.3	-0.4	0.2	0.3
Domestic demand	**1.1**	**1.2**	**0.8**	**2.0**
Net trade	**-0.1**	**-0.1**	**-0.1**	**-0.7**
GDP	**1.0**	**1.0**	**0.7**	**1.4**

(a) Contributions may not sum because of rounding.

Chart 1
US retail sales, stocks and industrial production



GDP growth in both the United States and the prospective euro area rose in Q1, but Japanese GDP fell for the second consecutive quarter.

The US economy remained strong in the first quarter of 1998. GDP rose by 1.4% (see Table A), on the back of increased domestic demand growth, and was 4.2% higher than a year earlier. This followed growth of 1% and 0.7% in the third and fourth quarters of 1997.

US consumption grew by 1.5% in Q1. This largely reflected strong rises in durables consumption, perhaps boosted by the discounting of motor vehicle prices following the dollar appreciation against Asian currencies. Consumption is also likely to have been strong in Q2: retail sales rose by 1.9% in Q2, to a level 6.3% higher than a year ago (see Chart 1); household income and employment growth were strong in Q2; and consumer confidence reached its highest level since 1969, though it fell subsequently in July.

Stockbuilding made a positive contribution to US growth, as in 1997 Q4. Despite rising stock levels, the stocks/sales ratio was little changed in the first quarter, as Chart 1 shows.

Net exports fell in 1998 Q1, as in 1997 as a whole. The widening trade deficit reflects continued dollar appreciation and the strength of domestic demand in the United States, relative to that of its trading partners. The monthly trade deficit rose to a record $15.8 billion in May.

(1) Based on data up to 30 July 1998.
(2) Developments in East Asia are discussed separately in the note on pages 216–19.
(3) The eleven countries that will enter into EMU on 1 January 1999, ie Germany, France, Italy, Austria, Belgium, Luxembourg, Finland, Ireland, the Netherlands, Portugal and Spain.

Chart 2
US non-farm payrolls and hourly earnings

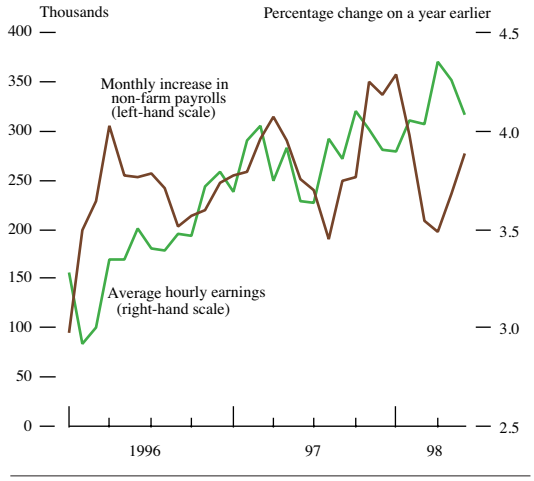


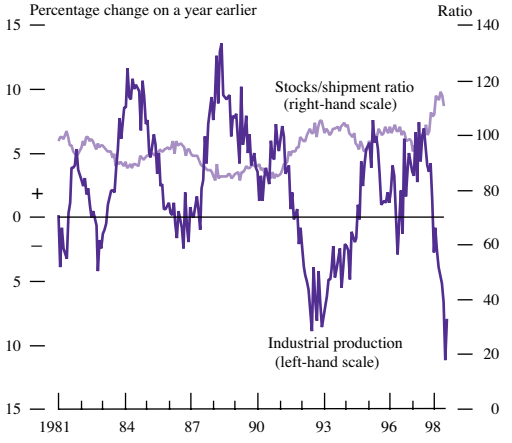
Table B
Quarterly contributions to Japanese GDP growth(a)

Percentage points

	1997			1998
	Q2	Q3	Q4	Q1
Private consumption	-3.2	0.9	-0.6	0.1
Government consumption	-0.1	0.1	0.1	-0.1
Investment	-0.8	-0.1	-0.3	-1.0
Stocks	0.3	0.0	-0.1	0.0
Domestic demand	**-3.8**	**0.9**	**-0.9**	**-1.0**
Net trade	**1.0**	**-0.1**	**0.6**	**-0.4**
GDP	**-2.8**	**0.8**	**-0.4**	**-1.3**

(a) Contributions may not sum because of rounding.

Chart 3
Japanese stocks/shipment ratio and industrial production



Industrial production growth in Q2 was stronger than in Q1 (see Chart 1), when it had been weak because warm weather had reduced utilities output. But annual production growth continued to slow, in line with the National Association of Purchasing Managers' index, which fell during Q2. The twelve-month growth rate of industrial output was 4.2% in Q2, down from 4.7% in Q1 and 5.8% in 1997 Q4.

The US labour market continued to tighten: non-farm payrolls rose by a monthly average of 278,000 in Q2, compared with 208,000 in 1998 Q1 and 282,000 in 1997 (see Chart 2). Increases in employment have been concentrated in the service sector: on average, service sector employment grew by 0.7% in Q2, whereas manufacturing employment fell by 0.1%. The US unemployment rate fell to 4.3% in April and May, its lowest level since February 1970. Although unemployment then rose to 4.5% in June, this seems to reflect recent strikes in the US vehicle manufacturing industry, rather than weakening demand.

The advance estimate of US GDP in the second quarter, which is subject to revision, suggests that US growth slowed to 0.4% in 1998 Q2, largely because of a negative contribution from stockbuilding and a further fall in net exports. Consumption and investment growth remained strong.

In contrast with the United States, the Japanese economy continued to weaken in the first quarter of 1998. GDP fell by 1.3%, after a fall of 0.4% in 1997 Q4, as domestic demand and net exports both fell (see Table B).

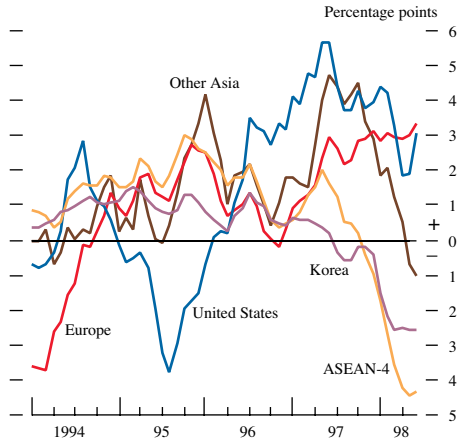
Non-residential investment fell by 5.1% in Q1: rising stock levels have reduced the incentive to invest, and survey evidence suggests that many firms face difficulties in obtaining bank finance. Weakening demand, following the tax rise in April 1997, falling government spending in the 1997 fiscal year and the slowdown in other Asian countries, has prevented firms from reducing stocks, which have risen to near-record levels, despite cuts in production. Industrial production in Q2 was 8.6% lower than a year earlier (see Chart 3). The June Tankan Survey suggests that firms will continue to cut production to reduce unwanted stocks.

Private consumption rose by 0.1% during the first quarter, following its 1% fall in 1997 Q4. The rise in consumption was smaller than the 0.7% increase in workers' incomes in Q1. Consumption seems likely to have remained weak in Q2: retail sales fell by 4.8% in the year to June. Consumer confidence remains low, and surveyed household incomes have fallen in Q2 so far, as production cuts have led to lower overtime payments and higher unemployment; unemployment rose to 4.1% in May, its highest rate on record.

Net exports fell in Q1, after a strong rise in 1997 Q4. Imports fell by 1.4%, because of weak domestic demand. But exports fell by 3.8%, as increased exports to the European Union and United States were more than counterbalanced by falls in exports to other countries in Asia (see Chart 4). According to customs-cleared trade data, the trade surplus has widened since Q1, with imports continuing to fall.

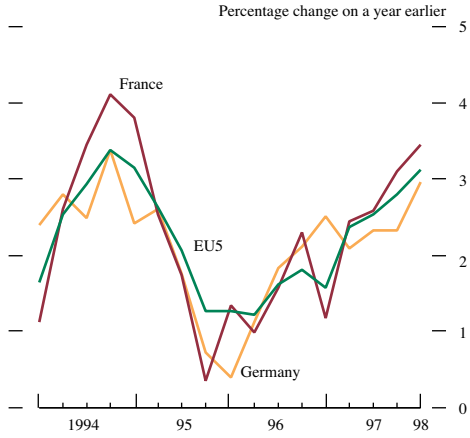
The outlook for Japan has worsened, as reflected by successive downward revisions to Consensus forecasts of 1998 GDP growth.

Chart 4
Japan: contributions to annual export growth(a)



(a) Current yen (not seasonally adjusted) three-month moving average.

Chart 5
GDP growth



Note: EU5 consists of Germany, France, Italy, Spain and the Netherlands.

Table C
Quarterly contributions to German GDP growth(a)

Percentage points

	1997			1998
	Q2	Q3	Q4	Q1
Private consumption	0.5	-0.4	0.3	0.6
Government consumption	0.2	-0.3	-0.3	0.3
Investment	0.1	0.1	0.0	0.6
Stocks	-0.5	0.4	0.7	0.0
Domestic demand	**0.3**	**-0.2**	**0.7**	**1.5**
Net trade	**0.6**	**0.9**	**-0.4**	**-0.6**
GDP	**1.0**	**0.7**	**0.3**	**1.0**

(a) Contributions may not sum because of rounding.

In response, the government announced a fiscal package in April, which has passed through parliament, and has since made further proposals to restore financial stability. But uncertainty remains as to whether these measures will succeed in bringing about self-sustaining recovery in Japan. Policy developments in Japan are discussed in the box on pages 210–11.

Growth in the prospective euro area(1) *increased in the first quarter, as domestic demand growth strengthened. GDP grew by 0.6%, and was 3.1% higher than a year earlier (see Chart 5). This followed growth of 0.5% in 1997 Q4.*

German GDP rose by 1% in the first quarter of 1998, following growth of 0.7% and 0.3% in the third and fourth quarters of 1997 respectively (see Table C). As in 1997 Q4, growth in Q1 was more than accounted for by domestic demand, offset by a fall in net exports. But in contrast with 1997, when stockbuilding made the largest contribution to domestic demand growth, all components of domestic demand except stockbuilding grew strongly in 1998 Q1.

Consumption growth increased, but the Q1 figure may overstate the underlying strength of German consumption. The rise was partly because of growth in real incomes, following the reduction of the solidarity tax, and lower-than-expected inflation. In addition, April's VAT rise led consumers to bring forward purchases of durables—especially cars—into the first quarter. So consumption growth is likely to be weaker in Q2. Average retail sales (including motor vehicles) in April and May were 3.5% lower than in Q1 (see Chart 6). And consumer sentiment in Germany weakened during Q2, despite a 0.8 percentage point fall in unemployment since its peak of 11.8% in 1997 Q4. This may be because falls in unemployment have come partly from government job creation schemes, and have not yet been reflected in significant increases in private-sector employment (see Chart 7).

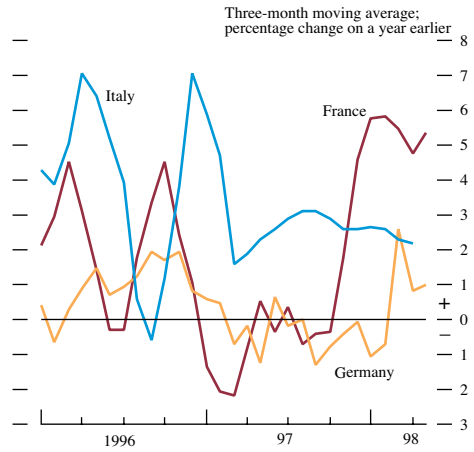
Investment also grew strongly in Q1, boosted, like consumption, by VAT-related effects. And the most recent investment survey (spring 1998) suggests that continued growth is likely in coming quarters: interest rates are low, and capacity utilisation remains close to its highest rates since 1990. But industrial production has fallen slightly since Q1, perhaps reflecting weaker demand (see Chart 8). West German business sentiment has moderated in 1998, though it remains quite strong by historical standards.

Net exports fell in Q1: exports rose by 1.2%, but imports rose by 3.2% (again, boosted by VAT-related purchases). Customs-cleared trade data suggest that the German trade surplus has increased since Q1. However, falling import prices mean that Q2 figures are likely to overstate any rise in net exports in real terms.

GDP in France rose by 0.6% in Q1 to a level 3.4% higher than a year previously, following 0.9% and 0.8% growth in the third and fourth quarters of 1997 respectively (see Table D). Growth slowed because of a fall in net exports in the first quarter, and unusually mild weather reduced energy output. During 1997, the contribution of domestic demand to growth increased, and in 1998 Q1, consumption, investment and stocks all made positive contributions to growth.

(1) As approximated by GDP-weighted growth figures for Germany, France, Italy, Spain and the Netherlands, which account for 88% of prospective euro area GDP.

Chart 6
Retail sales in Germany, France and Italy



Note: Retail sales include motor vehicles except for Italy.

Chart 7
Employment growth in Germany and France

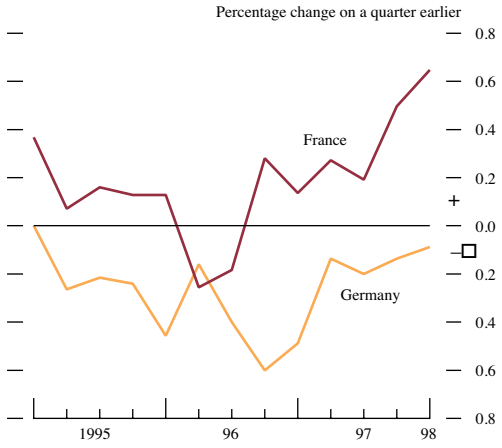


Table D
Quarterly contributions to French GDP growth[a]

Percentage points

	1997			1998
	Q2	Q3	Q4	Q1
Private consumption	0.2	0.7	0.6	0.4
Government consumption	0.0	0.0	0.0	0.0
Investment	0.3	0.1	0.0	0.3
Stocks	0.1	0.0	-0.1	0.5
Domestic demand	**0.6**	**0.9**	**0.4**	**1.4**
Net trade	**0.6**	**0.0**	**0.3**	**-0.8**
GDP	**1.1**	**0.9**	**0.8**	**0.6**

(a) Contributions may not sum because of rounding.

Private consumption growth slowed in 1998 Q1. But this seems to have been largely because unseasonally warm weather led to reduced energy consumption: retail sales grew at the same quarterly rate in 1998 Q1 as in 1997 Q4, and continued to be strong in Q2 (see Chart 6). Employment (see Chart 7) grew by 1.7% in the year to March 1998, resulting in robust growth of incomes and consumer spending. Consumer confidence remains high.

Business investment grew by 2.8% in 1998 Q1, in line with the latest investment survey, which suggested that firms planned marked increases in investment in 1998. The high level of capacity utilisation in manufacturing, and the strength of the equity market and corporate cashflows, suggest that business investment probably remained robust in Q2.

Industrial production growth has slowed in Q2 so far (see Chart 8). Average production in April and May was 1.1% higher than in Q1, when production rose by 1.3% on the previous quarter. But services output is likely to have increased in Q2 because of the World Cup, and business sentiment remains strong.

Net exports fell in Q1, their first quarterly fall since 1996 Q2. The growth of net exports has slowed progressively since the first half of 1997, as the lagged effects of the franc depreciation have worn off, and the Asian slowdown has taken effect.

In Italy, GDP fell by 0.1% in 1998 Q1. This follows quarterly growth rates of 0.5% and 0.2% in Q3 and Q4 respectively, suggesting a slowdown. Recorded growth was slower in Q4 partly because there were fewer working days than in Q3; working-day effects are not adjusted for in the official GDP statistics. Growth also slowed in Q1, even after allowing for the fewer working days than in Q4. Falling net exports largely account for weak Q1 growth, probably reflecting the effects of the Asian slowdown on Italian exports, which fell by 1.6%. Consumption growth was also weak, following the end of the government's car incentive scheme, which had supported consumption in 1997. But Q1 GDP growth understates the underlying strength of the Italian recovery: retail sales and industrial production in Q1 were respectively 2.3% and 3.3% higher than a year earlier.

Growth remained robust in other countries in the prospective euro area. GDP in the Netherlands rose by 1.1% in Q1, to a level 4.1% higher than a year earlier. Spanish GDP grew by 0.9% in 1998 Q1, as in 1997 Q4, and was 3.7% higher than a year earlier.

Consensus forecasts have been revised down for growth outside the United States, Japan and the prospective euro area (see Table E).

The slowdown in East Asia that followed financial market turbulence in the second half of 1997 has intensified, and spread to more countries. This has been reflected in downward revisions to Consensus forecasts for Asia. Developments in East Asia are discussed separately in the note on pages 216–19. Consensus Forecasts have revised down their 1998 growth projections for Eastern Europe. But this is largely accounted for by a lower projection for Russia following interest rate rises: Russian official interest rates rose to 150% in May, but have since fallen to 60%,

Policy developments in Japan

Japanese GDP fell by 1.3% in 1998 Q1. This was its second consecutive quarterly fall, so the economy technically entered recession. Weak demand in Japan, and in Asia as a whole, has resulted in stocks rising to near-record levels. In response, firms have been cutting investment, production and employment. With interest rates already very low, the government has announced another expansionary fiscal package to stimulate demand, and further proposals to address financial fragility.

Fiscal policy

In April, the government announced its largest-ever economic package, which included a fiscal injection of ¥12.3 trillion. Together with the tax cuts in February, this amounts to a total fiscal injection of ¥15.2 trillion (3% of GDP) into the economy in fiscal years 1998 and 1999. April's package (see the table below) comprises tax rebates and public works spending, which the government estimates will add 2–3 percentage points to GDP in fiscal year 1998; the OECD estimates the effect at $^{3}/_{4}$–$1^{1}/_{4}$ percentage points in calendar year 1998.

Japanese fiscal package

¥ trillion

	April package	May Bill
Public works	7.7	4.7
Tax cuts	4.6	2.6
Total	**12.3**	**6.2**
Total as percentage of GDP	**2.4**	**1.2**

Note: Figures are for fiscal year 1998, except for tax cuts in April package, which are for fiscal years 1998 and 1999.

The May 1998 supplementary Budget Bill implements the central government part of the package in fiscal year 1998. It correspondingly specifies smaller amounts than the April package, which includes tax cuts in fiscal year 1999 and local government spending. But the additional public spending from the package may still be smaller than originally specified. The May Bill suggests that much of the spending will come from accelerating existing projects. And of the ¥7.7 trillion originally specified, ¥4.1 trillion involves local government.(1) This part may be difficult to implement, because slower growth has reduced local government revenues.

The fiscal package provides only a temporary stimulus. In the medium term, fiscal consolidation is likely to be necessary: Japan faces an increasing fiscal burden from an ageing population, and the OECD project the gross debt/GDP ratio to rise to 96.5% in 1998. The Fiscal Structure Reform Law of December 1997 provides a timetable for consolidation. General government deficits are to fall to 3% of GDP by 2003 (since extended to 2005) and the gross debt/GDP ratio is to be stabilised. To achieve this, the government has cut planned public spending from fiscal year 1998 onwards. So the April package is needed partly to maintain spending levels.

The OECD takes a broadly positive view of fiscal policy effectiveness in its June *Economic Outlook*, suggesting that in tackling weak Japanese demand, 'monetary policy is likely to be of little assistance, . . . this points to the desirability of fiscal stimulus'.

The likely effect of a fiscal stimulus is, according to economic theory, ambiguous. Output is partly determined in the short run by aggregate demand, so in a recession, a fiscal stimulus would increase total spending and activity. But fiscal loosening might be ineffective for a number of reasons: if households expected higher taxes to follow, they might save any extra income from tax cuts; and if interest rates increase, fiscal expansion might be offset by falling private investment—although this seems unlikely in Japan, as interest rates are so low.

There are additional risks to Japanese fiscal policy effectiveness from weak consumer confidence and concerns about financial stability. These may have impaired the transmission mechanism and further reduced the fiscal multiplier, which already seemed low in earlier fiscal expansions. If Japanese demand is weak because of low consumer confidence, tax rebates (and funds received from higher government spending) may be mainly saved, rather than spent. And concerns about financial stability mean that these funds may be largely deposited outside the Japanese banking system, preventing further expansionary effects that would have come from banks offering these funds as credit to industry.

Monetary policy

In the May *World Economic Outlook* (*WEO*), the IMF advised that Japanese economic stagnation justified the continuation of easy monetary conditions, 'with no increase in official rates in the near future; indeed, the limited scope that remains for decreases in official rates may need to be utilised, together with continued activity to ensure ample liquidity'. Japanese official interest rates have remained at their 'emergency' level of 0.5% since September 1995.

Some have argued that, with aggregate demand below capacity despite short-term nominal interest rates close to zero, Japan appears to be in a liquidity trap. Professor Krugman(2) suggests that 'what is needed is a

(1) ¥3 trillion of local government spending plus ¥1.1 trillion of central government spending on joint central/local government projects.
(2) Paul Krugman is Ford International Professor of Economics at Massachusetts Institute of Technology.

credible commitment to future monetary expansion, so as to generate expectations of inflation'.(3) With inflation expectations sufficiently high, zero nominal rates of interest would mean strongly negative real interest rates, less saving and increased demand.

However, the effect of monetary expansion on inflation (and perhaps inflation expectations) might be limited by financial fragility. This has impaired the ability of banks to provide credit, regardless of interest rate levels. Banks might invest additional funds in less risky assets than business loans. Although broad and narrow money rose by 3.5% and 7.6% respectively in the year to June, bank lending to business actually fell by 2.5% in the year to March. Some slowdown in business loans might have been expected from improvements in banks' credit risk management. But this fall, together with survey evidence, suggests a credit crunch in parts of industry. And low consumer confidence, and the high savings rate (13.6% in 1997), may mean that consumers save, rather than spend, an unusually large proportion of any additional funds.

Financial stability

In the June *Economic Outlook*, the OECD advised that for Japan, 'dealing promptly and comprehensively with the crisis in the banking sector has become an overriding priority': 'Macroeconomic stimulus alone will not suffice to generate a sustained expansion'. Their key policy suggestions are that 'balance sheet problems must be resolved and the banking system must be recapitalised' and that 'the legal, regulatory and supervisory environment in which financial institutions operate will need to be improved'. The Financial Supervision Agency recently reported that loans in need of management or in danger of default total ¥88 trillion; ¥7 trillion of which banks have serious concerns about, or judge to be non-collectable.

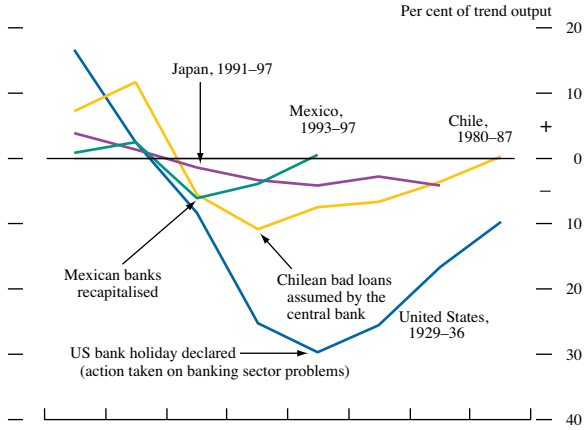
In the May *WEO*, the IMF examined three previous financial crises and their impact on growth (see the chart). In each case, activity recovered only once decisive action was taken to deal with banking sector problems.

The Japanese authorities have made some progress in tackling bad loans problems. They have encouraged banks to recognise the full extent of bad debts, and to write off and provision bad loans using operating profits. In February, the government allocated ¥13 trillion to recapitalise the financial system and allow debts to be written off, but only ¥2 trillion has been used so far.

More recently, the government has proposed additional measures to reform the financial sector, the key features of which are:

- The introduction of a 'bridge bank' mechanism, in which administrators would take over failed banks, ensure that loans to good borrowers are maintained, and either merge the bank with a healthy institution or pass it on to the state for eventual liquidation.
- The establishment of a secondary market for bad loans; the Cooperative Credit Purchasing Company would buy bad loans from banks and recycle them in the market.
- Reform of the property market to allow disposal of collateral for bad loans, and increase land market liquidity.
- The improvement of transparency and disclosure requirements regarding banks' bad loans, based on the Securities and Exchange Commission standard, and the promotion of 'voluntary and aggressive disclosure'.
- The strengthening of bank supervision and prudential standards. The Financial Supervision Agency will conduct an inspection of major banks, in collaboration with the Bank of Japan, to ensure that they are applying risk management effectively.

Paths of output gaps following financial sector shocks



United States	1929	1930	1931	1932	1933	1934	1935	1936
Chile	1980	1981	1982	1983	1984	1984	1986	1987
Japan	1991	1992	1993	1994	1995	1996	1997	
Mexico	1993	1994	1995	1996	1997			

Source: IMF.

These measures, if pursued rigorously, would seem likely to resolve many of the financial sector's problems, especially by removing unhealthy institutions from the banking sector, and eliminating bad loans from the balance sheets of healthy banks.

(3) 'Further notes on Japan's liquidity trap' (July 1998), P Krugman (see his website: http://web.mit.edu/krugman/www/).

Chart 8
Industrial production in Germany, France and Italy

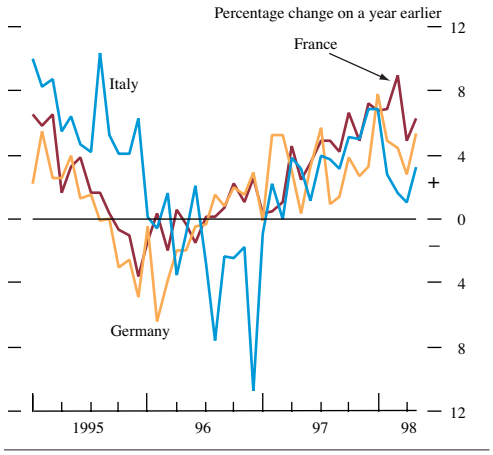


Table E
Consensus forecasts for 1998 GDP growth

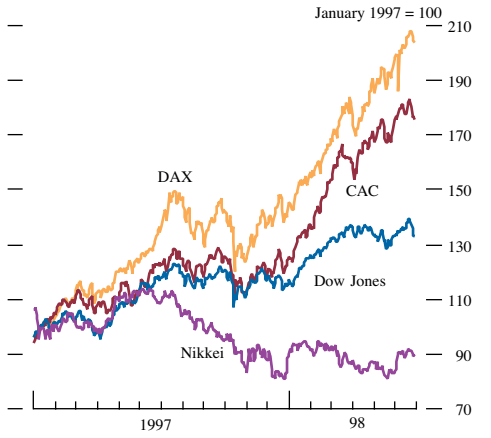
Percentage change on a year earlier

	Jan. 1998	July 1998	Change
North East Asia	5.1	2.7	-2.4
South East Asia	0.5	-7.4	-7.9
Eastern Europe	2.9	1.3	-1.6
Latin America	3.2	3.2	0.0

Note: *Eastern Europe Consensus Forecasts* uses a wider definition of Eastern Europe than that used here.

Source: Consensus Forecasts.

Chart 9
Equity markets(a)



(a) In local currencies.

following financial market turbulence reflecting concern about the fiscal position. Growth projections for some other Eastern European economies have been revised up.

The buoyancy in most major equity markets in 1997 has continued in the first half of 1998. Japanese share prices are little changed, remaining low.

Equity prices in the United States and major continental European markets have risen strongly in 1998 so far (see Chart 9). French and German equity prices have been particularly buoyant, rising by 38% and 37% respectively in the first half of the year, compared with 12% in the United States. European equity markets have been more volatile than in the United States during 1998.

Japanese stock prices were, on average, lower in 1998 Q2 than in 1998 Q1, when they recovered from falls at the end of 1997. The weakness of share prices in Q2 reflected continued uncertainty about prospects for the Japanese and Asian economies. There has been some recovery in stock prices since the co-ordinated central bank intervention to support the yen on 17 June, followed by the announcement of further measures to tackle financial instability. Japanese equity prices are about 7% lower than their average since January 1997.

Equity prices in a number of other countries have been volatile in recent months. In particular, Russian equity prices have fallen by around 50% since the start of May. Stock prices in other Eastern European markets also fell in May but, in contrast with Russia, have since largely recovered. As discussed in the note on pages 216–19, East Asian stock markets have continued to be weak following falls in April and May. Equity prices, and exchange rates, have also fallen sharply recently in Pakistan and South Africa.

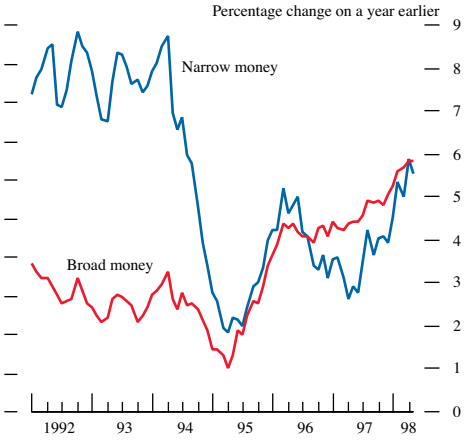
Since the start of the year, the annual growth rates of both broad and narrow money have risen strongly in the major six overseas economies(1) *(see Chart 10).*

In the major six overseas economies, average annual broad money growth rose from 5% in January to 5.6% in May (near peak levels for the 1990s). Real broad money growth rose from an annual rate of 3.2% in January to 4.2% in April. In the absence of velocity shifts, this may lead to a strengthening of nominal demand at some stage in the future.

US M2 growth increased to an annual rate of 7.3% in June, and has been above the upper end of the Federal Reserve's monitoring range (of 1%–5%) throughout 1998 so far. Italian M2 strengthened to an annual growth rate of 10.1% in May, the highest rate among the major six overseas economies. In contrast with narrow money, which has been growing strongly in recent months, Japanese broad money growth remained subdued, at 3.5% in the year to June. Annual broad money growth in Germany remained within the Bundesbank's target range (of 3%–6%); in June, the stock of M3 was an annualised 5.3% higher than its average in the fourth quarter of 1997. French M3 grew at an annual rate of 5.0% in May. Canada remained the only major country where broad money fell; the annual growth rate of M2+ was -1.5% in May.

(1) As measured by the GDP-weighted average of narrow and broad money growth in the major six overseas economies.

Chart 10
Average narrow[a] and broad[b] money growth in the M6 economies



(a) M1.
(b) M4 for the United Kingdom.
M3 for France and Germany.
M2 and CDs for Japan.
M2+ for Canada.
M2 for the United States and Italy.

Chart 11
US inflation

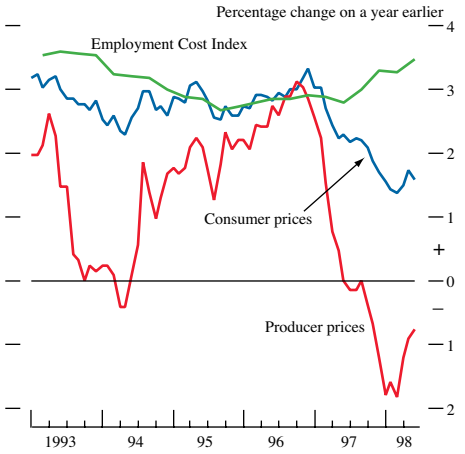
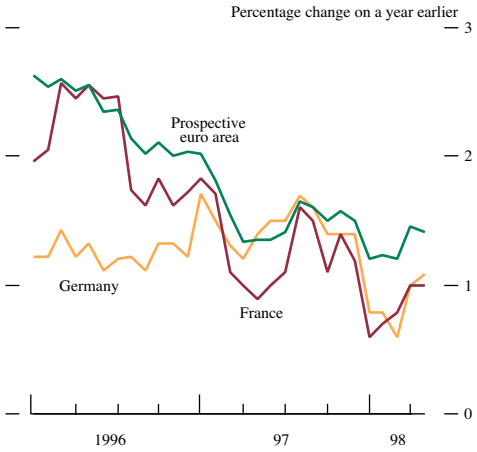


Chart 12
Harmonised CPI inflation



As with broad money, the annual rate of narrow money growth in the major six overseas economies has risen in 1998, from 4.5% in January to 5.6% in May. In real terms, average annual narrow money growth increased even more, from 2.8% in January to 4.5% in April.

Japanese narrow money growth moderated from an annual rate of 10.2% in February to 7.6% in May. Reserve money has been growing at an annual rate of around 10% since January 1998, largely as a result of the Bank of Japan's open market operations to provide the banking system with short-term liquidity. M1 growth in the United States has been rising since 1997 Q3, and has returned to positive annual growth rates since March this year. In May, the annual growth rate of M1 fell in France to 10%, but remained above 12% in Italy and Canada.

Consumer price inflation fell across the United States, the prospective euro area and Japan in the first quarter, largely because of falls in energy and commodity prices. Inflation has continued to be subdued in Q2.

Despite low unemployment and strong output growth, US consumer price inflation remains muted, but has risen slightly to an annual rate of 1.6% in June, having fallen since late 1996 (see Chart 11). The earlier decline reflected falls in commodity and energy prices, and inflation continues to be restrained by low energy prices; core consumer price inflation (excluding energy and food) is correspondingly higher than headline consumer price inflation, at 2.2% in June. Inflation is concentrated in the service sector, as goods prices have been stable: service prices rose by 2.7% in the year to June. The rate of producer price deflation has slowed as falls in commodity and oil prices have moderated: producer prices fell by 0.8% in the year to June, compared with a 1.8% fall on a year earlier in Q1.

Strong employment growth appears to be reflected in rising labour costs. Annual hourly earnings growth increased to 4.2% in 1998 Q2, compared with 4% in Q1 and 3.9% in 1997. And the annual rate of growth of the overall Employment Cost Index rose to 3.5% in Q2, up from 3.3% in both 1997 Q4 and 1998 Q1. But the inflationary impact of this has been mitigated by strong productivity growth, which is examined in the box on page 214.

In Japan, annual consumer price inflation fell sharply as the effects of the 2 percentage point consumption tax increase in 1997 dropped out of annual figures. In May, consumer prices were 0.5% above those of a year ago, reflecting the weakness of consumer demand and the significant spare capacity in the Japanese economy. Wholesale prices in May were 1.7% lower than a year earlier.

Consumer price inflation in the prospective euro area remained subdued (see Chart 12). In Germany, there seems to have been strong resistance to price rises following April's 1 percentage point increase in the rate of VAT. If fully passed on, this would have added 0.7 percentage points to annual inflation for a year. However, inflation in June, at 1.2%, was only 0.1 percentage points higher than in March. Inflation in France remains low, but has picked up a little since the start of the year: consumer prices in June were 1% above those of a year ago. The rate of Italian consumer price inflation remained stable.

US productivity growth

The US economy is generally viewed as being in an upturn that began in 1991. Productivity (as measured by output per person-hour) grew strongly at the start of the upswing, before slowing during 1993–95. But since 1996 it has picked up again, with annual non-farm business sector productivity growth averaging 1.8%, compared with its average of 1.4% since 1971. This is unusual: sustained increases in productivity growth usually occur earlier in a recovery. This box looks at possible explanations for the recent increase.

Average US labour productivity growth

Percentage per year

	Whole economy	Manufacturing
Since 1971	1.4	3.0
Since 1990	1.1	3.3
1997	1.7	4.5

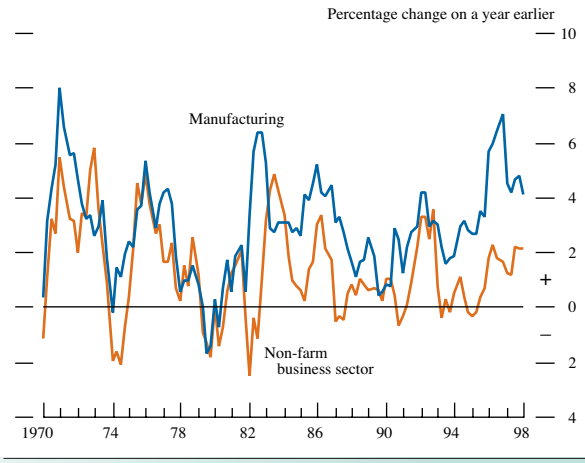
One possible explanation is the corporate restructuring that took place in the late 1980s and early 1990s, which may still be feeding through to productivity growth. But this seems a more plausible explanation for the upturn in US productivity growth in the early 1990s than the more recent rise.

A second, more likely, explanation is the unusually high rates of investment since 1996. In this period, quarterly investment growth averaged 3.1%, compared with an average of 1.2% since 1971. And this has been concentrated in advanced technology goods, which anecdotal evidence suggests have generated efficiency gains in firms' production processes.

There is a third explanation, related to the US economic cycle. As in other countries, productivity growth is strongly cyclical. It typically rises in the early years of a cycle, as producers expand output using existing capacity to meet growth in demand. On conventional measures, the United States is in the eighth year of an upswing. The Federal Reserve's tightening of monetary policy in 1994/95 resulted in a temporary slowdown in GDP growth, rather than a recession followed by a new upturn. But in the past three years, the US economy has in many ways behaved as if in the early phases of a boom, rather than in the later phases of an established recovery.

The behaviour of several cyclical variables suggests that the United States can be viewed as being in its second upturn of the 1990s. Since 1995, US real GDP growth has risen, especially in industries such as consumer durables and housing, where increases in growth are often seen in the early stages of an upturn. There has been a rapid rebuilding of US stock positions during the past three years, particularly in manufacturing. After falling following the rise in interest rates, capacity utilisation rates rose from early 1996 until early 1998. Correspondingly, as the chart shows, US labour productivity growth picked up in 1992, slowed, and then rose again in 1996.

US productivity growth



It seems likely that the explanation for the recent increase in US productivity growth is a combination of cyclical factors and technological investment. Some commentators have suggested that recent faster productivity growth marks a rise in trend productivity growth. But official data provide little evidence to support this: although the current rate of productivity growth is above its long-run average, it is slower than during previous peaks, including that reached in 1992, of 3.2% on the previous year. Indeed, productivity growth may now be slowing: productivity growth fell in Q1. And in Q2, annual industrial production growth has slowed, despite continued strong rises in employment; growth in new orders of capital goods has also fallen.

Table F
Harmonised index of consumer prices

Percentage changes on a year earlier

	1998	
	February	May
Austria	1.0	1.0
Belgium	0.8	1.3
Denmark	1.7	1.4
France	0.7	1.0
Finland	1.7	1.6
Germany	0.8	1.1
Greece	4.1	5.0
Ireland	1.1	2.4
Italy	2.1	2.0
Luxembourg	1.1	1.3
Netherlands	2.1	2.1
Portugal	1.3	2.2
Spain	1.7	2.0
Sweden	2.0	1.6
United Kingdom	1.5	2.0

As Table F shows, there is some divergence in inflation within the prospective euro area. Annual consumer price inflation in a number of the faster-growing countries, such as the Netherlands, Ireland, Portugal and Spain, is at or above 2%. For some of these countries, the convergence of short-term interest rates ahead of the introduction of the single currency may increase inflationary pressures, other things being equal.

Official interest rates have remained unchanged in the major six overseas economies since the publication of the May Quarterly Bulletin. *Bond yields have fallen in the major markets, but Japanese yields have changed little. Several smaller European countries have changed their interest rates.*

Official interest rates were unchanged in the major six overseas economies. Bond yields have fallen, though Japanese yields have changed little.

Official rates in both Spain and Portugal were cut in May, by 25 basis points and 20 basis points respectively, reflecting the continued convergence of their short-term rates with those of France and Germany.

Official rates in Sweden, who will not be participating in the first wave of EMU, have also been cut. In June, the Riksbank reduced its repo rates by 25 basis points, following falls in inflation. By contrast, Denmark raised its official rates in May: an initial rise of 50 basis points was followed by a cut of 25 basis points; and Norway raised rates by 125 basis points, following a 25 basis point rise earlier in 1998.

Developments in East Asia

The May 1998 *Quarterly Bulletin* discussed developments in East Asia up to mid April 1998.(1) This note outlines developments since then in the region.(2)

Financial markets and activity in the countries initially affected by financial market difficulties during 1997—the ASEAN-4(3) and Korea—have been weak. Growth elsewhere in the region has also slowed. Consensus forecasts of growth in Hong Kong SAR and China fell, after lower-than-expected GDP growth in 1998 Q1. Growth in Singapore and Chinese Taipei, which has been relatively unaffected to date, is also expected to slow. The recovery in financial markets in some Asian countries in 1998 Q1 reversed during Q2. This reflected political turmoil in Indonesia, as well as market concerns that China might devalue the renminbi.

An important factor behind this slowdown has probably been the economic and financial weakness in Japan. Japanese domestic demand and imports have fallen, and Japanese banks, previously important financiers to the Asian region, have retrenched. Weak Japanese demand means that Asian firms are likely to seek growth in exports to outside the region. So the deepening slowdown in East Asia is likely to result in increasing current account imbalances elsewhere.

ASEAN-4 and Korea

Financial markets generally weakened in the second quarter, after some recovery in 1998 Q1.

Equity prices in the ASEAN-4 and Korea fell in the second quarter, reaching new record lows (see Table 1). The Thai and Korean stock markets fell by about 46% and 38% respectively in 1998 Q2.

Table 1
Currency and stock market movements in Asia

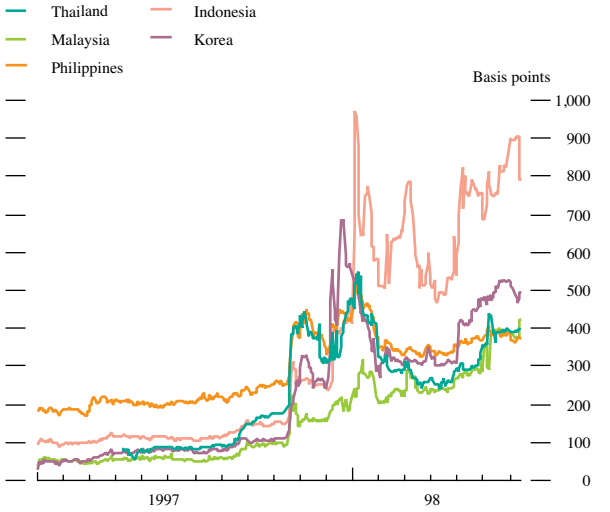
	Percentage change between start July 1997 and end March 1998		Percentage change between end March 1998 and end June 1998	
	Equity market (a)	Exchange rate (b)	Equity market (a)	Exchange rate (b)
Japan	-18.1	-13.6	-4.2	-4.1
China	-10.0	0.1	6.8	0.0
Hong Kong SAR	-23.7	0.0	-26.2	0.0
Singapore	-15.1	-11.4	-27.2	-4.8
Chinese Taipei	0.7	-15.2	-17.0	-4.5
Indonesia	-26.0	-71.6	-20.4	-42.8
Korea	-36.5	-35.8	-38.1	0.8
Malaysia	-33.3	-30.5	-36.7	-12.0
Philippines	-20.5	-30.4	-21.4	-9.7
Thailand	-12.9	-37.0	-46.4	-8.1

Source: Bloomberg.

