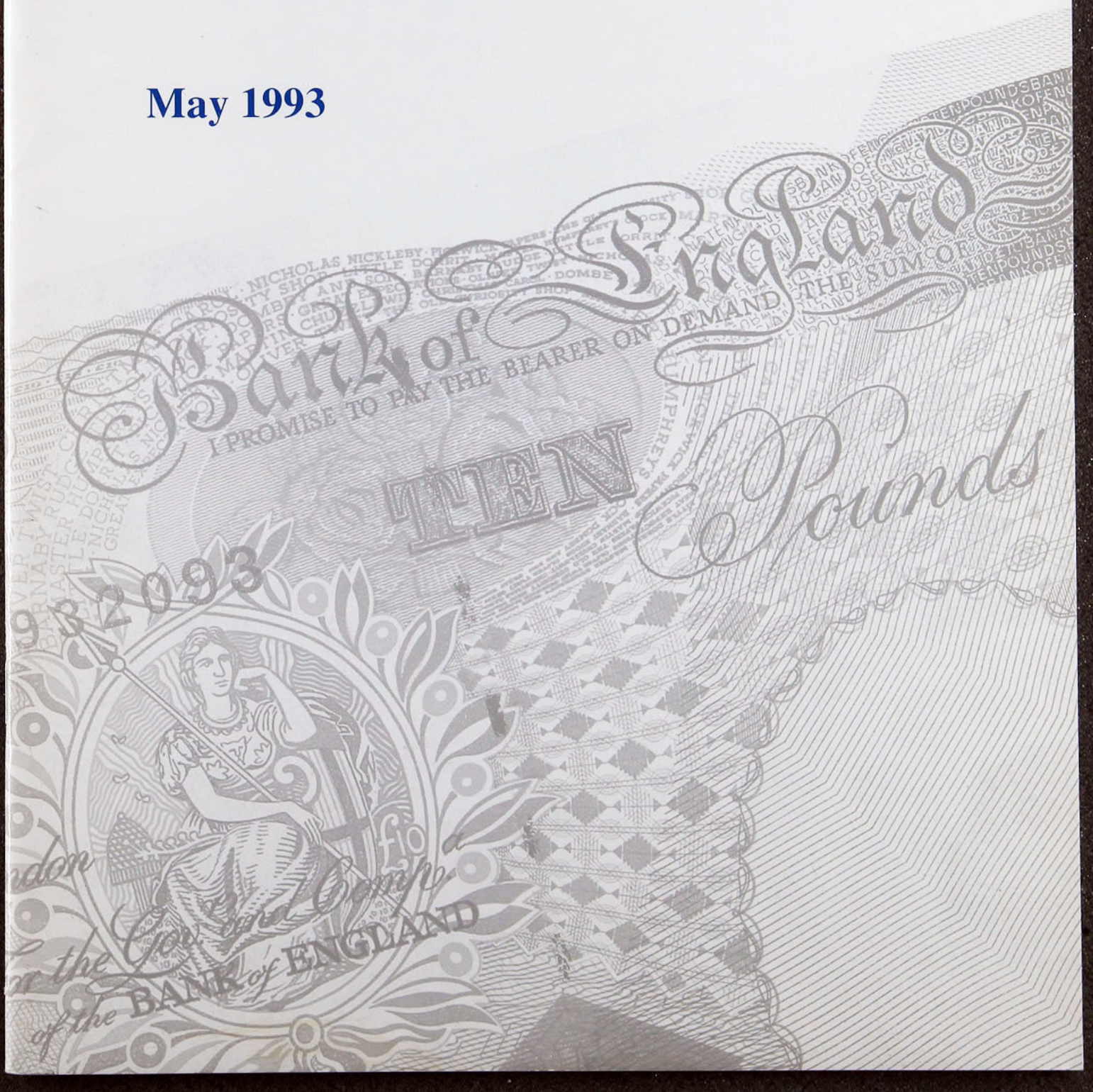
Bank of England

Inflation Report

May 1993



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May 1993

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Summary

The *Inflation Report* contains the Bank of England's analysis of recent changes in inflation and the prospects for the future. It contains six sections covering: (i) recent price developments; (ii) monetary and fiscal policy; (iii) demand and output; (iv) price dynamics; (v) prospects for inflation; and (vi) conclusions.