(a) Major indices expressed in local currencies: Nikkei 225; Hang Seng; Korean composite; Straits Times Industrial; Taiwan Stock Exchange; Thai Set; Malaysian Kuala Lumpur composite; Philippines composite; Jakarta composite.
(b) Nominal rate against US dollar.

Bond spreads over US Treasuries widened in 1998 Q2 (see Chart A). Spreads are still below the peaks reached during 1997 Q3, except for Malaysia, where concerns about economic policy reversals led spreads over US Treasuries to widen to new heights in June.

Chart A
ASEAN-4 and Korea: benchmark bond spreads over US Treasuries



Note: Denominated in US dollars.

Source: Bloomberg.

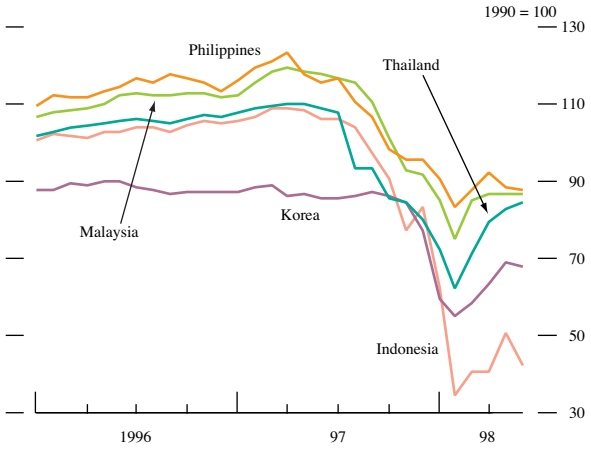
The ASEAN-4 currencies have continued to depreciate against the dollar, especially the Indonesian rupiah, although the Korean won was little changed in the second quarter. But because intra-regional trade is important, the depreciation of the effective exchange rate of any individual country is significantly less than any depreciation against the dollar. This, and high inflation in the ASEAN-4 and Korea, has meant that real effective exchange rates were either little changed in the second quarter, or appreciated; in the case of Korea and Thailand, real appreciations were quite large (see Chart B).

First-quarter GDP growth in the ASEAN-4 and Korea was weaker than markets had expected, with domestic demand contracting (see Table 2). This has been reflected in falling Consensus forecasts for 1998 GDP growth (see Chart C), which are negative for all these countries except the Philippines. However, there are some signs that output is stabilising in Thailand and Korea.

(1) See the May 1998 *Quarterly Bulletin*, pages 133–35.
(2) This note is based on events up to 24 July 1998.
(3) Indonesia, Malaysia, the Philippines and Thailand.

In the ASEAN-4, tight monetary policy, aimed at maintaining currency stability, has contributed to falling demand. Weakening demand led to an increase in net exports as imports fell. And there were signs that export credits were increasingly available, which should help to promote export growth in the near future. But this effect might be limited, because the similarity of ASEAN countries' export patterns means that they compete against each other in third markets, such as the United States. This, and the real effective appreciation of some currencies, might result in weaker net export growth than bilateral dollar exchange rate movements would suggest.

Chart B
ASEAN-4 and Korea: real effective exchange rates



Source: J P Morgan.

In Malaysia, the economic downturn has been worse than markets expected. Retail sales remain on a downward trend, and manufacturing production fell in 1998 Q1. The government has responded to the slowdown by pursuing fiscal reflation. A series of fiscal measures announced in June increased spending by 0.5% of GDP.

In the Philippines, annual GDP growth remained positive in Q1, reflecting rising net exports. Exports were 11.6% higher than a year earlier, largely because of strong US demand. The Philippine banking system is also stronger than in other countries in the region, providing exporters with easier access to financing. But the budget position is deteriorating: the official target of a PhP5 billion surplus (0.2% of GDP) in 1998 is unlikely to be met, because of slower growth. And consumer price inflation has risen in 1998—to 10.7% in the year to June.

Table 2
Real GDP growth

Percentage change on a year earlier

	1997				1998
	Q1	Q2	Q3	Q4	Q1
Malaysia	8.5	8.4	7.4	6.9	-1.8
Indonesia	8.5	6.8	2.5	1.4	-7.9
Korea	5.7	6.6	6.1	3.9	-3.8
Thailand	n.a.	n.a.	n.a.	n.a.	n.a.
Philippines	5.5	5.6	4.9	4.8	1.7

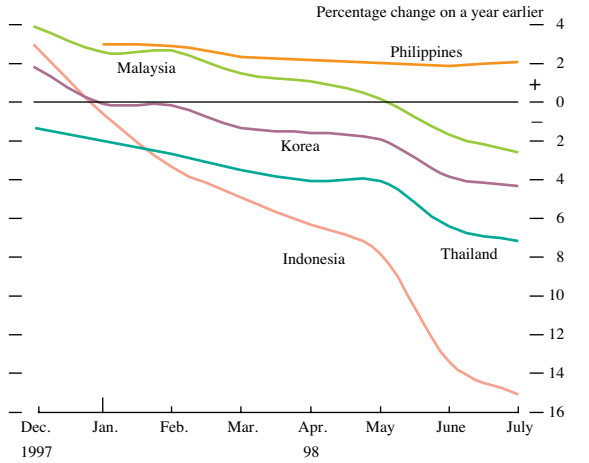
n.a. = not available.

Note: Quarterly data not available for Thailand.

Source: Datastream; data for Indonesia from the Bank of Indonesia and The Central Bureau of Statistics.

In Indonesia, a framework agreement for the restructuring of interbank debt, the maintenance of trade financing and the voluntary renegotiation of the external debts of Indonesian corporations was reached with foreign banks in early June. Bankruptcy laws have been amended, allowing the Bank Restructuring Agency to take control of Bank Central Asia (the largest private sector bank), which had been experiencing a deposit run. The IMF and Indonesia signed a further letter of intent, which revised an earlier agreement on a $23 billion package of multilateral official support. The agreement is based on forecasts of a fall in GDP of 10%–15% in 1998, for inflation in 1998 to remain below 80%, and for the budget deficit in 1998/99 to remain below 8.5% of GDP. Following the letter of intent, the Asian Development Bank released a $1.5 billion loan for restructuring the banking sector. On 3 July, the World Bank approved a $1 billion loan, delayed from May; $600 million was disbursed immediately, with the balance due in September. The IMF disbursed $1 billion on 16 July.

Chart C
ASEAN-4 and Korea: Consensus forecasts of 1998 GDP growth



Source: Consensus Forecasts.

Following the signing of the letter of intent, a fall in GDP of 16.5% in the year to 1998 Q2 has been announced, and Consensus forecasts for 1998 GDP growth have fallen below the projections in the letter. Consumer prices rose by 59.5% in the year to June, and inflation seems likely to increase as administrative controls on prices are removed.

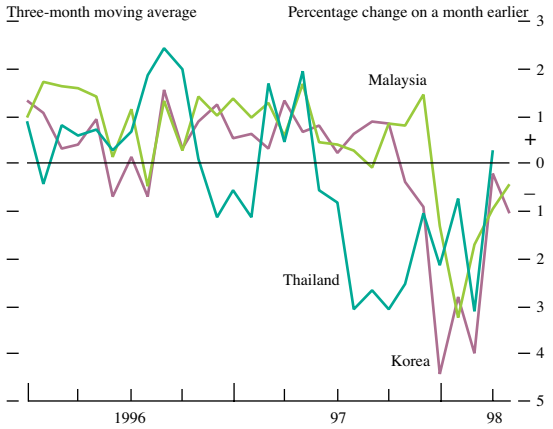
In Thailand, manufacturing output fell by 17% in the year to 1998 Q1, reflecting falling demand. The authorities have started a programme of structural adjustment. Bankruptcy and foreclosure laws have been amended, which should enable the corporate sector to be restructured and bad debts in the banking sector to be written off. The fourth letter of intent with the IMF increased the budget deficit target from 1% to 3% of GDP, excluding the interest cost of debt incurred from recapitalising the banking sector (estimated at between 2%–3% of GDP). So the underlying fiscal position

has loosened. Export volumes have risen by more than 20% since July 1997, though currency depreciation has lowered the dollar value of exports.

In Korea, GDP fell in 1998 Q1 on a year earlier, because of falling domestic demand. This has allowed Korea to restore its balance of payments position quickly: the merchandise trade surplus was $4.25 billion in May, largely because of falling imports, and foreign exchange reserves rose to $40.9 billion by the end of June. In response to falling demand, the government has announced a won5 trillion (1.2% of GDP) fiscal stimulus package, involving increased infrastructure spending and a reduction in the car sales tax. This is expected to increase the budget deficit to 3% of GDP for the current fiscal year. The government has also announced a $15 billion privatisation programme and won50 trillion (12% of GDP) of support for the financial system. It has rationalised the banking system by merging five insolvent banks with five solvent ones, and further bank mergers are possible. This raised concerns among some international investors.

In Korea and some ASEAN-4 countries, activity seems to have stabilised, following rapid contraction of output in late 1997 and 1998 Q1. Seasonally adjusted data show that for Korea, Thailand and Malaysia, the rate of decline of industrial output seems to have slowed in recent months (see Chart D).

Chart D
Asian industrial production



Note: Official Korean data already seasonally adjusted; data for Thailand and Malaysia seasonally adjusted by the Bank of England.

Hong Kong SAR, Singapore, China, and Chinese Taipei

Growth in Singapore, China and Chinese Taipei slowed in 1998 Q1, and GDP in Hong Kong SAR fell (see Table 3). As with other East Asian economies, Consensus forecasts for GDP growth have fallen, probably reflecting the strong trade links with this region (see Chart E). With monetary policy largely constrained by exchange rate considerations, most governments have loosened fiscal policy.

In Hong Kong SAR, GDP fell in 1998 Q1 relative to a year earlier. Demand has been weakened by a fall in tourism receipts and construction activity. The unemployment rate reached 4.5% in June, a 15-year high. In the second quarter, the Hang Seng share price index fell by 26%, and property prices have also fallen (by about 50% since their peaks in August 1997). Concern that China would devalue the renminbi led to speculation against the Hong Kong dollar in June; overnight interbank rates rose to 15%, as the Hong Kong Monetary Authority defended the exchange rate peg against the US dollar, but have subsequently fallen back. The government announced a fiscal stimulus of HK$32 billion (2.4% of GDP). The package includes rebates of property tax, cuts in interest income tax and a suspension of land sales.

Table 3
Real GDP growth

Percentage change on a year earlier

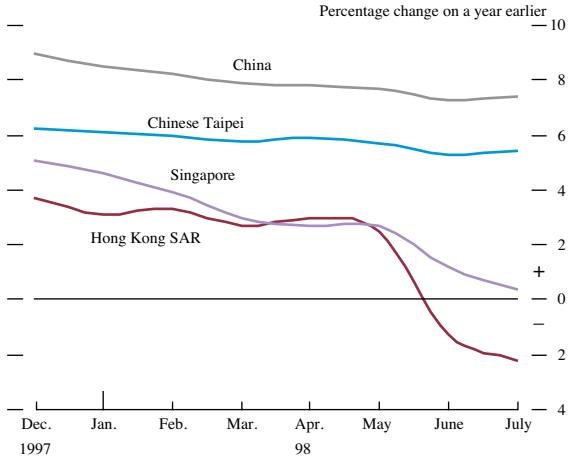
	1997				1998
	Q1	Q2	Q3	Q4	Q1
Hong Kong SAR	5.9	6.8	6.0	2.7	-2.0
Singapore	4.2	8.5	10.7	7.6	5.6
Chinese Taipei	6.9	6.3	6.9	7.1	5.9
China	9.4	9.5	9.0	8.8	7.2

Note: Chinese GDP is cumulative, from the beginning of the year.

Source: Datastream; data for China from the People's Bank of China *Quarterly Statistical Bulletin*.

In China, the annual rate of real GDP growth has slowed in 1998 so far, to 6.8% in Q2, partly because of continued industrial restructuring and tight monetary conditions. But Consensus forecasts for real GDP growth remain above 7% for 1998. Although monetary policy remains tight, lending rates were cut in June. Other policy measures have included official encouragement to commercial banks to provide working capital to state-owned enterprises.

Chart E
China, Hong Kong SAR, Chinese Taipei, Singapore: Consensus forecasts of 1998 GDP growth



Source: Consensus Forecasts.

Speculation about the prospect of a devaluation by the Chinese authorities, triggered by the weak yen, led to financial market turbulence at the end of June. But following intervention in support of the yen by the US and Japanese authorities on 17 June, the Chinese reaffirmed their commitment to a stable currency. This reduced

speculation that the Hong Kong dollar would also be forced to devalue.

In Singapore, slowing GDP growth in Q1 reflected falls in consumption, and in both manufacturing and services output growth (Singapore is a major exporter of services to the ASEAN region). The government announced a S$2 billion (1.4% of GDP) stimulus package in late June, targeted at the property sector. Stamp duty has been suspended, to protect stockbrokers' revenues. And the government has cut public sector tariffs and brought forward infrastructure projects. The government estimates that the package will result in a budget deficit of S$800 million (0.6% of GDP), compared with an earlier forecast of a S$2.7 billion surplus (1.9% of GDP). But Singapore still has one of the strongest fiscal positions in the region.

Despite the slowdown in the rest of the region, GDP growth in Chinese Taipei remained relatively strong in 1998 Q1. Domestic demand growth has been supported by public investment in infrastructure and private consumption. The strength of domestic demand relative to the rest of the region resulted in a fall in net exports in the first quarter.

The UK personal and corporate sectors during the 1980s and 1990s: a comparison of key financial indicators

By Glenn Hoggarth of the Bank's Financial Intermediaries Division and Alec Chrystal of the Bank's Monetary Assessment and Strategy Division.

This article draws together some key indicators of financial conditions in the personal and corporate sectors, which may provide interesting insights into aspects of the behaviour of the UK economy during the course of the two most recent business cycles. Although the main focus is retrospective, this analysis could also help to assess the likely future course of important components of aggregate demand.

Introduction

In this article, we examine various key financial indicators relating to the UK personal and corporate sectors in the 1980s and 1990s. The financial health of the personal and corporate sectors is potentially important as a leading indicator of changes in consumption and investment spending. When households run into financial difficulties, they are likely to cut back on spending plans. Firms in financial difficulties will postpone or cancel investment projects.

The 1980s and 1990s both began with recessions—defined as at least two consecutive quarters of falling output—which were succeeded by economic recoveries. At the time of writing, the 1990s recovery phase is not yet over, although the growth rate has slowed. One complete economic cycle runs from the start of the recovery in 1981 Q1 to the peak of 1990 Q2,(1) and the 1990s recovery started in 1992 Q2. This makes it convenient to compare the two decades by aligning the period following 1981 Q1 with the period following 1992 Q2.

We note similarities and differences between the two cycles. No two cycles are ever exactly the same, both because the shocks hitting the economy vary, and because the structure of the economy evolves. The 'boom and bust' in the first half of the 1970s was partly associated with the introduction of Competition and Credit Control and the subsequent return to quantitative controls on banks' balance sheets (the 'corset'). But the 1980s cycle was unusual in that it was the first cycle in the United Kingdom following a significant permanent liberalisation in the financial system (including the abolition of exchange controls and the corset, which led to a new competitive environment for banks and building societies). With these caveats in mind, the previous cycle may provide some interesting comparisons with the current one.

The article is in three sections: we first discuss some background issues, we then set out our selection of stylised facts, and finally we draw some conclusions.

Financial conditions and the business cycle

Economic cycles have three main elements: (i) the endogenous behaviour of individuals and companies, including financial ones; (ii) external shocks from the rest of the world; and (iii) policy responses from the government and monetary authorities. The way in which monetary policy changes affect the economy is known as the monetary transmission mechanism.

The monetary transmission mechanism works through four broad channels—interest rates, exchange rates, asset prices and credit.(2) All these channels were operating, to varying degrees, during the 1980s and 1990s. This article focuses mainly on indebtedness and credit market conditions, which relate, in particular, to the credit channel.

An important component of the credit channel is how the market for bank credit is affected by changes in the balance sheets of borrowers, who are dependent on bank credit, and lenders.(3) Banks and other lending institutions have the problem of imperfect information about the quality of borrowers. They try to overcome the risk of moral hazard and adverse selection by securing loans on assets, charging higher interest rates for unsecured loans, or channelling funds to borrowers with high net worth. Potential borrowers find it easier to persuade lenders that they are a good risk by offering some of their assets (especially property) as security. A financial accelerator effect has been identified: as credit expands in an upturn, asset values rise, creating further valuable collateral. A cumulative process can, it is argued, occur. In a downturn, when asset prices fall, so does the value of collateral, credit risk rises, lenders become more cautious, loan-financed spending falls, and recession typically ensues (or is made worse).

(1) Output did not rise consistently during this period—there was a minor downturn in 1984, but special factors in that year (notably the miners' strike) make it hard to argue that 1984 was a cyclical trough.
(2) See Mishkin, F S (1995), 'Symposium on the Monetary Transmission Mechanism', *Journal of Economic Perspectives*, 9(4) Autumn, pages 3–10.
(3) See, for example, Bernanke, B and Gertler, M (1995), 'Inside the Black Box: the Credit Channel of Money Policy Transmission', *Journal of Economic Perspectives*, Autumn; Kashyap, A K and Stein, J C (1995), 'The impact of monetary policy on bank balance sheets'; *Carnegie Rochester Conference Series on Public Policy*; Dale, S and Haldane, A (1993), 'Bank behaviour and the monetary transmission mechanism', Bank of England *Quarterly Bulletin*, November, pages 478–91.

Financial conditions are described below under three headings: (i) measures of the financial health of the personal and corporate sectors (Charts 1–15 and Table A); (ii) measures of the price of credit (lending rates), which reflect banks and building societies' supply of loans, as well as the personal and corporate sectors' demand for loans (Charts 16–20); and (iii) measures aimed explicitly at gauging the credit supply policies of financial institutions (Charts 21 and 22 and Table B).

The stylised facts

The following charts and tables show the paths of various financial indicators between the 1992 Q2 trough in output and 1998 Q1. These are shown alongside the paths of the same variables during the similar phase of the 1980s cycle. The period corresponding to 1998 Q1 in the previous cycle was 1986 Q4, although output continued rising for another three and a half years before it reached a peak in 1990 Q2 (shown as the vertical dashed lines in the charts). The green lines in the charts refer to the post-1992 Q2 data, and the orange lines show the 1981 Q1–1992 Q1 period.(1) References to the 'corporate sector' mean industrial and commercial companies (ICCs) only, so exclude other financial institutions (OFIs) unless explicitly stated. Data definitions and sources are set out in the Appendix.

(i) Measures of the financial position of the corporate and personal sectors

Three types of measure of borrowers' financial position are presented below: measures of *sectoral liquidity*—interest payments as a fraction of income (income gearing) and differences between sectoral income and expenditure (financial balances and savings rates) (Charts 1–5); measures of *sectoral net worth*—the value of debt relative to assets (capital gearing) and variations in the price of assets (Charts 6–13); and specific measures of *financial fragility*—mortgage arrears and repossessions, and personal bankruptcies and corporate liquidations (Charts 14 and 15).

During both the previous and current upswing (prior to the tightening in monetary policy in 1988 and more modest tightening during the past year), income gearing for both the personal and corporate sectors was broadly flat—interest payments increased in line with incomes. The level of corporate sector (net) income gearing in recent years has been similar to that of the mid 1980s (see Chart 1). It has risen noticeably in the last year, but is still well below the level reached in 1989. Total personal sector (gross) income gearing has also been lower in recent years than during the mid to late 1980s (see Chart 2). But within total personal sector gearing, mortgage income gearing has been at similar levels during both upturns, owing to two offsetting influences: the stock of mortgage debt (relative to income) was much higher in the mid 1990s than in the mid 1980s, but the level of interest rates was lower.(2)

The ICCs' financial surplus (as a percentage of GDP) and the personal sector (net) saving rate were both positively correlated with sectoral M4 lending/income during the previous cycle (see Charts 3 and 4).(3) This suggests that during the 1980s, individuals and companies financed imbalances between current income and expenditure mainly through changes in the amount borrowed from banks and building societies, rather than through changes in other sources of borrowing or in asset holdings. During the late 1980s, the movement of the corporate sector into financial deficit was financed by a sharp rise in ICCs' M4 borrowing. Similarly, the movement of ICCs back into financial surplus during the previous recession was mirrored by a marked cutback in their M4 borrowing (as a percentage of GDP). During this recovery, the ICCs' financial balance has again moved into deficit, albeit so far a modest one. But this has not been financed by borrowing from banks and building societies to the same extent as in the late 1980s—after rising for a while in 1995–96, the flow of M4 lending to ICCs (as a percentage of GDP) has so far fallen back.

The flow of M4 consumer credit relative to personal disposable income (see Chart 5) is now at comparable levels to the previous cycle. But overall lending flows to the personal sector, including mortgages, remain at levels (relative to PDI) well below those of the previous cycle. The flow of housing-related lending/income—including mortgage equity withdrawal—provides one major contrast between the 1980s and the 1990s. The surge in personal sector borrowing relative to income in 1987–88 was reflected in a significant fall in the savings ratio (see Chart 4). The personal sector savings ratio has fallen recently, but remains well above the level of the late 1980s.

We turn now to stocks of liabilities and assets. The stock of personal sector debt is measured as sterling borrowing from banks and building societies. Corporate sector debt also includes marketable securities, and foreign currency borrowing from bank and building societies. Sectoral debts are measured relative to disposable income and net financial plus tangible wealth (mainly housing) for the personal sector, and relative to fixed assets, valued at current replacement cost, for the corporate sector. Income is defined as personal disposable income for the personal sector, and post-tax income for the corporate sector. For the economy as a whole, outstanding M4 lending is measured relative to GDP.

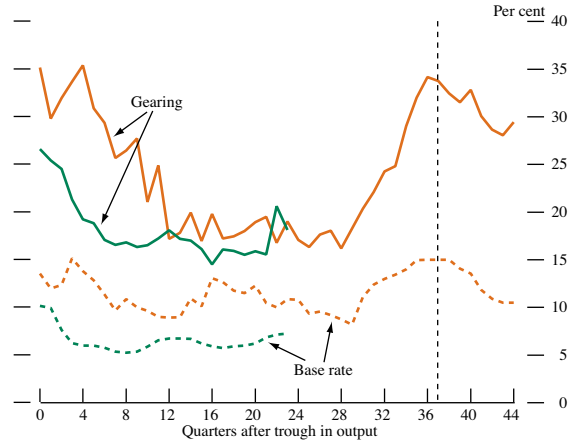
Aggregate domestic sterling lending of banks and building societies has increased much more slowly relative to GDP during this recovery than the previous one, but started from a much higher level—total M4 lending/GDP, for example, was $2\frac{1}{2}$ times larger in 1992 than in 1981 (see Chart 6). The large expansion of bank and building society lending between the late 1970s and early 1990s may have marked a sustained adjustment to the new more liberal financial environment of the 1980s. It is likely that individuals and

(1) Where the orange lines start late in the recovery, this is because earlier data were not available.
(2) In 1987, the stock of secured lending by banks and building societies was equivalent to 64% of aggregate annual personal disposable income, whereas in 1997 the figure was 75%. Official rates were around 10% in 1987, compared with $7\frac{1}{4}$%–$7\frac{1}{2}$% in the first half of 1998. Note that, where charts present ratios of stocks to PDI or GDP, the latter are quarterly rather than annual flows.
(3) Lending is measured as negative in the charts.

Key for Charts 1–6

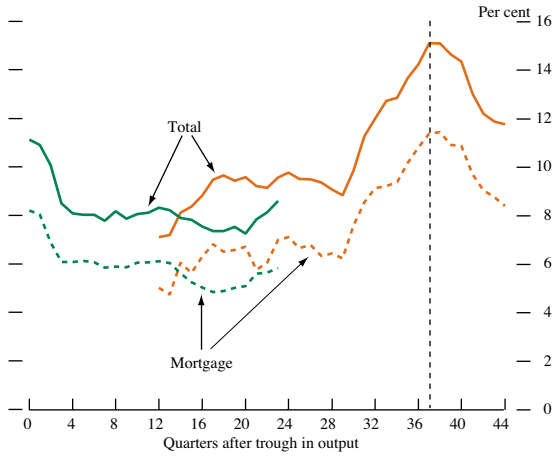
This recovery 1992 Q2–1998 Q1 --------- Previous peak 1990 Q2
Previous cycle 1981 Q1–1992 Q1

Chart 1
ICCs' net income gearing and base rate



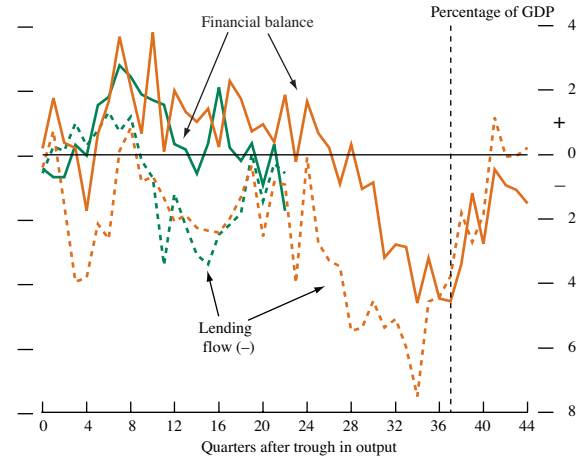
Sources: Office for National Statistics and Bank of England.

Chart 2
Personal sector income gearing



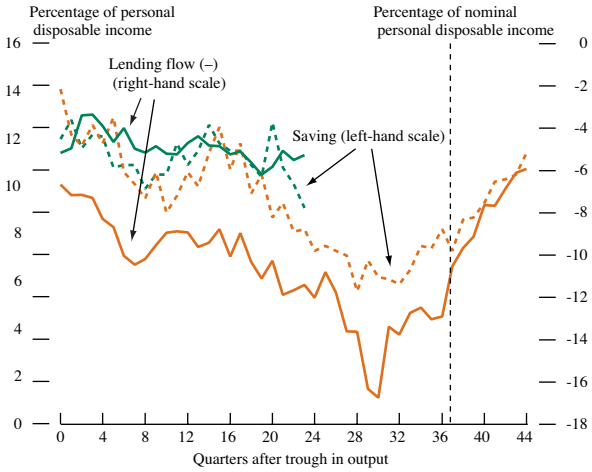
Sources: Office for National Statistics and Bank of England.

Chart 3
ICCs' financial balance and M4 lending flow



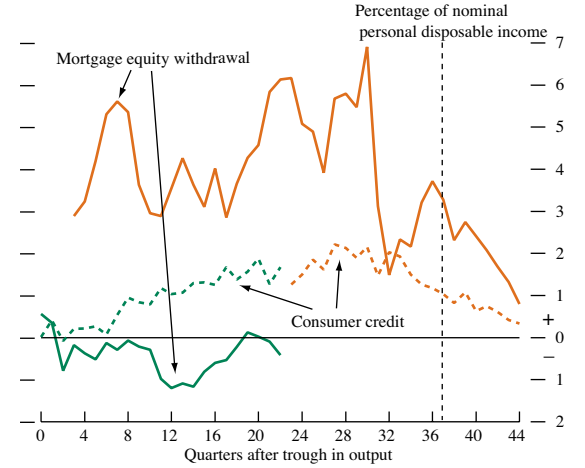
Sources: Office for National Statistics and Bank of England.

Chart 4
Personal sector saving rate and M4 lending flow



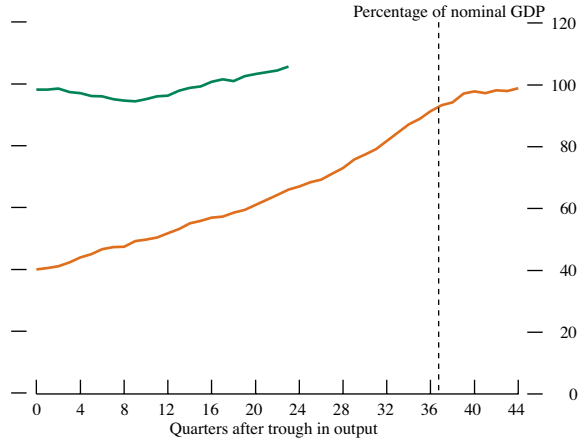
Sources: Office for National Statistics and Bank of England.

Chart 5
Flow of mortgage equity withdrawal and net consumer credit



Sources: Office for National Statistics and Bank of England.

Chart 6
Total M4 lending



Sources: Office for National Statistics and Bank of England.

companies started the 1990s cycle much closer to their desired levels of debt.

ICCs' M4 borrowing/income ratio has increased more slowly in recent years than before the peak of the previous cycle (see Chart 7). In addition, the personal secured M4 debt/income ratio has been flat during the present upturn, whereas it grew continuously and significantly during the 1980s (see Chart 8). M4 lending to OFIs and consumer credit, on the other hand, increased rapidly relative to income during this recovery, as it did during the last one (see Charts 9 and 10).[1] By 1998 Q1, these categories accounted for 21% and 8% respectively of total M4 lending.

Capital gearing—debt/assets—has fallen for both ICCs and the personal sector since the early 1990s, though ICCs' capital gearing remains above its level at the same stage of the previous cycle. In the late 1980s, corporate sector debt rose significantly relative to the capital stock (see Chart 7), as did personal sector capital gearing (see Chart 11), though not to the same extent. The ratio of personal sector debt to net wealth was more or less constant during the mid 1980s, only to be followed by a sharp decline in asset prices, particularly housing, and a consequent rise in personal capital gearing. In contrast with the 1980s recovery, personal sector debt has increased more slowly than net wealth in recent years.

Table A shows the percentage increase in the prices of the two most important components of personal sector wealth—housing and equity. Equity prices, and therefore financial wealth, have risen significantly during this recovery, as during the previous one (see Chart 12). Although there have been marked differences in changes in house prices on different indices during the past 18 months, all measures show that house prices rose significantly more in the previous cyclical upturn than they have so far during the current one. According to the Halifax, average (UK-wide) house prices were only around 7% higher in 1998 Q1 than in the trough of the last recession, whereas they more than doubled between 1983 Q1—the first period of data availability—and 1990 Q2. Similarly, the Nationwide and Department of Employment's house price indices have risen by 21% and 14% respectively during this recovery, whereas they rose by 149% and 176% between 1981 Q1 and 1990 Q2. Moreover, the (Halifax) house price/earnings ratio, which reached a historical peak in 1988, is now lower than at any time in the 1980s (see Chart 13); and the value of commercial property, which doubled during the 1980s, is only slightly higher than during the trough of the previous recession (see Table A).

Personal sector arrears and repossessions are now back at levels comparable to the mid 1980s (see Chart 14). By contrast, and despite a large fall during this recovery, the number of corporate insolvencies appears to have flattened out recently, at a higher absolute level than the trough

Table A
Asset prices, percentage change over period

	1981 Q1–1990 Q2	1992 Q1–1998 Q1
Halifax house price index (sa) (a)	131	7
Nationwide house price index (sa)	149	21
Department of Employment house price index	176	14
FT-SE All-Share	281	116
	End 1980-end 1989	End 1991-end 1997
IPD commercial property prices (capital value)	99	11

sa = seasonally adjusted.

Sources: Halifax, Nationwide, ONS and Investment Property Databank.

(a) The Halifax house price index started in 1983 Q1, so the first number relates to a shorter period (1983 Q1–1990 Q2).

reached in the late 1980s. This pattern is more pronounced for the personal sector, where despite declining sharply since the previous recession, bankruptcies remain well above the levels before the peak of the previous cycle (see Chart 15).[2] If observed insolvencies proxy for banks' *ex ante* credit risk, banks may have adjusted to these trends by reducing lending spreads (although by less than in the late 1980s). Alternatively, they could have simply demanded less security, or relaxed other terms.

Chart 16 plots the percentage of firms in the CBI Industrial Trends Survey who reported that the cost of finance was a factor limiting their planned capital spending, against the banks' base rate lagged by one quarter. Not surprisingly, there is a positive correlation between perceived financing costs and the base rate, and this provides support for the proposition that high interest rates choke off some investment. These data suggest that in the current cycle, manufacturing firms felt that, up to early 1998, there was little restriction on investment activity resulting directly from the cost of finance. We now turn to the issue of whether the behaviour of financial institutions contributes to variations in the cost of finance.

(ii) Lending spreads

Increases in debt/income ratios—across the board in the late 1980s, and for OFIs and consumer credit during the 1990s—could have resulted from either an increase in demand for loans (for given interest rates) and/or an increase in supply (easier credit conditions). The latter measures the contribution to the increase in debt from the behaviour of lending institutions, rather than as a result of macroeconomic factors at large. One way of assessing the importance of these two effects is to examine the changes in the lending spread—the premium of bank lending rates over wholesale money-market rates. If the rising demand effects outweigh supply, then the spread between the banks' lending rate and money-market rates should have widened. On the other hand, if the impact of an increase in supply outweighs demand, then the spread between the lending rate and money-market rates should have narrowed. The impact on spreads will depend both on the size of changes in supply

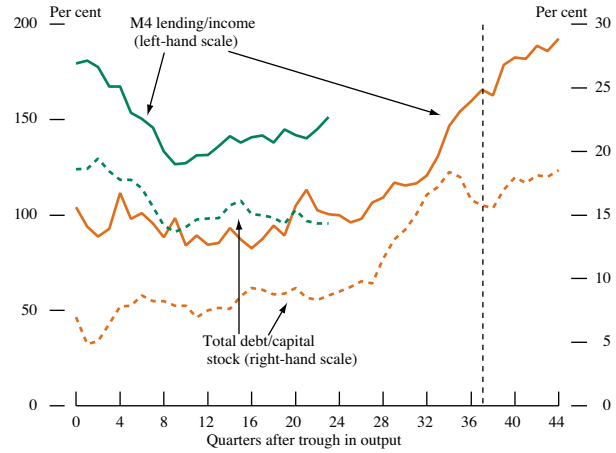
(1) Note that the sectoral money and lending aggregates separate out OFIs from persons, but that personal sector wealth includes assets held by Life Assurance and Pension Funds and other collective investment funds.
(2) It should be noted that the reported figures are absolute numbers of personal bankruptcies and corporate insolvencies. Ideally, these should be expressed as a proportion of the populations at risk, which we are unable to do, because of the unavailability of data.

Key for Charts 7–16 (excluding Chart 14)

This recovery 1992 Q2–1998 Q1 --------- Previous peak 1990 Q2

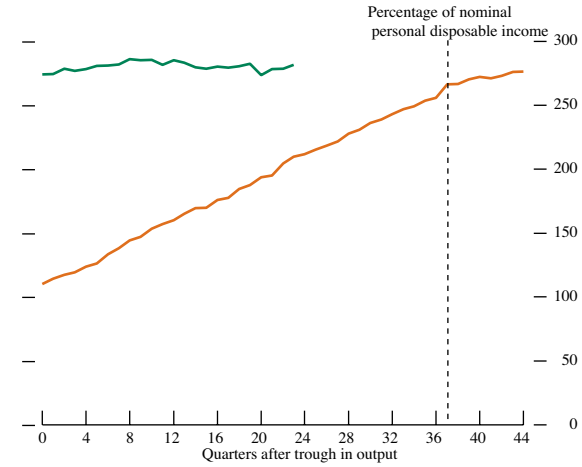
Previous cycle 1981 Q1–1992 Q1

Chart 7
ICCs' capital gearing and M4 lending/income



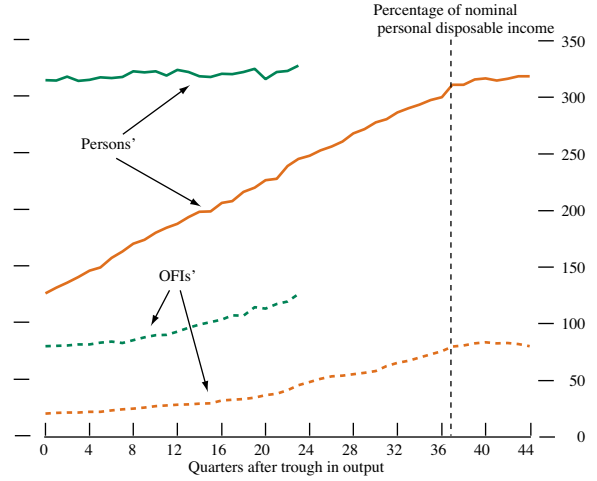
Sources: Office for National Statistics and Bank of England.

Chart 8
House purchase debt



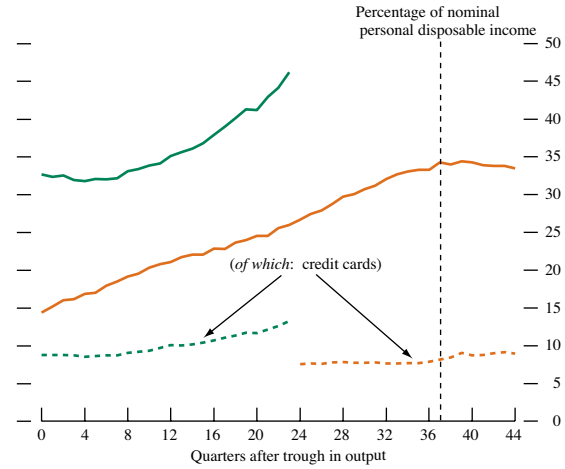
Sources: Office for National Statistics and Bank of England.

Chart 9
Personal sector and OFIs' M4 lending



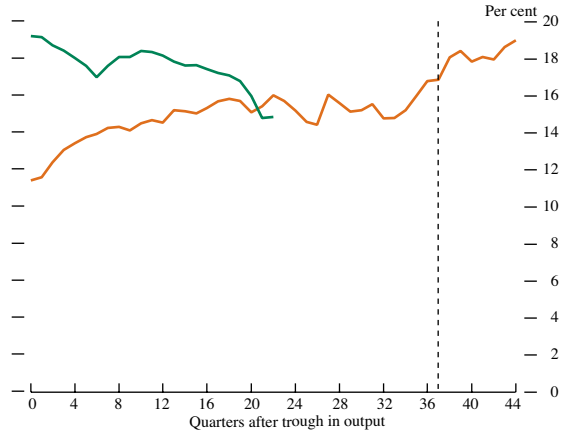
Sources: Office for National Statistics and Bank of England.

Chart 10
M4 consumer credit stock



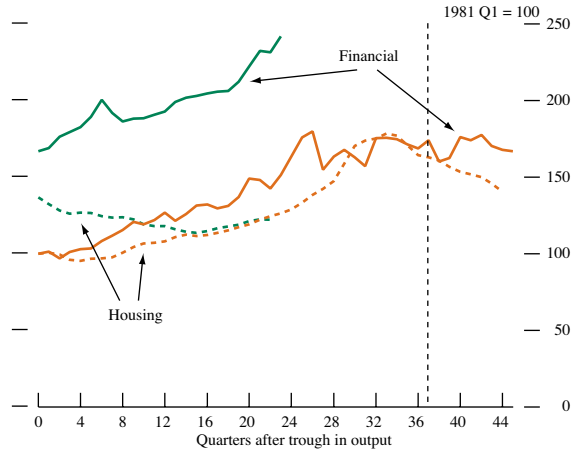
Sources: Office for National Statistics and Bank of England.

Chart 11
Personal sector capital gearing



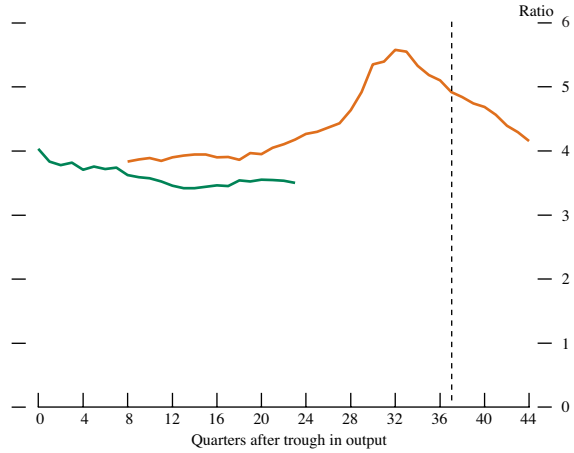
Source: Office for National Statistics.

Chart 12
Value of financial and housing wealth



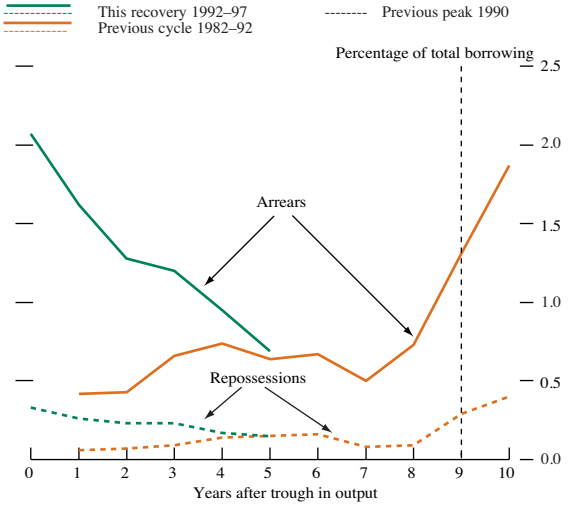
Source: Office for National Statistics.

Chart 13
House price to earnings ratio



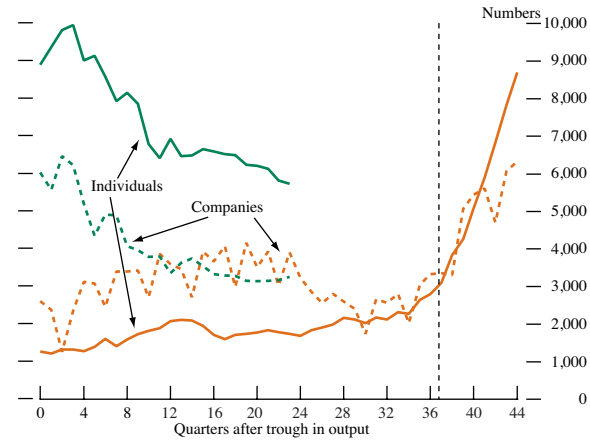
Source: Office for National Statistics.

Chart 14
Mortgage arrears and repossessions



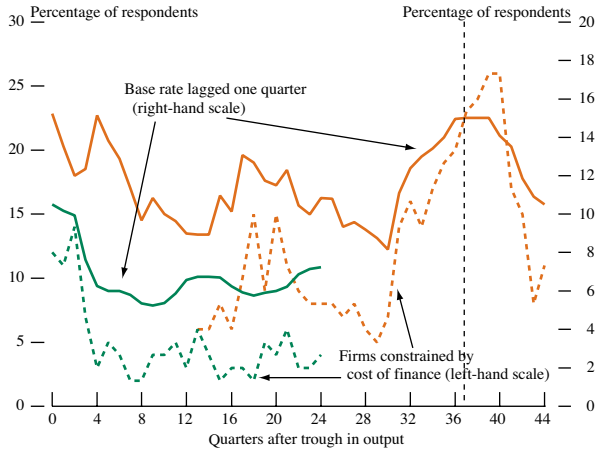
Source: Compendium of Housing Statistics.

Chart 15
Company liquidations and personal bankruptcies



Source: Office for National Statistics.

Chart 16
Cost of finance as a factor limiting capital expenditure and lagged base rate



Source: Confederation of British Industry.

and demand, and on the interest rate sensitivity of the demand for and supply of loans. In practice, it is hard to identify supply and demand influences separately, but it is worth setting out some situations under which a reduction in spreads would be indicative of increasing pressures on aggregate demand coming from credit markets (or *vice versa*). There are at least three reasons why the banks' lending spreads may decline:

- *Reduced uncertainty about the credit risks attached to bank lending*. This might arise, for example, from a shift to a lower-inflation environment increasing the transparency of the price mechanism, and would suggest that the reduction of lending spreads was justified on financial risk grounds. However, it would still imply that a shift in credit supply was exerting additional upward pressure on spending.

- *An increase in the average net worth of borrowers, with unchanged uncertainty*. If this was supported by an increase in incomes or asset values, the rise in credit would be an endogenous response to an expansion already under way, rather than an independent cause of this expansion. It would contribute to the financial accelerator mechanism mentioned earlier. Clearly, if the rise in net worth were reversed in a recession, interest rate spreads might widen again in the economic downturn.

- *No change in either the net worth of borrowers or uncertainty, but an increase in competition among lenders, resulting in narrower spreads*. This could increase both inflationary pressure and financial risk—the former because an increase in the supply of credit by the banking sector might increase spending, the latter because lenders might take on some loans at the margin that they would previously have turned down.

Lending spreads have narrowed across all main lending categories since 1993–94 (see Charts 17–20). This suggests that financial institutions have contributed to an easing of credit market conditions during this recovery, or have at least delayed the pass-through of the increase in official interest rates in the past year. Bank and building societies' mortgage spreads fell markedly at the end of the previous boom (see Charts 17 and 18), and widened again after 1990, possibly as a delayed response by lenders to rising official interest rates. This suggests that for most of the 1980s, the marked increase in mortgage debt/income was not the result of easier lending rate conditions (over and above those induced by monetary policy), although this does not rule out easier access to mortgages for given interest rates (eg higher mortgage loan to income and loan to value ratios). During the current economic upswing, the ratio of mortgage loans to incomes has been flat, despite a steady decline in mortgage spreads since 1994. This reduction in spreads helped to prevent house prices from falling further, and helped them to recover modestly in 1996–98. Despite this decline in mortgage spreads, overall margins of banks and building societies in the retail market have been maintained. The retail spread—the difference between mortgage and deposit rates—remains wide, because deposit rates have also fallen relative to base rates, particularly for building societies. One factor contributing to lower retail deposit rates for converting building societies was the potential for windfall gains from building society conversions. In fact, the inflows associated with the expectation of windfalls may have been partly responsible for the reduction in mortgage rates relative to the base rate in 1996–97; some of the benefit to building societies of being able to reduce their deposit rates may have been passed on to borrowers.

Data for interest rates on bank lending in the consumer credit market and to ICCs and OFIs are unavailable before 1992, preventing a comparison with the previous upturn. During the current recovery phase, a decline in spreads in the consumer credit market (see Chart 19) coincided with an increase in the loans/personal income ratio in 1994–95 (see Chart 10), though spreads rose again temporarily in 1996. The fall in spreads in 1994–95 could reflect either greater creditworthiness of borrowers or, for given creditworthiness, a loosening in supply conditions. The first hypothesis is supported by the decline in personal bankruptcies. However, the fact that consumer loans have increased more rapidly than personal sector incomes and that, in the consumer credit-card market at least, the number of accounts incurring interest rate charges has increased from an average of 59% in 1990 to 75% in 1997, may indicate that credit expansion has been gained through a reduction in the quality of credit-card borrowers. The number of credit-card providers has increased significantly in the last few years, and the range of rates available on credit-card lending has increased.

Chart 20 shows that bank lending spreads available to both ICCs and OFIs have also narrowed during this recovery.

(iii) Other measures of loan supply

Changes in supply conditions may be reflected in factors other than lending rates. For example, because of the risk of attracting the least creditworthy borrowers, lenders may tighten non-price credit conditions, such as security required or loan to value ratios, rather than raise lending rates during a recession. Some evidence that this happens is available from the CBI Industrial Trends Survey. Firms report that their ability to raise external finance becomes more restricted during recessions and improves during recoveries (see Chart 21).

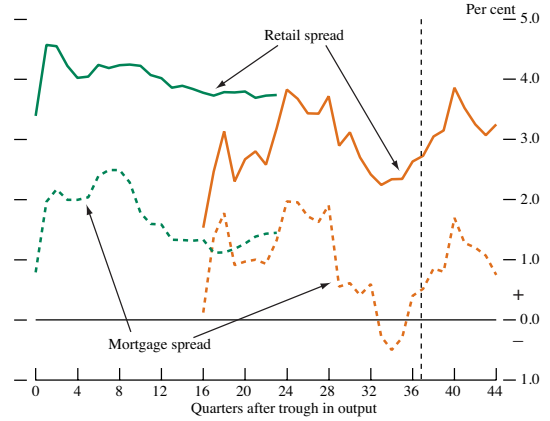
Changes in supply conditions may also be reflected in the composition of the banks' own balance sheets. In principle, faced with a deterioration in their balance sheets, banks could raise new capital rather than reduce their asset base. In practice, in times of stress it is difficult for banks to raise capital, because of the adverse signal this gives, and so they are likely to be more cautious about lending.

Chart 22 shows that the big clearing banks in the United Kingdom have had a large cushion of capital during the last recession and its aftermath. The minimum Basle

Key for Charts 17–18

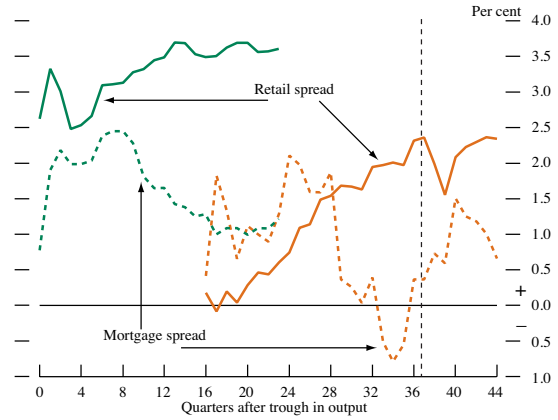
This recovery 1992 Q2–1998 Q1 --------- Previous peak 1990 Q2
Previous cycle 1981 Q1–1992 Q1

Chart 17
Mortgage and retail spreads: banks



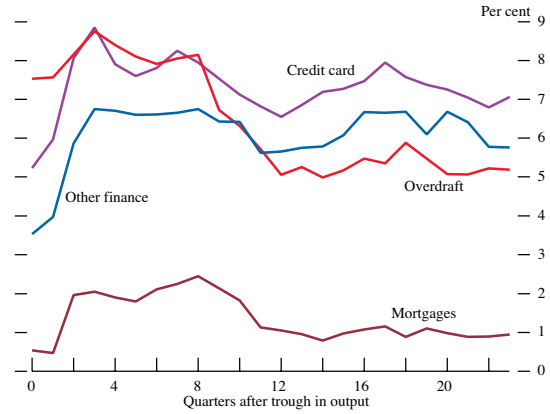
Source: Bank of England.

Chart 18
Mortgage and retail spreads: building societies



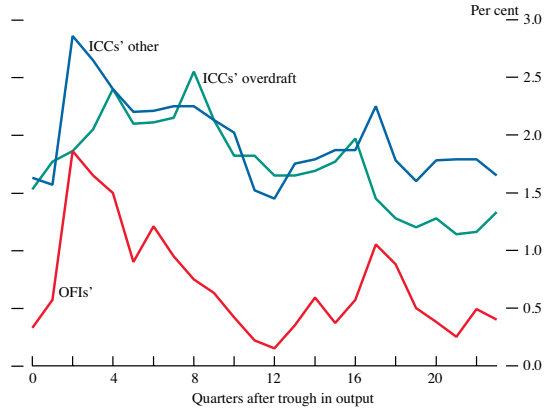
Source: Bank of England.

Chart 19
Consumer borrowing spreads 1992 Q2 to 1998 Q1



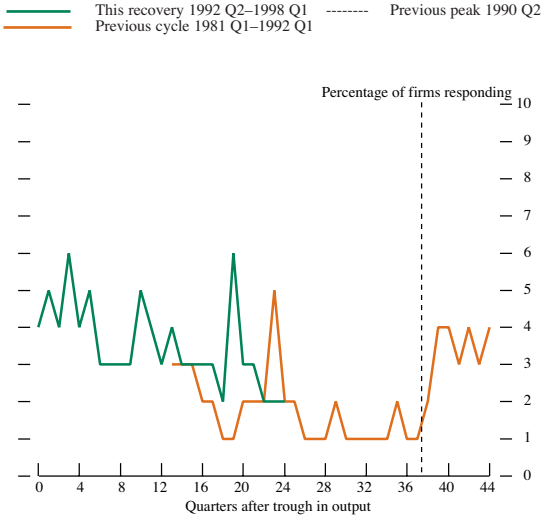
Source: Bank of England.

Chart 20
ICCs' and OFIs' lending spreads 1992 Q2 to 1998 Q1



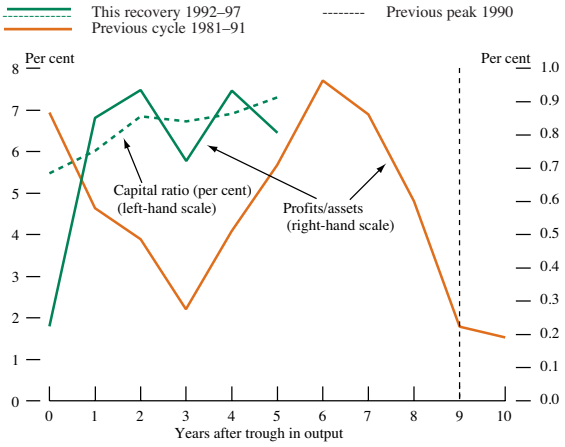
Source: Bank of England.

Chart 21
Lack of external finance limiting capital expenditure



Source: Confederation of British Industry.

Chart 22
'Big Four'(a) banks' profits/assets(b) and Tier 1 capital ratio(c)



Source: Annual accounts.

(a) NatWest, Barclays, Midland and Lloyds (Lloyds-TSB from 1995).
(b) Operating profits after charges for bad and doubtful debts and tax as a percentage of average assets.
(c) Tier 1 capital as a percentage of risk-weighted assets.

Table B
Sectoral loans and defaults risk

Figures in brackets exclude loans secured on dwellings

No		Write-offs (a)		Percentage of total bank lending stock								Percentage of increase in total bank lending			
		Mean per cent	Standard deviation	1986 Q4		1989 Q2		1992 Q1		1997 Q1		1986 Q4 –1989 Q2		1992 Q1 –1997 Q1	
1	Property companies	0.59	0.78	4.60	(5.26)	7.76	(9.01)	8.68	(10.87)	5.14	(7.02)	12.21	(14.48)	-6.77	(-13.35)
2	Construction	0.53	0.49	2.79	(3.19)	3.83	(4.45)	3.51	(4.39)	1.48	(2.03)	5.30	(6.29)	-5.31	(-10.47)
3	Textiles, leather, footwear and clothing	0.50	0.50	0.85	(0.97)	0.85	(0.98)	0.65	(0.81)	0.40	(0.55)	0.85	(1.01)	-0.41	(-0.81)
4	Other retail distribution	0.45	0.35	3.55	(4.06)	3.04	(3.52)	2.90	(3.64)	1.89	(2.58)	2.31	(2.74)	-1.51	(-2.97)
5	Transport and communications	0.45	0.35	1.91	(2.18)	1.83	(2.12)	1.71	(2.14)	2.32	(3.17)	1.72	(2.04)	4.36	(8.60)
6	Business and other services	0.39	0.31	7.12	(8.13)	7.97	(9.25)	7.88	(9.88)	6.46	(8.84)	9.17	(10.88)	1.70	(3.34)
7	Other manufacturing	0.34	0.31	2.96	(3.38)	3.57	(4.14)	3.18	(3.98)	1.92	(2.63)	4.42	(5.24)	-2.29	(-4.51)
8	Personal other	0.34	0.34	11.34	(12.95)	10.49	(11.98)	9.56	(11.98)	9.54	(13.05)	9.29	(11.02)	9.49	(18.70
9	Other engineering and metal goods	0.33	0.35	0.98	(1.11)	0.80	(0.93)	0.66	(0.82)	0.48	(0.66)	0.55	(0.65)	-0.10	(-0.19)
10	Wholesale distribution	0.30	0.24	5.22	(5.96)	3.80	(4.41)	2.90	(3.63)	2.50	(3.41)	1.81	(2.15)	1.15	(2.27)
11	Electrical and electronic engineering	0.28	0.24	1.75	(2.00)	1.50	(1.74)	1.22	(1.52)	0.93	(1.28)	1.15	(1.36)	-0.02	(-0.04)
12	Motor vehicles and parts	0.26	0.47	0.86	(0.98)	0.41	(0.48)	0.42	(0.52)	0.53	(0.72)	-0.22	(-0.26)	0.89	(1.75)
13	Other financial	0.26	0.29	12.34	(14.09)	12.56	(14.57)	10.73	(13.45)	10.14	(13.86)	12.87	(15.27)	8.14	(16.05)
14	Extractive industries and mineral products	0.20	0.43	0.84	(0.97)	0.66	(0.77)	0.73	(0.91)	0.37	(0.51)	0.41	(0.48)	-0.83	(-1.64)
15	Chemical industry	0.19	0.29	1.05	(1.19)	0.82	(0.95)	0.69	(0.86)	0.79	(1.08)	0.50	(0.59)	1.14	(2.24)
16	Food, drink and tobacco	0.14	0.16	2.97	(3.39)	2.68	(3.11)	2.30	(2.88)	1.84	(2.52)	2.28	(2.70)	0.31	(0.60)
17	Agriculture, forestry and fishing	0.13	0.10	3.00	(3.42)	1.92	(2.23)	1.53	(1.92)	1.14	(1.56)	0.40	(0.47)	-0.18	(-0.35)
18	Metal manufacturing	0.13	0.18	0.54	(0.62)	0.43	(0.49)	0.43	(0.54)	0.32	(0.44)	0.26	(0.31)	-0.05	(-0.09)
19	Insurance companies, pension funds etc	0.12	0.48	1.43	(1.63)	1.18	(1.37)	0.75	(0.94)	0.88	(1.21)	0.83	(0.99)	1.31	(2.59)
20	Secured on dwellings	0.05	0.07	12.46		13.81		20.17		26.84		15.72		49.26	
21	Central and local government services	0.04	0.18	0.68	(0.78)	0.49	(0.56)	0.47	(0.59)	0.56	(0.76)	0.21	(0.25)	0.85	(1.68)
22	Building societies			1.66	(1.89)	2.00	(2.32)	2.31	(2.89)	2.73	(3.73)	2.49	(2.96)	4.14	(8.16)
23	Hotels and catering			2.00	(2.28)	2.77	(3.22)	2.83	(3.55)	1.92	(2.63)	3.87	(4.59)	-1.13	(-2.22)
24	Investment and unit trusts etc			1.83	(2.10)	2.30	(2.67)	1.58	(1.98)	1.57	(2.15)	2.95	(3.50)	1.54	(3.03)
25	Leasing companies			3.84	(4.39)	4.00	(4.64)	5.61	(7.03)	5.92	(8.10)	4.23	(5.02)	6.97	(13.73)
26	Mechanical engineering			1.06	(1.21)	0.85	(0.99)	0.76	(0.95)	0.68	(0.92)	0.55	(0.65)	0.39	(0.76)
27	Oil and extraction of natural gas			1.34	(1.53)	0.98	(1.14)	1.26	(1.58)	0.87	(1.19)	0.47	(0.56)	-0.44	(-0.87)
28	Other energy industries and water			0.84	(0.96)	0.19	(0.22)	0.41	(0.51)	1.58	(2.16)	-0.72	(-0.86)	5.52	(10.87)
29	Other transport equipment			0.75	(0.85)	0.44	(0.51)	0.35	(0.44)	0.25	(0.34)	0.00	(0.00)	-0.09	(-0.18)
30	Retail motor trades			1.22	(1.40)	1.08	(1.25)	1.19	(1.49)	1.09	(1.49)	0.87	(1.03)	0.73	(1.44)
31	Securities dealers, stock-brokers etc			6.24	(7.12)	5.00	(5.80)	2.63	(3.29)	6.9	(9.43)	3.26	(3.87)	21.24	(41.86)
			100	**(100)**	**100**	**(100)**	**100**	**(100)**	**100**	**(100)**	**100**	**(100)**	**100**	**(100)**	

(a) Based on branch lending from 1976–91 by a large UK bank (see Davis, E P, 'Bank Credit Risk', Bank of England *Working Paper Series*, No 8 (April 1993)).

requirement for Tier 1 capital is 4% of risk-weighted assets. The average Tier 1 capital ratio of the 'Big Four' banks was 5½% in the trough of the last recession, and has since risen to 7%. Profits after tax and provisioning at the main UK banks have also been high in recent years, and above levels at the same stage of the previous cycle.(1) In contrast, many banks in the United States were close to their required regulatory capital ratios in the early stages of the US recovery. In the early 1990s, banks in the United States substituted (zero risk-weighted) government securities for (positively risk-weighted) loans in their asset portfolios.(2) This meant that cuts in the official rate did not initially boost the quantity of bank loans, but did so only when the economy improved and the capital constraint had eased. Notwithstanding their surplus regulatory capital, UK banks also decided to substitute government debt for private sector loans in their portfolios in the first two years of this recovery. Since 1995, however, the share of private sector assets in the banks' balance sheets has been on an upward trend (not shown), reflecting better lending opportunities in the private sectors.

A sectoral breakdown of bank loans may also provide an indication of banks' loan supply policy. Table B shows domestic bank lending by industrial sector.(3) The sectors are ordered by their degree of credit risk based on default rates during the 1976–91 period (shown in columns 1 and 2). The next four columns show the share of the outstanding stock of loans by sector at various dates: the first period of data availability (1986 Q4), close to the peak and trough of the previous cycle, and the most recent position available (1997 Q1).(4) The final two columns show the contribution of each sector to the total increase in bank lending during the two recovery phases. During the 1990s recovery, there has been a large fall in the share of bank lending to the property and construction sectors. Loans to these sectors in the 1980s contributed disproportionately to bank losses. That is, no doubt, why exposure to these sectors has been curtailed and has produced the contrast with the second half of the 1980s, when these sectors were among those where borrowing was growing most rapidly. The detailed sectoral data shows that the largest growth in bank and building society sterling lending during the 1990s has been to OFIs, particularly to securities dealers, mainly reflecting the growth in reverse repos (see Table C).

Table C

(a) Share of bank and building society loans by main asset categories

Per cent

	1990 Q2	1998 Q1
Housing	45.3	47.5
Consumer credit	7.7	7.8
Other personal (a)	8.0	2.2
ICCs	25.4	21.2
OFIs	13.6	21.3
of which:		
Leasing companies	3.0	4.3
Securities dealers	0.5	4.0
Insurance and pension funds	0.7	1.5

(b) Change in share of total loans since the trough

Percentage point change

	1981 Q1–1990 Q2	1992 Q1–1998 Q1
Housing	-1.4	-0.6
Consumer credit	0.6	0.4
Other personal (a)	0.3	-4.9
ICCs	-4.3	-2.3
OFIs	4.9	7.3
of which:		
Leasing companies	n/a	0.4
Securities dealers	n/a	3.6
Insurance and pension funds	n/a	1.0

n/a = not applicable.

Source: Bank of England.

(a) The marked decline in the share of 'other personal' loans is largely because of the reallocation of unincorporated businesses to ICCs or OFIs in 1997.

Conclusion

There are both similarities and differences in the financial positions of the corporate and personal sectors in the 1980s and 1990s. The current level of income gearing in both sectors is similar to the comparable stage of the previous economic cycle (end 1986)—debt levels are currently higher, but nominal interest rates are lower. In the 1980s, there was little change in income gearing for either the corporate or personal sectors prior to the sharp tightening of monetary policy in 1988, but the marked rise afterwards preceded the 1990–92 recession. No comparable rise in income gearing has yet been evident in the 1990s recovery, though it has risen slightly following the interest rate rises since spring 1997.

ICCs' capital gearing has been above the level of the mid 1980s throughout the current recovery, but so far has shown no signs of the kind of deterioration that occurred after 1987. Similarly, the stock of personal sector debt began this recovery at a higher level than in the early 1980s but, unlike then, has grown no faster than incomes and slower than wealth so far during the 1990s.

There are other contrasts between the 1980s and 1990s recoveries. With regard to lending flows, in the 1980s boom, there was a channelling of funds to ICCs and personal housing loans. But in the current recovery, lending has been channelled more towards unsecured consumer credit and to OFIs. With regard to asset prices, in the 1980s, property and equity prices rose markedly in tandem. Although equity prices have again risen strongly in the 1990s, property prices have so far risen slowly in comparison.

During the 1980s, the spread of bank and building society mortgage rates over base rate fell only towards the end of the boom and only as a result of a delayed response to the increase in official rates. In contrast, since the early 1990s, lending spreads in the mortgage market have fallen, as they

(1) See the *Banking Act Report* (1997/98), Bank of England.
(2) For evidence of capital constraints in the United States in the early 1990s, see the *Federal Reserve Bulletin* (various issues) and Thakor, A V (1996), 'Capital requirements, monetary policy, and aggregate bank lending: theory and empirical evidence,' *The Journal of Finance*, March.
(3) Data are shown excluding and including housing loans. The latter data are affected by the breaks in the series over the period, caused by the conversion of some building societies into banks.
(4) Due to a change of industrial classification, a sectoral composition on the same basis is unavailable after 1997 Q1.

appear to have done in other main lending markets. This may have contributed to the growth in lending during this recovery, but does not necessarily imply an increase in financial risk, so long as the financial status of borrowers has improved.

The evolution of the financial position of the personal sector during the 1980s probably reflected a steady response to financial liberalisation from a starting position of sub-optimal debt levels—total personal debt rose much more rapidly than incomes, and at least in line with the rapid growth in personal wealth. Although consumer credit has increased at least as much relative to incomes during the current upswing as in the previous one, it now still accounts for only around one eighth of personal sector debt. As noted above, the relatively slow growth in lending for house purchase so far during this upswing has meant that the personal sector debt/income ratio has remained flat, while the debt/wealth ratio has fallen. This suggests that the upward adjustments in personal sector debt levels that followed the 1980s liberalisation may have been completed before the current recovery.

Appendix
Data definitions for charts

Chart 1: ICCs' net income gearing is the ratio of net interest payments by ICCs on all forms of debt to income after tax (but before payment of interest and dividends) x 100. Source: ONS. Base rate is a quarterly average of banks' base rates. Source: Bank of England.

Chart 2: Personal sector total gearing is the ratio of gross interest payments to personal disposable income x 100; mortgage gearing is the ratio of mortgage interest payments to personal disposable income x 100. Sources: ONS and Bank of England.

Chart 3: ICCs' financial balance is the difference between ICCs' undistributed income and investment spending as percentage of quarterly nominal GDP. Source: ONS. M4 lending flow (measured as negative) is the bank and building society sterling lending to ICCs as percentage of quarterly nominal GDP. Source: Bank of England.

Chart 4: Personal sector savings rate is the ratio of saving (defined as PDI minus consumer spending) to personal disposable income x 100. M4 lending flow (measured as negative) is total personal sector M4 lending flow as percentage of PDI. Sources: ONS and Bank of England.

Chart 5: Mortgage equity withdrawal is the value of the lending flow to individuals secured on housing but not used directly for house purchase, as a percentage of personal disposable income. Consumer credit is the flow of unsecured M4 lending to individuals as a percentage of personal disposable income. Source: Bank of England.

Chart 6: Ratio of M4 lending stock to the private sector to current GDP at market prices, where the quarterly flow of GDP is annualised. Sources: Bank of England and ONS.

Chart 7: Ratio of stock of M4 lending to ICCs to income after tax (but before interest payments and dividends); and ratio of ICCs' stock of total debt (consisting of loans from banks and building societies in sterling and foreign currency and outstanding debt instruments net of liquid assets) to the capital stock (measured as the replacement value of fixed assets) as a percentage. Sources: ONS and Bank of England.

Chart 8: Stock of secured M4 debt to the personal sector as a percentage of quarterly personal disposable income. Sources: ONS and Bank of England.

Chart 9: Stock of M4 loans outstanding to personal sector and to OFIs as percentage of quarterly personal disposable income. Sources: Bank of England and ONS.

Chart 10: Stock of unsecured M4 consumer loans to individuals (and subset related to credit cards) as percentage of quarterly personal disposable income. Sources: Bank of England and ONS.

Chart 11: Personal sector ratio of M4 lending to net financial plus tangible wealth. Sources: Bank of England and ONS.

Chart 12: Index of the value of gross personal sector financial assets and the nominal value of the housing stock, where 1981 Q1 = 100. The value of the housing stock is an annual series interpolated to give quarterly observations. Source: ONS.

Chart 13: Ratio of the Halifax index of average house prices to average annual earnings per worker. Source: ONS.

Chart 14: Percentage of loans outstanding by value that are in arrears on loan repayments, and percentage (by value of loans) of mortgage holders subject to repossession—relates to the Council of Mortgage Lenders (CML) members only. Source: Compendium of Housing Statistics.

Chart 15: Number of companies being liquidated and persons filing for bankruptcy. Source: ONS.

Chart 16: Percentage of firms in CBI Quarterly Industrial Trends Survey responding positively to the question: 'What factors are likely to limit (wholly or partly) your capital expenditure authorisation over the next twelve months—cost of finance?' Also shown, quarterly average base rate lagged one quarter. Sources: CBI and Bank of England.

Charts 17 and 18: Retail spread is the difference between average quarterly variable mortgage rates and retail deposit rates. The mortgage spread is the difference between the average quarterly variable mortgage rate and base rate. Source: Bank of England.

Charts 19 and 20: Lending spread over base rate. Lending rates are calculated as the ratio of interest receipts to loans outstanding. Source: Bank of England.

Chart 21: Percentage of firms responding positively to the question: 'What factors are likely to limit (wholly or partly) your capital expenditure authorisation over the next twelve months—inability to raise external finance?' Source: CBI.

Chart 22: Ratio of Tier 1 capital of NatWest, Barclays, Lloyds (Lloyds-TSB from 1995) and Midland relative to risk-weighted assets and their profits (post-tax and bad debt charges) as a percentage of assets. Source: Published annual accounts.

Are prices and wages sticky downwards?

By Anthony Yates of the Bank's Structural Economic Analysis Division.

In this article,[1] *Anthony Yates examines the theoretical and empirical evidence for prices being sticky downwards—in other words, for the existence of downward nominal rigidities. This evidence has most commonly been cited in the context of wages—if downward nominal rigidities exist and prevent wages from adjusting fully to a shock to demand or supply, then such a shock may affect levels of employment. He concludes that the theoretical and empirical cases are both at best unproven.*

Introduction

From time to time, economists have argued that there may be barriers to prices adjusting fully. If prices do not adjust, then more of the effects of a shock—a shift in demand or supply—will be felt in quantities. This paper examines the evidence for one possible source of rigidity: that the money (or nominal) price of goods or labour may be sticky—and in particular sticky *downwards.*

The argument is most commonly made in connection with wages, and it is usually put in these terms: when the demand for labour falls, the real wage (that is, the amount of goods the wages will buy) has to fall to minimise the effect on employment. But if for some reason the money wage will not fall, then the real wage can only fall if the amount of goods these money wages can buy also falls—in other words, if the price level rises.[2] This simple example gives us our definition of downward nominal rigidity: wages are downwardly rigid if the responsiveness of the money wage to a shock to labour demand is greater when the shock is positive than when it is negative. In this kind of world, if monetary policy holds the price level constant, the real wage cannot fall sufficiently, and the shock to the demand for labour will bring about a fall in employment.

The second section of this article evaluates the theoretical case for downward nominal rigidity in wages and in prices; the third section considers the empirical evidence. The final section draws together the theoretical and empirical evidence, and concludes that the empirical case for downward nominal rigidities is at best 'not proven'.

Theories of downward nominal rigidity

1 Wages

There are two broad classes of argument for the existence of downward nominal rigidities in wages, relating to (i) relative wage effects and (ii) money-illusion.

(i) Relative wage effects

One argument—ascribed by some to Keynes—for the existence of downward nominal rigidities is that individuals will not be prepared to concede nominal wage cuts because they are concerned about relative wages. In fact, a concern about relative wages is not enough to generate downward nominal rigidity. Suppose, for example, that I am offered a 10% cut in nominal wages by my employer. If I am concerned about what my peers are earning in a neighbouring factory, and uncertain as to whether they are going to be made a similar offer, I might resist the cut, investing time and energy in strikes, or quitting and searching for another job. Next, suppose that in a different situation, I am offered a 10% nominal wage increase by my employer. If I am concerned about relativities, I should still be worried that I might lose out by accepting the offer: my peers in the neighbouring factory may be offered 20%. So I ought to devote just as much effort towards increasing the money wage offer as I did when I was offered a 10% cut. In each case, there is a kind of co-ordination failure: no one party wants to be the first to take what might be a disadvantageous wage offer. In each scenario, real wage cuts could be implemented across the economy by a change in the general price level, but this is just as true for when nominal wages are rising as when they are falling.

The following section argues that for concern about relative wages to result in an argument for the existence of downward nominal rigidities, additional—and quite possibly unrealistic—assumptions are needed about the determination of wages.

- *Union cartels*

One possibility is that wage-bargainers are part of a cartel. If the labour force were members of competing trade unions, and unions wanted to maintain 'market share' in worker-membership and were concerned about real wages, the unions could collude by fixing nominal wages (or at least nominal wage bids); and they would do this only if

(1) This article summarises some of the analysis in 'Downward nominal rigidities and monetary policy', Bank of England *Working Paper*, No 82, forthcoming.
(2) For the sake of simplicity, it is assumed that there is no productivity growth. With productivity growth, then even if the price level is constant, the real product wage can fall if nominal wages are constant.

they did *not* have access to cheap means of continuous wage indexation. In this situation, under certain informational assumptions, individual unions would be reluctant to concede nominal wage cuts in the face of an adverse shock to aggregate demand, in case other unions would interpret this as beginning a 'price war' over membership, which would eventually result in no change in market share and lower nominal (and real) wages. They would feel more inclined to accept nominal wage increases, since other unions would know that by doing so they risked pricing themselves out of the market for worker-members. However, note the auxiliary assumptions made here: competing trade unions cannot properly infer each others' preferences and so cannot interpret each others' wage bids, and worker-members are transferable across trade unions and jobs.(1)

- *Staggered wages and no information about outside wage changes*

Another possibility is that wage contracts are staggered and, as before, not indexed to the price level; individual workers or unions have no information about outsiders' future wage settlements, and always assume that others' nominal wages are going to remain unchanged when they come up for renegotiation. In this situation, workers will be happier with a 10% nominal wage increase—which, according to their information, will give them a real relative increase of 10%—than with a 10% cut.

- *Staggered wages and a dislike of 'going first'*

Yet another possibility is that wage contracts are staggered and non-indexed, and renegotiation of wages outside the (say annual) wage round is impossible or very costly for workers and firms alike. In these circumstances, workers faced with a 10% nominal wage cut may be reluctant to go first, even if they know that others will follow, because they will lose out in the meantime. But workers will be happy to go first if they are offered a 10% nominal wage increase, because for a short period they will gain. Of course, we also need to rule out the possibility that workers will value the option to 'catch up' in the next period's negotiations, or to assume that they discount this option so heavily that downward nominal rigidity still results.

The argument that downward nominal rigidities exist thus rests on a series of assumptions: the existence of union cartels; the non-indexation of wage contracts; and no knowledge about outside wages, or the aversion to falling behind others when wage contracts are staggered. All possibilities rely on an additional assumption that workers can extract some rent from employers and not be substituted costlessly for a member of the jobless queues. These rents may derive from the monopoly power of trade unions, or search costs, or hiring and firing costs. If they cannot extract these rents, then firms will simply pay workers their real marginal product, whatever that implies in nominal terms.

Relativities reconsidered

Leaving aside these theoretical assumptions, can we find evidence that wage relativities, or 'fairness', are indeed important concerns in the real world? There is a considerable amount of survey, experimental and empirical evidence that fairness is important.(2) But there are serious problems in interpreting this evidence. It could be that workers are concerned about the differential between themselves and the highest earners, but it could also be that individuals are simply happier with higher levels of income. In some cases, the two behaviours are observationally equivalent.

Moreover, it is difficult to distinguish between workers who are genuinely concerned about fairness, and workers who are simply monitoring wages relative to their own outside options. If workers are aware of their outside opportunities and are simply weighing up the costs and benefits of staying with their current firm, then this is perfectly consistent with competitive (full-information) behaviour in labour markets. For example, if there is a fall in the demand for *x*'s type of labour across the whole economy, *x* will see that the outside wage has also fallen and will probably accept a cut in his or her own money (and therefore real) wage. If the outside wage has not fallen, this will send a signal to *x* that there is something amiss with *x*'s firm, and will lead *x* to decide whether or not to stay put, taking into account the chances of getting a job elsewhere. In short, what in empirical studies looks like a concern for 'fairness' could be nothing of the sort, and may not lead to downward nominal rigidity in wages.

But there is an interesting contradiction here: many of the studies of fairness demonstrate the phenomenon that an individual's happiness or own wage is a function of the outside wage. This comes close to violating one of the assumptions needed to link fairness to downward nominal rigidity—that workers have little or no knowledge of outsiders' wages and assume that a 10% nominal wage cut means that they will lose out by 10%.

Moreover, the discussion so far has taken it as given that concern about relativities reflects *selfish* behaviour: that, for example, *x* feels unhappy if he or she earns less than *y*. It is common in the literature on experimental game theory to observe the opposite. For example, laboratory experiments

(1) We might ask at this point why we could not think of individuals competing for work forming a cartel, rather than a collection of trade unions. The reasons are these. First, the assumption that individuals cannot interpret others' wage negotiations accurately is less plausible when the others work in the same firm. Second, labour demand is typically 'lumpy' (because of technology and hiring and firing costs) and so competition over 'market share', which in the individuals' case means hours worked, is likely to be limited and of second-order importance.

(2) For example, a recent paper by Clark and Oswald (1996) studies 5,000 workers surveyed in the first wave of the British Household Panel Study. They find evidence of respondents reporting themselves as being 'happier' when their wages are higher relative to a benchmark comparison. Cappelli and Sherer (1988) report on a survey of around 600 airline employees in the United States, and also find that 'satisfaction with pay' rises significantly as the wage rises relative to a measure of outside market wages. Katz (1986) found that *firms* are concerned with the 'fairness and consistency' of their wage structures, which could indicate that *workers* themselves consider fairness to be important. Di Tella *et al* (1996) find a weak correlation across countries between income inequality (measured by the Gini coefficient) and total reported levels of 'happiness' in country surveys. They also find that happiness rises as individuals move up the income distribution within countries.

with people playing competitive games often show that participants will throw away income if this leads to a fairer distribution of the winnings.[1] This could mean that certain groups within a company might turn down a money wage increase, or even accept a money wage decrease that leads to a fairer distribution of earnings. This is not to say that this form of fairness is an important economic phenomenon, but it does illustrate that concern about wage relativities does not give us *a priori* grounds for believing that there is downward nominal rigidity in wages.

(ii) Wage bargainers suffer from money-illusion

Another argument for the existence of downward nominal rigidities is based on the assumption that workers suffer from money-illusion, and so will resist nominal wage cuts as they assume they amount to real wage cuts.

But money-illusion itself is not enough to create downward nominal rigidities. First, if there is no real-wage rigidity—if wage-bargainers are simply price-takers and are paid their marginal products—then a negative shock to the demand for labour will not create any excess supply: workers' money-illusion will not come into the determination of the labour market equilibrium. Second, for downward nominal rigidities to operate, wage earners' happiness must suffer more when 5% of their money wage is taken away than it improves by having an extra 5% given to them. In other words, workers must also display what is known as *loss aversion*. This may amount to nothing more than the observation that individuals find themselves at a point where the marginal utility of real income falls as income rises. Or it could be that consumption is lumpy. A fall in real income may mean that an individual can no longer service the mortgages on a house of size x, and has to trade down to one of $x - \delta$ and incur transactions costs. Yet a rise in real income of the same size may not be sufficient to warrant paying the transactions costs associated with trading up to a house of size $x + \delta$.

So is there evidence that money-illusion and loss aversion are pervasive? Keynes (1936) himself wrote of 'the psychological encouragement likely to be felt from a moderate tendency for money-wages to rise' (page 271). On the other hand, Tobin (1972) once wrote that 'economic theorists can commit no greater crime than to assume money illusion' (page 3); but perhaps the evidence persuades us to think differently.

For example, Kahneman, Knetsch and Thaler (1986) report the results of a survey where 78% of respondents said that they would prefer a 7% money wage increase when inflation was 12% to a 5% money wage cut when prices were stable. This is money-illusion: real wages fall by (about) 5% in both examples, but respondents gained satisfaction from having increases in the money wage itself. Shiller (1996) also reports survey evidence of people's dislike of inflation: he says that 'the largest concern with inflation appears to be that it lowers people's standard of living. Non-economists often appear to believe in a sort of sticky-wage model, by which wages do not respond to inflationary shocks' (page 2). No one would dispute the fact that some money wages will not respond to inflationary shocks, nor that over significant time periods, inflation does lower people's standard of living.[2] But Shiller's observation still sounds very much like a form of money-illusion, not least since in industrialised economies, the *real* wage has risen pretty much in line with productivity. Shiller asked respondents a more direct question about money-illusion—he asked whether they agreed with the statement: *'I think that if my pay went up I would feel more satisfaction in my job, more sense of fulfilment, even if prices went up just as much'*. Only 41% of all respondents disagreed with this. (Worryingly, only 90% of economists disagreed.)

However, perhaps we ought not to place too much weight on this kind of information. It relies on individuals' perceptions of *hypothetical* events, rather than reveals their preferences by showing how they respond to *actual* events.

Turning to loss aversion, Dunn (1996) finds evidence of this in wage data from the United States. His observation confirms the earlier work of Thaler (1980), Knetsch and Sinden (1984), and Kahneman, Knetsch and Thaler (1990), which found that in experimental games, people required more money to give up an object than they were willing to pay to acquire it. There are instances of this kind of behaviour elsewhere in the economy. For example, a substantial literature has grown up around the idea that managers of joint-stock companies set their dividend policies to minimise the chance of ever having to cut dividends. This is presumably because they fear that markets will react more adversely to a cut in dividends than they do positively when dividends increase. This is borne out by survey evidence, for example Lintner (1956), or empirical tests, such as the work by Fama and Babiak (1968).

Nonetheless, it ought to be evident by now that the task of finding a good explanation for money wages being sticky downwards is very demanding. To summarise, we need either:

(i) a concern for fairness, real wage-stickiness plus *either*
  - (a) union cartels;
  - (b) no information about outside wage settlements;

  or (c) extreme dislike of 'going first' in the wage round;

or

(ii) money-illusion, loss aversion *and* real-wage stickiness.

There are many examples of practitioners who believe that downward nominal rigidity is a genuine phenomenon.

(1) See, for example, Guth *et al* (1982), Bolton (1991) and Smith (1994).
(2) See Briault (1995) for a discussion of the costs of inflation.

Bewley and Brainard (1993) surveyed employers in Connecticut and wrote: *'The psychological factors are the reaction of employees to the loss of income resulting from a pay cut or short-time. A loss of income hurts morale . . . Employers claimed that employees saved little so that their living standards fall as soon as their pay is cut . . . the reduction in living standards put them in a bad mood . . . a pay cut may also be interpreted as a slap in the face, even if the pay of all employees is cut'* (page 3). If this is true, Connecticut would seem to be subject to money-illusion, loss aversion and fairness considerations all at the same time: perhaps proof of the old joke that economists are those who take something that works in practice and prove that it does not work in theory!

2 Prices

Are there similar possibilities that prices are sticky downwards in product markets? Of course, if firms are price-setters in product markets, and they operate in labour markets with some or all of the features identified already, then there may be a visible downward stickiness in product prices. But are there features of the goods market, *independent* of the determinants of money wages, that mean that prices will not fall as readily as they should?

(i) Price cuts would confuse customers who have money-illusion

Just as money-illusion could influence the determination of the price of labour, it could also affect product prices. One argument is that when aggregate inflation is positive, and price cuts are therefore rare, producers may be reluctant to cut prices for fear that such cuts would confuse their customers, who are not used to them. Whatever we may think about the theory, we can probably throw out this possibility simply because anyone who has shopped will know that price cuts, though perhaps rarer than price rises, are still common. Some prices (for example the prices of calculators, videos and computers) have fallen almost continuously, even leaving aside the improvements in the quality of these goods. In January last year, around 20% of prices in the UK RPI had fallen during the previous twelve months.