Compared with three months ago, it is now somewhat easier to see how last autumn's depreciation is affecting domestic prices. Retail prices of a number of products, including some food items and consumer durables, have risen more rapidly since the autumn. And the latest three-month inflation rate has increased a little since the last *Report* and now stands somewhat further above the twelve-month rate than was the case three months ago. Nevertheless, underlying inflation, at 3.5%, is still in line with our expectations in February.

Inflation, as measured by RPIX, has remained within the target range throughout the period since the February *Report*. During that period new information about the likely course of future inflation has been of three main kinds. First, levels of real activity are rising more rapidly than had been anticipated three months ago. Most of the indicators relating to the real economy, including output, retail sales and employment, point to increasing levels of activity. Second, the exchange rate, as measured by the sterling effective exchange rate index on 7 May, is some 5% above the level at the time of the February *Report*. Third, in the March Budget the Chancellor announced increases in indirect taxes, to take effect both this year and next, which will raise the measured rate of underlying inflation. The rise in the exchange rate is not independent of the news about activity, indeed in large part it follows from it. This increase in the exchange rate has lowered somewhat the risk of breaching the top of the target range towards the end of this year and the early part of next.

The projections for the next three months show inflation declining in April, but then rising to 3.5% by June. The initial fall largely reflects the impact of the change from the Community Charge to the Council Tax. The subsequent rise is expected to be broadly based, and associated with the direct pass-through of higher import prices into domestic retail prices.

On balance, the changes since the last *Inflation Report* have lowered slightly both the expected inflation rate and the probability of breaching the 4% limit during the course of this year. The impact next year of the Budget measures, together with the uncertainties surrounding the rate at which the output gap is likely to narrow, suggest that the probability of breaching the target next year may be a little greater than previously envisaged, but the Bank's central expectation still is that the target will be met. Any further increase (decrease) in the exchange rate would lower (raise) the probability of breaching the target.

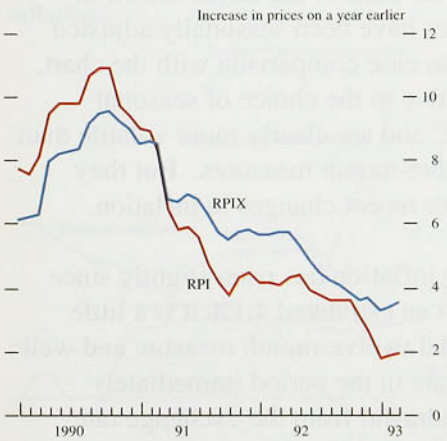
Expectations of inflation in the future are not yet consistent with the target range for inflation of 1%–4%. Both direct surveys of expectations and also the indirect evidence from implied forward market interest rates suggest that many economic agents have yet to be convinced that the target will be met in the long run. But the longer underlying inflation remains within the target range the more credibility will grow over time.

Looking to the end of 1994 and beyond, the principal uncertainty concerns the response of domestic factor costs—wages and profits—to the loss of purchasing power resulting from depreciation of the currency. If total profits and wages rise because of a *volume* effect, rather than an increase in profit margins per unit of output or earnings per head, then the increase in nominal demand consistent with the monetary stance will lead to rising real activity and continuing low inflation. A continuing determination on the part of the authorities to meet the inflation target will help to ensure that increases in wages and profits are real increases, reflecting higher output and productivity, rather than nominal increases reflecting only higher unit costs. It is vital in this context that the inflation target be seen as a framework for policy over a long period, and that monetary and fiscal policy should be consistent with achieving the target on a sustained basis.

Recent price developments 1

Inflation is a rise in the *general* level of prices. When there are significant changes in *relative* prices, the various measures of inflation may give different estimates of 'the' rate of inflation. This is particularly relevant following a depreciation of the currency—the effective sterling exchange rate fell by more than 13% between the first quarter of 1992 and the first quarter of this year—when retail prices will rise to reflect the one-off adjustment of domestic prices to the higher costs of imports. In principle the GDP deflator, which measures the rise in the price of domestically produced output, offers a better guide to underlying inflation. But, because there are time lags between changes in the exchange rate and the response of prices in the home market to increases in import prices, the GDP deflator is itself a misleading guide to underlying inflation at exactly the time when it might be thought to provide a more accurate signal. Indeed, the GDP deflator (measured at factor cost) fell by almost 1% in the fourth quarter of last year, when import prices rose but were not immediately reflected in higher prices at home. And the deflator is likely to rise during 1993 to compensate for this fall. These arguments strengthen the case for defining the official inflation target in terms of the increase in the Retail Prices Index excluding mortgage interest payments. Measured in this way the outturn for inflation is available promptly and is easily understood, thus enhancing accountability. It is, however, affected by changes in indirect taxes which, following the March Budget, will lead to higher measured inflation than would otherwise have been the case. For these reasons Section 1 discusses recent changes in different measures of inflation in the United Kingdom.

Chart 1.1
Inflation



1.1 Retail prices

The headline rate of inflation, as measured by the twelve-month change in the Retail Prices Index (RPI), was 1.9% in March compared with 2.6% in December. The rate fell sharply between December and January, to a twenty-five year low of 1.7%, but rose slightly in both February and March (see Chart 1.1). This fall was partly the result of

Chart 1.2
Conventional measures of inflation

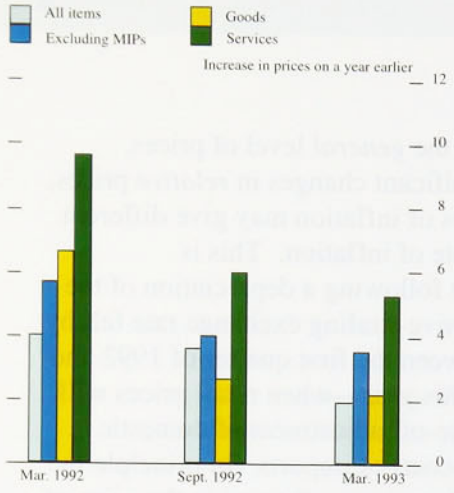


Table 1.A
Short-run measures of inflation

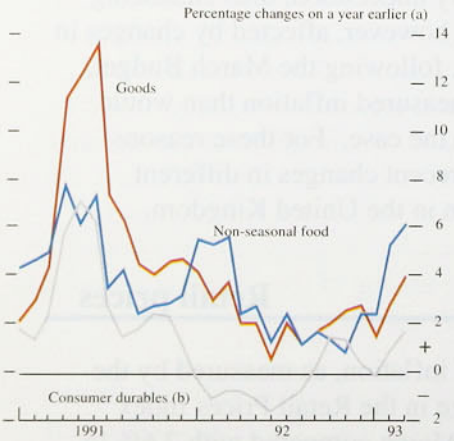
Percentage changes (a)

	RPI	RPIX	Goods	Services
March 1992	3.5	4.7	3.6	7.3
June 1992	3.2	2.8	0.5	4.8
September 1992	2.6	3.1	1.6	4.9
December 1992	0.8	3.9	2.7	5.1
March 1993	1.0	4.1	3.9	6.4

(a) The change in the latest month on three months earlier, seasonally adjusted and annualised.

The natural logarithms of the price series were seasonally adjusted using a Kalman filter to decompose the series into trend, cyclical, irregular and seasonal components. The series for goods and services do not exhaust the RPIX series because the latter comprises also the Community Charge, personal articles and dwellings insurance.

Chart 1.3
Recent retail price developments



(a) The change in the latest month on three months earlier, seasonally adjusted, annualised rates.
(b) Consumer durables consists of furniture and furnishings, electrical appliances, clothing and footwear, audio-visual equipment, records, toys etc.

reductions in mortgage interest rates, which fell by an average of one percentage point between December and March. But the underlying rate of inflation—the increase in the RPI excluding mortgage interest payments (RPIX)—also fell from 3.7% in December to 3.5% in March.

As Chart 1.1 shows, inflation fell most rapidly between mid-1990 and mid-1991. Thereafter the headline rate fell only very slowly until the latter part of last year. The underlying rate, by contrast, showed a steady reduction from April of last year which only came to an end with the increases in February and March this year. As Chart 1.2 shows, the decline in the underlying rate was broadly based, and held in both services and goods.

Very recent price developments are captured rather poorly, however, by conventional measures which record the change in prices over the previous twelve months. Table 1.A shows price changes recorded over three-month periods for each of the series shown in Chart 1.2. The figures have been seasonally adjusted and then annualised to ease comparison with the chart. The figures are sensitive to the choice of seasonal adjustment technique, and are clearly more volatile than the conventional twelve-month measures. But they provide an insight into recent changes in inflation.