(ii) Price cuts signal quality cuts

A second argument why firms might be inhibited from making price cuts is that they fear that customers might interpret this as a fall in quality. One possibility is that customers cannot perfectly observe the quality of the good they are to purchase before they buy it; if they assume that firms price at or according to marginal cost, then they might assume that a fall in the price constitutes a reduction in the quality of the (marginal) inputs used to produce it. And if the relationship between the expected quality of the good and utility derived from buying it is discontinuous (below a certain quality threshold the good is useless), then the firm could experience disproportionate falls in demand if the price is reduced. This idea was first suggested by Stiglitz (1987), and presumes that customers have only limited information about the quality of the range of goods from which they are choosing. What little evidence there is suggests that this type of behaviour is rare.(1) But another possibility is that consumers derive utility from high prices themselves—from the prestige of consuming an expensive product, for example.

(iii) Prices are sticky downwards because of strategic behaviour between firms

Another barrier to price cuts may be strategic interaction between firms. The argument here is very similar to the discussion of union cartels. Imagine the following set of circumstances. Costs are falling over time (because of process innovation) in an industry with a few large competing firms. Selling prices are set by implicit agreement above the competitive (marginal cost) price, and because cartels cannot costlessly index the agreement, the agreement is made in nominal terms. But in order to stop new firms from entering, prices have to fall in line with the downward trend in costs. If firms cannot easily monitor whether a firm is cutting prices to gain market share or to preserve price/marginal cost margins, then prices may not fall at all, because no firm wants to be first to break the agreement and risk a price war. There is a small theoretical literature on this subject,(2) and some survey evidence in support of this idea.(3)

'Outcome'-based evidence of downward nominal rigidity

So far, it has been argued that some typical arguments for the existence of downward nominal rigidities—based on either fairness concerns, or on money-illusion—are not watertight. We have also considered some evidence that sheds light on whether the behaviours embodied in a fuller theory of downward rigidity (money-illusion, loss aversion, cartel behaviour, quality signalling) are detectable. We turn now to look at empirical evidence on wage and price outcomes to see if the economy behaves in a way that is *consistent with* there being some downward nominal rigidity —even if, as we shall explore later, such evidence cannot *prove* that there is downward nominal rigidity.

How frequent are wage and price cuts?

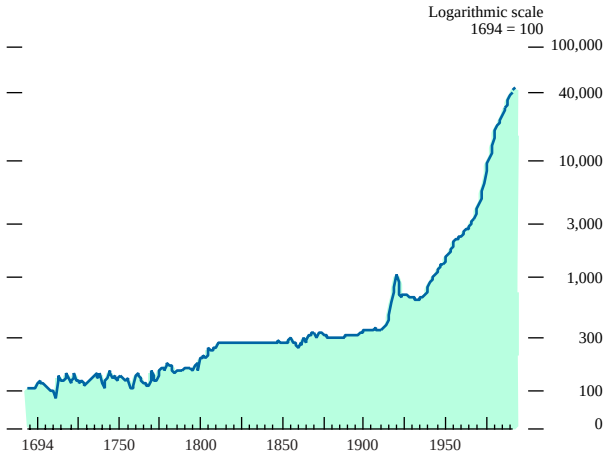
This is perhaps the most obvious question to ask. Surely, if price and wage cuts are common, we cannot claim that the economy behaves as though there is downward nominal rigidity. Chart 1 shows that cuts in the aggregate money wage were far more common in previous centuries; Chart 2 makes the same point, but for the aggregate price level.

Nevertheless, movements in the *aggregate* price level conceal considerable variation in *individual* prices. Table A

(1) See, for example, Blinder (1995) and Hall *et al* (1996).
(2) Granero (1996); Hansen *et al* (1996) and Kovenoch and Widdows (1991) all present models that generate nominal price asymmetries due to strategic interaction.
(3) See Hall *et al* (1996) and Small and Yates (1998).

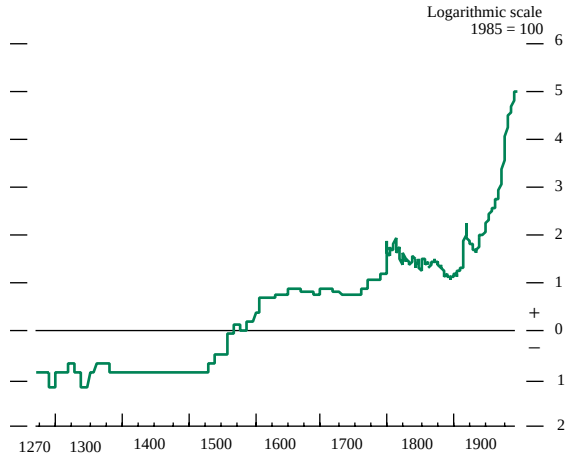
offers snapshots of the distribution of (annual) price changes at two-year intervals from 1976–96, and Chart 3 plots the proportions of prices within the aggregate index that are falling (year on year), from 1975–96. It is clear that at any one time significant proportions of retail prices are falling in the economy.

Chart 1
The money wage since 1694



Source: Data compiled at the Bank of England, combining ONS sources and data from Phelps Brown and Hopkins (1956).

Chart 2
The aggregate price level since 1270



Source: McFarlane and Mortimer-Lee (1995).

Table A
The distribution of price changes in the RPI

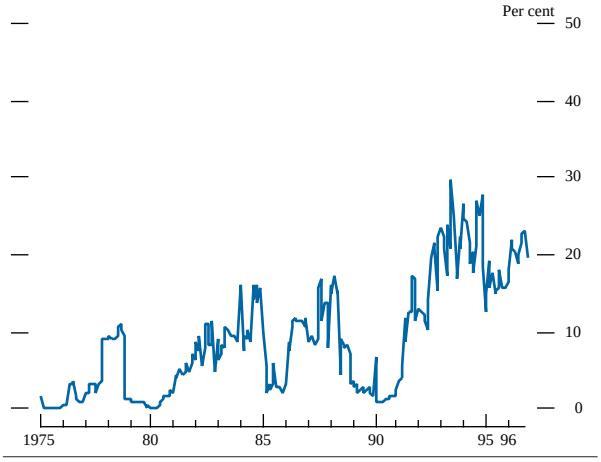
Per cent	<-10	-10≤ x <-5	-5≤ x <0	0	0< x ≤5	5< x ≤10	>10
Jan. 1976	0.3	0.0	0.3	0.0	5.6	4.2	89.6
Jan. 1978	1.2	0.0	8.0	0.0	5.3	6.9	78.6
Jan. 1980	0.0	0.0	0.0	0.0	5.0	8.3	86.8
Jan. 1982	0.0	0.0	8.9	0.0	16.1	32.5	42.6
Jan. 1984	0.0	0.0	16.1	1.4	39.7	40.6	2.3
Jan. 1986	0.3	0.0	2.9	0.0	46.9	44.4	5.6
Jan. 1988	0.0	0.3	15.7	3.0	40.0	38.0	3.0
Jan. 1990	0.0	0.0	6.6	0.4	26.5	50.5	15.9
Jan. 1992	7.7	0.5	4.7	0.0	18.2	38.2	30.7
Jan. 1994	0.7	8.1	15.7	3.0	42.7	23.9	5.8
Jan. 1996	0.0	3.6	14.5	1.1	48.2	32.1	0.5

Note: Weighted proportions of the index falling into particular inflation ranges, calculated as annual percentage changes; distribution observed across around 65 components of the RPI.

Similarly, we can look at the distribution of money wages. Table B shows data compiled by the Bank from various organisations that collect data on wage settlements.

Chart 3
Price cuts in the RPI

Weighted proportions



Negative settlements are indeed rare: in 1993, when 63% of employees were receiving settlements in the range 0.1%–2.4%, 3% were receiving pay freezes and only 0.2% of employees took pay cuts. In no other years were there any recorded negative settlements. Carruth and Oswald (1989) also find that there are very few negative settlements in the United Kingdom. Ingram (1991) uses manufacturing settlements data collected by the Confederation of British Industry and arrives at the same conclusion: negative settlements are extremely rare.

Table B
The distribution of wage settlements in the United Kingdom

Employees in each pay band as a percentage of the total

	Cuts	Freezes	0.1–2.4	2.5–4.9	5.0–7.4	7.5–9.9	10.0+
1992	0.0	5.8	0.8	78.1	15.2	0.0	0.2
1993	0.2	3.0	63.2	33.3	0.3	0.0	0.0
1994	0.0	0.6	47.7	50.9	0.7	0.0	0.0
1995	0.0	0.7	5.7	92.6	0.8	0.1	0.0
1996	0.0	0.7	11.3	86.1	1.8	0.0	0.1
1997	0.0	0.2	3.6	87.5	8.1	0.1	0.5
1998 (a)	0.0	0.1	0.4	85.3	12.8	1.3	0.1

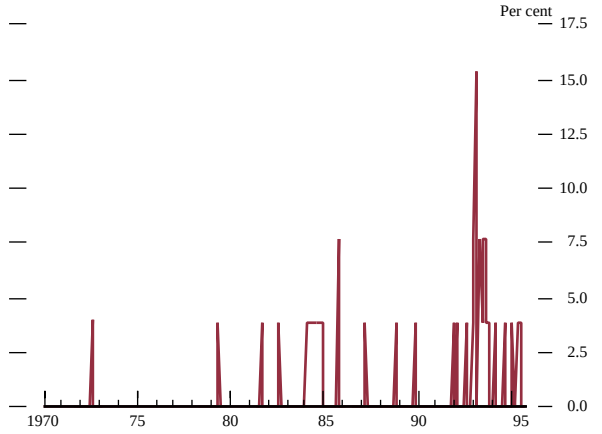
Source: Bank wage settlements database, compiled from IDS, LRD, IRS publications.

(a) Provisional data.

Of course, negotiated settlements may leave scope for employers to cut nominal earnings by other means. Chart 4, which shows the (unweighted) proportion of industries where average earnings fell over a twelve-month period, reveals that there are rather fewer earnings cuts than price cuts (Chart 3) in the United Kingdom. But we would expect this, because money wages rise not only with inflation but also with productivity.

Smith (1998) examines changes in the self-reported, 'usual' gross pay of respondents in the British Household Panel Study (BHPS): she finds that nominal pay cuts are common. Each year between 1991 and 1995, between 26%–30% of respondents (who did not change jobs) saw their nominal pay fall. Even this figure may conceal some flexibility, since employers could no doubt bring about deviations from 'usual' pay, for example, by varying overtime.

Chart 4
Earnings cuts in the United Kingdom



Source: ONS.

Table C summarises the evidence on the frequency of wage cuts, including studies on US data, which reveal a fair degree of controversy about exactly how frequent nominal wage cuts are.

What does the distribution of wage and price changes tell us about downward rigidities?

It is difficult to know what to conclude from these data on the frequency of wage and price cuts, because we do not know the counterfactual. For example, just because we observe some wages and prices falling, this does not allow us to rule out the possibility that these wages and prices would have fallen by even more in the absence of some downward rigidity. To detect downward nominal rigidity, we need to know more about the distribution of wage and price changes: in this way we can get a grip on the counterfactual.

First, if there is downward nominal rigidity, then we would expect wage and price changes to cluster at zero and so to exhibit positive skewness. Of course, there may be other factors causing a cluster at zero—for example, productivity shocks could cluster such that the bargained wage change comes out at zero—but this is unlikely.

Do the UK distributions of wage and price changes show some signs of skewness? The settlements data are clearly truncated at zero—see Table B. Table A also shows some evidence of a cluster at zero and positive skewness in retail prices. But Charts 5 to 7 show that average skewness does not seem to be positive, and in fact varies a great deal.

There is also useful information in changes in the distribution over time. Skewness should fall as inflation rises: the higher the rate of aggregate inflation, the fewer workers and firms there are who would ideally like to cut wages/prices, and the fewer recorded wage changes there

Table C
Evidence on nominal wage rigidity: the frequency of wage cuts

Source	Nature of data	Summary
Akerlof *et al* (1996), Bureau of Labor Statistics	Changes in wages by employers (ie settlements) 1959–78 (US)	Negligible fractions of both union and non-union employers making negative changes
Akerlof *et al* (1996), Authors' survey of Washington area	Phone survey of respondents' wage changes in previous year, 1995 (US), excluding overtime and bonuses	1.7% negative pay changes and no change in job characteristics; additional 1% with changes in job characteristics
Akerlof *et al* (1996), Bureau of Labor Statistics	Contract settlements involving more than 1,000 workers (US)	2.3% of contracts with negative changes in first year, average 1970–94
Various studies using the Panel Study of Income Dynamics (PSID)	Wage and salary changes (including bonuses and overtime) (US)	10.6% of wage-earners and 24.3% of salary-earners with pay cuts
Carruth and Oswald (1989)	UK settlements data	Nominal wage cuts rare
Crawford and Harrison (1997)	Canadian SLID data, 1993	10% had hourly wage cuts
Crawford and Harrison (1997)	Sobeco Ernst and Young Survey of wage changes, including bonuses	9%–20% had wage cuts
Crawford and Harrison (1997)	Canadian union wage settlements data units of >500 employees	Negligible number of negative settlements
Pierre Fortin (personal communication with Akerlof *et al*)	Canadian labour contracts without COLAs	0.25% with wage cuts during 1986–88; 5.7% with cuts and 47.2% with wage freezes during 1992–94
Holzer (1996) four-city study	Changes in wages of new employees (excluding bonuses etc) reported by firms hiring non-college graduates (US)	4.84% of new employees with wage cuts
Ingram (1991)	UK manufacturing settlements data	Nominal wage cuts rare; wage freezes common in recession
O'Brien (1989), Hanes (1993), and others	Historical data (US)	Considerable wage rigidity in pre-war recessions
Smith (1998)	United Kingdom, gross pay from the BHPS, 1991–95	30% of job-stayers (per year) had nominal pay cuts
Yates (1998)	UK settlements data 1992–97	Very few recorded nominal wage cuts

ought to be clustered around zero. In other words, downward nominal rigidity should mean that there is a negative correlation between the mean and skewness of inflation in prices and wages. We cannot rule out the possibility that there might be other reasons why there is a zero-spike, or that this spike should correlate with the inflation rate. But in the absence of any obvious candidates, it would seem reasonable to interpret any correlation as revealing downward nominal rigidity.(1)

We can test this straightforwardly by examining the correlation coefficients between different moments of price and wage changes for the United Kingdom. (The data used run from 1965–95 for wages; from 1975–95 for retail prices; and from 1980–95 for producer prices.)(2) These coefficients show that there is no strong negative correlation

(1) Hall and Yates (1998) point out that a negative relation between mean and skewness could also indicate *upward* nominal rigidity; in which case, we need to use theory to decide whether a negative correlation is indicative of downward or upward rigidity. Kashyap (1995) is the only reference to the possibility that prices might be sticky upwards, pointing out that firms may be reluctant to push prices above certain nominal thresholds (eg £2.99 or £3.99) if they expect that demand would fall disproportionately. Hall *et al* (1996) found that 34% of firms (and 69% of retailers) thought that threshold pricing was important for their pricing. This argument is of course less relevant for wages. Other studies of the skewness in wage and price distributions include McLaughlin (1994), Lebow, Stockton and Wascher (1995) and Kahn (1997).
(2) The evidence on wages is an update of Yates (1995); the evidence on prices cited here draws from Hall and Yates (1998).

Chart 5
Skewness in retail prices

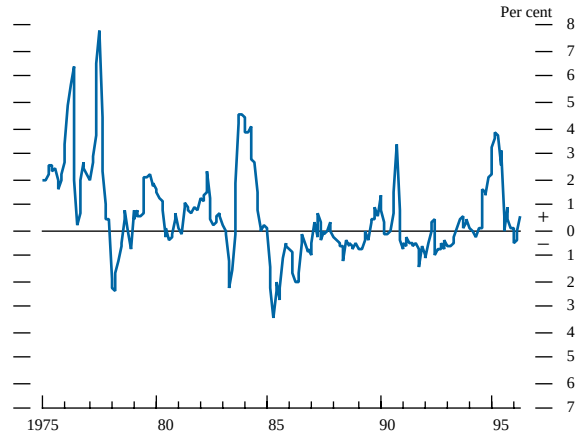


Chart 6
Skewness in producer prices

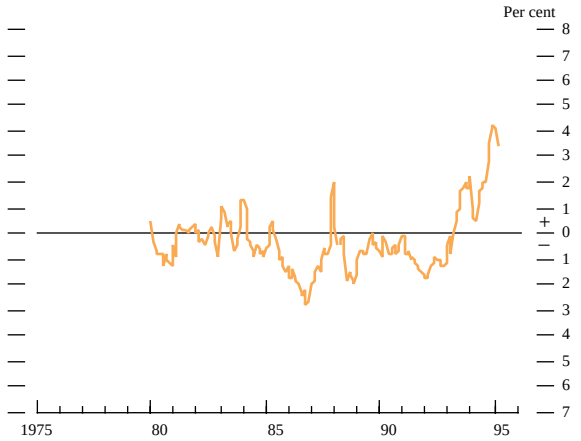
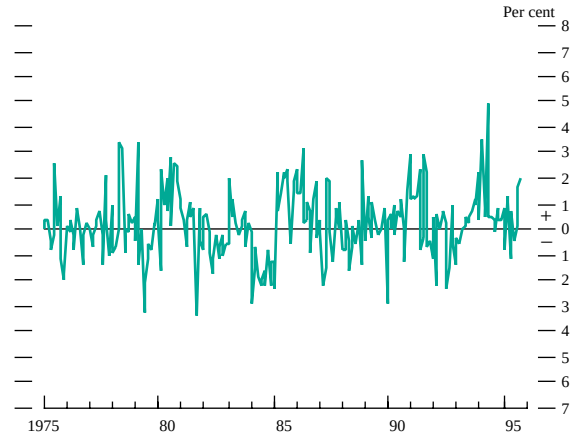


Chart 7
Skewness in wages



Note: All data come from the ONS; distributions are of the annual change in prices or wages, so these are the units of 'skewness'; retail price distribution consists of 65 sub-components; the producer price distribution is a disaggregation of the Producer Price Index, made up of around 300 sub-components; the earnings distribution is of SIC two-digit industries.

between the mean and skewness of inflation in retail, producer prices or wage inflation.

Hall and Yates (1998) go on to test more formally for a relationship between the mean and skewness of price changes, using the concept of Granger causality. These results, together with new results for UK earnings data, are reproduced in the Annex on page 243. If downward nominal rigidity is a significant phenomenon, then not only should there be a significant negative causality, but this causality should run from mean inflation to skewness and not the other way round. In fact, the results show no evidence of this. In no case, for either retail/producer prices or wages, is there any significant negative causality running from mean inflation to skewness. Formally, the hypothesis that the coefficients on mean inflation are insignificant in a regression of the skewness (or kurtosis) of inflation on its own lags can be accepted with a level of confidence greater than 80%. The closest to a result consistent with downward nominal rigidity is that there is evidence of negative causality running from the skewness to the mean of (i) the level and change in wages, and (ii) the change in retail prices. But the causality goes the wrong way for this to be evidence of downward nominal rigidity. Hall and Yates (1998) report experiments testing for the impact of the level of aggregation used in the calculation of the moments of these distributions, the weighting procedures used to construct the inflation aggregates, and the sample period. They conclude that this central result is relatively robust.

But other studies that use more disaggregated data have tended to find evidence of downward nominal rigidity, for example, Card and Hyslop (1995), using US data on individual earnings from the Panel Study of Income Dynamics (PSID). But Card and Hyslop noted that the data source that they used excluded low-performing job-movers, and perhaps biased the results towards finding evidence of downward nominal rigidity. Using the same PSID data, Kahn (1997) notes that while the spike in the distribution of wage-earners (paid more often than monthly) gets larger as inflation falls, this is not the case for salary-earners (paid monthly): regressions of the asymmetry in the wage distribution on the median wage change in Lebow *et al* (1995) confirm this dichotomy.

Brown *et al* (1996) confirm these findings, using CBI manufacturing settlements data for the United Kingdom. They measure wages at the level of the bargaining group, and so include all individuals, low-performing or otherwise (although there may be other selection biases induced by studying only firms who are CBI members). However, the drawback of settlements data, as we have already noted, is that firms can, in practice, achieve nominal earnings flexibility by varying hours worked, or overtime rates, or holiday, or other benefits, or any number of variables that are not measured by Brown *et al*. So an apparent downward rigidity in settlements may not imply that total earnings are rigid downwards. Smith's (1998) study of the BHPS reveals that between 6%–7.5% of those who did not change jobs had constant nominal wages (year on year) between 1991–95. The figure falls somewhat when she adjusts for those who report changes in hours worked, and the 'spike' is likewise smaller for 'job-changers'.

Table D summarises the evidence on how inflation affects the distribution of wages and prices.

Table D
Evidence on nominal rigidity: the effect of inflation on the distribution of wages and prices

Source	Nature of data	Summary
Lebow *et al* (1992)	US retail prices	No negative correlation between skewness and mean inflation
Rae (1993)	New Zealand retail prices	No negative correlation between skewness and mean inflation
Crawford and Dupasquier (1994)	Canadian retail prices	No negative correlation between skewness and mean inflation
Card and Hyslop (1995)	Panel Study of Income Dynamics (PSID) data (including earnings)	Inflation reduces the asymmetry between the upper and lower parts of the wage-change distribution
Lebow *et al* (1995)	As above—PSID	Correlation between asymmetry and inflation for wage-earners but not salary-earners
Brown *et al* (1996)	UK settlements data, manufacturing	Inflation reduces the asymmetry between the upper and lower parts of the settlements distribution
Crawford and Harrison (1997)	Canadian wage settlements data	Some evidence that the predicted number of settlement freezes is less than the actual number, at zero inflation. But depends on settlement definition
Groshen and Schweitzer (1997)	Federal Reserve Bank of Cleveland Community Salary Survey	Inflation reduces the standard deviation of wage changes across occupations and employers
Hall and Yates (1998) and Yates (1998)	United Kingdom: retail, producer price and average earnings distributions	No negative correlation between skewness and mean inflation
Yates (1998)	Japan: earnings and wholesale prices	No significant negative correlation between the skewness and mean of wage or price inflation
Smith (1998)	United Kingdom: gross pay of job-stayers in BHPS	No significant correlation between asymmetry and inflation

So there is no unanimity on the question of downward nominal rigidities, and there are clearly problems in interpreting correlations between the moments of a distribution in the way that these studies do. On the face of it, the evidence for downward nominal rigidity remains unpersuasive.

Asymmetries in the response to shocks

One final broad type of evidence that can shed light on whether there are downward nominal rigidities or not is whether the economy as a whole, individual industries, or even individual firms respond in the same way to upward demand or supply shocks as to downward shocks. Small and Yates (1998) use the responses to the Hall *et al* (1996) survey to analyse asymmetries in price responses to cost and demand shocks. They find that output prices are downwardly rigid in the face of cost shocks, but upwardly rigid in the face of demand shocks. Arden *et al* (1997) find, using UK manufacturing prices, that prices are quicker to respond to upward than downward shocks. Buckle and Carlson (1998) use survey data on New Zealand firms and find that (at high rates of inflation) prices are more likely to respond to demand/cost increases than decreases.

Blinder's (1995) survey also offers very mixed support for theories of downward nominal rigidity. He found that firms take longer to change prices in response to falls in demand and costs than they do to respond to increases in demand and costs. But he also reports that 4.5% of firms prefer to increase prices (rather than production) in response to a rise in demand, while 27% of firms prefer to cut prices in response to a fall in demand.

Another literature that has emerged over the last ten years or so looks at whether output responds symmetrically to upward and downward shocks to money or prices. If there is downward nominal rigidity in wages, for example, then a downward shock to prices will reduce the demand for labour (because the real wage will rise), and output will fall; an upward shock will have no (or at least a smaller) effect on employment or output. But though some of the results reported are consistent with there being downward nominal rigidity, they are not proof of it: De Long and Summers' work (which spawned the literature) was actually designed to test the 'credit channel' view of monetary policy. If this is what explains the asymmetry, then there are no implications for the existence of downward nominal rigidities.

Yet another approach has been to estimate the sacrifice ratio —the amount of unemployment generated by (or output lost in) a disinflation of a given size—and to see whether this is higher at lower rates of inflation.(1) If there are downward nominal rigidities, then it could be that inducing a disinflation will lead to more firms coming up against the downward floor to money wages when inflation is lower, and therefore that the (temporary) cost in terms of unemployment is higher. Ball, Mankiw and Romer (1998), Ball (1993), and Yates and Chapple (1996) all find that the output-inflation trade-off is higher in countries (or during episodes) with lower rates of inflation. Once again, these results are consistent with, but not proof of, there being downward nominal rigidity. (These particular pieces of work were actually designed to test 'menu cost' theories of price-setting, which predict that the trade-off will increase at lower rates of inflation, because firms change prices less frequently.)

The Ball, Ball *et al* and Yates and Chapple papers look at the correlation between the sacrifice ratio and inflation for a cross-section of countries. Another literature has sought to uncover evidence of non-linearities in the Phillips curve by estimating time-series relationships between inflation and growth, or inflation and unemployment. Certain types of non-linearity in these relationships might be consistent with downward nominal rigidity. For example, Clark *et al* posit that negative output gaps reduce inflation by less than positive output gaps increase it. That could be because negative output gaps do not have the same impact on

(1) Note that the conventional view is that in the long run there will be no impact on output or unemployment, so here we are really talking about whether the downward nominal rigidity increases the short-run cost of disinflation.

nominal wages, because of a floor to nominal wages, as positive output gaps do. Alternatively, one could invert the Phillips curve so that the output gap was on the left-hand side, and posit that negative changes in inflation are more likely to push desired wage changes against the zero constraint and therefore imply larger shifts in the output gap.

The evidence for non-linearity in the Phillips curve is decidedly mixed, as Table E shows. The findings differ according to the countries covered, the frequency and length of time-series covered and the method used to measure the output or unemployment gap. Such evidence as there is points to such effects being weaker in the United Kingdom than elsewhere.(1) Some (eg Clark *et al* (1996)) have argued that tests have been biased towards finding that the Phillips curve is linear: policy may have acted to counter the potentially non-linear response of inflation to demand shocks, for example. But even if there were a non-linearity in the Phillips curve, hidden or otherwise, such a finding would only be consistent with, not proof of, there being downward nominal rigidities in an economy. Other explanations abound. For example, Debelle and Laxton (1996) motivate their non-linear Phillips curve by arguing that 'as the unemployment rate falls below the NAIRU, bottlenecks start to develop which result in further increases in demand having even larger inflationary consequences' (page 8): the idea being that, in the very short run, capacity is fixed, or at least prohibitively costly to expand.

Table E
Evidence on non-linearities in the Phillips curve

Authors	Country, time period, data frequency	Method	Measures of output gap and expectations	Conclusion
Evans (1992)	United States, 1953–91, quarterly	SVAR with time-varying parameters	Output gap and inflation expectations system-determined	Trade-off higher at low rates of inflation
Clark *et al* (1996)	United States, 1964 Q1-1990 Q4, quarterly	Kinked functional form	Moving average output gap, survey inflation expectations	Significant non-linearity
Laxton *et al* (1995)	Pooled sampled major seven OECD countries, 1967–91, annual	Cubic, quadratic, fractional functional forms, pooled estimation	HP-filtered output gap; proxy of inflation expectations based on lagged values of inflation and other variables	Linear model rejected by the data
Turner (1995)	OECD, early 1960s to 1994 approximately, annual	Kinked functional form	HP-filtered output gap, lagged inflation used instead of expectations	Linear model preferred for the United Kingdom; Phillips curve is non-linear in the United States, Japan and Canada
Bean (1996)	OECD, sample period varies from 1951/1983–92, annual	Pooled estimation, no correction for convexity in measurement of output gap; quadratic and exponential functional forms	Transform of capacity utilisation measure of output gap, lagged inflation proxy for inflation expectations	Mild non-linearity, but not significant at 10% level
Debelle and Laxton (1996)	United States, Canada, United Kingdom, 1971 Q2-1995 Q2, quarterly	Fractional functional form	Unemployment gap, bond market inflation expectations	No nested test, but argue that non-linear model fits data better under certain restrictions on the volatility of the NAIRU
Gordon (1996)	United States, 1955–96, quarterly	Kinked functional form	Lagged inflation proxy for inflation expectations; time-varying NAIRU estimated jointly with Phillips curve	No significant non-linearity
Eisner (1997)	United States, 1956–94, quarterly	Kinked functional form	Moving average of unemployment; lagged inflation proxy for expectations	Phillips curve is non-linear, but the curvature is opposite to that suggested by other papers, ie concave, not convex
Fisher *et al* (1996)	United Kingdom, 1977 Q1-1995 Q1, quarterly	Exponential functional form	Production function output gap, survey inflation expectations	Asymmetric Phillips curve fits the data better, but no nested test
Fillion and Leonard (1997)	Canada, 1968 Q4-1994 Q4, quarterly	Not known	Not known	Significant but imprecise asymmetry
Dupasquier and Ricketts (1997)	Canada, United States, 1963–95, quarterly	(i) correlation of errors from linear model with the output gaps (ii) correlation of trade-off with Maskeov inflation states	Multivariate filters/SVAR output gaps; lagged inflation and Kalmar Filter inflation expectations	Method (i) linear for Canada, non-linear for United States Method (ii) opposite to (i) above
Kimura and Ueda (1997)	Japan, 1976–95, quarterly	Kinked functional form for each industry	Actual unemployment, inflation proxy for expectations	No downward nominal rigidity in wages
Laxton *et al* (1997)	United States, 1968 Q1-1997 Q1, quarterly	Fractional functional form, Kalmar Filter; and estimation of Phillips curve and NAIRU	Michigan Survey expectations	Mild asymmetry fits the data better
Yates (1998)	United Kingdom, 1966 Q1-1994 Q4, quarterly	Kinked and quadratic functional form, model consistent output gap	Moving average output and unemployment gaps, filters, bond market expectations	No significant non-linearity
Yates (1998)	United Kingdom, United States, Sweden, France, Italy, Denmark, sample varies from 1800–1938, annual	Kinked functional form, SURE estimation	Moving average output gap	No significant non-linearity

(1) See *Working Paper* for further details, including test results.

Problems with the empirical evidence

What should we make of all this evidence on downward nominal rigidities? The majority of the evidence seems to point to there being no downward nominal rigidities, although there are clearly studies that suggest the opposite. There are two points we need to bear in mind for interpreting this evidence. First, some have argued that the likelihood of finding evidence of downward nominal rigidities is reduced by using data collected in an era of positive inflation, when the nominal wage or price floors do not bite. For example, if inflation is high enough, the whole of the wage distribution is above the zero floor, and we will not observe a spike. The only way of addressing this criticism is to look at evidence collected for countries or time periods when inflation was either zero or at least very low. Yates (1998) looks at this question by performing tests on the correlation between the mean and skewness of the wage and price distributions in Japan, concluding that there is no evidence of downward nominal rigidity. He also looks to see whether the Phillips curve is sloped differently when the aggregate price level is falling, where the Phillips curve is estimated over the period 1800–1938 and for the United States, United Kingdom, Italy, Sweden, Denmark and France. He detects no extra convexity in the Phillips curve during times of falling prices.

Another argument is that what little evidence there is of downward nominal rigidities is in fact *exaggerated*, not diminished, by it being collected in an era of positive inflation. For example, Ball and Mankiw (1995) present a model in which at zero inflation, firms respond symmetrically to shocks to desired prices in either direction; but when inflation is positive, firms have an incentive to allow downward shocks to prices to be achieved by the effect of inflation eroding the real price, rather than incurring a 'menu cost' associated with making a nominal price change. So though it is true that the historical inflation regime may affect our inference about whether or not there are downward nominal rigidities, it is not clear which way the evidence is biased.

Summary

This article has reviewed the theoretical and empirical evidence for the existence of downward nominal rigidities. It has argued that, contrary to the reasoning implicit in studies by others, a concern about fairness is not sufficient to generate downward nominal rigidities in wages. Other assumptions are also needed: that there are union cartels; or that individuals/unions have no knowledge of outside wages; or that individuals/unions are highly averse to falling behind when wage contracts are staggered. A second possibility raised in the literature is that individuals might suffer from money-illusion. But they must also display loss aversion for this to be an explanation of downward nominal rigidities.

Three arguments have been advanced to support the existence of downward nominal rigidities in product markets. Price cuts may confuse customers used to positive inflation (a form of money-illusion); may be interpreted as quality cuts (and buyers are subject to money-illusion); and may be inhibited by strategic behaviour between firm cartels.

Four types of empirical evidence have been examined:

(i) *the frequency of wage and price cuts*, which is not particularly illuminating, since it is unknown how frequent wage and price cuts would be in a frictionless world running at a given inflation rate;

(ii) the skewness of the *distribution of wage and price changes*, which should be negatively related to the mean if downward nominal rigidities were operating. This was generally found not to be the case for either wages or prices in the United Kingdom;

(iii) *survey evidence* (in particular from the Bank) on how firms set prices, which shows that prices are downwardly rigid in response to some phenomena, but upwardly so in response to others; and

(iv) evidence on the UK *Phillips curve*, which it has been argued is not significantly convex.

Much of the empirical evidence is only consistent with and not proof of downward nominal rigidities, and tests have not revealed the existence of downward nominal rigidities in countries or time periods in which prices were falling. Moreover, there are theoretical models that predict that at positive rates of inflation, we are more rather than less likely to detect empirical relationships that reveal an apparent downward nominal rigidity.

In short, the theoretical arguments for downward nominal rigidities are more complex than much of the literature would have us believe. The empirical evidence leaves the case for downward nominal rigidities at best unproven.

Annex

Granger-causality test results:

(i) Wages

Dependent variable	Independent variable	P	Sign of sum of coefficients on independent variable
skew	mean	0.62	+
mean	skew	0.06	-
kurt	mean	0.66	+
mean	kurt	0.12	+

(ii) Producer prices

Dependent variable	Independent variable	P	Sign of sum of coefficients on independent variable
skew	mean	0.91	+
mean	skew	0.66	-
kurt	mean	0.59	+
mean	kurt	0.92	+

(iii) Retail prices

Dependent variable	Independent variable	P	Sign of sum of coefficients on independent variable
skew	mean	0.24	+
mean	skew	0.10	-
kurt	mean	0.44	+
mean	kurt	0.29	-

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Why has the female unemployment rate in Britain fallen?

By Phil Evans of the Bank's Structural Economic Analysis Division.

In this article,[1] *Phil Evans examines recent trends in male and female unemployment, and finds that the fall in aggregate unemployment between 1984 and 1993 is wholly accounted for by a decrease in female unemployment. This lower female unemployment rate is almost fully explained by a fall in the rate at which women become unemployed; this fall is uniform across skill groups and is particularly significant among women with young children. He suggests that increased workplace assistance to women with young children has reduced the frictions in the female labour market, and may have lowered the natural rate of female unemployment.*

Introduction

The most recent peak in aggregate unemployment (measured by the International Labour Organisation (ILO) search-based definition) in Britain was 10.4%, reached in spring 1993.[2] This is lower than the previous peak, 11.7%, in spring 1984. This article explains how the fall between the peaks is wholly accounted for by lower female unemployment (male unemployment was actually higher in 1993) across all skill groups, and particularly applies to women with young children. The first section discusses recent trends in male and female unemployment rates, and relates them to their inflow rates and average unemployment durations. The second section analyses which groups of women now have lower unemployment rates, and the third section considers possible reasons for these lower rates. The fourth section summarises the conclusions.

Male and female unemployment rates

The ILO-defined trend aggregate unemployment rate—defined, as in the rest of this article, as unemployment/employment—fell by 1.9 percentage points between the unemployment peaks in 1984 and 1993 (see Chart 1). Within this aggregate, female unemployment fell by 5 percentage points, whereas male unemployment rose by 0.5 percentage points. Before 1990, male and female unemployment rates were broadly similar. But by 1993, unemployment rates for males were 5.9 percentage points higher than for females, and stayed more than $2\frac{3}{4}$ percentage points higher through to 1997.

Chart 2 shows a longer time series for male and female claimant-count unemployment rates. These tend to differ more than the ILO rates, reflecting the large number of women searching for jobs, but not eligible for benefits. But both measures show that the gap between male and female unemployment rates has widened, particularly in the 1990s.

In the rest of this section, we analyse the ILO unemployment rates in more detail.

Chart 1
Unemployment rates by gender

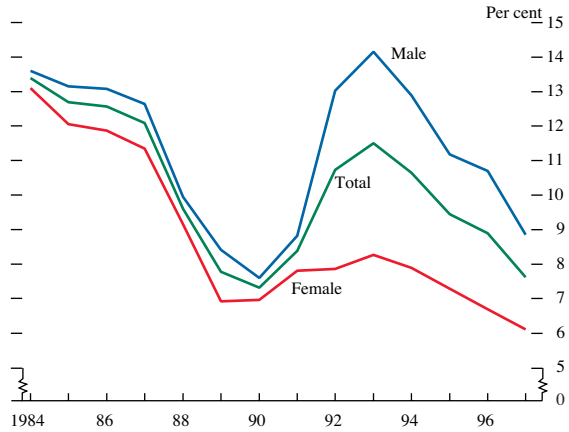
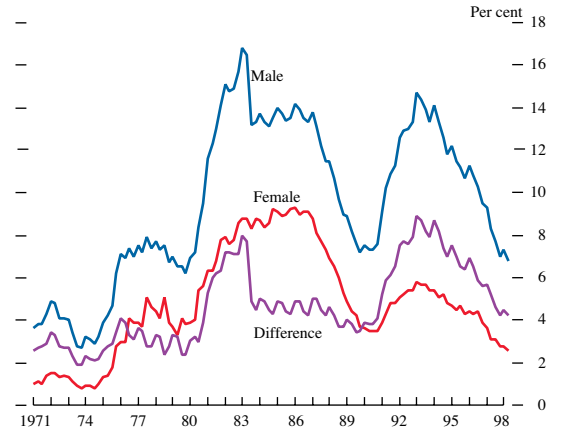


Chart 2
Male and female unemployment rates (UK claimant count)



(1) Based on a forthcoming Bank *Working Paper*, 'Why has the female unemployment rate in Britain fallen so much?'.
(2) This article focuses on the ILO search-based definition of unemployment, as reported in the Labour Force Survey. The claimant count is not a good measure of female unemployment, because many women cannot claim benefits when their husbands are working.

A useful starting-point is to assess whether unemployment has fallen because workers remain jobless for shorter spells once they become unemployed (the average duration of unemployment spells) or because they become unemployed less often (the inflow rate). Inflows and outflows tend to track each other over the business cycle (Burda and Wyplosz (1994)) and on their own tell us little about what is driving unemployment. It is more intuitive and useful to consider the *rates* at which workers flow into and out of unemployment.

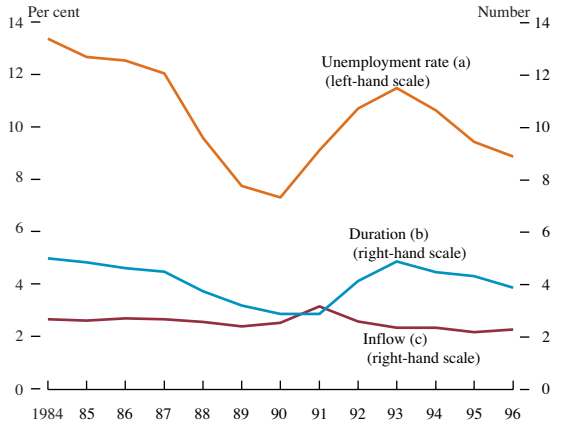
The steps in this assessment are as follows. Let N be the stock employed, U the stock unemployed and I the number of workers that flow into unemployment. We can write U/N, the unemployment rate, as

$$\frac{U}{N} = \frac{U}{I} \times \frac{I}{N} \qquad \textbf{(1)}$$

I/N is the inflow rate, the average probability that employed workers will become unemployed. We define inflows as the number of workers unemployed for less than three months.(1)

Let O be exits from the unemployment pool. Then O/U is the average chance that an unemployed worker will leave the pool, the 'exit rate'. Layard *et al* (1991) argue that we can assume year-on-year stationarity, which implies that inflows are equal to outflows.(2) Since I is then equal to O, I/U also equals the exit rate, and the inverse is the average duration of unemployment. So equation **(1)** decomposes unemployment into the product of the average length of unemployment spells and the inflow rate.(3) Chart 3 shows inflow rates and average durations of unemployment based on this decomposition, and Chart 4 shows the actual unemployment rate and the unemployment rate if inflows had remained at their 1984 level. If the inflow rate had not fallen, the unemployment rate would barely have fallen between 1984–93.

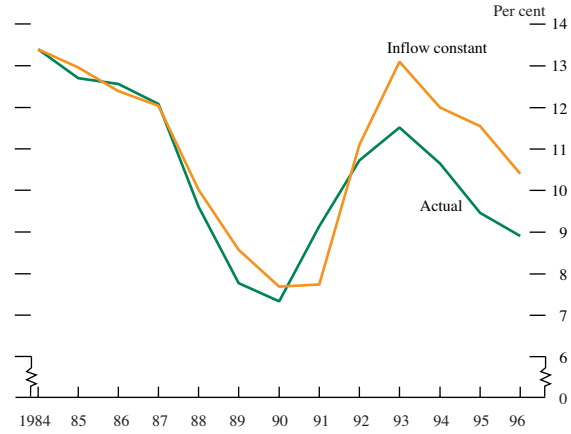
Chart 3
Aggregate unemployment rate, inflow rate and duration rate



Note: Based on the decomposition in equation **(1)**, where the unemployment rate is the product of the inflow rate and the average duration of unemployment spells.

(a) Percentage rate.
(b) Number of quarters.
(c) Inflow per quarter.

Chart 4
Actual and inflow constant unemployment rates

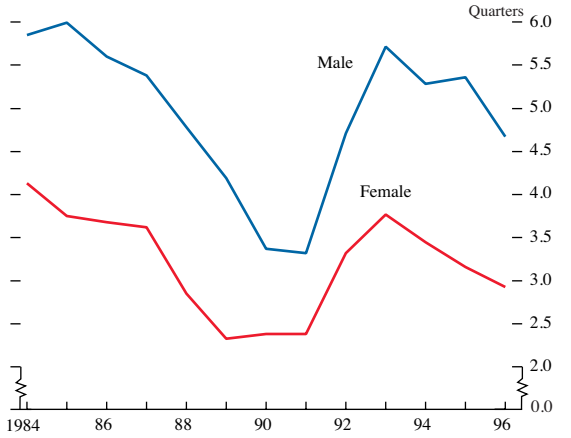


Note: Actual unemployment rate (U/N) and unemployment rate had the inflow rate remained at its 1984 level.