Short-run underlying inflation has risen slightly since three months ago. At an estimated 4.1% it is a little above the conventional twelve-month measure and well above the short-run rate in the period immediately before sterling's withdrawal from the exchange rate mechanism. The short-run rate of increase of goods prices also reached a trough during this period and has picked up quite sharply since then. The impact of devaluation would be expected to show up earlier in the prices of goods than of services because imports constitute a greater proportion of final expenditure on goods than of services. Nevertheless, short-run changes in the price of services have also increased recently. The effects of devaluation were first visible in petrol prices but, as can be seen in Chart 1.3, there has also been some acceleration in food prices and the prices of consumer durables since the autumn.

1.2 Manufacturing prices

Producer output price indices measure the prices of goods leaving UK factories, destined for the domestic

Chart 1.4
Producer output prices

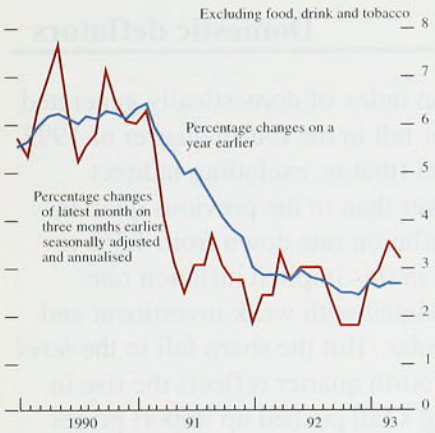
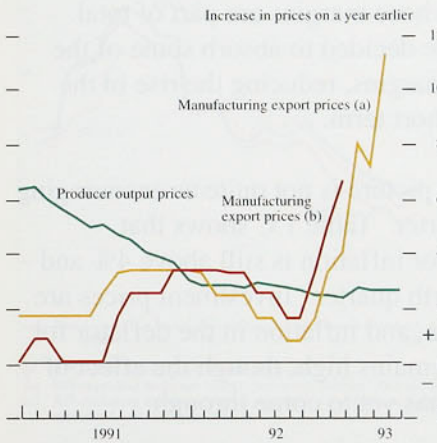


Chart 1.5
Manufacturing export and producer price inflation



(a) Non-EC based data.
(b) Total trade data.

Table 1.B
Sectoral changes in producer output prices

Percentage increase in component in the year to

	April 1991	April 1992	Oct. 1992	April 1993
Food, drink and tobacco	6.9	5.5	4.8	5.7
Textiles	5.1	3.6	3.4	2.6
Instrument engineering	7.0	5.1	4.6	5.3
Extraction of minerals	2.1	-1.9	0.2	-2.7
Motor vehicles and parts	8.3	2.7	—	1.8
All industries	6.2	3.8	3.3	3.8

market. These can be compared with UK producers' export prices. To the extent that the two indices refer to the same goods, they indicate the scale of price discrimination between home and export markets. During late 1990 and early 1991, after sterling's entry into the ERM, export prices were rising at a much slower rate than domestic producer output prices. Since then the pattern has been reversed, with sterling export prices rising sharply following sterling's depreciation last autumn.

Excluding the food, drink and tobacco sectors, the twelve-month increase in producer output prices has stayed at around 2½% to 3% since the beginning of last year. This followed quite rapid declines during 1991; producer prices had been rising at over 6% in the year to 1991 Q1. Shorter-run measures show a clear pick-up in output price inflation (excluding food, drink and tobacco) since the end of last year. In the three months to April, output prices rose at an annualised rate of 3.2% compared with an equivalent rate of 1.8% in the three months to December (see Chart 1.4).

Export prices have risen rapidly since last September, as can be seen in Chart 1.5. From January of this year, export price data have been available only for non-EC trade, and these show a twelve-month increase in manufacturing prices of 11.2% in March, up from 1.6% in October. Shorter-run measures indicate more clearly the extent to which prices have responded to the depreciation. Between September 1992 and March 1993, export prices (total trade) rose by 10.9%, after rising by only 1.1% in the previous six months. Since sterling has depreciated by rather more against the dollar than against the European currencies these estimates may be higher than the equivalent figures including trade with EC countries.