(a) Average durations of unemployment

Chart 5 shows that women have always left the unemployment pool faster than men. In the early part of the period, shorter durations accounted for the slightly lower unemployment rate of women. If the relative efficiency with which unemployed women are competing for jobs has increased, we would expect to see a time-series fall in their relative unemployment durations. But time-series changes in the rate at which unemployed men and women find jobs appear very similar, and so cannot explain changes in relative unemployment rates.

Chart 5
Male and female unemployment durations



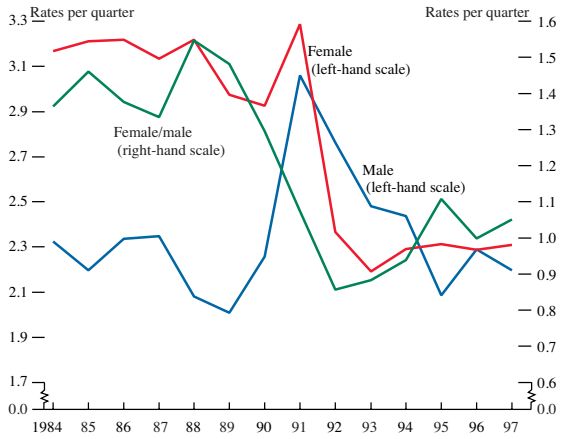
Note: Aggregate duration of unemployment spells, as defined by equation **(1)**.

(1) Our main results are robust to defining the inflow rate as inflows divided by the sum of inactivity and employment. The main results are also robust to defining inflows as those unemployed for less than one month, but some of our tests would involve small cell sizes if we defined inflows in this way.
(2) This assumption is justified if the labour market is very dynamic, because the market would adjust to shocks quickly enough that, one year later, if there were no more shocks, inflows would be equal to outflows. If the labour market is thought to adjust slowly to shocks, unemployment changes slowly, and the approximation that inflows equal outflows is roughly correct.
(3) Pissarides (1986) uses a slightly different approach, but the same assumption that year-on-year inflows equal outflows. He measures actual inflow and outflow rates, but uses the identity in **(1)** to calculate an implied unemployment rate.

(b) Inflow rates

Lower inflow rates account for almost all of the fall in unemployment between 1984 and 1993; from 1993 onwards, they account for 1½–2 percentage points of the fall in unemployment relative to 1984. Chart 6 shows that women had higher inflow rates than males until 1990; after this, a sustained fall in female inflow rates led to parity with males by 1996.

Chart 6
Male and female inflow rates



Note: Inflow rates, defined as those unemployed for less than three months divided by employment.

At first sight, it might appear that some event in 1991, such as a change in benefit rules, led to a step fall in female inflow rates. But inflow rates may also change over the cycle. To control approximately for the cyclical component of inflows, Chart 6 also plots the ratio of female and male inflow rates, which falls steadily between 1988–92. So it appears that the fall in female unemployment is due to much lower rates of entry into unemployment.

(c) Contributions to the fall in the aggregate unemployment rate

Table A shows how much of the fall in unemployment since 1984 was caused by changes in the aggregate duration of unemployment spells, and how much by changes in the aggregate inflow rate into unemployment. Each total is then analysed further to show contributions from males and females, and a weighting component to reflect the gradual increase in female participation in the labour market.(1)

Table A
Changes in unemployment rates since 1984

Cumulative percentage change since 1984

Year	**Duration**	Male	Female	Weight	**Inflow**	Male	Female	Weight
1984	**0.00**	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00
1985	**-0.43**	0.10	-0.29	-0.24	**-0.27**	-0.36	0.09	0.01
1986	**-1.01**	-0.26	-0.46	-0.29	**0.18**	0.04	0.11	0.03
1987	**-1.36**	-0.52	-0.55	-0.29	**0.05**	0.09	-0.09	0.05
1988	**-3.24**	-1.17	-1.61	-0.47	**-0.54**	-0.69	0.10	0.05
1989	**-4.37**	-1.79	-2.16	-0.42	**-1.25**	-0.89	-0.41	0.06
1990	**-5.42**	-3.02	-2.09	-0.32	**-0.64**	-0.18	-0.52	0.07
1991	**-6.68**	-4.12	-2.38	-0.18	**2.43**	2.09	0.26	0.09
1992	**-2.23**	-1.53	-0.75	0.04	**-0.43**	1.20	-1.76	0.12
1993	**-0.27**	-0.10	-0.17	0.00	**-1.62**	0.43	-2.19	0.14
1994	**-1.24**	-0.62	-0.57	-0.05	**-1.51**	0.32	-1.96	0.14
1995	**-1.51**	-0.49	-0.86	-0.17	**-2.43**	-0.65	-1.91	0.13
1996	**-2.56**	-1.34	-1.12	-0.10	**-1.93**	-0.09	-1.98	0.14

Note: Peak unemployment years are highlighted.

The table shows that a lower average duration of unemployment spells accounts for only 0.27 percentage points (15%) of the 1.9 percentage point fall in the unemployment rate between the peaks in 1984 and 1993. But the fall in female inflow rates accounts for no less than 2.19 percentage points—115% of the total fall.

Which groups of women have lower unemployment rates?

(a) Skilled/unskilled?

One possible reason for lower female unemployment rates is that as the demand for skilled labour has increased, driving up skilled wage rates, inactive skilled women have been drawn into employment—and skilled workers tend to have lower unemployment rates.(2) The change in the unemployment rate can be analysed into the contributions of the skilled and unskilled sectors to changes in male and female unemployment rates.(3) Table B shows how changes in skilled and unskilled unemployment rates, and changes in the proportion of skilled workers in the labour force, have contributed to changes to the unemployment rates for men and women since 1984.

Table B
Changes in skilled and unskilled unemployment rates

Cumulative percentage changes since 1984

	Female			Male		
Year	Skilled	Unskilled	Weight	Skilled	Unskilled	Weight
1984	0.00	0.00	0.00	0.00	0.00	0.00
1985	-0.23	-0.58	-0.06	-0.02	-0.24	-0.11
1986	-0.24	-0.25	-0.08	-0.02	-0.56	-0.09
1987	-0.46	-0.89	-0.10	-0.09	-0.58	-0.13
1988	-0.87	-2.35	-0.12	-0.85	-2.06	-0.08
1989	-1.14	-3.40	-0.21	-1.41	-2.99	-0.28
1990	-1.21	-3.70	-0.29	-1.44	-3.07	-0.47
1991	-1.07	-3.08	-0.34	-0.44	-1.78	-0.55
1992	-1.07	-2.83	-0.45	0.77	-0.38	-0.82
1993	-1.21	-2.46	-0.42	0.68	0.27	-0.60
1994	-1.46	-2.38	-0.48	0.25	-0.11	-0.63
1995	-1.37	-2.95	-0.49	-0.19	-0.98	-0.67
1996	-1.61	-3.39	-0.49	-0.58	-1.23	-0.72

Notes: 'Skilled' is defined as having 'A' levels or higher. The peak unemployment years are highlighted.

The growth in the share of skilled workers has been larger for women than for men. But Table B shows that changes in the skill composition of labour have lowered the male unemployment rate more than the female rate; this is because the initial spread between skilled and unskilled unemployment rates was higher for men than for women, and so the change in the weight is larger. In addition, a fall in the unemployment rate of unskilled females accounts for 68% of the fall in female unemployment between 1984–93, but that sector has a weight of 65% in 1993 in the female labour force. So unemployment rates for skilled and

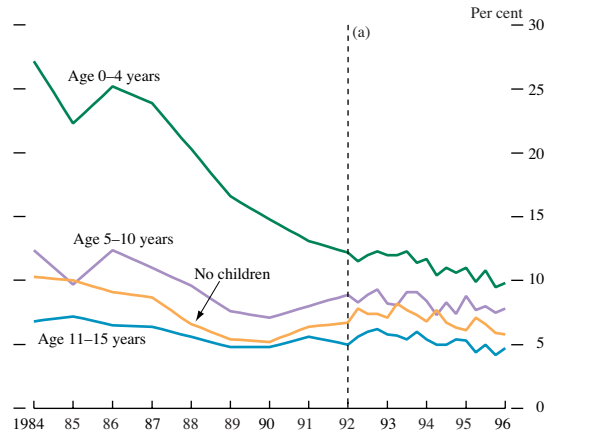
(1) See Appendix for details.
(2) 'Skill' is defined here by the level of educational attainment. (See note to Table B.)
(3) See Appendix for details.

unskilled females have fallen roughly in step. It therefore appears that the fall in female unemployment relative to males is not skill-biased.(1)

(b) Women with young children?

A second possible explanation for lower female unemployment rates might relate to numbers of young children. Chart 7 plots the unemployment rates of four groups of women: those with no children, and those with the youngest child aged 0–4, 5–10 and 11–15. The biggest fall in unemployment rates is among women with children aged 0–4, from 27.2% in 1984, to 9.8% in 1996.(2)

Chart 7
Female unemployment rates

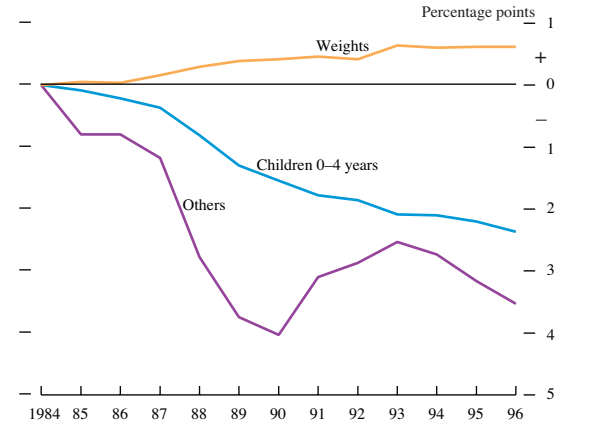


Notes: Actual unemployment rates for women with children aged 0–4, 5–10, 11–15, or with no children. 'Unemployment' is defined as unemployment/employment, as before.

(a) Annual data before 1992, then quarterly data.

Between 1984–96, the share of women with young children in the female labour force rose from 10% to 13.5%, which, other things being equal, would have added around 0.5 percentage points to the unemployment rate by 1996. Chart 8 shows that women with young children account for around 45% of the fall in the total female unemployment rate between 1984 and 1993, though they make up only 10% of the female labour force.

Chart 8
Contributions of women with young children to falling female unemployment rates



Note: The chart explains cumulative changes in female unemployment rates in a given year relative to 1984 by changes in: the unemployment rate of women with children aged 0–4; the unemployment rate of all other women; and the composition of the female labour force.

The rest of this article focuses on explaining the unemployment rates of women with young children. But 'other' women also account for about half of the fall in female unemployment; a discussion of why these women also have lower unemployment rates appears in the *Working Paper* version of the article.

Explaining the lower unemployment rates of women with young children

Any explanation of why the female unemployment rate has fallen must take account of the increase in female participation rates in the same period. So we can discount any idea that women previously recorded as unemployed have simply stopped actively searching for work and become inactive instead.

(a) Increased demand?

One possible explanation is that during the current recovery, labour demand has increased in sectors that employ a high proportion of women, reducing their unemployment rate relative to men. Employment has grown strongly in the service sector and part-time work, where a disproportionate number of women are employed. But female unemployment rates have fallen equally across all qualifications and occupations, and though part-time work has increased as a proportion of total male employment, it has fallen as a proportion of female employment. And service sector employment, as a proportion of total employment, has increased faster for men than for women (though from a lower base).

An increase in the demand for labour can only drive unemployment down if wages and prices do not fully adjust. But wages (and other non-pecuniary benefits) are likely to have had enough time since 1992 to adjust to increasing demand, while the female inflow rate has remained low and stable since falling sharply relative to the male rate between 1988–92. An increase in demand that favoured women might also be more likely to reduce female unemployment via the speed with which the unemployed find work than via a lower inflow rate. As shown earlier, this is not the case. In summary, demand-led explanations of the fall in the unemployment rate for women relative to men do not seem convincing (though there was a slight increase in the average female duration in 1997).

(b) Factors relating to young children?

It was seen earlier that the fall in unemployment between 1984–93 was almost entirely accounted for by lower inflow rates, with a large proportion of the fall due to lower unemployment rates of women with young children. The

(1) This conclusion is supported by more formal analysis in the *Working Paper* version of this article.
(2) See the Appendix for details.

rest of this section considers why the inflow rates of women with young children might have fallen.

(a) Better childcare provision

Women with young children may be constrained in their working lives by the need to look after young children or use childminding facilities. Table C shows that the proportion of children under five years of age in local authority nurseries or with registered childminders almost doubled between 1974–93; the number of children under five years old receiving day care or childminding increased by roughly 200,000 between 1984–93. But these long-term increases in childminding facilities, which have increased female participation over the longer term, are unlikely to have played the most significant role in making female unemployment fall, because they are slow-moving compared with the large and rapid fall in inflow rates and unemployment.

Table C
Children under five years of age in childcare in England

Per cent

	Local authority	Childminders (a)	Play groups	Total (b)
1974	0.9	2.5	10.3	13.7
1984	1.8	3.9	13.1	18.8
1993	4.1	9.2	12.1	25.4

Source: Social Trends.

(a) Since the Children Act 1989, childminders are required to register places available for any child under eight years old.
(b) The figures prior to 1989 relate to under five year olds only, but in 1993, only 6% of places for childminders were registered as solely for use by under fives.

(b) Flexible working practices

Most childcare is informal and part-time; many mothers with young children look for jobs where they can work part-time, flexi-time, or job share, or work only during term-time. These options may be increasingly available at the firms where they worked before maternity leave—and be reinforced by maternity rights, which have strengthened over time—but may not be readily on offer at other firms. So there may be less incentive for mothers returning to the labour market after having a child to search the rest of the job market—if there is an immediate and acceptable offer at their previous firm, they may return to work without becoming registered as unemployed, and so decrease unemployment via a reduced inflow rate.

Are women returning to their old jobs more often after childbirth, instead of becoming unemployed and searching for a new job, if they want to participate in the labour market? In 1988 and 1996, surveys carried out by the Policy Studies Institute (PSI) asked mothers of new-born children whether their firm operated flexible working practices (available to all workers) and family-friendly working practices available to mothers. Table D shows large increases in the availability of both types of practice, making it easier for mothers to return to work after childbirth.

The results in Table E show changes in the post-childbirth employment outcomes of mothers, again using the PSI surveys. The proportion of mothers who had returned to work with the same employer rose from 35% in 1988, to 58% in 1996. Of those not in work after childbirth, 20% were seeking work in 1988, compared with only 10% in 1996.

Table D
The availability of selected workplace arrangements that might help mothers with young children

Percentage of firms offering:	1979 survey	1988 survey	1996 survey (a)
Part-time	39	36	79
Job sharing	n.a.	6	35
Flexi-time	12	12	32
Shift work	11	9	26
Some work at home	3	4	17
Career break at home	n.a.	4	23
Help with childcare	3	4	9 (b)

n.a. = not available.

Source: Callender *et al* (1997).

(a) The 1996 survey asked if employers operated any of the arrangements in the table, and the 1988 survey asked if they operated them 'for people doing your kind of work'. To the extent that respondents to the 1996 survey said that their firm operated an arrangement without it actually being available to that person, it will produce higher estimates than in 1988.
(b) Workplace nursery or crèche only.

Table E
The probability that women return to work after childbirth

Per cent

	1988 survey	1996 survey
Returned to work	46	67
of which:		
Same employer	35	58
Different employer	11	9
Not in work	55	33
of which:		
Seeking work	20	10

Source: Callender *et al* (1997).

This evidence suggests that mothers can increasingly return to the pre-childbirth employer if they want to participate in the labour market, instead of becoming unemployed and looking for work. The problem with this survey evidence is that it is based on fairly small samples, with only a 55% response rate in 1996. The LFS can be used to provide additional, but slightly more indirect evidence.

In the LFS, women who take a break from work to have children and return to the same firm include tenure accumulated prior to childbirth when asked how long they have been employed in their current job. (For example, a woman employed with a firm for three years, who takes a break for childbirth and returns to the same firm for three more years, reports accumulated tenure of six years.) Table F shows the pattern of elapsed job tenure for employed women with children aged under five years. Tenure of more than five years, when the child is under five, should mean that the woman has returned to the firm that employed her prior to childbirth. The total number of women in employment with children aged 0–4 in employment rose from 700,000 to 1.5 million between 1984–96. Women with tenure lengths of less than five years had a lower share of employment in 1996 than in 1984, but women with tenure lengths of five years or more increased their share from 23% to 41% in the same period.

Table F
Tenure of employed women with children aged 0–4

Tenure	1984		1996	
	Employed (thousands)	Percentage	Employed (thousands)	Percentage
<3 months	97	13.9	120	7.7
3–6 months	72	10.3	96	6.1
6–12 months	110	15.7	183	11.7
1–2 years	114	16.2	221	14.2
2–5 years	144	20.6	296	18.9
5–10 years	114	16.2	346	22.2
10–20 years	47	6.7	279	17.9
>20 years	3	3.6	20	1.3
Total	**701**	**100**	**1,560**	**100**

Notes: The table gives tenure at the time of interview. Figures may not sum because of rounding.

This provides strong evidence that women are increasingly returning after childbirth to work for the same employer, which can account for a large part of their lower inflow rates into unemployment. But why were these facilities not offered previously? Have there been any particular developments that might help to explain the increase in family-friendly practices?

Firms are likely to set up these schemes when the present value of the benefits of doing so are greater than the costs, many of which are set-up costs (Opportunity 2000 (1993)). Hillage and Simkin (1992) find that the running costs of such schemes are fairly low. If a firm only employs one female worker, with few firm-specific skills, it will not be worth paying the fixed costs to set up the scheme. But by the end of the 1980s, female participation in the workforce had increased, the average educational attainment of women relative to men had risen, childbearing was increasingly being postponed and women were having fewer children. This suggests that women have been gaining more general and firm-specific human capital over time. These trends will have pushed the benefits of schemes beyond the costs for many firms, and may have prompted them to set up new schemes.

A further factor in reducing female inflow rates may have been the introduction of Family Credit (FC) payments in 1988. FC replaced Family Income Support (FIS) as the in-work benefit for families on lower incomes and, unlike FIS, it offered more benefit with each additional child (as unemployment benefit does). Moreover, FC payments were based on net rather than gross income, so that nobody lost income by taking FC. This may have encouraged jobless individuals with children to take work rather than continue on unemployment benefit, by making the employment option more financially rewarding overall than previously.

There were 210,000 recipients of FIS in 1987; in 1988, there were 470,000 recipients of FC (Dilnot and Webb (1990)). These other payments will have lowered the reservation wage of some women after childbirth. It is possible that firms could then attract women back to work and avoid loss of firm-specific human capital without paying for full childcare costs, but using much less costly family-friendly practices. These effects will have been reinforced by an extension to the FC scheme in 1992.

Conclusions

ILO-defined unemployment in Britain peaked at a lower level in 1993 than in 1984, because of lower female unemployment rates. These were almost completely accounted for by a fall in the rate at which women become unemployed. This fall is uniform across skill groups, but is particularly significant among women with young children.

This article has suggested that certain frictions in the female labour market, especially those associated with having young children, lessened in the late 1980s and early 1990s, and explain much of the fall in female inflow rates. Identifying reduced frictions is particularly important because it implies that the natural rate of female unemployment may have fallen, perhaps accounting for some of the increase in earnings growth at given unemployment rates during the 1990s.

The preferred explanations given here focus on the restrictions on the set of available jobs that are acceptable to women, mainly due to the presence of young children. When mothers are considering a return to work after childbirth, they have to search the set of available vacancies, which takes time and effort. But many firms have increased flexibility and other provisions that help mothers of young children return to their previous employer, and these offers are immediately apparent without the need for job search. So returning mothers, on average, now face fewer frictions in finding work after childbirth.

Though the analysis presented here suggests that falling female unemployment has lowered aggregate unemployment, more needs to be known about how much of the fall has simply displaced male workers. But this article does set out some of the stylised facts on female unemployment, and offers some suggestive evidence on what might explain these trends.

Appendix

Decomposing the aggregate unemployment rate into:

(a) The average duration of unemployment spells and the aggregate inflow rate for males and females

We can use equation **(1)**, ie:

$$\frac{U}{N} = \frac{U}{I} \times \frac{I}{N} \qquad \textbf{(1)}$$

to decompose the aggregate unemployment rate into the product of the aggregate inflow rate and average duration of unemployment spells. Let t denote the year, and subscript 0 the base year, 1984 in our case. D is the aggregate average duration and I the aggregate inflow rate. Taking the difference of year t from the base year 0, adding and subtracting D_0 x I_t yields:

$$\Delta U = U_t - U_0 = I_t\,(D_t - D_0) + D_0\,(I_t - I_0) \qquad \textbf{(2)}$$

The aggregate inflow rate is a weighted average of the male inflow rate I^m, and the female rate I^f.

$$I_t = \alpha_t\, I^m_t + (1 - \alpha_t)\, I^f_t \qquad \textbf{(3)}$$

Taking differences of **(3)** from the base year 0 and rearranging gives

$$I_t - I_0 = \alpha_t (I^m_t - I^m_0) + (1 - \alpha_t)(I^f_t - I^f_0) + (\alpha_t - \alpha_0)(I^m_0 - I^f_0) \qquad \textbf{(4)}$$

So changes in the aggregate inflow rate are decomposed into three parts. The first two are the components due to changes in the male and female inflow rates. The third is the change in the weighting of male and female inflow rates as the two groups change in size between 1984 and year t. An equivalent expression can be derived to decompose changes in the aggregate duration.

$$D_t - D_0 = \beta_t\,(D^m_t - D^m_0) + (1 - \beta_t)(D^f_t - D^f_0) + (\beta_t - \beta_0)(D^m_0 - D^f_0) \qquad \textbf{(5)}$$

Substituting **(4)** and **(5)** into equation **(2)**, we have

$$\Delta U = I_t \left[\begin{array}{l} \beta_t\left(D^m_t - D^m_0\right) + \left(1 - \beta_t\right)\left(D^f_t - D^f_0\right) + \\ \left(\beta_t - \beta_0\right)\left(D^m_0 - D^f_0\right) \end{array} \right] + D_0 \left[\begin{array}{l} \alpha_t\left(I^m_t - I^m_0\right) + \left(1 - \alpha_t\right)\left(I^f_t - I^f_0\right) + \\ \left(\alpha_t - \alpha_0\right)\left(I^m_0 - I^f_0\right) \end{array} \right] \qquad \textbf{(6)}$$

(b) Skill groups

The contributions of the skilled and unskilled sectors to changes in male and female unemployment rates respectively are:

$$U^f_t = \gamma_t\left(U^{sf}_t - U^{sf}_0\right) + \left(1 - \gamma_t\right)\left(U^{uf}_t - U^{uf}_0\right) + \left(\gamma_t - \gamma_0\right)\left(U^{sf}_0 - U^{uf}_0\right)$$

and

$$U^m_t = \delta_t\left(U^{sm}_t - U^{sm}_0\right) + \left(1 - \delta_t\right)\left(U^{um}_t - U^{um}_0\right) + \left(\delta_t - \delta_0\right)\left(U^{sm}_0 - U^{um}_0\right) \qquad \textbf{(7)}$$

where superscript u denotes unskilled, s skilled, f female and m male. The change in the unemployment rate U, for either gender, is the sum of a term for changes in skilled rates, changes in unskilled rates, and a change in the weights applied (reflecting increasing skill levels in the labour force).

Decomposing changes in the female unemployment rate

Equation **(8)** decomposes changes in the female unemployment rate, U^f, into changes in the unemployment rate of women with children aged 0–4, the unemployment rate of all other women, and the change in the labour force shares of these groups.

$$\Delta U^f = \beta_t\left(U^{04}_t - U^{04}_0\right) + \left(1 - \beta_t\right)\left(U^r_t - U^r_0\right) + \left(\beta_t - \beta_0\right)\left(U^{04}_0 - U^r_0\right) \qquad \textbf{(8)}$$

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Testing value-at-risk approaches to capital adequacy

By Patricia Jackson and William Perraudin of the Bank's Regulatory Policy Division and David Maude of the Bank's Monetary Assessment and Strategy Division.

This article[1] looks at the nature of whole-book value-at-risk models, and describes how the Bank of England set out in 1995 to assess their performance in accurately predicting risk and in providing a basis for reliable trading-book capital calculations.

Introduction

In the past three years, a revision to the Basle Accord and new EU Directives have radically changed the method for calculating capital to back the trading books of banks. The 1988 Basle Accord applied a credit-risk capital treatment to both the banking and trading books of banks—in other words, not only to loans, but also to readily tradable items such as securities. This credit-risk approach had a number of drawbacks when applied to trading books, and in 1988 work was started by both the Basle Committee on Banking Supervision and the European Union to find an alternative approach.

Two new methodologies were developed. The first new 'standard' approach rested heavily on the risk-based capital weights already applied by some supervisors of securities firms in the United Kingdom and the United States. These fixed weights were based on calculations of price volatility for different types of security. In the case of bonds, for example, the weights varied substantially for different maturities. But this approach did not provide a way of reflecting diversification benefits across whole trading books, which was important for the largest firms.[2] The solution was to develop an alternative methodology, based on the internal value-at-risk (VaR) models that had been developed by the largest firms as a management tool to assess risk on whole trading-book portfolios.

The move towards a risk-based approach to calculating capital for the trading books of banks was clearly an important development. The credit-risk approach did not enable hedges within the trading book to be recognised, nor did it take into account short positions or positions in government bonds (although in the United Kingdom, a requirement was introduced for the latter). It also did not enable the influence of maturity on the price volatility of interest rate items to be recognised. However, an important question for the Bank of England was whether the new approaches (both the standard and the VaR) would actually deliver adequate capital, given potential trading-book losses.

For the standard approach, which was incorporated in the Capital Adequacy Directive (CAD),[3] the issue was particularly acute with regard to the UK gilt-edged market makers (GEMMs). These central players in the gilts market were required to have specialist books, limited to sterling bonds. The additive structure of the standard approach (according to which risk-based capital requirements are calculated market by market, by type of risk, before being summed) generates a sizable cushion of capital for diversified books, but the Bank wanted to know whether it would generate an adequate cushion of capital for specialist books such as those of the GEMMs.

In 1994, the Bank conducted studies in which the profits and losses on actual GEMM books were simulated over daily and weekly periods back to 1988. The results were compared with the capital that would have been required by the CAD. The conclusion reached was that, although the CAD did generate capital sufficient to cover 99% of weekly losses, in some periods this would not have provided a sufficient cushion. Because of this, when the CAD was introduced, the requirement for these firms was increased, to 125% of the CAD general market risk standard.

When VaR models were proposed as a way of capturing the effect of risk diversification in trading books, a similar question arose for the Bank, of whether this approach would deliver sufficient capital relative to the losses that might be experienced on actual books. In particular, it was important to know whether VaR models could predict losses accurately.

The Basle approach to models

Under both the 1997 Amendment to the Basle Accord and the Second Capital Adequacy Directive adopted by the European Union, banks can choose whether to use the standard approach to calculating capital requirements for trading books (equities, interest rate instruments, foreign exchange and commodities), or to seek supervisory approval to employ their own in-house VaR models as the basis for

(1) Based on the Bank's *Working Paper* No 79.
(2) The United Kingdom had developed a method of allowing for diversification of equity books for securities firms, but this was not adopted by the European Union or the Basle Committee on Banking Supervision.
(3) The European Commission's Capital Adequacy Directive, agreed in 1993 and introduced at the start of 1996, which established EU minimum capital requirements for the trading books of banks and securities firms.

the capital calculation. Even in the standard approach, models are employed to a limited extent to enable some positions to be correctly processed for inclusion in the standard methodology—this is particularly true of options positions. The alternative approach, however, relies entirely on internal models.

Exclusive reliance on models raises questions about necessary safeguards to ensure that the capital requirements generated are adequate. Basle addressed this in a number of ways. One was to lay down simple standards for the construction of the models. For example, models must be formulated to yield a value-at-risk estimate that will not be exceeded on more than 1% of occasions. The losses must be calculated for a ten-day holding period, and at least twelve months of returns data must be used. Basle does not, however, prescribe the type of model to be used. Basle also included a substantial additional buffer, by requiring banks to hold capital equivalent to the higher of (i) the VaR number yielded by the model or (ii) three times the 60-day moving average of the VaR numbers generated on the current and past books. In addition to these quantitative safeguards, Basle also included a number of qualitative safeguards, for example that the model had to be part of the bank's own risk-measurement system, and that stress testing had to be carried out on the portfolios to look at extreme losses.

As a check on the accuracy of the models, the supervisors carry out back-testing—a comparison of actual trading results with model-generated risk measures. This may pose problems, first because trading results are often affected by changes to portfolios in the period following the calculation of the VaR. Because of this, Basle has urged banks to develop their own capability to perform back-tests, using the losses that would have been made if the book had been held constant over a one-day period. Second, as Kupiec (1995) argues, back-testing requires a large number of observations in order to make a judgment about the accuracy of the model. Nevertheless, back-testing and some kind of penalty are essential to provide incentives for firms to increase the accuracy of the models. Firms that do not meet the back-testing criterion for accuracy suffer additional capital charges (see below).

Value-at-risk analysis

The typical VaR models developed by the firms for their internal risk-management purposes attempt to measure the loss on a portfolio over a specified period (often the next 24 hours) that will only be exceeded on a given fraction of occasions (usually 1% or 5%). Two broad types of VaR analysis are used:

(i) under *parametric* VaR analysis, the distribution of asset returns is estimated from historical data, under the assumption that this distribution is a member of a given parametric class. The commonest approach is to suppose that returns are stationary, joint normal and independent over time. Using estimates of the means and covariances of returns, it is then possible to calculate the loss in a one-day holding period that will be exceeded with a given probability; and

(ii) the *simulation* approach to VaR analysis consists of calculating the losses that would have been experienced on a particular portfolio in previous 24-hour periods (using a run of historical returns data) and finding the loss that is exceeded on a given percentage of days in the sample. As a non-parametric procedure, this approach imposes no assumptions about the distribution of returns, other than that they are independent over time.

Testing the VaR models

Before the amendment to the Basle Accord had been agreed, we tested what the VaR models delivered, by taking data on actual trading books from a bank with sizable trading exposure, covering equity, interest rate and foreign exchange risk (see the boxes on pages 258 and 259 for details). We examined the impact of window length (ie the length of the period from which returns data are taken for the models) and the effect of weighting returns data in the parametric VaR calculations. We also compared the empirical performance of parametric and simulation-based VaR models when used to calculate the possible losses on these books.(1)

A finding of considerable practical significance was that the various approaches to VaR modelling differ widely in the accuracy with which they predict the fraction of times a given loss will be exceeded. In this respect, simulation-based were better than parametric VaR techniques. This is clearly important when these models are used to generate capital requirements. On the other hand, parametric VaR analysis tracks the time-series behaviour of volatility better than simulation-based techniques, and appears to yield slightly superior volatility forecasts. However, with well-diversified fixed-income books, the gains in forecasting accuracy are relatively slight.

Finally, we investigated the size of buffer that would come out of the Basle requirement that capital must exceed the higher of the current VaR or three times the average VaR of the previous 60 days.

Parametric VaR analysis

The first question that we addressed is how sensitive parametric VaR analyses are to the way in which the volatilities are estimated. The approach to volatility estimation typically used in VaR applications is to take a weighted average of the squared deviations of each return from an estimate of the mean return, using a window of past data. So if r_t is the holding return at t, a typical estimator for $\sigma^2 = VaR(r_t)$ would be:

(1) A significant omission in our study was the treatment of derivatives in VaR models.

Portfolio data

The main advantage of using actual books for the predominant bank trading risks is that it ensures that the pattern of risk exposures along the yield curve and between markets is realistic. The amount of exposure taken at different points on the yield curve and between markets clearly reflects a bank's investment decisions. Randomly generated portfolios are unlikely to be representative, and it would be difficult to build stylised books that were representative without basing them on actual books.

The table shows the breakdown of the four different books that we employed in our statistical analysis. The first three portfolios were those held by a bank with a sizable trading operation in three consecutive months. In the table, the foreign exchange exposure for a particular currency represents the total net sterling value of assets denominated in that currency. So for example, if the bank acquires a ten-year Deutsche Mark-denominated bond, both the foreign exchange exposure and the six to ten-year bond categories in the Deutsche Mark column of the table increase.(1)

Two features of the data stand out. First, the degree to which the bank's fixed-income exposure fluctuates over relatively short periods of time is quite striking. This fact underlines the importance of banks satisfying capital requirements for market risk almost continuously. VaR models need to be run daily. Second, the bank's net foreign exchange exposure is relatively small, except for the large short dollar position in portfolio 4. This suggests that the bank is systematically hedging the net foreign exchange risk in its trading book.(2) Other data that we saw suggest that the months we chose were fairly typical of the bank's general behaviour, in that foreign exchange risk is systematically hedged, whereas other exposures fluctuate considerably.

Portfolio amounts

£ millions

Portfolio 1

	FFr	£	$	Yen	DM
FX	-10.89	n/a	-46.02	4.31	40.95
3–12 months	24.04	56.82	-191.56	-590.78	462.35
2–5 years	-11.45	-336.42	83.13	1,247.51	-139.10
6–10 years	-3.52	-14.62	69.96	-65.45	-144.32
11+ years	0.00	0.00	-3.19	5.52	-41.66

Portfolio 2

	FFr	£	$	Yen	DM
FX	-5.95	n/a	5.72	-22.23	10.20
3–12 months	64.96	40.01	-135.10	-529.87	629.00
2–5 years	-130.29	-268.84	-33.18	1194.70	-178.89
6–10 years	19.39	11.17	0.93	-58.66	-107.47
11+ years	0.00	0.00	-2.17	5.20	-8.76

Portfolio 3

	FFr	£	$	Yen	DM
FX	-9.86	n/a	33.50	-5.59	22.48
3–12 months	-237.72	105.39	4.56	-1314.62	11.69
2–5 years	43.46	-245.85	11.11	346.49	89.64
6–10 years	39.53	22.44	0.26	-58.31	-69.96
11+ years	0.00	-26.70	-2.72	-4.75	-8.81

Portfolio 4

	FFr	£	$	Yen	DM
FX	28.51	n/a	-132.10	11.84	-26.08
3–12 months	-11.00	2.22	-153.15	-341.36	-327.05
2–5 years	-160.38	13.88	24.53	357.72	559.87
6–10 years	179.83	-53.34	53.92	40.87	-298.86
11+ years	43.13	39.72	29.99	0.00	0.00
Equities	1.50	2.81	-37.69	6.06	8.24

n/a = not applicable.

Most of our data on the bank's portfolio consisted of interest rate exposures in different currencies. But it is also important to examine whether VaR analysis performs differently when applied to portfolios containing equities, rather than only fixed-income and foreign exchange positions. The bank also provided us with data on a single additional portfolio, here labelled portfolio 4, which contained equity exposures. The relatively small size of this equity book is typical of what most banks hold.

(1) The practice of considering the exchange rate and foreign currency price risks separately is common among practitioners.
(2) The exposures were the consolidated exposures for the bank and its securities companies, and therefore this did not simply reflect the effect of the Bank of England's guideline on overnight FX exposures that applies to the bank.

$$\hat{\sigma}_t^2 = \frac{1}{T-1}\sum_{i=0}^{T-1}\lambda_i (r_{t-T+i} - \bar{r}_t)^2 \qquad \textbf{(1)}$$

where $\lambda_i \in [0,1]$, $\sum_{i=0}^{T-1}\lambda_i / T = 1$, and $\bar{r}_t \equiv \sum_{j=0}^{T-1} r_{t-T+j} / T$

In implementing the VaR models, we worked out the returns for one-day or rolling ten-day holding periods on a given portfolio, and then calculated volatilities, tail probabilities etc, using that single series.(1)

Three choices must be made in implementing the parametric VaR model described above, namely (a) an appropriate length for the data 'window', *(T)*; (b) the weighting scheme to be adopted, $(\lambda_0, \lambda_1, \ldots \lambda_{T-1})$; and (c) whether the mean should be estimated using the sample mean, $\sum_{j=0}^{T-1} r_{t-T+j} / T$, or set to zero as some empirical researchers have advocated.(2)

(a) Window length

Table A shows two ways of assessing the sensitivity of the VaR results to the choice of *T*. In the upper block of the table, we show the mean absolute forecast error, where we define the forecast error at period *t* as:

$$\left| r_t - \bar{r}_t \right| - \hat{\sigma}_t \qquad \textbf{(2)}$$

(1) This approach yields results that are arithmetically identical to those one would obtain if one estimated a full covariance matrix for *n* individual asset return series (Σ), and then estimated the volatility of a portfolio with portfolio holdings, $a \equiv (a_1, a_2, \ldots, a_n)'$, by calculating the quadratic form, $a'\Sigma a$. The latter approach is taken by practitioners, including JP Morgan in their *RiskMetrics* system, and is more efficient if one has many portfolios for which one wants the value at risk on a single date. When a large number of VaR calculations are required for a small number of portfolios on different dates, our approach is quicker.
(2) See, for example, J P Morgan (1995), page 66.

Table A
Parametric VaR models: window length

		3 months' data	6 months' data	12 months' data	24 months' data
		Mean absolute forecast error			
Portfolio 1	Mean	26.71*	26.79	27.02	27.12
	Standard error	(0.85)	(0.73)	(0.64)	(0.60)
	t-statistic	*n/a*	*0.20*	*0.57*	*0.79*
Portfolio 2	Mean	17.26*	17.32	17.40	17.29
	Standard error	(0.55)	(0.47)	(0.42)	(0.41)
	t-statistic	*n/a*	*0.21*	*0.39*	*0.08*
Portfolio 3	Mean	5.43	5.42	5.44	5.40*
	Standard error	(0.21)	(0.17)	(0.15)	(0.14)
	t-statistic	*0.23*	*0.18*	*0.72*	*n/a*
Portfolio 4	Mean	77.12*	78.11	78.10	78.60
	Standard error	(2.10)	(1.85)	(1.78)	(1.72)
	t-statistic	*n/a*	*0.89*	*0.68*	*0.99*

	3 months' data	6 months' data	12 months' data	24 months' data
	Tail probabilities			
Portfolio 1	1.71	1.38	1.32*	1.32*
Portfolio 2	2.11	1.91	1.58	1.51*
Portfolio 3	1.58	1.32	1.45	1.25*
Portfolio 4	1.71	1.65	1.71	1.28*

n/a = not applicable.

Notes: Calculations use equal weights ($\lambda_i = 1\ \forall\ i$), zero means and daily returns.
Forecast errors are scaled up by 10,000.
Asterisks indicate lowest in the row.
Newey-West standard errors are in parentheses.
T-statistics are given for the difference from the lowest mean absolute error in the same row.

Averaging the absolute forecast errors over the entire sample period yields a measure of the accuracy of the volatility estimates. Standard errors are reported in parentheses under each mean. These are calculated using the technique of Newey and West (1987), and so are robust to complex patterns of time dependence. The standard errors give a very conservative impression of the statistical significance of differences in mean forecast errors, since means calculated under different assumptions are highly positively correlated, reducing the variability of the average difference. So we also give the t-statistics for the difference between each mean absolute forecast error and the lowest mean in the same row of the table. The t-statistics are also calculated using the Newey-West technique.

Note that we tried working with various other measures of forecast accuracy. First, one may define the forecast error as $\left|(r_t - \bar{r}_t)^2 - \hat{\sigma}_t^2\right|$, and then employ the sample mean of these absolute differences. In this case, one is evaluating forecasts of the instantaneous variance rather than the instantaneous standard deviation. Since VaR calculations employ the latter, this is probably not appropriate. Second, we experimented by using root mean squares of the forecast errors instead of simply means. The problem with this approach is that it attributes more weight to outliers. We thought it better, therefore, to use means. In the lower block of Table A, we provide measures of the degree to which capital requirements based on different VaR models cover losses that occur with a given probability. Assuming normally distributed returns, one may deduce from the time series of estimated volatilities a corresponding series for what we shall call '1% cut-off points', meaning the loss that, according to the model, will be exceeded on average

Returns data

The bond returns employed in our study were based on a time series of zero-coupon yield curves calculated by an investment bank (not the one that supplied us with portfolio data). From this, we calculated holding returns for the maturity categories on which we had portfolio data. For equities, we employed the returns on the French CAC 40, the UK FT All-Share, the German DAX, the US S&P Composite and the Japanese Nikkei 225. Including equities and foreign exchange positions meant that in total we were dealing with 79 different sources of risk. All returns were calculated as changes in log prices.

Throughout the analysis, we took sterling as the base currency and employed data from July 1987 to April 1995. The table below shows the annualised sample standard deviations of the daily returns on our 79 asset categories. The figures in the table suggest that returns on fixed-income books are much less volatile than returns on equities, unless the fixed-income portfolio includes very long-dated securities. Even holdings heavily weighted towards long-dated bonds will have relatively low average durations, and so are likely to exhibit lower volatilities than portfolios that include equities or foreign exchange. Although the returns data covered the period July 1987 to April 1995, estimates of the VaRs were made only for the period from June 1989. Data from the earlier period were used in whole or in part (depending on the length of the data window) to construct the first VaR estimate. This meant that it was not possible to compute a VaR estimate for the 1987 equity market crash, although the crash did appear in the past data when VaR estimates were calculated using a 24-month window.(1)

Standard deviations of daily returns

	FFr	£	$	Yen	DM
FX	6.32	n/a	10.74	10.00	6.63
<3 months	0.90	0.48	0.31	0.22	0.25
3–6 months	1.09	0.86	0.53	0.34	0.45
6–9 months	1.31	1.32	0.83	0.53	0.67
9–12 months	1.49	1.76	1.16	0.70	0.88
1–2 years	2.63	3.33	2.09	1.30	1.72
2–3 years	3.62	4.42	3.10	1.95	2.27
3–4 years	4.59	5.53	4.13	2.67	2.93
4–5 years	5.58	6.57	5.15	3.43	3.50
5–6 years	6.65	7.55	6.14	4.36	4.06
6–7 years	7.99	8.55	7.13	5.62	4.97
7–8 years	9.36	9.80	8.13	6.73	6.19
8–9 years	10.15	10.97	9.08	7.66	7.34
9–10 years	10.40	12.05	9.94	8.43	8.53
11+ years	11.45	13.66	11.63	10.09	10.50
Equities	19.48	14.24	16.51	22.43	20.02

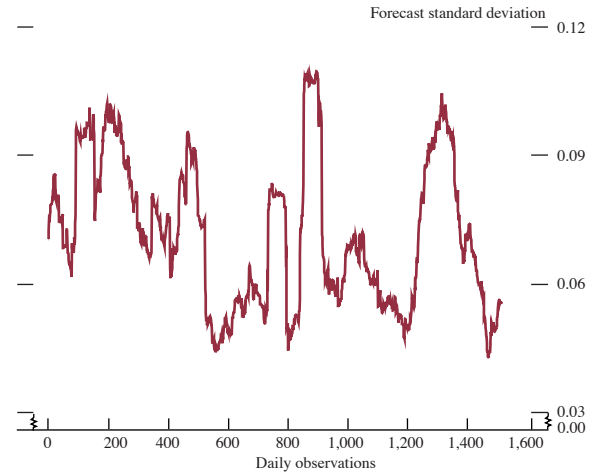
n/a = not applicable.