Turning to the sectoral composition of changes in manufacturing prices, the rates of change in the sub-components of producer output prices show some variation. At the two-digit level of the Standard Industrial Classification (SIC) no component was showing more than a 6% increase in the year to April (see Table 1.B), and most were in the 1½%–4% range. Indeed, the extraction of minerals category, which showed a 2.7% decline over the same period, was one of only two components to show a twelve-month fall. Since the depreciation of sterling the largest increase has been in the food, drink and tobacco category, which rose by 5.2% unadjusted between August and April,

with other large increases in electrical and electronic engineering and miscellaneous manufacturing.

1.3 Domestic deflators

The GDP deflator is an index of domestically generated inflation. The deflator fell in the fourth quarter of 1992. Measured at factor cost (that is, excluding indirect taxes) it was 0.9% lower than in the previous quarter, bringing the annual inflation rate down from 4.5% to 2.3%. The slowdown in this implied inflation rate during 1992 was associated with weak investment and export prices in particular. But the sharp fall in the *level* of the deflator in the fourth quarter reflects the rise in import prices. Sterling's fall pushed up import prices sharply, leading to a rise of almost 9% in the fourth quarter. In most circumstances, this rise would result in a rise in the deflators for other expenditure components, leaving the overall GDP deflator unaffected. But during a period when demand is weak, firms may choose not to pass on import price rises immediately. In particular, domestic importers, whose margins are part of total value added, may have decided to absorb some of the devaluation in those margins, reducing the rise in the GDP deflator in the short term.

Overall, however, the picture is not quite as encouraging as in the previous quarter. Table 1.C shows that consumer price deflator inflation is still above 4% and accelerated in the fourth quarter. Investment prices are beginning to rise again, and inflation in the deflator for public consumption remains high, though the effect of the 1½% pay ceiling has yet to come through.

The GDP deflator can also be constructed from its cost rather than expenditure components and this highlights the role played by firms' margins. Table 1.D shows labour costs, company profits, import costs, a residual category 'other income' (which includes gross trading surpluses of public corporations and general government enterprises, as well as income from rent and self employment, excluding stock appreciation) and the GDP deflator. There has been a dramatic fall in unit labour cost increases since the beginning of 1991. However, particularly in its early stages, the recession also bore down heavily on profits (or firms' margins), shown in the second column of Table 1.D. Attempts were made to rebuild margins in the second and third quarters of 1992, but they were squeezed again in the fourth quarter, when the rise in import costs appears to have been absorbed in importers' margins.

Table 1.C
Domestic deflators—expenditure components

	GDP	Consumption	Investment	Government	Exports	Imports
Increase on a year earlier; *per cent*						
1991 Q1	8.1	7.2	2.2	9.5	0.6	-4.3
Q2	6.6	6.7	-0.4	7.8	1.2	-3.2
Q3	4.9	6.8	-1.9	6.3	0.4	—
Q4	4.9	6.1	-2.5	6.1	-0.5	0.1
1992 Q1	5.2	6.1	-4.4	6.6	1.7	0.3
Q2	5.5	5.3	-4.7	6.4	0.2	-0.9
Q3	4.5	4.4	-4.1	7.0	-1.5	-2.1
Q4	2.3	4.1	-2.5	7.4	2.4	5.7
Seasonally adjusted quarterly growth rates						
Q3 on Q2	0.4	0.7	-0.5	1.4	-1.7	-0.5
Q4 on Q3	-0.9	1.8	1.0	1.9	3.5	8.7

Source: CSO and Bank of England. The GDP deflator is measured at factor cost by the CSO. The domestic expenditure deflators are Bank estimates of factor cost deflators, based on published CSO estimates at market prices.

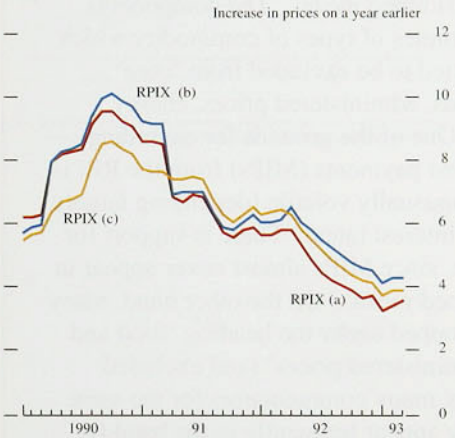
Table 1.D
Domestic deflators—cost components