Note: Standard deviations are annualised (multiplied by $\sqrt{250}$) and in per cent.

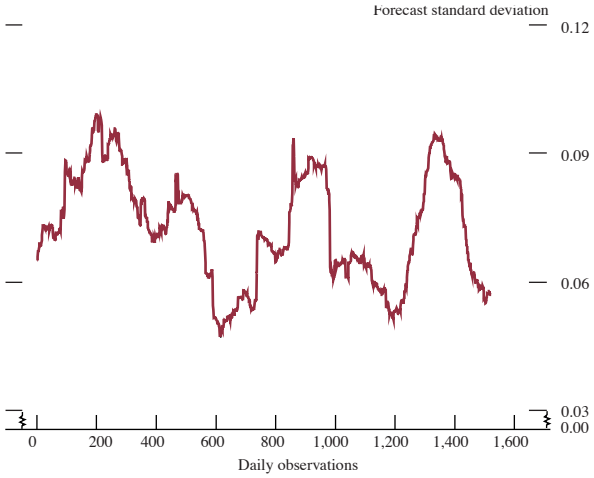
(1) This explains the high estimates for portfolio 4 at the very start of the estimation period, shown in Chart 1.

Chart 1
Plots of forecasts

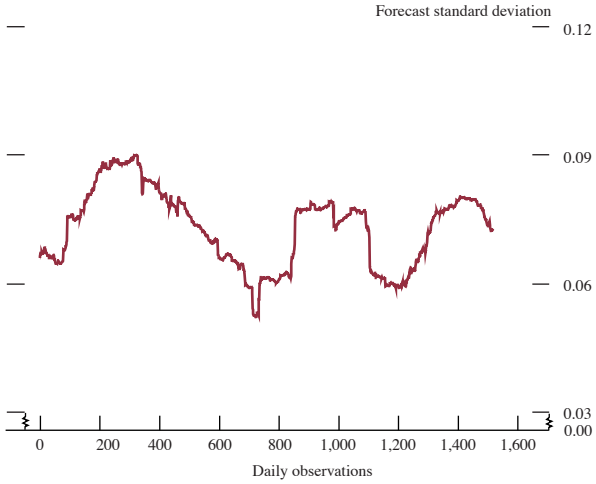
Portfolio 1: 3-month window



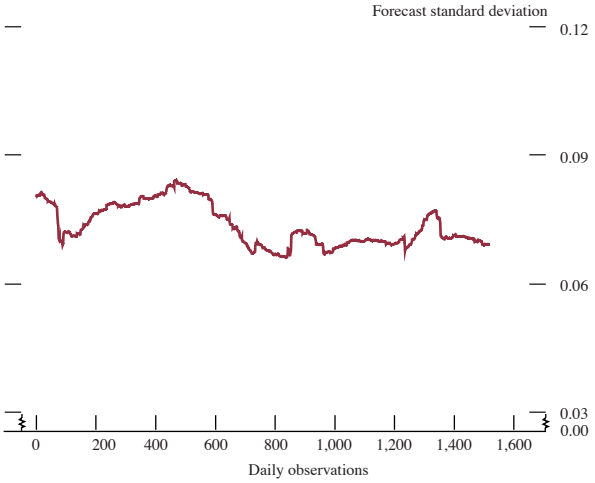
Portfolio 1: 6-month window



Portfolio 1: 12-month window



Portfolio 1: 24-month window



1% of the time.[1] As a measure of the performance of different VaR models, the lower panel in Table A shows the proportion of actual portfolio returns that fall below the 1% cut-off points.

As the upper panel of Table A shows, the mean absolute forecast errors are relatively insensitive to the length of the data window, though in most cases a short window yields slightly more accurate forecasts. On the face of it, the insensitivity is surprising, since plots of the forecasts based on long or short windows look quite different (see Chart 1). Furthermore, comparisons of the forecasting accuracy of different VaR techniques applied to individual exchange rate returns included in J P Morgan (1995) suggest that different window lengths *do* make a difference (although not a large one). In fact, the accuracy of forecasts of volatilities and the sensitivity of the forecasts to different techniques depend very much on the return series in question. When we repeated the analyses reported in Table A using the return on a single exchange rate, as in J P Morgan (1995), we found distinctly greater differences between the forecasting performances of different VaR techniques. However, it is important to note that using a different window size significantly affects the tail probabilities shown in the lower part of the table. In general, the figures in the table show that losses exceed the 1% cut-off points much more than 1% of the time, demonstrating the inaccuracy of the measures of tail probability implied by parametric VaR models based on normal distributions. Hendricks (1996) reaches a similar conclusion in his study of VaR models applied to foreign exchange portfolio returns. This is not surprising given the widely documented leptokurtosis (ie

(1) More precisely, the cut-off points may be obtained by inverting the equation:

$$\text{Prob}\left[\sum_{n=1}^{n} r_{nt} a_n < -\gamma \middle| \sigma^2, \mu\right] = 0.01$$

for γ on a period-by-period basis. (In the equation above, a_n is the holding of the nth asset. Throughout our analysis, we shall normalise initial wealth to unity, so that $\sum_{n=1}^{N} a_n = 1$.) Inverting the equation yields:

$$\gamma \equiv -\mu - \Phi^{-1}(0.01)\sigma$$

where $\Phi(\cdot)$ is the cumulative distribution function for a standard normal random variable.

fat-tailed distribution) of interest rates and stock returns. But the results in Table A suggest that a longer data window helps to reduce the tail probability bias.

(b) Weighting schemes

As mentioned before, a common procedure is to calculate variance estimates for VaR-type analyses using *weighted* squared deviations from an estimate of the mean. Rapidly declining weights mean that variance estimates are largely based on the last few observations, though information contained in more lagged observations is not totally ignored. The motivation for this approach is the widely recognised fact that financial market returns are conditionally heteroskedastic.

A range of more or less complicated techniques has been developed to model this feature of financial returns. In particular, Generalised Autoregressive and Conditionally Heteroskedastic (GARCH) models are specifically designed for this purpose.(1) Most implementations of VaR analysis have taken the simpler approach of estimating variances using the weighted average of squared deviations from the mean described above, with weights that decline exponentially as the lag length increases. The weights are thus of the form:

$$\lambda_i \equiv T\frac{1-\lambda}{1-\lambda^{T-1}}\lambda^i \qquad i = 0, 1, 2, \ldots, T-1 \qquad \textbf{(3)}$$

for a constant $\lambda \in [0,1]$, where $\sum_0^{T-1}\lambda_i = T$.

The upper panel of Table B shows mean absolute volatility forecast errors obtained using different weighting schemes. The calculations are carried out using daily returns with 24-month windows of lagged data, and means fixed at zero. Once again, the volatility forecasts for the fixed income and foreign exchange books are quite insensitive to the precise approach followed, although rapidly declining weights ($\lambda = 0.94$) perform somewhat better for all four portfolios, and yield a statistically significant improvement in forecast accuracy for portfolio 4. The lower panel of Table B shows the tail probabilities for different weighting schemes. It is apparent that using weighting schemes with rapidly declining weights increases the upward bias in the tail probabilities. As with window length, there appears to be a trade-off, in that weighting schemes may improve the degree to which the VaR calculations track time-varying volatilities (ie the mean absolute forecast errors may be reduced to some small degree), but worsen the bias in the tail probabilities.

Table B
Parametric VaR models: exponential weights

		Equal weights	$\lambda = 0.97$	$\lambda = 0.94$
		Mean absolute errors		
Portfolio 1	Mean	27.17	26.37	26.11*
	Standard error	(0.60)	(0.84)	(0.94)
	t-statistic	*1.67*	*1.33*	*n/a*
Portfolio 2	Mean	17.29	17.05	16.86*
	Standard error	(0.41)	(0.53)	(0.60)
	t-statistic	*1.08*	*1.26*	*n/a*
Portfolio 3	Mean	5.40	5.36	5.30*
	Standard error	(0.14)	(0.19)	(0.22)
	t-statistic	*0.71*	*1.03*	*n/a*
Portfolio 4	Mean	78.60	76.49	75.62*
	Standard error	(1.72)	(1.98)	(2.15)
	t-statistic	*2.18*	*1.61*	*n/a*
		Tail probabilities		
Portfolio 1		1.32*	1.32*	1.72
Portfolio 2		1.51*	1.71	1.91
Portfolio 3		1.25*	1.45	1.45
Portfolio 4		1.38*	1.65	1.65

n/a = not applicable.

Notes: Calculations use zero means, daily returns, and a 24-month window.
Forecast errors are scaled up by 10,000.
Asterisks indicate lowest in the row.
Newey-West standard errors are in parentheses.
T-statistics are given for the difference from the lowest mean absolute error in the same row.

(c) The inclusion of estimated means

The last exercise we perform to assess the sensitivity of VaR analyses to different assumptions is to calculate mean absolute forecast errors for parametric VaR models (i) with means estimated from lagged returns, and (ii) with the means set to zero. Fixing the means at zero might seem an unconventional statistical procedure, but the estimation error associated with badly determined mean estimates in relatively small samples may reduce the efficiency of the estimated volatilities. (Figlewski (1994) makes a similar point in the context of return variance estimation.) If the true mean returns are, as seems likely, very close to zero, fixing them at this level could enhance the forecasts. In fact, the results in Table C show that, for the particular books and return data we employ, the findings are mixed. The mean absolute forecast errors with means set to zero are in some cases lower and in some higher than when the means are freely estimated. With one-day returns, the

Table C
Parametric VaR models: sample mean inclusion

Mean absolute forecast errors

			Sample mean	Zero mean
Portfolio 1	one-day return	Mean	27.30	27.17
		Standard error	(0.61)	(0.60)
		t-statistic	*2.01*	*n/a*
	ten-day return (a)	Mean	82.54	81.58
		Standard error	(2.44)	(2.46)
		t-statistic	*0.95*	*n/a*
Portfolio 2	one-day return	Mean	17.31	17.29
		Standard error	(0.41)	(0.41)
		t-statistic	*0.56*	*n/a*
	ten-day return (a)	Mean	51.27	50.67
		Standard error	(1.34)	(1.38)
		t-statistic	*0.86*	*n/a*
Portfolio 3	one-day return	Mean	5.39	5.40
		Standard error	(0.14)	(0.14)
		t-statistic	*n/a*	*1.14*
	ten-day return (a)	Mean	16.34	16.38
		Standard error	(0.45)	(0.49)
		t-statistic	*n/a*	*0.23*
Portfolio 4	one-day return	Mean	78.53	78.60
		Standard error	(1.73)	(1.72)
		t-statistic	*n/a*	*0.34*
	ten-day return (a)	Mean	237.69	232.23
		Standard error	(7.23)	(7.65)
		t-statistic	*1.68*	*n/a*

n/a = not applicable.

Notes: Calculations use equal weights, one-day returns, and a 24-month window.
Forecast errors are scaled up by 10,000.
Asterisks indicate lowest in the row.
Newey-West standard errors are in parentheses.
T-statistics are given for the difference from the lowest mean absolute error in the same row.

(a) Calculated by multiplying one-day returns by $\sqrt{10}$.

(1) See the August 1997 *Quarterly Bulletin*, page 288, for more details on GARCH models.

differences are very small. With portfolio 1, one-day return forecast accuracy is improved in a statistically significant way, but the gain appears economically insignificant.

Parametric versus non-parametric VaR models

In this section, we compare the performance of parametric and non-parametric VaR models. Since non-parametric VaR models do not yield a time series of volatility forecast errors, we restrict our comparison to the tail probabilities that the two kinds of model produce. Table D shows the results for data window lengths ranging from 3 to 24 months. For the parametric approach, ten-day return tail probabilities were calculated by scaling up the one-day VaR estimates by $\sqrt{10}$, and then taking the fraction of observations for which the ten-day loss outturns exceed the implied cut-off level. The one-day tail probabilities are calculated as in previous sections. For the non-parametric approach, ten-day return tail probabilities were calculated using ten-day portfolio losses to compute the VaR, and then taking the fraction of observations for which the ten-day loss outturns exceed the implied cut-off level. For the one-day tail probabilities, the VaR was computed using one-day portfolio losses, and the result was compared with the one-day outturns. For both the parametric and the non-parametric approaches, the ten-day return outturns were computed on a rolling basis by summing the log daily returns.

Table D
Parametric and simulation VaRs: tail probabilities

	3 months' data	6 months' data	12 months' data	24 months' data
Portfolio 1				
One-day return parametric	1.71	1.38	1.32	1.32
Ten-day return parametric (a)	1.78	1.05	1.32	1.05
One-day return simulation	1.71	0.79	1.38	0.92
Ten-day simulation (b)	3.69	1.97	2.30	1.78
Portfolio 2				
One-day return parametric	2.11	1.91	1.58	1.51
Ten-day return parametric (a)	0.79	0.72	0.99	0.92
One-day return simulation	1.78	0.99	1.18	1.18
Ten-day return simulation (b)	2.63	1.32	1.45	1.65
Portfolio 3				
One-day return parametric	1.58	1.32	1.45	1.25
Ten-day return parametric (a)	1.58	1.12	1.05	1.05
One-day return simulation	1.51	0.86	1.18	0.86
Ten-day return simulation (b)	3.09	1.32	1.58	1.18
Portfolio 4				
One-day return parametric	1.71	1.65	1.71	1.38
Ten-day return parametric (a)	1.12	1.12	1.18	0.92
One-day return simulation	1.38	0.72	1.38	0.92
Ten-day return simulation (b)	3.09	1.58	1.38	1.25

(a) Calculated by multiplying the one-day VaR estimate by $\sqrt{10}$ and comparing this with the subsequent realised ten-day log returns.
(b) Calculated by estimating the VaR from the portfolio losses over ten-day periods and comparing these with the subsequent realised ten-day log returns.

The results in the table suggest that calculating the one-day and ten-day VaR cut-off points from short data windows is inadvisable, in that the small-sample biases are substantial. For longer data windows, the non-parametric approach for the one-day returns consistently outperforms the parametric VaR model, in that the tail probabilities are matched more accurately. For the parametric approach, the tail probabilities computed using the different lag lengths consistently exceed the 1% level, reflecting the well-known non-normality of financial returns. Looking at the ten-day returns, the non-parametric approach appears to perform worse than the parametric VaR estimates for some portfolios. In general, the tail probability figures for ten-day returns underline the statistical problems involved in attempting to deduce ten-day volatilities directly from estimates of one-day volatilities.

'Spike' loss periods

An important question is whether the ability of parametric VaR analysis to 'track' the time-series behaviour of volatility enables it to outperform simulation-based VaR models in predictions of large 'spike' losses in portfolio values. It is possible that even if parametric VaR models do not yield lower mean absolute forecast errors, as we saw above, they are better at picking out large market movements. This issue is particularly important if VaR analysis is to be used for regulatory purposes, since the primary concern of regulators regarding trading-book risks is that banks will be wiped out by sudden large losses that occur before action can be taken to reduce the riskiness of the bank's portfolio. To examine this issue, we split our sample period into six-month intervals and identify, for each of our portfolios, the day within each period on which the largest loss occurred.

Before comparing the performance of the parametric and simulation-based VaR models, let us examine the composition of the spike portfolio losses. Table E provides detailed breakdowns of the constituent parts of each of these large-value declines for portfolio 4, which contains equity as well as interest rate and foreign exchange risk. As is apparent from Table E, bond risk was the most important factor in generating large losses, acting as the dominant factor in eight out of twelve cases. Foreign exchange risk was the most important factor in the remaining four cases. The table in the box on portfolios data shows that portfolio 4 contains greater foreign exchange exposure than the other portfolios (in particular, a relatively large net US dollar position).

It is surprising that the equity exposure created no spike losses in the period of our sample. We were concerned that this result reflects the fact that large changes in equity values tend to be negative, and the largest equity exposure in portfolio 4 is a short position in US equities. As an experiment, we re-ran the VaR calculations assuming that the equity exposures (and the corresponding components of the foreign exchange exposures) were of opposite sign. Even with this change, none of the spike losses were attributable mainly to equity losses. One may, therefore, conclude that the relatively small size of the equity exposure is enough to make equity risk minimal, even though equity returns themselves are much more volatile than those on bond portfolios.(1)

(1) The more 'spiky' and volatile nature of equities has been recognised by regulators, eg in the CAD building-block approach. Under the CAD, a single position in a ten-year government bond would carry a capital requirement of 2.4%, whereas a single position in an equity index would carry a charge of 8%. For a single equity, the charge would be 12%.

Table E
'Spike losses' (daily returns in per cent)—portfolio 4

Date		France	United Kingdom	United States	Japan	Germany	Total
03/07/89	FX	0.13	n/a	-2.03	-0.01	-0.11	-2.02
	Bond	0.26	-0.09	-0.05	-1.61	-1.12	-2.61
	Equities	0.01	0.02	-0.12	0.04	0.09	0.03
	Total	**0.39**	**-0.07**	**-2.20**	**-1.58**	**-1.14**	**-4.60**
21/02/90	FX	0.01	n/a	-0.72	0.06	-0.02	-0.67
	Bond	1.35	0.02	0.04	0.46	-4.22	-2.36
	Equities	-0.01	-0.02	0.03	-0.16	-0.06	-0.23
	Total	**1.34**	**0.00**	**-0.65**	**0.35**	**-4.30**	**-3.26**
06/08/90	FX	-0.04	n/a	-0.87	0.05	0.04	-0.82
	Bond	-3.18	-0.32	-2.41	-1.47	2.99	-4.38
	Equities	-0.07	-0.07	0.98	-0.16	-0.39	0.29
	Total	**-3.28**	**-0.38**	**-2.30**	**-1.58**	**2.64**	**-4.90**
11/02/91	FX	-0.04	n/a	-0.56	0.04	0 .06	-0.50
	Bond	0.75	-0.04	-0.13	-1.65	-1.38	-2.45
	Equities	0.01	0.04	-0.81	0.00	0.10	-0.66
	Total	**0.73**	**-0.00**	**-1.50**	**-1.61**	**-1.23**	**-3.61**
01/09/91	FX	-0.03	n/a	-2.08	0.11	0.06	-1.95
	Bond	0.35	-0.06	0.03	-1.09	-1.10	-1.88
	Equities	-0.00	-0.01	0.04	-0.03	-0.06	-0.05
	Total	**0.32**	**-0.07**	**-2.01**	**-1.01**	**-1.10**	**-3.87**
18/11/91	FX	-0.18	n/a	-1.35	0.09	0.15	-1.28
	Bond	-0.50	0.07	-0.04	-0.04	-0.14	-0.67
	Equities	-0.04	-0.04	-0.22	-0.15	-0.07	-0.52
	Total	**-0.72**	**0.03**	**-1.60**	**-0.11**	**-0.06**	**-2.47**
23/09/92	FX	0.09	n/a	0.03	-0.08	-0.17	-0.13
	Bond	-3.25	-0.05	-0.34	-0.06	-2.33	-6.02
	Equities	-0.00	-0.00	-0.02	0.00	0.03	0.01
	Total	**-3.16**	**-0.05**	**-0.33**	**-0.14**	**-2.46**	**-6.15**
05/01/93	FX	0.47	n/a	-3.14	0.26	-0.46	-2.87
	Bond	-0.30	-0.24	-0.13	0.06	-0.54	-1.15
	Equities	0.01	-0.01	0.08	-0.05	0.11	0.13
	Total	**0.18**	**-0.25**	**-3.19**	**0.27**	**-0.89**	**-3.89**
13/04/93	FX	0.09	n/a	-2.46	0.20	-0.11	-2.27
	Bond	0.31	0.06	-0.23	-0.81	-0.20	-0.88
	Equities	0.02	0.02	-0.06	0.22	0.06	0.26
	Total	**0.42**	**0.08**	**-2.75**	**-0.40**	**-0.25**	**-2.89**
01/03/94	FX	0.05	n/a	0.01	0.04	-0.03	0.07
	Bond	-1.51	-0.17	-1.07	-1.79	0.86	-3.68
	Equities	-0.03	-0.03	0.18	0.06	-0.08	0.09
	Total	**-1.50**	**-0.20**	**-0.88**	**-1.69**	**0.75**	**-3.52**
28/06/94	FX	0.00	n/a	0.58	-0.02	-0.01	0.55
	Bond	-0.23	-0.08	-0.78	-1.44	-3.15	-5.67
	Equities	0.01	0.01	0.09	0.08	0.10	0.29
	Total	**-0.22**	**-0.07**	**-0.11**	**-1.37**	**-3.06**	**-4.82**
03/10/94	FX	0.10	n/a	-0.07	0.09	-0.10	0.02
	Bond	-1.64	-0.06	-0.49	-1.19	-0.03	-3.42
	Equities	-0.02	-0.03	0.07	0.02	0.00	0.04
	Total	**-1.57**	**-0.09**	**-0.49**	**-1.08**	**-0.13**	**-3.36**

n/a = not applicable.

Note: Components may not sum to totals because of rounding.

Table F shows the capital requirement implied by the VaR estimates minus the actual loss sustained.(1) We term this quantity the capital surplus (+) or capital shortfall (–). As one may see, parametric and simulation-based VaR models perform somewhat differently. When capital is based on the simulation-based VaR model, the bank has a capital surplus on 16 of the 48 spike loss dates. When the parametric VaR model is used, the bank has a surplus on nine occasions. Whether the capital surplus is positive or negative, on most spike loss dates, the simulation-based VaR model implies a larger capital surplus than the parametric VaR model. The implication is that, though it does not exploit the conditional structure of volatility, the simulation-based VaR model seems to do a somewhat better job of establishing appropriate capital requirements. Chart 2 illustrates this, using a 24-month window, for each of the portfolios.

Basle alternative approach capital calculations

A final important question is how much of a capital cushion the proposed Basle alternative approach would deliver for actual books, given not only the 99% confidence level, but also the multiplier of three. We look at this issue for our portfolios, by comparing the capital requirement that would be generated by one part of the proposed two-stage test, namely three times the 60-day average of the VaR estimates calculated to cover a ten-day holding period, using the parameters laid down by Basle. A bank would be required to hold capital equivalent to the greater of (i) this amount and (ii) the VaR for the current book. With a multiplier of three, the first of these tests will 'bite', unless the bank's current book is abnormally risky.

Table F
Model performance on 'spike' loss dates

	Portfolio 1		Portfolio 2	
Model	Simulation	Parametric	Simulation	Parametric
Period 1	-1.63	-1.51	-0.49	-0.47
Period 2	-0.56	-0.64	-0.42	-0.43
Period 3	-0.75	-0.89	-0.48	-0.54
Period 4	-0.03	-0.08	-0.29	-0.39
Period 5	0.28	0.11	0.15	0.02
Period 6	-1.08	-1.34	-1.05	-1.22
Period 7	-1.81	-2.09	-1.39	-1.51
Period 8	0.04	-0.24	-0.31	-0.35
Period 9	0.40	0.15	-0.08	-0.10
Period 10	0.11	-0.08	0.06	0.00
Period 11	-0.07	-0.10	-0.04	-0.04
Period 12	-0.16	-0.08	0.18	0.12
	Portfolio 3		Portfolio 4	
Model	Simulation	Parametric	Simulation	Parametric
Period 1	-0.06	-0.05	-0.81	-0.58
Period 2	-0.08	-0.10	0.05	-0.15
Period 3	-0.11	-0.13	-1.62	-1.95
Period 4	-0.10	-0.12	-0.32	-0.53
Period 5	-0.09	-0.12	-0.62	-0.79
Period 6	-0.08	-0.16	0.79	0.58
Period 7	-0.75	-0.80	-3.19	-3.29
Period 8	-0.01	-0.10	-0.34	-0.79
Period 9	0.16	0.06	0.66	0.13
Period 10	0.04	-0.03	-0.54	-0.47
Period 11	0.03	0.01	-1.28	-1.40
Period 12	0.04	0.04	0.29	-0.09

Notes: The table shows the capital shortfall (-) or surplus (+) for the largest loss in each six-month period. Parametric approach uses zero mean. Figures are expressed as daily returns in per cent. Equal weights, daily returns, 24-month window.

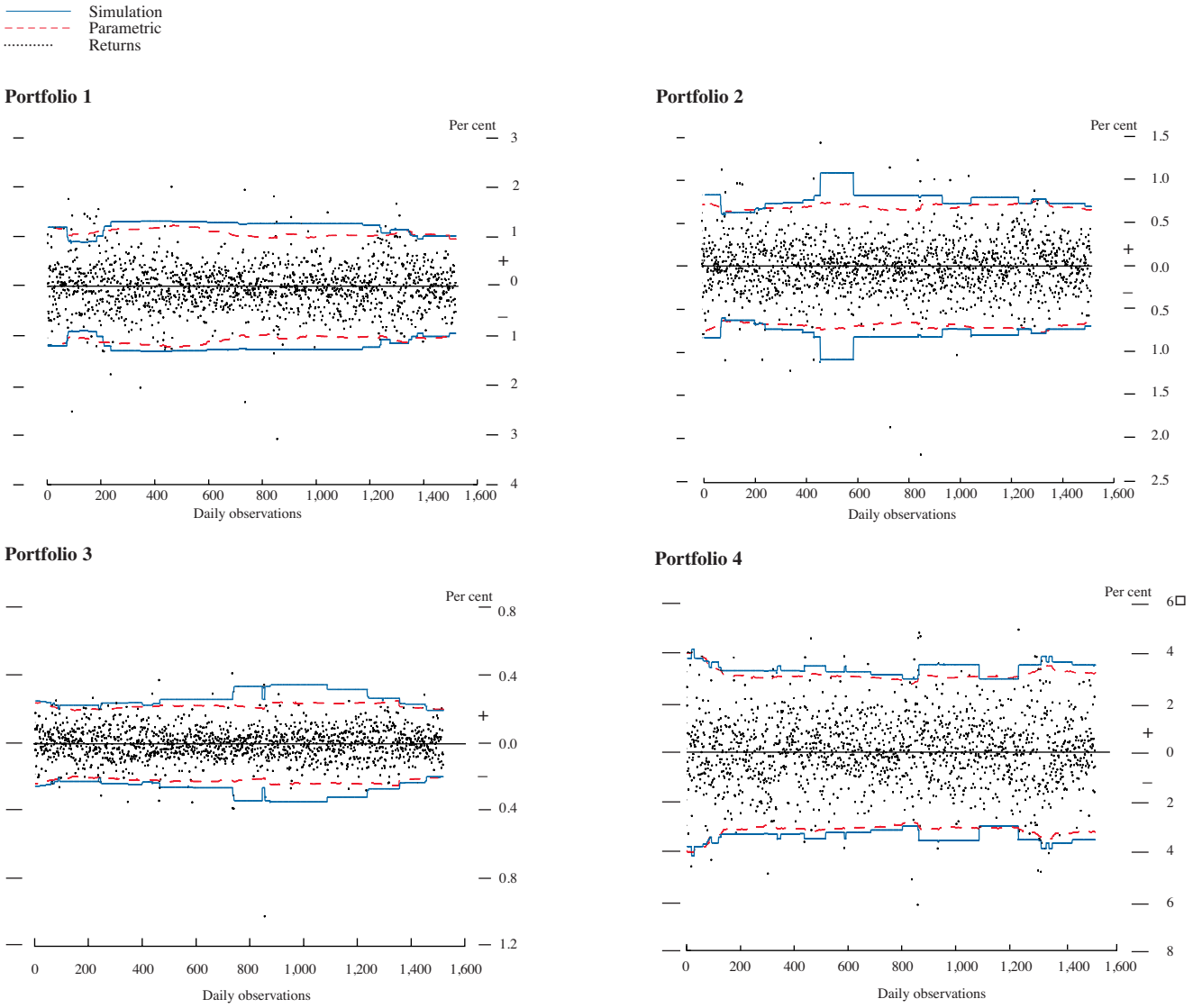
We compared the ten-day returns that would have been secured on our four portfolios during the period July 1989 to April 1995 with the capital requirement based on three times the 60-day average of the ten-day VaR estimates calculated by multiplying the daily VaR estimates by $\sqrt{10}$. (The Basle requirement would usually be calculated using the 60-day average for VaR estimates for different books held on different days.) In performing the calculations, we used the parametric approach, with a 24-month window of past returns data, equal weights, and a zero mean. We calculated the capital requirement implied by multipliers of two and two and a half, as well as three. None of the portfolios had a single loss outlier (losses that exceeded the capital requirement) when the multiplier was either two and a half or three. Three of the portfolios had a single (marginal) loss outlier for a multiplier of two.

The Basle approach to back-testing

The alternative Basle approach includes a requirement that banks would suffer increases in their capital requirements if, over a twelve-month period (250 trading days), their VaR models under-predict the number of losses exceeding the 1% cut-off point. Such losses are termed 'exceptions'. If a bank's VaR model has generated zero to four exceptions, it

(1) The capital 'requirement' is the VaR for the whole book produced using a 99% confidence level. We do not incorporate in this calculation any other aspects of the Basle proposals, such as the three-times multiplier.

Chart 2
Comparison of simulation and parametric-based VaR models



is said to be in the Green Zone; if five to nine, it is in the Yellow Zone; and if there are more than ten exceptions, it is in the Red Zone. The capital requirement for banks whose models are in the Yellow Zone may be increased by regulators; if they are in the Red Zone, the requirement would almost certainly be increased.

We ran back-tests for all four of our portfolios, comparing the VaR figures calculated for one-day holding periods (again, using the parametric approach) with the actual return on each book. The number of exceptions for each portfolio over the different twelve-month periods are set out in Table G. The results vary for different portfolios. For three of the six periods, if portfolio 2 were held, the model would generate more than four exceptions. The highest number of exceptions was seven, which occurred twice for portfolio 2 and once for portfolio 4. According to the Basle guidelines, this would normally lead to an increase of 0.65 in the multiplier, unless the supervisor could be persuaded that special factors had affected outcomes.(1) The fact that the model moves from the Green to the Yellow Zone so much from period to period underlines the difficulty of distinguishing between good and bad models using samples of only 250 observations. However, our results suggest that a grossly inaccurate model would be picked up by such back-testing.

Table G
Back-testing results—number of exceptions in each twelve-month period

Portfolio	1	2	3	4
Period 1	6	7	4	3
Period 2	4	7	5	3
Period 3	3	2	4	1
Period 4	4	5	4	4
Period 5	1	1	2	3
Period 6	2	1	0	7

Green Zone = 0–4 exceptions.
Yellow Zone = 5–9 exceptions.
Red Zone = 10+ exceptions.

(1) Supervisors can disregard the Yellow Zone if they believe that there is a good reason for the poor performance, unrelated to the model. However, the Red Zone can only be disregarded in extraordinary circumstances.

Summary

This article has set out the results of the tests carried out by the Bank to assess the accuracy of the risk-measurement models used by firms to evaluate risk on their trading-book portfolios. The main conclusions from these tests were as follows:

- Different VaR models performed more or less well in supplying unbiased measures of the value at risk. (For some VaR models built with a 99% confidence level, significantly more than 1% of losses exceeded the value-at-risk estimate.)

- Simulation-based VaR models met this test better than parametric VaR models based on normal distributions, because of the severely fat-tailed nature of reasonably diversified fixed-income exposures. Most banks' trading books are made up largely of such exposures.

- Use of short data samples (or a weighting scheme that places heavy weight on recent data) worsened the biases in the VaR estimates for parametric models.

- The extra safeguards around the use of the VaR models (the requirement that a firm must meet the higher of the estimated VaR, or three times the 60-day moving average of the current and past VaRs) would probably mean, for market-risk models of the kind tested, that only extremely risky portfolios would fail to be covered by sufficient capital.

- The back-testing requirements incorporated in the Basle approach are likely to lead to some banks holding higher capital. A bank holding the portfolios employed in the study could find its capital requirements adjusted upwards from time to time if it used the parametric approach.

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The cyclicality of mark-ups and profit margins: some evidence for manufacturing and services

By Ian Small of the Bank's Structural Economic Analysis Division.

This article[1] reviews how price-cost mark-ups and firm profit margins in UK manufacturing and services behave over the business cycle, to see whether they move pro-cyclically. Movements in mark-ups and margins are important because of their effect on prices: pro-cyclical changes might suggest that price pressures increase during recovery periods and decrease during recessions. The article presents some empirical evidence that suggests that mark-ups and profit margins do both move pro-cyclically.

Introduction

Movements in price-cost mark-ups and profit margins are an important component of changes in prices. So the behaviour of these mark-ups and margins over the business cycle is of interest to anyone concerned with the behaviour of prices in the short to medium run.

The term 'mark-up' refers to a good's selling price expressed as a proportion of its marginal costs; 'profit margins' are the difference between a good's selling price and its average variable cost, expressed as a proportion of its price. Different theoretical models give contradictory predictions about how mark-ups and margins will behave over the cycle. So we turn to empirical evidence. Studies based on US and Canadian data give mixed results.[2] Recent articles by Haskel, Martin and Small (1995) and Machin and Van Reenen (1993) have looked at UK data and found that mark-ups and firm profit margins in the United Kingdom are pro-cyclical. But these articles only look at the manufacturing sector, which now accounts for less than 25% of the UK economy. This article aims to extend the existing work by examining whether mark-ups and profit margins are pro-cyclical not only in manufacturing, but also in non-manufacturing industries, particularly retailing.

The rest of the article is in three sections. The second section looks at the cyclicality of mark-ups, using Haskel *et al*'s extension to Robert Hall's method of estimating mark-ups.[3] The third section looks at the cyclicality of firm profit margins, using Machin and Van Reenen's model of firm profitability, to see if profit margins are still pro-cyclical even after adjusting for other factors that vary with time. Using these two different approaches and datasets acts as a test on the reliability and robustness of the results. The final section of the article reviews the main findings and draws some conclusions. Annex 1 gives further details on the data used, and Annex 2 the regression results.

The cyclicality of mark-ups

To test for the cyclicality of mark-ups, we use Haskel *et al*'s extension to Hall's approach to estimating average mark-ups. Starting from a definition of marginal cost, Hall derives the following relationship between the growth rate of the output/capital ratio and the average mark-up, labour's revenue share, the growth rate of the labour/capital ratio and technical progress:[4]

$$\Delta(y-k)_t = \mu * V_t^L \Delta(l-k)_t + \theta(t) \qquad \textbf{(1)}$$

where y is the log of value-added output, l is the log of labour input, k is the log of capital input, μ is the average mark-up, V_t^L is labour's factor share at time t and $\theta(t)$ is the rate of technical progress.

Haskel *et al* extended Hall's approach to allow for the possible cyclicality of the mark-up, by specifying the mark-up as a function of a cyclical variable (cyc_t).[5] That is:

$$\mu_t = \mu + \mu_1 * cyc_t \qquad \textbf{(2)}$$

The coefficient μ_1 tells us whether mark-ups are pro or counter-cyclical and, in conjunction with the cyclicality variable, how much mark-ups move over the cycle.

To test how the mark-up behaves over the cycle in a range of industries, the following version of equation **(1)** is estimated:

$$\Delta(y-k)_{i,t} = (\mu_i + \mu_1 * cyc_{i,t}) * V_{i,t}^L \Delta(l-k)_{i,t} + \theta(t)_i + u_{i,t} \qquad \textbf{(3)}$$

where i represents industry i.

Equation **(3)** is estimated using annual data for a total of 16 industries: Financial services, Communications, Transport, Hotels and catering, Distribution, Repair and

(1) This article is based on Bank of England *Working Paper* No 72, December 1997.
(2) For the United States, Domowitz, Hubbard and Peterson (1986 and 1988) reported pro-cyclical mark-ups. However, Bils (1987), Rotemberg and Woodford (1991) and Morrison (1990) all found counter-cyclical mark-ups. Interestingly, Morrison (1994) reports pro-cyclical mark-ups for Canada.
(3) See Hall (1986), (1988), (1990).
(4) Details of Hall's approach and Haskel *et al*'s extension to his approach are given in the *Working Paper*.
(5) They also specify the mark-up as a function of market power in the industry.

construction, Metal manufacturing, Other mineral products, Chemicals, Other metal products, Mechanical engineering, Electrical engineering, Motor vehicles, Textiles, Clothing and footwear, and Paper, publishing and printing. Changes in the standard industrial classification restrict the period of estimation to 1968–91.

As it is unclear what the most appropriate cyclical indicator is, five different cyclical variables were used in the tests: the current and lagged values of the ONS coincident indicator; the current value of the ONS lagged indicator;[1] and the current and lagged values of the proportions of firms in the CBI Industrial Trends Survey reporting either (i) that their level of output is not below capacity, or (ii) that their output is constrained by capacity. No industry-specific cyclical variables are available for non-manufacturing industries, so the same aggregate cyclical variables were used for all industries.[2] The individual industry equations are estimated as a system. This lets the estimated coefficients vary across the industries, while allowing for the possibility that the residuals of the individual industry equations are correlated, for example because of common macro shocks. Following Bean and Symons (1989), the rate of growth due to technical progress is modelled by a constant and two shift dummies (one for 1974–80 and one for 1981–91) to allow for possible changes in the rate.

Table A contains estimates of equation **(3)** using various cyclicality variables and imposing the restriction that the coefficient on the cyclicality variable is the same in all industries; this restriction is accepted in each column. In each case, the estimated coefficient is positive and significant, which implies that mark-ups are pro-cyclical, though the estimate in column 2 is only significant at the 10% level.

Table A
Cyclicality results from equation (3)

Standard errors in brackets

Cyclical variable	(1)	(2)	(3)	(4)	(5)
Lagged ONS coincident indicator	0.0822 (0.0097)				
Current ONS coincident indicator		0.0225 (0.0134)			
ONS lagged indicator			0.0579 (0.0092)		
Lagged per cent of firms reporting output below capacity (a)				1.716 (0.4917)	
Lagged per cent of firms reporting capacity shortage (a)					1.979 (0.8820)

(a) From CBI Industrial Trends Survey.

The cyclicality of firm profit margins

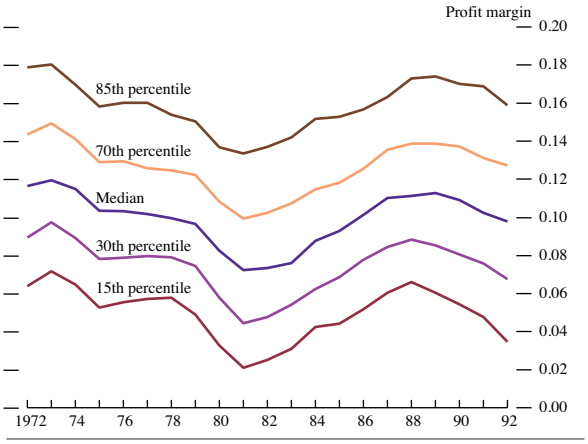
To check the robustness of the previous section's findings, this section looks at the behaviour of firm profit margins over the cycle, to see whether any pro-cyclicality only reflects movements in the standard determinants of margins, or whether, even after controlling for these, margins are still pro-cyclical.

Firm profit margins

The data used here are from Datastream, and cover 761 quoted firms in the period 1972–92. The sample is restricted to companies operating in either manufacturing or retailing, and for which at least eight consecutive years of data are available. These sample selection criteria generated 12,524 firm-year observations, 78% of the maximum number of observations available for a panel with these dimensions. The firms tend to be large, which means that while the sample is not representative of the population of all firms, it is an appropriate sample for estimating oligopolistic models of profitability.

Chart 1 plots the distribution of firm profit margins, defined as the ratio of trading profits (Π) to sales (S), in the sample.[3] It shows that all the percentiles of the distribution display a similar pattern during the period. During the mid 1970s, profit margins fell slightly and then stabilised, before falling sharply during the recession at the beginning of the 1980s. After 1981, profit margins started to recover, and continued to rise throughout the rest of the 1980s until the start of the recent recession, when they again fell, though not as sharply as in the previous recession.

Chart 1
Distribution of profit margins



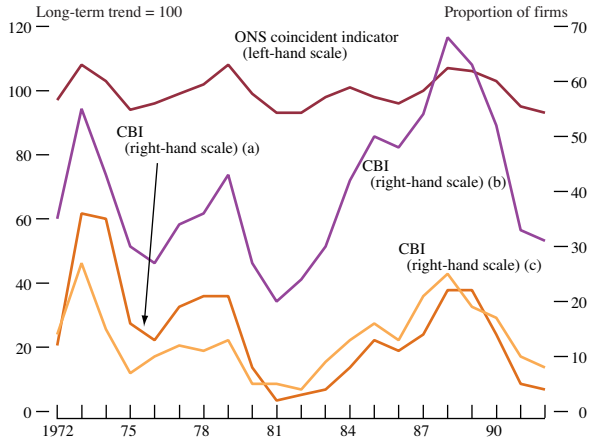
Comparing the pattern of profit margins with the various aggregate cyclical indicators plotted in Chart 2 shows that there appears to be some pro-cyclicality in firm profit margins during the period. This is confirmed by pooling the data and regressing firm profit margins $(\Pi/S)_i$ on the various cyclicality indicators (see top panel of Table B). The estimated coefficients on the cyclicality indicators all suggest that firm profit margins are pro-cyclical.

To see if there are substantial differences in the cyclical nature of profit margins between different sectors, the data on firm profit margins in each sector are pooled and

(1) The ONS discontinued publishing cyclical indicators in February 1997.
(2) An attempt was made to construct industry-specific cyclicality variables by taking the difference between actual output and trend output as estimated by a regression of industry output on a quintic polynomial in time, but this produced very imprecise estimates.
(3) 'Trading profits' are profits inclusive of interest payments and depreciation.

regressed on the various aggregate cyclicality variables (see top panel of Table B). This shows that firm profit margins are pro-cyclical in all the sectors. It also suggests that there are only relatively minor differences in the behaviour of firm profit margins over the business cycle in the various sectors of manufacturing and in retailing.