	Wage costs	Company profits	Other income	Import prices	GDP deflator
Increase on a year earlier; *per cent*					
1991 Q1	10.4	-5.7	10.1	-4.3	8.1
Q2	9.3	-4.8	5.5	-3.2	6.6
Q3	7.1	-8.7	7.4	—	4.9
Q4	6.3	-2.0	4.8	0.1	4.9
1992 Q1	7.0	—	2.2	0.3	5.2
Q2	5.0	9.2	4.7	-0.9	5.5
Q3	4.3	7.4	3.4	-2.1	4.5
Q4	2.4	5.1	0.7	5.7	2.3
Seasonally adjusted quarterly growth rate					
Q3 on Q2	0.1	—	1.7	-0.5	0.4
Q4 on Q3	-0.5	-0.3	-2.6	8.7	-0.9

1.4 'Core' inflation

The argument for moving from a broad measure of underlying inflation to a narrower measure of 'core' inflation derives from the problem of distinguishing changes in relative prices from changes in the price level. Large changes in relative prices can provide a misleading impression. They often result from temporary fluctuations of comparatively narrow groups of prices, such as seasonal foods and petrol. Stripping out the more volatile components of the RPI, and those components which directly reflect the Government's policy actions, will produce an index which is less representative of actual price changes but which may offer a more accurate guide to movements in the trend. Chart 1.6 presents two alternative measures of 'core' inflation alongside the standard measure of underlying inflation. The two 'core' measures have moved closely with underlying inflation since the February *Report*. Both measures recorded sharp falls in January and both have risen slightly since then to rates just below those for December.

Chart 1.6
Measures of 'core' inflation



(a) RPI excluding mortgage interest payments.
(b) RPI excluding mortgage interest payments, food and fuel and light.
(c) RPI excluding mortgage interest payments, food, fuel and light, local authority taxes and indirect taxes.

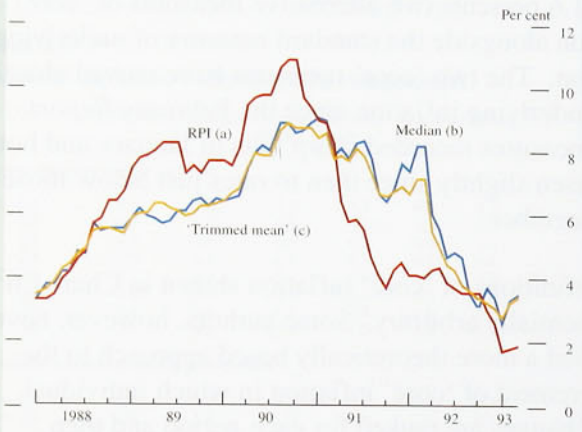
The definitions of 'core' inflation shown in Chart 1.6 are essentially arbitrary. Some authors, however, have proposed a more theoretically based approach to the measurement of 'core' inflation in which individual price changes are ranked for each period and then selected or rejected for inclusion according to some agreed criterion. The technique is a very simple one, and may best be thought of as producing a median inflation rate, or an average over the less volatile components of the index (the 'trimmed mean'). The box on page 10 presents estimates compiled from 74 components of the RPI. Although median inflation rose fractionally between December and March, it has the same general characteristics as underlying inflation and is currently coincident with it.

These measures are interesting, and deserve further investigation. However, the risk remains that, in stripping out large price movements, the resulting index may be unrepresentative. The Housing Adjusted RPI (HARP index) includes all of the items in the RPI with one exception. It replaces the mortgage interest component of the headline RPI with an alternative user-cost-of-capital measure of owner-occupied housing costs. The construction of the measure was described in the February *Inflation Report*. The HARP measure of inflation has risen by 0.4 percentage points since three months ago. At 1.8%, it remains just below the headline RPI rate having been 1.2 percentage points below the

'Core' inflation

Measures of core inflation strip out some of the more volatile components of the RPI in order to reveal the underlying trend. But there may be less arbitrary ways of measuring core inflation than simply stripping out particular series such as mortgage interest payments, administered prices or food and energy. One alternative is to use statistical methods to smooth out short-term fluctuations in the RPI. But these methods are also arbitrary. They might generate a less volatile series, but there is no clear reason to suppose that underlying inflation itself is not volatile. Another measure of core inflation, due to Bryan and Cecchetti,[1] is based on the idea that a significant proportion of firms face costs of adjusting prices ('menu costs'). In such circumstances, changes in relative prices can affect the aggregate price level, and hence the rate of inflation. Where, for example, the distribution of desired price changes is such that a few large desired changes are balanced out by many smaller ones, then if there are menu costs, only those firms facing a large desired change will bother to change prices. Thus what was just a change in relative prices, would, measured by the average, show up as an increase in the price level, even though the underlying rate of inflation would not have changed. In such circumstances, one way to uncover the underlying rate of inflation is to choose the median inflation rate among goods and services. Since most firms would not bother to change prices over and above the underlying inflation rate, the spread of price changes across goods and services would be bunched around this underlying rate. If there were a few larger actual price changes, then the average rate would be pulled away from the underlying rate.

Retail price inflation and measures of the 'core' rate



(a) The 12-month percentage change in the all-items retail price index.
(b) The 'median' rate.
(c) The 70% 'trimmed mean': the average of the central 70% of price changes.

The chart shows a (weighted) median rate of inflation derived from observations on 74 components of the RPI. It shows also the average inflation rate of the central 70% of the distribution of price changes. This 'trimmed-mean' excludes some of those changes in prices which would not be compensated for by smaller changes in the opposite direction because of the menu costs. The proportion of the distribution which is excluded is arbitrary.

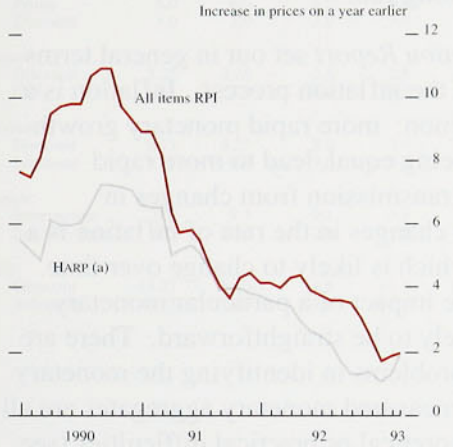
The table illustrates how often certain components appear in the 'trimmed mean'. The components chosen are examples of types of commodity which might be expected to be excluded from 'core' indices (eg foods, administered prices, energy products etc). One of the grounds for excluding mortgage interest payments (MIPs) from the RPI is that MIPs are unusually volatile (depending largely on the level of interest rates). There is support for this in the table, since MIPs almost never appear in the 70% 'trimmed mean'. On the other hand, many components grouped under the heading 'food and energy' or 'administered prices' (and excluded from the RPI by many commentators for the same reason) actually appear frequently in the band (in some cases, they are never excluded). The table suggests that excluding some goods for all time on the grounds of volatility alone is not sensible.

RPI sub-sections and their appearance in the 70% 'trimmed mean' (January 1988–March 1993)

Description	Number of appearances in 70% 'trimmed mean' (percentage of observations used)
Biscuits and cakes	100
Milk, fresh	95
Restaurant meals	100
Beer	83
Mortgage interest payments	2
Rates/Community Charge	14
Water and other charges	21
DIY materials	100
Electricity	89
Gas	76
Telephones etc	75
Other clothing	100
Chemists goods	100
Purchase of motor vehicles	62
Petrol and oil	57
Rail fares	86
Bus and coach fares	78
Household consumables	100

(1) Bryan, M and Cecchetti, S (1992), 'Measuring Core Inflation', *Mimeo*.

Chart 1.7
RPI and HARP inflation rates



(a) Incorporates user-cost measures with constant real yield for costs of owner-occupation (using unadjusted Halifax house price index).

headline rate in December (see Chart 1.7). The contrasting behaviour of these two measures since December is partly related to house prices which rose by 0.6% between December and March and which are captured directly in the HARP index but not in the RPI.

One other price index which is of interest is the Tax and Price Index (TPI). This measures the change in gross income that would be needed to allow a household to continue purchasing a representative bundle of goods, taking into account not only changes in prices but also changes to direct taxes. The switching of the tax burden from direct to indirect taxes in recent years has contributed to the measured rise in the average level of prices. However, the change in gross income needed to compensate for this increase has typically been less than one-for-one. And in the year to March the rise in the TPI was just 0.7%.