Chart 2
Cyclical indicators



(a) Proportion of firms facing skilled labour shortages, question 14b.
(b) Proportion of firms not below capacity, question 4.
(c) Proportion of firms facing capacity shortages, question 14d.

Table B
Regression results: pro-cyclicality of profit margins, 1972–92(a)

Standard errors in brackets

Panel A: aggregated results

	(1)	(2)	(3)	(4)
Constant	-0.0611 (0.0121)	0.1509 (0.0029)	0.0868 (0.0011)	0.0872 (0.0013)
ONS coincident indicator	0.1667 (0.0122)			
Firms reporting output below capacity (b)		0.0758 (0.0046)		
Firms reporting output constrained by skilled labour shortages (b)			0.1212 (0.0061)	
Firms reporting output constrained by capacity (b)				0.1852 (0.0095)
R^2	0.0142	0.0208	0.0307	0.0296
N	12524	12524	12524	12524

Panel B: individual sectors

	Metals and chemicals	Engineering	Other manufacturing	Retailing
ONS coincident indicator	0.1745 (0.0342)	0.1649 (0.0197)	0.1653 (0.0195)	0.1657 (0.0333)
Firms reporting output below capacity (b)	0.1156 (0.0131)	0.0649 (0.0076)	0.0696 (0.0074)	0.0876 (0.0128)
Firms reporting output constrained by skilled labour shortages (b)	0.1163 (0.0171)	0.1215 (0.0099)	0.1258 (0.0098)	0.1055 (0.0165)
Firms reporting output constrained by capacity (b)	0.2454 (0.0265)	0.1621 (0.0155)	0.1828 (0.0152)	0.1955 (0.0259)
N	1723	4815	4829	1157

(a) Dependent variable in both panels is $(\Pi/S)_{i,t}$.
(b) From CBI Quarterly Industrial Trends Survey.

Modelling profitability

In the light of the evidence just presented, which suggests that profit margins are pro-cyclical, we now test whether this finding is robust when movements in the factors that determine profit margins are taken into account. The model used is that of Machin and Van Reenen, for which the starting-point, as with many models of profitability, is the model of oligopoly developed by Cowling and Waterson (1976). This expresses the mark-up of price over marginal cost for a profit-maximising firm, measured here by the profit margin, as a function of the firm's market share (MS_i), a conjectural term (λ_i) that captures what the firm expects the output responses of other firms to be to a change in its output, and the elasticity of demand in the firm's industry (ε_i). That is:

$$(\Pi/S)_i = MS_i(1+\lambda_i) / \varepsilon_i \qquad \textbf{(4)}$$

To turn this expression into an estimable equation, the unobservable conjectural term needs to be modelled. Machin and Van Reenen use the following relatively general formulation:

$$\lambda_i = \alpha_{1,i}((1-MS_i) / MS_i) + \alpha_{2,i}(1/MS_i) \qquad \textbf{(5)}$$

The coefficients $\alpha_{1,i}$ and $\alpha_{2,i}$ capture how much each firm reacts to the actions of its competitors. These coefficients are assumed to be functions of sales concentration in the firm's principal operating industry ($SC_{j,t}$), past profitability and an aggregate cyclicality variable (CYC_t).(1) The cyclicality variable is included to allow for the possibility that even after controlling for the structural time-varying determinants of profit margins, margins still vary over the cycle, for example as the nature of competition varies. So firm conjectures are modelled by the following expression:

$$\begin{aligned}\lambda_i = {} & (\delta_{1,1}(\Pi/S)_{i,t} + \delta_{1,2}SC_{j,t} + \delta_{1,3}CYC_t)((1-MS_i)/MS_i) \\ & + (\delta_{2,1}(\Pi/S)_{i,t} + \delta_{2,2}SC_{j,t} + \delta_{2,3}CYC_t)(1-MS_i)\end{aligned} \qquad \textbf{(6)}$$

Substituting this expression for λ_i in equation **(4)** and rearranging it gives the following general model of profit determination:

$$\begin{aligned}(\Pi/S)_{i,t} = {} & \gamma_i + \beta_1 (\Pi/S)_{i,t-1} + \beta_2 MS_{i,t} + \beta_3 SC_{j,t} + \beta_4 CYC_t \\ & + \beta_5 MS_{i,t} * (\Pi/S)_{i,t-1} + \beta_6 MS_{i,t} * SC_{j,t} \\ & + \beta_7 MS_{i,t} * CYC_t + u_{i,t}\end{aligned} \qquad \textbf{(7)}$$

where γ_i controls for any unobservable firm-specific effects that do not vary with time, for example management ability.(2)

Equation **(7)** is estimated using the panel of firm data from the first part of this section.(3) Firm market share is

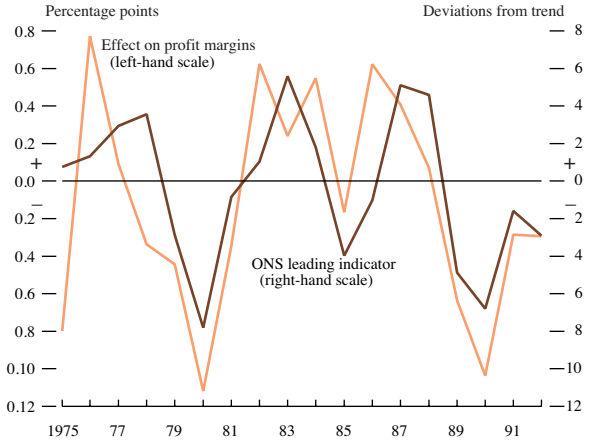
(1) The assumptions that these coefficients are the same for all firms in an industry and increasing functions of industry sales concentration are standard in studies that use Cowling and Waterson's model. Lagged profitability is included to allow for the possibility that there are lags in adjustment, and because current conjectures may depend upon past performance.
(2) The firm-specific fixed effects are eliminated from equation **(7)** using the standard method of taking first differences. The equation is estimated by instrumental variables, using the Generalised Method of Moments procedure proposed by Arellano and Bond (1988 and 1991). This procedure uses variables dated (t-2) or earlier as valid instruments, and calls upon more instruments as the period of estimation advances. The actual instruments used are all the moment restrictions dated between t-3 and t-4 on the lagged dependent variable, firm market share, the firm's investment/sales ratio and dividend payments. If the interactions are included in the regression, the same moment restrictions on them are also used as instruments. The validity of the instrument set is checked by a Sargan test and a test for second-order serial correlation. In a first-differenced model, the Sargan test is only valid if there is no second-order serial correlation.
(3) The coefficient on the interaction between firm market share and the cyclicality variable was always small and insignificant, so this term was dropped from the estimated equation.

measured by each firm's share of sales in its industry, and sales concentration is measured by the weighted average of sales concentration in the firm's industry.(1) Industry sales and sales concentration are matched to individual firms on the basis of the firm's main operating industry in terms of sales. As in the tests for cyclicality of mark-ups, a number of variables are used to model the cyclicality term, including the current values of the ONS coincident indicator and the proportions of firms in the CBI survey reporting either that their current level of output is not below capacity, or that their output is currently constrained by a lack of skilled labour or a lack of capacity.

The results, reported in full in Annex 2, show that the estimated coefficients on the non-cyclicality variables are very similar in terms of sign and size, and with a few exceptions are all significant at the 5% level.(2) Firm market share and industry sales concentration both have a positive effect on firm profit margins. But the interaction between firm market share and industry sales concentration has a negative effect. So though increases in a firm's market share or in sales concentration lead to higher profit margins, this effect is dampened to some extent if a firm has a large market share and operates in a highly concentrated industry. The latter suggests that there is a degree of competitive behaviour between firms in oligopolistic industries. Past profitability has a substantial effect upon current profit margins, suggesting that there is a large degree of persistence in firm profitability. This result is in line with the findings of the persistence of profitability literature (see, for example, Mueller (1990)).

Finally, comparing the pattern of the coefficients on the cyclical variables with the ONS leading indicator shows that even after controlling for quite a wide range of determinants of profit margins, margins are still pro-cyclical: the size of the coefficients falls in the late 1970s and early 1980s, then recovers in the mid 1980s before falling again in the late 1980s and early 1990s (see Chart 3). In terms of the effect on profitability, the estimates imply that profit margins were 0.8 percentage points higher in 1976 (the peak in the sample period) than they would otherwise have been, and 1 percentage point lower in 1990 (the trough in the sample period).(3) Given that the mean profit margin for the whole period is 10%, these effects on profitability are not inconsequential.

Chart 3
Pro-cyclicality of profit margins



Conclusion

This article has examined price-cost mark-ups and profit margins in UK manufacturing and services, extending existing findings that both are pro-cyclical in the manufacturing sector. It has presented evidence that both are pro-cyclical in services as well as in manufacturing. This suggests that price pressures may move in line with the business cycle, increasing during the recovery period and decreasing during recessions.

(1) See Annex 1 for further details.
(2) The exceptions are firm market share in columns (1), (2) and (4).
(3) The effect in 1975 is the coefficient on the constant. After 1975, the effect in each year is the sum of the coefficient on the constant plus the coefficient on the time dummy.

Annex 1
Details on data and sources

Mark-ups data

Real value-added output: GDP at constant factor cost, Table B.4, Blue Book.
Nominal value-added: Table B.3, Blue Book.
Nominal total wages: Table 3.3, Blue Book.
Real gross capital stock: Table A3.8, Blue Book.
Total employment: Table A.2, Employment Gazette.
Actual hours worked: Table E.4, Employment Gazette.

Capacity variables

Percentage of firms reporting that their level of output is below capacity: Question 4, CBI Quarterly Industrial Trends Survey.
Percentage of firms reporting that their output is constrained by capacity: Question 14d, CBI Quarterly Industrial Trends Survey.
Percentage of firms reporting that their output is constrained by skilled labour shortages: Question 14b, CBI Quarterly Industrial Trends Survey.
ONS coincident indicator: Economic Trends.
ONS lagged indicator: Economic Trends.

Company data

The structure of the panel is as follows: 12 firms have only 8 observations, 25 have 9, 49 have 10, 55 have 11, 48 have 12, 49 have 13, 41 have 14, 40 have 15, 36 have 16, 30 have 17, 43 have 18, 57 have 19, 18 have 20 and 258 firms are observed continuously for the whole 21-year period.
Trading profits: Datastream item 135.
Total sales: Datastream item 104.

Profit margins industry data

Two-digit industry sales: Manufacturing: Table A, Census of Production; retailing: Business Monitor.
Sales concentration: Manufacturing: sales-weighted average of three-digit sales concentration in each two-digit industry, Table A3, Census of Production; retailing: Table A3, Retailing Business Monitor SDA25.

Annex 2
Cyclicality of profit margins, regression results

	(1)	(2)	(3)	(4)	(5) (a)
C					-0.0079 (0.0017)
$(\Pi/S)_{i,t-1}$	0.5381 (0.0299)	0.4998 (0.0518)	0.4283 (0.0605)	0.4975 (0.0507)	0.5056 (0.0782)
$MS_{i,t}$	0.3965 (0.2129)	0.2726 (0.2080)	0.6087 (0.3024)	0.2966 (0.2128)	0.6682 (0.3254)
$SC_{j,t}$	0.1027 (0.0165)	0.1237 (0.0210)	0.0863 (0.0208)	0.1105 (0.0206)	0.0364 (0.0224)
$MS_{i,t} * SC_{j,t}$	-0.6651 (0.3646)	-0.6354 (0.2831)	-1.0657 (0.4461)	-0.6828 (0.2969)	-1.0872 (0.4851)
ONS coincident indicator	0.0586 (0.0078)				
CBI $Q4_t$		0.0430 (0.0047)			
CBI $Q14b_t$			0.0637 (0.0082)		
CBI $Q14d_t$				0.1081 (0.0101)	
Test statistics					
Serial correlation [N(0,1)]	-1.508	-0.880	-1.227	-0.740	-0.858
Sargan test χ^2 (df)	312.00 (168)	289.44 (168)	286.84 (168)	274.08 (162)	177.26 (168)
Wald test for time dummies χ^2 (df)					327.43 (18)
Sample size	10241	10241	10241	10241	10241
Number of firms	761	761	761	761	761

(a) Time dummies relating to column 5:

1976	0.0157 (0.0028)	1982	0.0142 (0.0024)	1988	0.0087 (0.0027)
1977	0.0089 (0.0022)	1983	0.0104 (0.0030)	1989	0.0016 (0.0028)
1978	0.0046 (0.0020)	1984	0.0135 (0.0034)	1990	-0.0024 (0.0030)
1979	0.0036 (0.0025)	1985	0.0063 (0.0027)	1991	0.0051 (0.0036)
1980	-0.0032 (0.0023)	1986	0.0142 (0.0025)	1992	0.0050 (0.0030)
1981	0.0045 (0.0024)	1987	0.0121 (0.0027)		

Notes: The dependent variable is $(\Pi/S)_{i,t}$. Estimation is in first differences. Standard errors in brackets. Those reported are robust one-step estimates. The instrument set consists of all the moment restrictions dated between (t-3) and (t-4) on the lagged dependent variable, firm market share, the firm's investment-sales ratio and firm dividend payments. The serial correlation test is N(0,1) test for second-order serial correlation, and the Sargan test is a χ^2 test of the over-identifying restrictions.

The drawback with the results in the first four columns of the table is that each regression fails the Sargan test. Therefore in column (5) the cyclicality variable is dropped and replaced by a full set of time dummies. This is a more general way of modelling the cyclicality effect, as the time dummies will capture any unobserved time-specific effects that are common to all firms. This solves the mis-specification problem in the first four columns; the regression in column (5) passes the Sargan test. In addition, the main non-cyclicality findings from the first four columns still hold; the estimated coefficients on the non-cyclicality variables in column (5) are similar to those in columns (1)–(4).

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Three views of macroeconomics

In this speech,[1] Sir Alan Budd, a member of the Bank's Monetary Policy Committee, reviews the changing approaches to macroeconomic policy shown by three Budgets that occurred at similar stages in the economic cycle. He concludes that this analysis provides an illustration based on experience of the need for robust policy rules.

Last November, I celebrated my retirement from the Treasury. It therefore seems appropriate for me to devote this talk to reminiscence. I want to talk about three Budgets and use them to illustrate changing approaches to macroeconomic policy. They are the Budgets of 1972, 1981 and 1992. I was directly involved, as a Treasury official, in two of them and took a particular interest in the other one. I should say now that I am not intending to reveal confidential information about the operation of the Treasury. (It is well-known that such efforts are immediately punished by a bolt of lightning, and I would not wish to cause any injury to innocent bystanders.)

In relation to each of these Budgets, I shall ask what they reveal about the views current at the time about the behaviour of the economy, in particular in relation to the determination of output and inflation. At the end, I shall attempt to draw some conclusions from these experiences. I have learned that when talking to sixth forms it is a mistake to assume that they all remember the early days of the Thatcher government. I suspect that it is a similar mistake when talking to this conference, so I shall take little for granted.

My final point by way of introduction is that this is not an exercise in mockery. It is true that I no longer hold some of the views implied in these Budgets, though in some cases I did at the time. A sense of modesty about it all is rather more appropriate than a sense of superiority.

My choice of Budgets is not completely random. Two of them, those of 1972 and 1981, were quite extraordinary, but all three occurred at approximately the same stage of the cycle. The troughs in the cycles, as recorded by the CSO (as it then was), occurred in February 1972, the first quarter of 1981 and the second quarter of 1992. Thus the Budgets were all very close to the trough.

We start with the Budget of 1972. The immediate background, as reported in the Budget 'Red Book', was that GDP had grown by 2½% between the first and second halves of 1971, although this had followed a rather prolonged period in which it had grown substantially below the rate of growth of productive potential. Unemployment had risen sharply (by the standards of the day). It was 260,000 (or 1.2% of total employees) higher at the end of 1971 than it had been a year earlier. By the end of 1971, unemployment was more than 900,000 (about 4% of the labour force). Retail price inflation had reached an annual rate of 11% during the first six months of the year, but had subsequently fallen back to about 5½%. The twelve-month rate was 8%. Interest rates had been cut during the year by 2 percentage points. Broad money (M3) had risen by 13% during 1971. Public expenditure had been increased in a package of measures announced the previous July. Competition and Credit Control, which among other things involved the abolition of quantitative restrictions on bank lending and the conventional liquidity ratios observed by the clearing banks, had been introduced in September 1971.

Against this background, the then Chancellor of the Exchequer, Mr Barber, made generous tax cuts, in addition to the increases in public expenditure and cuts in interest rates of the previous year. The tax cuts were worth about 2% of GDP (from a non-indexed base); the main measures were increases in the married and single allowances, and cuts in purchase tax rates.

It was clear that the purpose of the Budget (as of the preceding policy changes) was to cut unemployment. In his Budget speech, Mr Barber said: 'There is universal agreement that the present high level of unemployment is on every ground—economic and social—one which no government could tolerate'. The Budget was expected to raise demand by about 2% of GDP.

So the aim of the Budget was clear. But what about the effects of demand expansion, and the resulting fall in unemployment, on inflation? Mr Barber made two interesting comments in his Budget speech.

The first was: 'While cost inflation is clearly one of the causes of high unemployment, I have never agreed with those who look to unemployment as the cure for inflation'.

The second was: 'I do not believe that a stimulus to demand of the order I propose will be inimical to the fight

(1) Given at the Royal Economic Society Conference held at Warwick University on 1 April 1998.

against inflation. On the contrary, the business community has repeatedly said that the increase in productivity and profitability resulting from a faster growth of output is one of the most effective means of restraining price increases'.

We can pause and ask what observations and what economic theories led to the conclusion that faster growth would actually help to reduce inflation. One clue was provided by a remark in Mr Barber's 1971 speech. He said: 'Two problems, above all, command attention at the present time, inflation and unemployment: a new and, in many ways, a baffling combination of evils'.

The 1960s had seen unemployment cycling around 2½% (on present definitions), but with a tendency to rise. Inflation had varied around 3%, but was also tending to rise. But in 1970, as Mr Barber remarked, both inflation and unemployment had risen. This observation gave rise to such comments as: 'The Phillips curve is dead' or, alternatively, 'It has been stood on its head'. (Recall that I am talking about comments made in 1970 or thereabouts.) The rise in inflation under conditions of rising unemployment was variously explained as a response to rising trade union militancy, or as a sign of social breakdown. There were also the real wage push and catch-up theories, which could readily explain how faster economic growth would produce lower increases in nominal wages. Finally, there was the common observation that unit labour costs tended to fall in the early stages of an economic recovery, because of short-term increases in labour productivity.

If faster growth and falling unemployment would produce lower inflation, it is worth asking whether there was any limit to this process. That indeed is a question that could be asked of much of macroeconomic policy-making in the period up to 1972. It is possible that, mindful of the problem that had dominated post-war macroeconomic policy to the end of the 1960s, the limit was expected to be provided by the balance of payments. (Though even that limit was to be removed by the move to floating exchange rates in 1972.) Since the Red Book talked of productive potential, there was clearly some supply-side constraint, although it appeared to be rather weak. Also, the Red Book had specifically drawn attention to the exceptional rise in unemployment during 1971 at a time of economic growth, and concluded that there had been an upward shift in productive capacity. The official forecasts that accompanied the Budget showed GDP growing by 4¾% in 1972, and by 6% between the first half of 1972 and the first half of 1973.

There were certainly criticisms of the 1972 Budget. A particularly important source was Cambridge University, where the New Cambridge School, under Wynne Godley, argued that the rapid increase in the Budget deficit associated with the fiscal expansion would result in an equivalent deterioration in the balance of payments. To oversimplify somewhat, the New Cambridge School, with its emphasis on financial flows, argued that the private sector's financial surplus tended to remain constant (at an annual rate of about £1 billion). Thus any increase in the public sector's deficit would be matched by an equivalent increase in the overseas sector's surplus (ie in the balance of payments deficit).

The other source of criticism was from the monetarists, who had an explanation for the conjunction of rising inflation and rising unemployment (Milton Friedman had given his Presidential Address to the American Economic Association in 1968), and drew attention to the rapid growth of the money supply. They warned that the result, sooner or later, would be a burst of inflation.

The following years (with a further relaxation of fiscal policy in the 1973 Budget) saw, first of all, GDP growth of more than 7% in real terms in 1973. Unemployment fell to below 500,000 by the end of 1973. Then New Cambridge had its triumph. The balance of payments recorded a deficit of £1 billion (1½% of GDP) in 1973 and more than £3 billion (4% of GDP) in 1974. Finally we had, apparently, the triumph of the monetarists. By 1975, despite a series of prices and incomes policies, inflation reached a peak of 27% and unemployment was back to one million and rising.

From 1972, I move the story on nine years. 1981 was the new Conservative government's third Budget. The economy was in a deep recession. GDP had fallen by 2½% in 1980. Manufacturing output had fallen by 9%. Unemployment had risen during the year from 5½% to 9½%, an unprecedented rise of one million in a year. Retail price inflation had fallen from a peak of 22% in May 1978 to 13% in January 1981. The underlying six-month annualised rate was 10%–11%, broadly in line with the OECD average.

Against this rather grim background to the real economy, the 1981 Budget was designed to produce a fiscal tightening of 1¾% of GDP. That made it, up to that point, one of the toughest of the post-war Budgets. (The other tough Budgets had been those of 1951 and 1968, but the circumstances had been entirely different. The 1951 Budget had been a response to the Korean War and rearmament; the 1968 Budget had followed the devaluation of 1967.) Since GDP was forecast to fall by 2%, the reduction in the structural deficit was significantly larger than 1¾% of GDP. The structural deficit was cut by between 4% and 5% of GDP.

The main measures were a freezing of personal income tax allowances (at a time when inflation was 13%), increased taxes on oil revenues, a special tax on bank deposits, increased excise duties on fuel, tobacco and alcohol, and a rise in vehicle excise duty.

The Red Book introduced the Budget in the following terms: 'The Budget represents a further step towards the achievement of the Government's medium-term objective of bringing down inflation and creating the conditions for sustainable growth of output and employment'.

The next sentence was a key passage: 'In order to permit its monetary objectives to be met at tolerable interest rates, the

Government's aim is to contain public sector borrowing to a real level well below that of 1980–81'.

This point was set out in greater detail in the presentation of the Medium Term Financial Strategy. The growth of broad money (measured then by sterling M3) was to be reduced from the 20% it had reached during 1980–81, to 6%–10% in 1981–82 and to 4%–8% by 1983–84.

The Red Book said: 'The Government intend that fiscal policy should be consistent with this declining path for monetary growth. The PSBR as a proportion of GDP will be brought down substantially over the medium term, so as to create conditions in which interest rates can fall'.

In his Budget speech, Geoffrey Howe said: 'It is the experience of Governments around the world that if they try to borrow too much, either interest rates or inflation, or both, begin to soar.

Britain's experience tells the same story. If we are to stay on course for lower inflation and lower interest rates, we must borrow less. Public borrowing, as a proportion of national income, must be brought down. This is why the medium-term financial strategy envisages a downward path for borrowing, as well as for the growth of the money supply. These remain the essential prerequisites for a lasting grip on inflation'.

To explain the 1981 Budget, we can look back over the years since the 1972 Budget. As I mentioned, the immediate effect had been a rapid growth of GDP and a fall in unemployment, but three years later, inflation and unemployment had been at record post-war levels. In 1976, there had been the IMF crisis, followed by the severe fiscal tightening of 1977.

Those events produced a sea-change in policy circles.

Above all they produced:

- doubts about the effectiveness of fiscal policy in altering aggregate demand;
- acceptance of the inflationary role of the money supply;
- recognition of the link between public sector borrowing and the growth of the money supply;
- recognition of the role of the exchange rate in the monetary transmission mechanism; and
- appreciation of the role of supply and demand factors in determining the level of unemployment.

Note that I am not, for the moment, saying whether those views were right or wrong; I am merely saying that they had permeated policy-making.

Mr Callaghan, the Labour Party Leader and Prime Minister, as he then was, had made his much-quoted speech in September 1976: 'We used to think that you could just spend your way out of a recession and increase employment by cutting taxes and boosting government spending. I tell you in all candour that that option no longer exists, and that insofar as it ever did exist, it worked by injecting inflation into the economy. And each time that happened, the average level of unemployment has risen. Higher inflation, followed by higher unemployment. That is the history of the last twenty years'.

The idea that fiscal policy was ineffective was reinforced by the observation that the fiscal tightening of 1977 was followed by a healthy economic recovery in 1978.

The importance of the money supply was supported by the fact that the rapid monetary growth of the early 1970s had been followed (as the monetarists had predicted) by the inflationary outburst of the mid 1970s. The link between public borrowing and the broad money supply could be shown through the monetary identities. The role of the exchange rate in the transmission mechanism could be seen from experience. Once it was allowed to float, its fall had accompanied the rapid growth of the money supply and preceded the inflation of 1974–75.

All these ideas had been brilliantly incorporated in the London Business School model by Terry Burns. A fiscal expansion, unless accompanied by a rise in interest rates to encourage sales of public sector debt to the non-bank private sector, would result in a rise in the money supply. The rise in the money supply would generate a fall in the exchange rate. The open-economy model of inflation showed that prices of traded goods would move rapidly to equality with world prices, and the resulting inflation would spread (via wage increases) to the rest of the economy. Finally, experience had shown that the personal sector's savings ratio, as measured in the National Income Accounts, rose with inflation. Thus the effect of a fiscal expansion on demand would rapidly be reversed, and the result would simply be a rise in inflation.

It was these ideas that had provided the intellectual basis for the Medium Term Financial Strategy, which had been introduced with the 1980 Budget. But it had gone off course in 1980. The money supply had grown by 20% rather than the intended 6%–10%, and the PSBR had been £13 billion rather than the intended £9¼ billion. The Budget was designed to bring the Medium Term Financial Strategy back on course. Monetary growth had to be reduced. If this was to be done at the same time as interest rates fell, the PSBR had to be reduced. But would not the fiscal tightening slow down economic growth and raise unemployment?

The Budget Red Book provided some hint of official thinking: 'The past year has been difficult as the economy has had to adjust, against a background of world recession, to a higher exchange rate and lower inflation. The

immediate costs of this adjustment are falling output and sharply rising unemployment. However, part of the loss of output and employment could have been avoided had wage increases been lower; only since the Autumn has there been evidence of greater realism in pay settlements'.

In his Budget speech, Geoffrey Howe also commented on the role of excessive pay claims: 'Many factories had already gone a long way towards pricing themselves out of the market by earlier pay settlements. Many of those who secured big pay increases may have improved their own standard of living, but only at the cost of pushing their fellow workers out of a job'.

But matters were beginning to improve: 'Pay bargainers have begun to face up to the harsh truth that excessive pay is a major cause of unemployment'. He hoped that the government's policies would produce lower inflation and, in due course, lower unemployment.

The forecasts that were published with the Budget showed GDP falling by a further 2% in 1981, although a recovery was expected between the first and second halves of the year. GDP was expected to grow by 1% between the first half of 1981 and the first half of 1982. As was the custom, there was no forecast of unemployment. Retail price inflation was expected to be 10% by the end of 1981 and 8% by the middle of 1982.

In the event, the economy started to recover in the second quarter of the year. Growth between the first half of 1981 and the first half of 1982 was $2^{1}/_{4}$%. However, unemployment continued to rise until 1986. Inflation was 12% at the end of 1981, and was about 8% by the middle of 1982.

The 1981 Budget had considerably more critics than supporters. Notoriously, it produced the letter to the *Times* of 30 March, which included the following: 'There is no basis in economic theory or supporting evidence for the Government's belief that by deflating demand they will bring inflation permanently under control and thereby induce an automatic recovery in output and employment'.

Since this letter was signed by a large number of economists that I respect and admire, I have spent a great deal of time contemplating it. If 'discuss' was added at the end, it might make a good exam question. I would make the following comments. First, any economist worth his salt could invent six theories in a morning to match any posited set of observations. Second, there would be no need to invent such theories, since there would be perfectly good ones to hand. A standard eclectic model would produce the result that if demand were deflated (for example, by reducing the growth of the money supply), the ultimate result would be a fall in inflation and a return to the equilibrium level of output and employment. However, I recall this letter not as evidence of the state of economic thought at the time, but as a sign of the bitterness of the debate and the extent of the breakdown in the consensus.

I shall deal with the 1992 Budget more briefly, since it is more clearly a descendant, though subject to further evolution, of the 1981 Budget.

The United Kingdom had joined the ERM in October 1990. At Budget time, retail price inflation was 4%, having been 9% a year earlier. Producer price inflation was $2^{3}/_{4}$%. GDP had fallen by $2^{1}/_{2}$% in 1991 and was still falling at the end of the year. Unemployment had reached $9^{1}/_{2}$%. Interest rates had been cut by $3^{1}/_{2}$ percentage points during the year. The Autumn Statement, presented the previous November, had included increases in public expenditure.

The Budget provided a fiscal relaxation of about 0.2% of GDP in 1991–92 (from an indexed base), and about 0.3% of GDP in 1992–93. The main change was the introduction of the new 20% income tax rate on the first £2,000 of taxable income.

The Red Book stated: 'Successful economic performance requires permanently low inflation and a healthy supply side'. In his Mais Lecture of 1984, Lord Lawson had emphasised that macroeconomic policy should be assigned to the control of inflation, and microeconomic policy should be assigned to the improvement of sustainable output and employment. The Red Book explained that, within macroeconomic policy, membership of the ERM provided the basis for monetary policy. At that time, monetary policy was directed at keeping sterling within 6% either side of the central ERM parities. The announced policy was that in due course sterling would move to the narrow $2^{1}/_{4}$% band round the central parity of 2.95 Deutsche Marks.

The government's fiscal policy was to maintain a firm fiscal stance by balancing the Budget over the medium term. 'This approach ensures that fiscal policy supports monetary policy in achieving low inflation'.

The Red Book continued: 'ERM membership will remain the central discipline underpinning UK macroeconomic policy in the medium term. In principle, policy requirements are not fundamentally altered by ERM membership: they would be much the same even if the United Kingdom had chosen to pursue the objective of defeating inflation outside the ERM. But ERM membership now provides the medium-term nominal framework within which the UK economy must operate'.

Given the constraints of ERM membership, of the objective of balancing the Budget over the medium term, and of its commitment to meeting the Maastricht criteria (which included the avoidance of an excessive fiscal deficit, indicated by a deficit of more than 3% of GDP), the government had little room for manoeuvre.

Mr Lamont denied that he was engaging in fiscal activism. In his Budget speech he referred to the success in bringing

down inflation and said: 'There are those who would put this [fall in the inflation] at risk by seeking to pump up demand, but I am not prepared to take steps which would call into question the Government's determination to match or better the inflation performance of our Community partners.

And even if it were thought desirable, it is not remotely feasible for Governments to try to target the level of demand month by month or quarter by quarter. Having made such progress in getting inflation down, it would be tragic now to throw it all away with an ill-judged or ill-timed attempt to kick-start demand'.

However, Mr Lamont believed that it was appropriate to allow some short-term relaxation of fiscal policy, since this was consistent, according to the projections made at the time, with bringing the PSBR back to ¾% of GDP over the following five years. The PSBR was projected to reach a peak of 4¾% in 1993–94 and then to fall steadily.

The forecasts published with the Budget had GDP rising by about 2% between the second half of 1991 and the second half of 1992, and by 3% between the first half of 1992 and the first half of 1993, helped by a projected improvement in competitiveness as UK costs and prices fell relative to those of its trading partners. Retail price inflation was forecast to fall to 3¾% by the end of 1992, and to 3¼% by mid 1993. Unemployment was expected to continue rising for a while, though at a slower rate than previously.

The events since the Budget of 1992 will be more familiar to most of you. The United Kingdom left the ERM on 16 September 1992. GDP fell by about ½% in 1992, compared with a forecast rise of 1%. Unemployment continued to rise during 1992, but stopped just short of 3 million and has been falling ever since. Inflation was 2.6% at the end of 1992 and 1.2% in mid 1993.

That is the end of the story. What were the three views of macroeconomics? With some inevitable oversimplification, they can be characterised as follows.

In 1972:

- output and unemployment were determined by aggregate demand;
- aggregate demand could be freely manipulated by the authorities, particularly through changes in fiscal policy; and
- inflation was either unaffected by, or possibly reduced by, reductions in unemployment.

In 1981:

- output and employment were self-equilibriating (though not necessarily rapidly);
- attempts to change aggregate real demand through fiscal expansion would be ineffective; and
- inflation was determined in the medium to long term by the growth of the money supply.

In 1992:

- output and employment were self-equilibriating in the medium to long term, but determined by aggregate demand in the short term;
- aggregate demand could be affected in the short term by fiscal policy; and
- inflation was determined by the pressure of demand in the short term, and by the inflation of currency system partners in the medium to long term (recall that this was a period of quasi-fixed exchange rates, at least with the ERM currencies).

If that sounds as if 1992 was closer to 1981 than it was to 1972, that is deliberate. The changes between 1981 and 1992 largely concerned the speed with which markets are thought to adjust (though that is obviously not a trivial matter as far as policy-making is concerned).

If one were to bring the story up to date, one could perhaps say that as far as macroeconomics is concerned, we now have a flexible exchange rate version of the ideas behind the 1992 Budget, with the addition of those twin peaks of human evolution—the Monetary Policy Committee of the Bank of England at one end of town and the Code for Fiscal Responsibility at the other. It is also true, I think, that the basis of current policy is closer to the professional consensus than was the case in 1972 or 1981 (though that is not necessarily a source of comfort, and I am not saying who it is that has moved).

What do we learn from these experiences? In my own case, I find further evidence to support the one (rather tentative) conclusion that I draw from nearly 30 years' experience, namely that it is all very difficult. I have described three very different Budgets, and I have suggested that they represent three different views of macroeconomics. It is hard to believe that all those views were right. I can offer two explanations for these swings in policy-making. They are not necessarily inconsistent with each other, though one is more benign than the other.

The benign explanation would run as follows. The early 1970s saw a number of shocks, including the change in policy regime following the breakdown of the Bretton Woods fixed exchange rate system and the oil price rises of 1973–74. It was not an easy matter to choose the right policies in these profoundly changed circumstances. It involved a process of trial and error. Policy-makers reasonably enough learned from experience, and also absorbed elements from developments in economic theory. The path of inflation from 1970 onwards looks consistent with the idea of erratic progress towards some degree of success in bringing it under control and stabilising it. (One might of course ask why other countries found the process rather less difficult.)

The less benign explanation (which is not obviously inconsistent with the previous one) would run as follows. Policies have been based on beliefs that have had flimsy foundations in terms of theory or evidence. When there are new events that seem to be inconsistent with the current approach, the framework is abandoned and replaced by something else that seems to fit the recent facts better. By analogy with econometrics, one could perhaps call this policy 'over-fitting'. As in econometrics, the new system rapidly breaks down in response to the next shock.

I think that the truth probably lies somewhere between the two explanations, and it would be inappropriate for me to say exactly where we should place it. If pressed, I would say that the 1972 Budget was an extreme version (in response to short-term developments) of policies based on insecure analytical and empirical foundations. 1981 was a robust (and perhaps inevitably somewhat crude) attempt to place policy on a sound footing. It has been sensibly modified in the light of experience and further analysis. I believe that we now have an approach to policy that would have dealt better on average with the events of the past quarter of a century, even if it had not been entirely appropriate in all conditions. I believe that it offers a good chance of dealing successfully with future shocks, although it does not, of course, guarantee it.

Finally, you may feel that I have spent 50 minutes (if not 30 years) stumbling towards the familiar concept of robust policy rules. That is true; my purpose has been to show, from experience, how necessary they are.

Trade and investment in the light of the Asian crisis

In this speech,[1] Dr DeAnne Julius, a member of the Bank's Monetary Policy Committee, assesses possible economic and political consequences of the Asian financial crisis. After outlining a downside scenario, she sets out a number of practical steps that leaders of the G7 countries and others might take to avoid or at least mitigate such an outcome.

I am delighted to have the opportunity to participate in this important conference on the eve of the G8 Summit.[2] I am also delighted to be sharing the platform with my colleague on the Monetary Policy Committee. We have planned quite a strict division of labour on this topic, but it still may give us a chance to disagree with each other without being labelled as hawks or doves!

In fact, when I used to work on Asia in my previous incarnations at the World Bank and as a corporate economist, the predominant ornithological metaphor was of flying geese. Japan, of course, was the lead goose in the formation, with the rest of the Asian economies forming the V behind. I always felt that there were a few avionics problems with that metaphor, since nearly all of the smaller and poorer economies were flying much faster than Japan. And since about 1990, when the Japanese economy began to suffer from the burst of its equity and land price bubbles, the formation seemed to be flying in reverse, with the rest of Asia providing the strongest source of demand for Japan's output.

Now the whole formation has slowed precipitously, and is in danger of stalling. My central message to the G7 in their Economic Summit deliberations this weekend is that globalisation means mutual structural adjustment. There is a risk of complacency, not to mention closing the barn door after the horse has fled, in focusing too heavily on the financial aspects of the Asian crisis. Certainly, we should take advantage of whatever lessons can be learned for international financial reporting and regulation. But the financial eruptions in Asia are (we hope) mostly behind us, while the economic and political fallout is yet to come. And the longer-term effect of those on the real economy—through the channels of world trade and direct investment—could be aggravated if they are not well anticipated and accepted by all of us.

To make the case for this message, I would like first to consider the background to the Asian crisis, and then to discuss what I shall call a downside scenario in three phases—financial, economic and political.

First, the build-up. The period from 1990–97 was a remarkably auspicious time in recent economic history. World growth was stronger than it had been in the previous two decades, despite domestic recessions early in the 1990s in some of the largest economies. There were no synchronised downturns across the OECD, and there seemed to be a new delinkage of growth between the OECD economies—which were growing at around their long-term trend rates—and the developing world, where growth seemed to be accelerating. Some commentators speculated that this was due to 'the end of history', or at least the discrediting of the old socialist models of economic planning and state-owned production. While the philosophical shift that followed the fall of the Berlin Wall in 1989 certainly brought fundamental changes to the central European economies, it would be too much to claim, in my view, that they shifted world economic growth onto a new, higher track.

What has changed, however, is the scope, and therefore the pace, of globalisation. Since the beginning of this decade, world GDP has grown, in real terms, by 30%, at an average rate of 3.8% per annum. During that same period, world trade has increased by 40%, rising in volume terms by almost 6% per annum. This pattern of trade growing around 50% faster than GDP has been one of the salient features of the post-war period. It reflects the critical role of trade in stimulating economic growth through increased specialisation, and the additional competitive spur of the larger international market. But from a strictly domestic standpoint, it also shifts the balance of forces that drive national economic growth more and more towards the external sector. And for all but the largest world economies (by which I mean essentially only the United States and Japan), it makes the exchange rate an increasingly important determinant of domestic economic growth and stability.

This increasing importance of the external sector has been given a greater spur, as well as a new twist, by the phenomenal growth of foreign direct investment (FDI). The step change in FDI flows was actually in the late 1980s, when Japanese companies became important players. Then the wave of privatisations began, initially here in Britain,

(1) Given at the conference 'Jobs, Crime and Money: Challenges for the G8 Summit of 1998', at the Plaisterers' Hall, London on 13 May 1998. The conference was organised by Clifford Chance, the London School of Economics and the University of Toronto GB Research Group.
(2) The Birmingham Summit meeting on economic issues involved the G7 countries: the United States, Japan, Germany, France, Italy, Canada and the United Kingdom. Russia joined the Summit meetings on political issues as a full participant, making it the first G8 Summit. Mentions of the G7 in this paper refer to the seven countries listed above, while G8 refers to the Summit conference as a whole.

but then in Latin America, Asia and elsewhere. These were often managed by foreign merchant banks and consultancies, which were very effective in mobilising foreign capital for investment in large segments of developing country businesses that had formerly been on the states' books. At a global level, after a brief dip around 1990 associated with the US recession and the slowdown in Japan, FDI flows resumed apace. Since 1990, they have more than doubled, growing at an average annual rate, in real terms, of 14%. That is more than twice as fast as the growth of world trade.

The 'new twist' to globalisation provided by FDI is important to understanding the current situation in Asia. Unlike portfolio flows into emerging market funds, direct investment cannot be quickly withdrawn. Direct investment decisions are taken carefully, weighing up the macroeconomic, commercial and political risks, before capital is committed. Those risks have risen dramatically since the Asian currency collapses of 1997. Macroeconomic assumptions on which past investments were made have been proven wrong. In currency markets, as we all know, overshoots and reversals are to be expected. But even if many of these currencies appreciate from their troughs to more appropriate levels, the private sector's view of macroeconomic risk over the next five to ten years has been permanently changed by this experience. If these macroeconomic shocks turn out to have negative political repercussions, a possibility that I shall come to later, then FDI into those countries could take a number of years to recover.

So my own view is that the Asian financial crisis will have more severe and longer-term economic consequences for those countries than is yet widely appreciated. Indeed, the IMF seems to be edging towards the same conclusion. Its successive forecasts for this year's economic growth have been getting progressively gloomier. For the developing countries as a whole, including Asia, the IMF now forecasts growth of just over 4% this year, compared with its forecast of more than 6% back in October. It now foresees serious recessions, in the sense of a year-on-year decline in output, in Indonesia, Thailand and Korea. Many other forecasters expect a year-on-year recession in Japan this year. We may see further downward revisions in IMF and other official forecasts for 1999 as we move closer to that date.

But what does this growing pessimism on Asian growth imply for the rest of us, and specifically for the G8 heads of governments meeting this weekend in Birmingham? Well, again according to the IMF forecasts, very little. Despite the major downgrading of developing country growth prospects, they have made almost no change in their forecasts for growth in the G7. The reason for this is that domestically led demand growth in the United States in particular, but also in some of the geographically peripheral economies of Europe, is very robust. So the IMF is making the perfectly defensible economic judgment that, despite the increase in globalisation during the past decade—which was most evident in Asia—the linkages between those countries and ours have not significantly changed.

I am a bit more sceptical. As I pointed out earlier, the world economy went into this Asian currency crisis in remarkably good shape. We had had nearly a decade of strong growth, led by buoyant trade and direct investment flows. World inflation had come down significantly, not only in the OECD countries, but also in many parts of the developing world. But when we look behind the aggregates, it becomes clear that the strong performance of the Asian countries themselves was a significant contributor to the growth we were all enjoying. Asian growth was significantly higher, and Asian inflation lower, than world aggregates for this period. The result was that in just six years (full 1997 data are not yet available), Asia's share of world economic output grew from 20% to 25%. In terms of world exports, Asia's share increased by 3 percentage points to 19% by 1996. And most striking of all, Asia's share of FDI inflows doubled during that period, from 12% to just over 24%. The Asian countries were a disproportionate contributor to—and beneficiary of—world growth during this decade. Now the tables are turned. It seems to me at least conceivable that a serious economic setback in Asia may similarly have a disproportionate impact on world growth over the next few years.

Let me stress, however, that this is not a prediction. It is rather a scenario, offered in the spirit of a self-denying (rather than a self-fulfilling) prophecy. By recognising and warning against what is possible, we may be able to take steps that make it less probable, and avoid the sort of actions that could make it inevitable.

How would a downside scenario come about? It would be through a combination of economic impacts and political reactions—both in Asia and in the G7 countries—to the financial shocks that have occurred. The main features of such a scenario might run as follows. On the financial front (1997–98), as currency pegs break in Asia and asset prices fall, bank failures would proliferate. In the G7 countries, credit lines to Asia would tighten, portfolio investment would be withdrawn, and new lending to the region would be reduced. On the economic front (1998–2000), many Asian countries would experience a credit crunch, causing companies to fail, imports to plummet, and unemployment to rise. Japan, already weakened domestically by banking problems and fragile consumer confidence, would fall back into recession as its Asian export markets collapsed. These developments would spell export losses in the rest of the G7, sharp falls in FDI profitability, downward price pressures on tradable goods at home and ballooning external deficits. Significant exchange rate swings could follow.

But the most damaging phase of this downside scenario could be yet to come on the political front, where effects are often much more long-lasting (1998–2008). In Asian countries with weak democracies, the economic strains could generate social unrest, strikes and sudden political upsets. This would greatly increase the political risk

premium on FDI as perceived by companies in the G7, and could also rekindle protectionist pressures and anti-dumping actions, as the cheap imports resulting from excess capacity and undervalued exchange rates flood into G7 markets.

And of course, if one wants to paint a truly gloomy scenario, then the sequence feeds back upon itself, with the economic and political developments generating further financial shocks both in Asia and in other vulnerable developing countries.

Now the point I am trying to make is not that this description of future developments in Asia and here is the most likely prospect. (I have done enough scenario planning in my time to resist attaching probabilities to any one outcome.) Rather, I am trying to illustrate the complex of economic, political and social linkages that come into play in a globalised world economy. While the financial crisis in Asia is, or soon will be, over, I expect its economic and political legacy to linger.

Let me conclude with a list of practical steps that the G7 leaders and others may take to avoid, or at least, mitigate, the kind of downside scenario that I have presented. First, the most obvious lesson for G7 investors is that there needs to be greater scrutiny of commercial risks. To some extent this will happen automatically, as companies lick their wounds from the damage already incurred. But there is also a role for the OECD in standardising disclosure rules and promoting best practice in corporate governance.

Second, political risk insurance (PRI) should be expanded. The private sector markets for political risk insurance are rather new and limited in depth, while the traditional bilateral agencies lack capacity to expand their coverage. With demand increasing for PRI, and the size of private involvement in infrastructure projects growing, this is an area where the World Bank could help. MIGA, the World Bank arm that provides PRI, has limits on the cover it can provide (both in aggregate and per project) that are too low in relation to the needs of the market.

Third, joint IMF/World Bank country assessments should be initiated and required as a condition of future bail-outs. The role of the IMF in this crisis has attracted much criticism, as well as a recognition from most participants and observers that its role is both difficult and essential. Few would doubt its credentials in macroeconomic analysis. A practical step that would strengthen analysis in the microeconomic, private sector and social dimensions of reform would be to use a joint IMF/World Bank team. The depth of structural knowledge possessed by the Bank's country experts would help both in diagnosing weaknesses that originate in the private sector, and in developing solutions that are tailored to each country's situation.

Fourth, Japanese efforts at economic revival should be supported. Berating Japan for not playing a more active role in this crisis is unproductive. Japan is in a difficult situation. Both fiscal and monetary stimulus is being applied, but there are legitimate uncertainties about how the economy will respond. Given the weakness of domestic demand, the inevitable rise in unemployment leading to further precautionary savings, and the effect on Japanese banks and exporters of the downturn in the rest of Asia, it is probably unrealistic to look to Japan to do much more. Its own road to recovery is likely to be a long one.

Fifth, we in Europe and North America need to be ready to tolerate substantial current account deterioration over the next few years. We should expect, and we can afford to allow, our external accounts to adjust to the new global capacity overhang and increased competitiveness of Asian exports. The Director General of the World Trade Association, Renato Ruggiero, recently predicted that this adjustment could amount to a $70 billion deterioration across the OECD in 1998. We at the Bank of England are forecasting a shift of the UK external position amounting to 3% of GDP over the next two years. These kinds of shifts could well lead to protectionist pressures, which need to be firmly opposed.

And finally, the most important contribution that the G7 can make to a rapid recovery in Asia is to keep our own economic houses in good order—with stable prices and sustainably high rates of economic growth.

That, together with an open door for trade and investment, can shorten the painful period of adjustment that lies ahead for Asian firms and households. And for my part, I would be more than willing, with the hindsight of a year hence, to consign my downside scenario to the overflowing dustbin of unfulfilled forecasts.

The UK economy and monetary policy—looking ahead

Mervyn King, Deputy Governor of the Bank, reviews[1] the outlook for the UK economy, and recent developments in the housing market. He discusses the potential value of house prices as an indicator of economic prospects, but also the difficulties in measuring house prices accurately. He then describes how the members of the Bank's Monetary Policy Committee base their decisions on economic data from month to month, with the common aim of meeting the Government's inflation target; he notes that attempts to classify members as 'hawks' or 'doves' are misguided.

Next Monday—1 June—sees the start of the statutory basis for Britain's new monetary policy regime. An independent Bank of England will, through its Monetary Policy Committee (MPC), set interest rates to achieve an inflation target of 2½%. For over 30 years economic policy in Britain has been bedevilled by inflation and the resulting instability of output and employment. Stability—of both prices and macroeconomic performance more generally—requires a credible commitment to a monetary and fiscal framework embracing low inflation and sustainable public finances. That we now have.

But stability of the economy is not the same as stability of interest rates. Short-term interest rates must go up and down according to the state of the economy if the inflation target is to be met. In contrast, if monetary policy is successful in achieving the inflation target then, precisely because short-term interest rates will have moved over the economic cycle, long-term interest rates will be relatively stable. And, from the perspective of your borrowers, whether on fixed or floating-rate mortgages, what matters is the predictability of the cost of a loan over the life of the mortgage rather than fluctuations, within reason, of monthly payments. Timely movements in short-term interest rates are the means by which both the average cost of a mortgage, and its variability, can be reduced to the minimum necessary to attract loan finance. In so doing we should be able to avoid crisis—and inevitably large—changes of interest rates of the kind that we have seen so often in the past. Indeed, since the inflation target was adopted in October 1992 there have been no changes of interest rates of that kind—all changes were decided at the regular monthly monetary meetings. Moreover, the switch last May to a fixed timetable of meetings for the MPC—with all interest rate decisions announced at 12 noon on the Thursday on which the MPC meeting concludes—was a major step forward in reducing uncertainty in financial markets.

Through the Looking Glass . . .

So if interest rates must be flexible, in which direction are they likely to move next? I wish I could tell you. Inflation, as measured by RPIX, rose to 3.0% in April, compared with 2.6% in March. But that jump largely reflected the Budget changes to excise duties which took effect earlier this year than last. That will drop out of the index in the third quarter of this year when RPIX inflation is likely to fall back towards its target level of 2½%.

However, this relatively optimistic short-term outlook reflects an extraordinarily benign inflation environment. The combination of a strong exchange rate (still about 25% above its level of August 1996), a 20% fall in dollar oil prices over the past year, and an average fall of 9.5% in other commodity prices, is holding down retail price inflation. Domestically generated inflation is significantly higher than RPIX inflation. As the one-off effects of the rise in sterling wear off over the course of the next year or so—as indeed they will unless sterling appreciates further—inflation will start to rise above the target unless domestically generated inflation declines.

In the long run, domestically generated inflation is likely to be close to the rate of increase of unit labour costs. At present unit labour costs are rising at about 3½% a year. The earnings figures released earlier this month—which showed that average earnings in the economy grew by 4.9% and in the private sector by no less than 5.6%—were undoubtedly disappointing. It is too soon to judge how far they reflect the impact of higher bonuses this year than last. In any event, to hit the inflation target those rates of earnings growth will have to fall back.

These high levels of earnings growth are not the underlying cause of inflationary pressure; they are a symptom of a tight labour market. Equally, the prospects for earnings growth depend critically on the future path of output and on inflation expectations. The MPC's central projection in the May *Inflation Report* is that the pace of output growth will slow. But a slowdown in economic growth is not, in itself, sufficient to hit the inflation target. The central issue for monetary policy is whether total nominal demand will slow sufficiently quickly to prevent retail price inflation rising when the favourable effects of a high exchange rate and lower commodity prices wear off.

(1) At the Building Societies Annual Conference in Bournemouth on 27 May 1998.

The extent to which domestic demand growth slows down is crucial. At present, we are relying on a sharp deterioration in the trade balance to keep output growth down to levels that do not lead to rising inflationary pressure. But in the longer run, domestic demand growth must fall from its present rate of 3½%–4% to something closer to trend. During 1997 as a whole, consumption grew by 5%. That growth rate is already moderating. And the MPC's central projection is for a further slowdown in domestic demand during this year. That is likely to be brought about by a combination of the fiscal and monetary tightening that has been put in place over the past year or so. But there are real uncertainties. There is a risk that consumption may prove stubbornly buoyant. Real personal disposable income increased by 4.2% last year, and the ratio of net financial wealth of households to their income reached an all-time high of over three. Those factors will support consumption. The latest retail sales figures provide some comfort with volume growth below that in the middle of last year when consumption was stimulated by windfall gains, predominantly from the conversion of building societies.

Highs and lows in house prices

In the past, domestic demand has been sensitive to developments in the housing market. In the late 1980s house prices increased by 40% in two years, while consumption rose by over 9%. Borrowing using housing as collateral—so-called 'equity withdrawal'—amounted to almost 50% of the increase in consumption over that period. The impact of rises in house prices on consumption—which is cause and which is effect—remains hotly contested by economists. A rise in house prices leads not only to an increase in wealth but also to an increase in the cost of housing services. Or, to put it another way, if the price of your home goes up, you will not be able to spend more on other things if you wish to carry on living in your home. So it is not at all clear that changes in house prices will in fact have a significant impact on household spending.

Perhaps of greater importance is the role which house prices play in signalling consumer confidence about the future. In common with other assets, such as equities, house prices can respond quickly to news about future economic prospects. And house prices and consumer confidence do seem to be closely correlated. So house prices may be a leading indicator of sentiment about the economy and hence of consumption and domestic demand. But, just like equities, house prices also reflect changes in real interest rates. Since long-term real interest rates have fallen from over 3½% to below 3% over the past year, it is not surprising that house, and other asset, prices have risen.

Precisely because housing is an asset, its price is more volatile than most goods and services in the retail price index. As such, it is important to look at house price levels as well as at their rates of change. Although house prices have been rising quite rapidly over the past couple of years, they returned to the peak reached in the late 1980s only at the end of last year, and exceeded it for the first time in the first quarter of this year. That, of course, followed the sharp fall in house prices in the early 1990s—house prices fell by over 10% between 1990 and the end of 1992.

For most families, apart from future earnings and pensions, their wealth is dominated by one asset and one liability. The asset is their home and the liability is the mortgage on it. But the difference between these two is sensitive to the state of the economy. In a low-inflation world, house prices are likely to rise and fall whereas the mortgage liability is fixed in money terms. This mismatch has the potential to create large swings in household net worth which may well exacerbate fluctuations in demand and output. The upside consequence was seen in the consumption boom of the 1980s, and the opposite was evident in the bust of the early 1990s when falls in house prices meant that as many as 1½ million families had negative net equity resulting in higher precautionary saving and lower consumption.

The forward-looking information contained in house prices underlines the importance the MPC attaches to measuring them accurately. The recent divergence between the rates of house price inflation implied by the Halifax and the Nationwide indices is both puzzling and unfortunate. The rates of house price inflation recorded by the two indices began to diverge at the beginning of 1997. The most recently published data suggest that house prices, as measured by the Nationwide index, rose by 12% in the year to April 1998, whereas, according to the Halifax index, they rose by only 5.6%. Gross household wealth in the year to April 1998 rose by £80 billion more according to the Nationwide than the Halifax index. Such differences matter in our assessment of the economy.

The Bank of England, together with representatives from the Halifax and Nationwide and from the Department of Environment, Transport and the Regions (DETR), has spent a great deal of time and effort trying to understand the cause of this divergence and to assess what is really happening to house prices.

The answer to the first question—what accounts for the divergence?—remains largely a mystery. The Bank's preferred explanation, reached I have to admit via a process of elimination of other plausible explanations rather than by the existence of incontrovertible evidence, is that the divergence reflects the way in which house prices are 'mix-adjusted' to take account of the different characteristics of the houses bought and sold in any one month. Changes in the relative composition of the loan portfolios of the Halifax and the Nationwide over the last year or so are likely to have magnified this effect.

To answer the second question—what is really happening to house prices?—the Bank has developed an alternative measure of house price inflation using data from the Land Registry. These data have the advantage that they cover nearly all housing transactions in England and Wales and so are more comprehensive than the data used by either the Halifax or the Nationwide. However, the Bank estimate is far from ideal. The published Land Registry data are not

mix-adjusted. And, although the Bank staff do apply a simple mix adjustment to take account of the basic type of property bought and sold and the county in which the property is located, it is less sophisticated than that used by either the Halifax or Nationwide.

So I would not want to claim in any way that we at the Bank have found the true measure of house price inflation. Rather, the Bank estimate was developed in the spirit of trying to give some guidance to the members of the MPC on the relative weights that they should attach to the conflicting pictures painted by the Halifax and Nationwide indices. The house price index constructed by the DETR is also helpful in this respect. That index has the advantage that it is constructed using a more complete method for adjusting for the mix of houses transacted than the Bank estimate, but it is based on only a small sample—approximately 5%—of mortgage-backed transactions.

The Bank estimate suggests that house prices increased by 9% in the year to 1997 Q4, compared with 6.9% measured by Halifax and 12.9% by Nationwide. The Bank estimate is broadly consistent with the DETR index, which shows a 7.9% increase over the same period. But further work is required on this issue which is of importance to us all.

'Divided we stand, united we fall'

That brings me to the MPC and the prospect for interest rates. The transparency of the new process means that the debate about monetary policy within the MPC is explained clearly to the world at large. Hence the reasons why monetary policy is so finely balanced are, I believe, now widely understood.

But it is not just the policy debate which is now more transparent. The voting record of each individual member of the MPC is in the public domain. There is a good reason for this. Disclosure is an incentive for individuals to cast their vote for the policy most likely to hit the government's inflation target. I have little doubt that the prospect of having to defend one's voting record in public makes individual members of the MPC well aware of their responsibilities. There can be no hiding behind the coat-tails of the chairman, nor disowning a decision subsequently by claiming to have argued against a position adopted by consensus. Transparency should improve both the quality of decisions and the accountability of Committee members.

But there is an additional point which is fundamental to the role of the MPC. Its purpose is to take technical decisions about the level of short-term interest rates. When the issue is one of technical judgment it is better to rely on the collective wisdom of nine people than the views of only one individual. I have noticed that the highest in the land often rely on teams of doctors whereas you and I have only one. Of course, it is often tempting to take comfort from the great confidence with which any one doctor proclaims his or her diagnosis. But the evidence suggests that in difficult cases reasonable experts can interpret the evidence in different ways. Rather than take comfort from one self-confident view, which I would find difficult to challenge, I would like to know where the balance of professional opinion lies. That is why in the case of essentially technical judgments it is sensible to rely upon collective wisdom, and there are other areas in which we do precisely that. The Law Lords, for example, reach their decisions by aggregating individual judgments, and the same is true in the United States Supreme Court. The MPC is based on the same principle. For such a system to work it is crucial that the individual members of the MPC give their best judgment and do not try to reach an artificial consensus.

When policy is clearly off-track, as in the spring of last year, it is not difficult to reach unanimous decisions, as the Committee did through 1997. But when policy is finely balanced, disagreements about the precise level of interest rate are not only likely but an indication that policy is broadly on-track. That is why the motto of the MPC should perhaps be 'divided we stand, united we fall'.

Some commentators have been unable to resist labelling members of the Committee as either 'hawks' or 'doves'. There is a fundamental problem with this labelling. It makes no sense in the new system to describe individuals as hawks or doves. Each member of the Committee has the same inflation target. Unlike some other central banks, MPC members cannot entertain closet views about the attractions or dangers of slightly higher or lower inflation. Their task—to which they will be held personally accountable—is to hit the Government's inflation target. So members of the Committee vote on interest rates according to the economic data, which change from month to month, and the analysis of those data. No one takes a position that higher interest rates are a good or a bad thing out of principle. If you drove past an infant school at 40 mph, you might well be described as driving dangerously fast. But if you drove at 40 mph on a motorway, you might well be described as driving dangerously slowly. Actions must be judged in the light of the circumstances. In terms of monetary policy, that means that the positions which members of the MPC take on interest rates will change over time according to the way the economy evolves. But if interest rates themselves cannot be predicted, because they depend on changing economic data, what should be predictable is the way MPC members respond to those data. A predictable 'policy reaction function', to use the jargon, should, over time, diminish the interest which market commentators take in the meetings of the MPC and direct interest to what is happening in the economy.

So, as the voting record shows, it is seriously misleading to think of the MPC in terms of fixed camps of hawks and doves. As circumstances change, it is easy to imagine that the hawks shall be doves and the doves shall be hawks. And, over a five-year period, since each member of the

MPC is trying to hit the same inflation target, I predict that it will be impossible to distinguish between doves and hawks. What will the commentators call us then? If Britain either has or is about to join Monetary Union, then the birds may have flown the nest. But if the MPC is still setting interest rates in Britain, then I hope that we shall be seen as a group that is tediously predictable, sometimes raising interest rates, sometimes cutting them, but always moving in response to the economic data in order to hit the inflation target.

Recent economic developments and the MPC approach to monetary policy

*In his annual speech at the Mansion House, the **Governor**[1] reviews developments over the past year in both the global and UK economies, noting that major imbalances in both have complicated the task of policy-makers. Domestically, the economy is closer to full-capacity output, with a greater risk of overheating than for some time, but the serious imbalance between external and domestic demand has created some difficult questions for the Monetary Policy Committee. The **Governor** notes that it is not surprising that, within a common framework of analysis, the MPC members have reached marginally different conclusions, and that what were fine judgments have changed—and will change in future—with the facts, in either direction.*

My Lord Mayor, Chancellor, Ladies and Gentlemen.

The past year, since we last enjoyed the generous hospitality of the Mansion House, on this great City of London occasion, has been a testing time. It has been characterised by major imbalances both in the global economy and here in the United Kingdom—which have complicated the task of policy-makers everywhere, including the task of the Bank of England's Monetary Policy Committee (MPC).

Internationally, there has been good news in the enviable performance of the US—'Goldilocks'—economy, with continuing robust domestic demand growth and further falls in unemployment, with so far remarkably little inflationary pressure. To the extent that this performance can be sustained, it provides substantial underpinning for the global economy as a whole.

And there has been encouraging news, too, in the re-emergence of domestic demand growth in the continental European countries as they prepare to take the final step to Monetary Union. That is a promising context for the launch of a strong, credible currency and I wish the European Central Bank every success in its historic task. Domestic expansion with monetary stability within Europe is in the interest of us all.

Elsewhere though, the international situation has been decidedly less benign. A combination of financial fragility and weak business and consumer confidence has weighed heavily on the Japanese economy and on the yen; and the financial thunderstorms, which broke initially last year over a number of other countries in Asia, are still intermittently rumbling around the region and elsewhere. The economic fallout from these developments poses a serious downside risk to the growth of world activity, and threatens the emergence of potentially large international payments imbalances. It is a dangerous environment.

All of this has prompted a far-reaching re-examination of the international monetary structure, and in the meantime it presents the international monetary authorities with some difficult immediate management challenges. It also, of course, represents an uncertain international background for the conduct of monetary policy in this country.

Our own overall economic performance in the past year was again very encouraging. Output growth (on the latest data, to the first quarter of this year) was 2.9%—significantly above the rate of inflation (measured by the GDP deflator) for the fourth time in the past five years, which I think is unprecedented in post-war British experience. On this basis, annual output growth has averaged some 3.1% over the past five years, while annual inflation has averaged 2.2%. And unemployment (on the conventional claimant-count basis) fell further last year, to 4.8% on the latest figures, the lowest since the summer of 1980.

The task, of course, is to sustain this pattern of relatively steady growth with low inflation into the medium and longer term. And that task has certainly become much tougher.

At the aggregate level, looking at the economy as a whole, though no one—and I mean no one, whatever they may claim—knows with any great precision just where current demand and output are in relation to the underlying supply capacity of the economy, there is no doubt that we are now at least much closer to full-capacity output than we have been; and the actual rate of growth over the past year was, on almost anyone's calculation, above the rate of underlying capacity growth. So we have been at greater risk of overheating than for some time.

The consequence if we were to overheat is quite clear. Inflation would accelerate, and we would then need to impose an abrupt slowdown on the economy to bring it back under control to meet the Government's inflation target. It was, of course, to avoid accelerating inflation and the associated need for an abrupt slowdown that the members of the MPC last year had no difficulty in agreeing upon a significant policy tightening.

(1) In a speech given at the Lord Mayor's Dinner for Bankers and Merchants of the City of London on 11 June 1998.

But there was—and is—a significant complication. The aggregate position takes no account of the serious imbalance within the overall economy between external and domestic demand. The internationally exposed sectors of the economy were already confronted last year with an exaggeratedly strong exchange rate, particularly against the core European currencies, which could only partly be explained by cyclical and monetary policy differences. It appeared to have a good deal to do with market scepticism—I would argue misplaced scepticism—about the prospective strength of the euro. The internationally exposed sectors faced a further battering as a result of the economic impact of the developments in Asia and elsewhere that I mentioned earlier.

These pressures have had, and are having, a seriously depressing effect on demand and output in the exposed sectors of the economy—particularly, large parts of manufacturing industry and agriculture—which is contributing to a sharp deterioration in our balance of payments and a fall in the net external component of aggregate demand.

At the same time, the strong exchange rate and the weakness of world commodity prices are having a direct dampening impact on costs and prices in this country—particularly at the wholesale, producer level, but also affecting retail prices.

Meanwhile, the domestic economy has been unsustainably strong. Private consumption, in particular, was growing at an annualised rate of more than 5% last summer, and was still growing at an annualised rate of 4% by the first quarter of this year. This compares with a longer-term trend rate of some 2½%. But for the dampening impact of the external influences on aggregate demand and on costs and prices, this could already have resulted in accelerating inflation.

The complication for monetary policy, in this situation of external/domestic imbalance, has, of course, been that a tightening of monetary policy to slow the pace of the domestic economy would have been likely to aggravate the appreciation of the exchange rate, intensifying also the restraining external demand and price effects, and putting even more intense pressure on the internationally exposed sectors.

There is no question but that the strength of the domestic economy must moderate further—as indeed we expect that it will. But the external influences—which we can anyway not do much about, but which will in time wear off—made this moderation of domestic demand growth less immediately urgent than it would otherwise have been. In these circumstances, with some evidence that growth in the domestic economy was in fact slowing, and given the evident pressures on the internationally exposed sectors, we needed, in my view, to be more than usually confident in our judgment as to the need to tighten policy further.

The questions with which the MPC has been struggling this year then are: just how much shelter the external situation would in fact give us, and for how long; and just how much time, therefore, we had to bring about a sufficient slowdown in domestic demand to prevent inflation accelerating and the economy from overheating. Now these are immensely difficult judgments. They depend partly upon one's perception about the starting position—that is, how close we are to full capacity utilisation to begin with. And they depend upon not just the direction, but the rate of change and the timing, of changes in the different components of aggregate demand. It is hardly surprising that the various members of the MPC should, within this common framework of analysis, reach—essentially marginally—different conclusions, reflecting their individual judgments as to the balance of risks. Indeed it would have been incredible if they had not reached marginally different conclusions. What is unusual (and what outside observers are I think still getting used to) is that different possible interpretations of the data and different possible judgments are openly displayed in the minutes of our meetings, which also record the way in which each member votes.

Some people seem to find this open discussion of alternative views confusing. My own view is that it can only contribute to the effectiveness of monetary policy if the public at large better understand the nature of the issues and the uncertainties surrounding them. But our procedures have had one, by me at least, unforeseen, and I think regrettable, consequence, in that they have focused excessive attention upon how individual members of the MPC vote—leading to their over-simple categorisation as either hawks or doves. It is as if their judgments were expected to be consistently instinctive rather than objectively based upon their individual, open-minded assessment, reached after careful analysis, of the most recent information available at the particular time. As a result, serious economic commentary seems (perhaps temporarily) to have ceded some ground to ornithomancy—which, as of course you know, is the ancient practice of divining the future by observing the behaviour of birds—especially their flight patterns!

This, I suspect, contributed to the surprise reaction to last week's further rise in interest rates—which proved once again that 'Hell hath no fury like a wrong-footed financial commentator'! It should not have been such a great shock. In the *Inflation Report* that we published a month ago, we set out the analysis as I have described it to you this evening, and we drew attention to the fact that the outlook for monetary policy remained finely balanced—as it has clearly been for some months. We drew attention also to the major uncertainties surrounding the central inflation projection. These uncertainties included both the level of the exchange rate and developments in the labour market. It was—as we explained in our press notice last Thursday—the subsequent 'news' essentially on these fronts, and particularly the sharp acceleration in private sector earnings growth, that caused the MPC to conclude that the necessary slowdown in domestic demand growth had become more pressing. The interest rate decision showed simply that what were always fine judgments changed with the facts—as I can assure you they will in future, in either direction.

Financial services into the year 2000

In this speech,[1] *Ian Plenderleith outlines some of the main challenges and opportunities facing the derivatives industry in the next few years, in particular the introduction of the euro, Year 2000 compliance, and a range of issues bearing on the structure of derivatives trading.*

I am asked, in this keynote address, to try to identify some of the challenges and opportunities facing financial services in the derivatives industry into the year 2000. There are in fact so many issues that I hardly know where to start. But let me try to offer you an agenda of some of the issues that I hope you will have an opportunity to review over the course of this conference; and if, in debating them, you should happen to stumble on any answers, I would be delighted to have them.

Preparations for the euro

First, however, we have to get to the year 2000, and there are a couple of preliminary hurdles we have to clear on the way—sort of warm-up games before the main contest. They are, of course, our old friends, the single currency and the Millennium bug. Far be it from me to imply that they are in any way similar, but they do at least share the common characteristic of being capable of delivering serious damage to your business activities if you do not prepare for them thoroughly and in good time.

For the euro, since the rather extended meeting of the selection committee at the beginning of May, we now know the names of the players and their starting prices. The United Kingdom will, as you know, not itself be a participant in the first wave, but as a 'pre-in', we intend to remain closely involved in the development of the monetary union. In particular, the UK Government has placed great emphasis on the importance of pushing ahead with the necessary preparatory work, so that the UK business and financial communities will be ready for the euro.

This is most notably evident in the substantial scale of preparatory work that has been undertaken in the past two years in the international financial markets here in London. Since these are international markets, trading all the major world currencies, and since London is the world's pre-eminent international financial centre, there will understandably, and perfectly naturally, be substantial trading activity in the euro in London, just as there is already in the dollar and other internationally traded currencies. My colleague, John Townend, and his team at the Bank of England have therefore been leading a far-reaching exercise to ensure that the necessary market-wide systems and dealing conventions are put in place to trade the euro, and to provide essential information for individual firms to make their own in-house preparations. This comprehensive exercise has extended across the full range of markets—not just foreign exchange, but also money-market instruments, bonds and equities, futures, options, swaps, FRAs and other derivatives, on-exchange and OTC, repo and collateral management, and the full range of payment and settlement systems. To keep everyone who is engaged in this extensive exercise up to date with progress, we have issued a flagship quarterly publication, now in its eighth edition, *Practical Issues*, which is circulated to some 40,000 avid readers, several thousand of them abroad; indeed, the European authorities themselves have described it, gratifyingly, as the bible for euro-preparatory work.

This extensive programme to prepare for the euro has made excellent progress, and the bottom line is that the London markets will be ready, willing and able to trade the euro. So let no one doubt the seriousness of our intention that London will be in a position to offer the full range of trading and payment facilities in euro on an efficient, safe and cost-effective basis. This is not a matter of competition with other centres. It is entirely likely that EMU will generate an expansion of euro activity in the countries joining the monetary union at the outset, because of course the euro will be their domestic currency. But it will also be an international currency, and it is in international trading that London's distinctive strengths lie—for the euro, just as much as for the dollar and other international currencies at present. The important point is that what is involved is a positive-sum game, from which all can gain. The euro represents an opportunity for expanded international business in London, and seizing that opportunity is a very real practical contribution that the London markets can make to the success of the euro. We cannot fix the weather, but we shall be able to do pretty well anything you want with the euro.

Preparations for the year 2000

Having geared up for the euro, it might then seem reasonable to have a short rest, but someone with a twisted sense of humour decided to follow the launch of the euro very rapidly with the year 2000 and its Millennium bug.

(1) Given at the Fifth International Derivatives Conference, organised by the Futures and Options Association and the Futures Industry Association in London on 16 June 1998.

You do not need me to emphasise the need for thorough and painstaking review of all systems to ensure Year 2000 compliance. Certainly, this message is being taken with the utmost seriousness throughout the London markets. Here, too, the Bank of England has been active in helping to co-ordinate and stimulate timely action, and in providing information in another quarterly publication, *Financial Sector Preparations for the Year 2000*.

Issues for the next millennium

Let us now try to look forward beyond these immediate business challenges. If we assume that you succeed in embracing the euro, and avoiding the embrace of the bug, what issues await you in the next millennium? I could draw up quite a long list, but I want to concentrate today on five issues that seem to me to be particularly relevant to your agenda for this conference.

Organised exchanges

The first is what future role there is for organised exchanges to play in the international trading markets. There is no doubt that organised exchanges around the world have undergone enormous changes in recent years, in the type of services they provide, in their use of technology, and in the way they are structured and governed. Some critics have argued that, with advances in IT providing ever more sophisticated systems for electronic trading, including the capability for participation via remote terminals, and with the growth of OTC business, the day of organised exchanges is drawing to a close and that they will have no role, or only a limited role, to play in the future.

I would not agree. I would argue, instead, that organised exchanges will continue to have an important contribution to make to the structure of our trading markets, in providing liquid, fair, and safe trading facilities for the international financial community. To see why this is likely, I think one needs to go back to fundamentals and see what it is that organised exchanges provide, at the most fundamental level. What they provide is at least two essential features of any efficient market: first, a trading system so that buyers and sellers can find each other and deal on the basis of a known set of trading and execution conventions, which each can rely on the other observing; and second, trade-supporting services—principally clearing and settlement, which may be administered by the exchange itself or provided by an outside supplier, and frequently also trade-reporting, price display, and related market-information services. The way in which these facilities are provided has changed over the years, and will continue to change. But however they are structured and delivered, they are necessary ingredients for a healthy market, and providing them is a role that exchanges can usefully fulfil for years to come. Interestingly, as the OTC derivative markets have developed increased volume in recent years, the same desire for the same two features—to standardise trading practices, and to provide safe clearing arrangements, has begun to emerge, and the lack of any exchange to organise these facilities for OTC business sometimes makes it harder to achieve agreed market-wide procedures.

Organised exchanges have therefore, in my view, a continuing and important future role to play. But one can nonetheless expect big changes in the landscape, as indeed is already happening. As integration of the world financial system deepens, we can expect to see a process of coalescence and consolidation of individual national exchanges. Just as we have seen, within a single country, regional and local exchanges consolidate into one or more integrated national exchanges, so now at the international level we may see national exchanges progressively consolidate into fewer, wider-ranging exchanges covering large areas of a particular time zone. Two current developments may particularly accelerate this process—the increased capability of exchanges in providing remote trading access, for participants not physically present in the local market; and the introduction of the euro as the single currency for eleven European national markets.

The process of consolidation may take some time, and I would expect it to advance incrementally, by a process of progressive identification of areas of co-operation and joint venture, rather than instant merger. There may, for example, be scope for exchanges to come together to co-operate in joint marketing of particular products or services, or to promote reciprocal membership, or to develop a common trading platform while still remaining independently responsible for functions such as membership and marketing. But whatever the model, the general direction seems to me clear: we shall still see exchanges playing a role in providing facilities for liquid, fair and safe markets, but we are likely to see greater cross-border integration and, in the end, fewer exchanges. The important challenge facing exchanges will be to identify the areas where co-operation among them can maximise the value of the services markets need them to provide; and the prizes will go, as they should, to those with the clearest foresight.

Trading systems: open-outcry or electronic?

A second issue that I would suggest for your agenda is what form of trading system, or systems, exchanges should be providing. In the securities markets, the debate in this area has been long-running, as the competing merits of quote-driven, market-making systems, as compared with trade-driven, order-matching systems, have been debated endlessly. In the futures industry, the debate has in recent years been about the respective merits of open-outcry floor trading or electronic trading.

In all these debates, the answer always seems to me very straightforward—in principle. The choice is not something to be resolved by academics debating the intrinsic merit of one approach or another, though academic research can certainly produce illuminating insights, and has done so. Equally, sadly, the debate is not a cultural one: coloured blazers and vivid manual gesticulation may be a lot more fun than horn-rimmed computer nerds hunched over

electronic terminals, and we all know what makes a better sight for the tourists and the TV cameras, but that is not how the debate should be resolved. Nor should it hang on regulatory convenience, since both systems are capable of proper regulatory oversight; nor solely on the financial interests of the market intermediaries, since it is their customers and clients—the end-users—who ultimately pay.

What it seems to me will always ultimately determine the choice of trading system is, quite simply, revealed preference—which system market-users actually prefer to use in executing their business. The problem, of course, is that this is fine as a criterion in principle, but revealed preference is often hard to determine in practice, and certainly hard to divine far enough in advance for the necessary systems to be put in place.

In the securities markets, interestingly, the debate between quote-driven and order-matching has for the moment ended in a draw. Both types of trading system are wanted and the London Stock Exchange has, I believe, put itself in a strong competitive position—much stronger than is sometimes recognised—by equipping itself with both. In the futures markets, the answer may be different. Electronic trading plainly offers many advantages—lower costs, possibly quicker product innovation if new products can be brought to a screen more promptly than a new pit can be allocated, better audit trails, and maybe wider distribution through the potential for remote access and round-the-clock trading. Equally, electronic trading has limitations, at any rate with the current state of screen technology: there may be capacity problems; the liquidity of screen-trading can suffer in volatile markets; and spread trading can be difficult without execution risk. Here again, the best guiding principle seems to be the revealed preference of market-users—particularly the end-users, without whose business there would be no market. Looking down the road, it seems very likely that advances in technology will increase the relative advantages of electronic trading over time, and perhaps quite quickly. The key challenge for exchanges is to keep up with the pace of change, and to equip themselves with the technology that best provides liquid, fair and safe trading for the users of their markets.

OTC trading

A third issue that I would suggest for your agenda is what role, alongside the trading systems provided by exchanges, there is for OTC trading. The scale of OTC activity has grown rapidly in recent years. At the beginning of 1994, OTC outstandings were about the same as exchange-traded outstandings. On the latest data, OTC outstandings were more than double those of exchange-traded contracts. This rapid growth no doubt reflects the greater flexibility OTC products can offer on contract size, maturity, underlying instrument, etc, ie greater customisation. The growth has been facilitated by improvements in credit risk management, with the greater use of collateral freeing up credit lines, and by greater regulatory acceptance of netting in the calculation of regulatory capital requirements. What is interesting is that, as the scale of trading increases, greater attention is being directed towards developing a standardised trading framework and structured clearing arrangements, for at least the more plain-vanilla products such as swaps and FRAs. OTC activity thus begins to take on some of the characteristics of exchange-traded business, which is one reason why I argued earlier that exchanges, in a modern form, will continue to have a contribution to make to the market.

But in the OTC area, it seems to me that we are not looking at a mutually-exclusive phenomenon, in which exchange trading competes with OTC. Exchange trading can provide greater depth of liquidity for standardised products. OTC trading offers greater scope for customisation, but often needs the depth of exchange-based trading in standard products to provide the necessary hedge. So both are needed, and indeed complement each other. I buy my suits off the peg, as it happens, being a modestly-paid central banker; you no doubt have your blazers bespoke-tailored; but in the market as a whole, there is a need for both services—and so too in the futures markets.

Product innovation

A fourth issue I would like to suggest for your agenda flows very cogently from the OTC markets, and that is product innovation. The derivatives markets have been marked by rapid growth in recent years. Can this continue? All the evidence, looking forward into the next millennium, suggests that derivatives will continue to display rapid expansion—in overall activity, but most especially in diversity of products. Customer needs for specific financial packages seem likely to grow, as control of financial risk becomes more advanced. The process of global integration will add to this demand. Continuing advances in IT will make the derivatives industry more able to meet the demand for customised products. And demand is likely to be fed at the wholesale level by the widening circle of countries that reach economic maturity on the basis of market-based economic systems, notwithstanding the present setbacks in Asia; and at the retail level, by the increase in personal wealth and by the greater responsibility individuals have to take for managing their own savings.

We are likely therefore to see increased appetite for customised financial products, and an increased demand for product innovation. This seems to me a further reason to be confident of the role of London, because a great strength of the London financial markets, and an important reason for London's pre-eminence as an international financial centre, has been its immense capacity for innovation and its rapid responsiveness in developing new products for new needs. I expect this to continue, and it is one reason that I am confident that London will retain its international lead in financial services.

LIFFE

This brings me to the fifth and final issue on which I want to touch—the future development of London's international futures and options exchange—LIFFE.

It is worth reminding ourselves that LIFFE has a track record of outstandingly strong performance in a highly competitive arena, and that its present market position, notwithstanding recent movements, remains extremely powerful. It remains the dominant futures exchange in the European time zone, looking across the product range as a whole; in volume, it matches the major American exchanges; and its business continues to expand—volume in its short-term interest-rate contracts has risen by 57% in the first five months of this year.

Quite undue attention has recently been paid to shifts in the trading pattern of just one of LIFFE's contracts, the ten-year Bund contract—attention, in my view, out of all proportion to the importance of what is happening. It hardly seems very surprising that trading in the German government's own bond should move to the home country if the local exchange there can offer adequate facilities in its local centre, just as trading in the dollar bond contracts is centred in the domestic US exchanges. What is actually extraordinary is that so much trading of the German Bund contract should for so long have been concentrated outside Germany, in London. What matters for London, and for the international markets based here, is that London, and LIFFE, should continue to provide competitive facilities for internationally based trading activity, and for this, the depth and diversity of the unrivalled range of markets that London provides remains the great strength.

Nonetheless, the needs of these markets do not stand still, and it is therefore a very positive development, and much to be welcomed, that LIFFE is currently addressing significant changes in the structure of its trading systems and in its governance arrangements. These changes, and the virtually unanimous support they commanded at last week's EGM, are encouraging evidence of the vigour and the capacity for change of the LIFFE markets. They reflect LIFFE's determination to remain at the cutting edge of international futures and options trading, and they will place LIFFE in a strong position to capitalise on the trends I have tried to outline earlier in this speech. Futures trading originated in the United States, and I think those two great American wordsmiths had it right—Mark Twain, when he said, 'Rumours of my demise are greatly exaggerated'; and Ronald Reagan when he said, 'You ain't seen nothing yet'.

Conclusion

I have tried in these introductory remarks to suggest some of the issues that you may want to address in the next few days. No doubt there are others. The challenges are great, but so too are the opportunities. I have every confidence that the derivatives industry has an immense contribution to make to the future development of the international trading markets, and hence to the wider aims we all share for worldwide economic advancement.

Bank of England publications

Working Papers

An up-to-date list of *Working Papers* is maintained on the Bank of England's Internet site at http://www.bankofengland.co.uk/. Abstracts of all *Papers* are also available. Papers released since summer 1996 are available in full, in PDF format. The *Working Paper* series are available free of charge. A complete list of the *Working Papers* is available from the address below.

No	Title	Author
29	Pricing deposit insurance in the United Kingdom *(March 1995)*	David Maude William Perraudin
30	Modelling UK inflation uncertainty: the impact of news and the relationship with inflation *(April 1995)*	M A S Joyce
31	Measuring core inflation *(April 1995)*	Danny T Quah Shaun P Vahey
32	An assessment of the relative importance of real interest rates, inflation and term premia in determining the prices of real and nominal UK bonds *(April 1995)*	David G Barr Bahram Pesaran
33	Granger causality in the presence of structural changes *(May 1995)*	Marco Bianchi
34	How cyclical is the PSBR? *(May 1995)*	Joanna Paisley Chris Salmon
35	Money as an indicator *(May 1995)*	Mark S Astley Andrew G Haldane
36	Testing for convergence: evidence from nonparametric multimodality tests *(June 1995)*	Marco Bianchi
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Monetary and Financial Statistics

A monthly publication, *Bank of England: Monetary and Financial Statistics,* was launched in January 1997. This comprehensive publication (priced at £70.00 per annum in the United Kingdom for 1998) contains detailed data on money and lending, bank and building society balance sheets, international positions of banks operating in the United Kingdom, government financing and the money markets (including gilt repo and stock lending), issues of securities and short-term paper, interest and exchange rates and occasional background articles. If you would like more information please contact Daxa Khilosia, Monetary and Financial Statistics Division HO-5, telephone 0171–601 5353.

Financial Statistics Users Group seminar

In March 1997, the Bank of England and the ONS hosted a Financial Statistics User Group (FSUG) conference which was introduced by Mervyn King, Deputy Governor (then Executive Director) of the Bank of England. A full report of this seminar was published in July 1997; if you wish to receive a copy or would like to be on the mailing list of FSUG, please contact the Group secretary, Daxa Khilosia, Monetary and Financial Statistics Division HO-5, telephone 0171–601 5353.

Targeting Inflation book

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

Index-linked debt book

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

Openness and Growth book

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

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Issued by the Publications Group, Inflation Report Division, Threadneedle Street, Bank of England, London, EC2R 8AH; telephone 0171–601 4030; fax 0171–601 5196; email mapublications@bankofengland.co.uk. The Bank's Internet pages are at http://www.bankofengland.co.uk. General enquiries about the Bank of England should be made to 0171–601 4444.