1.5 Summary

Compared with three months ago, it is now somewhat easier to see how last autumn's depreciation is affecting domestic prices. Retail prices of a number of products, including some food items and consumer durables, have risen more rapidly since the autumn. And the latest three-month inflation rate has increased a little since the last *Inflation Report* and now stands somewhat further above the twelve-month rate than was the case three months ago. Nevertheless, underlying inflation, at 3.5%, is still in line with our expectations in February. Judging the balance of pressures in the coming months requires an examination of the forward indicators of prices. It is to these that we now turn.

2 Monetary and fiscal policy

Section 1 discussed recent developments in a range of price indices. The rest of the *Report* considers the factors which will determine inflation in the future, in both the short and long run.

The February *Inflation Report* set out in general terms the Bank's view of the inflation process. Inflation is a monetary phenomenon: more rapid monetary growth will, other things being equal, lead to more rapid inflation. But the transmission from changes in monetary policy to changes in the rate of inflation is a complex process which is likely to change over time. Identification of the impact of a particular monetary shock is thus unlikely to be straightforward. There are also considerable problems in identifying the monetary shock itself, since measured monetary aggregates are all subject to some theoretical or practical difficulties (see the article on page 240 of the May *Quarterly Bulletin* and the box on page 14).

Analysis of inflation begins, therefore, with an analysis of monetary policy, both present and anticipated. Although monetary policy may be analysed in terms of changes in the monetary aggregates—and some discussion of these appears in Section 2.1—the primary instrument of monetary policy is short-term interest rates. It is also the primary channel by which monetary policy has its impact on the economy, although the impact of any given change in the short-term interest rate will depend, in part, on the extent to which the change is reflected in longer-term interest rates. This in turn will depend on expectations of future monetary policy. Since the autumn, the inflation target has been the objective to which monetary policy is directed, and if the commitment to the target is fully credible then the authorities would be expected to respond to any prospective movement of inflation close to the limits of its target range or beyond. The credibility of the authorities' commitment to the inflation target can thus be judged by examining the markets' expectations of future interest rates. This is discussed in Section 2.1.

One important determinant of expectations is fiscal policy. Changes in fiscal policy would be expected to result in short-run changes in output and prices. But if monetary policy does not accommodate the resulting change in prices then fiscal policy of itself should have

Table 2.A
Official interest rates overseas

Per cent per annum

	1992		1993		
	1 Sept.	1 Dec.	1 Mar.	1 Apr.	7 May
United States:					
Prime	6.0	6.0	6.0	6.0	6.0
Discount	3.0	3.0	3.0	3.0	3.0
Japan:					
Discount	3.25	3.25	2.5	2.5	2.5
Call	4.1	3.9	3.2	3.2	3.2
Germany:					
Discount	8.75	8.25	8.0	7.5	7.25
Lombard	9.75	9.5	9.0	9.0	8.5
France:					
Intervention	9.6	9.1	9.1	9.1	8.0
5-10 day repo	10.5	10.0	12.0	12.0	9.0
Italy:					
Discount	13.25	13.0	11.5	11.5	11.0
Advances	14.75	14.0	12.5	12.5	12.0

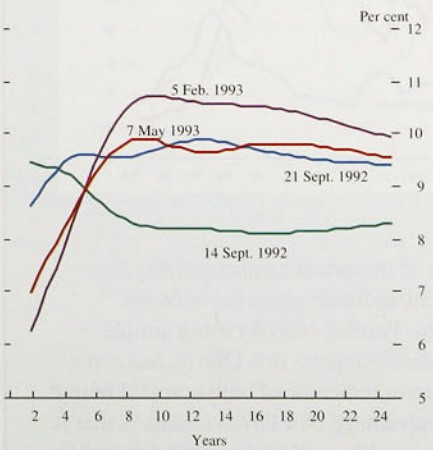
Table 2.B
Expected 3-month sterling Libor rates

Per cent per annum

		1993			1994
Date	Spot	June	Sept.	Dec.	Mar.
14 Sept.1992	10.25	9.5	9.2	9.2	9.1
21 Sept.	9.25	8.0	8.0	8.3	8.5
5 Feb. 1993(a)	6.2	5.3	5.2	5.3	5.7
7 May	6.0	5.9	5.9	6.0	6.3

(a) Quoted in the February *Inflation Report*.

Chart 2.1
Implied forward interest rates



no long-run impact on the price level. But large and persistent deficits may cause investors to fear that the authorities will be tempted to erode the real burden of debt by inflation. In this way, fiscal policy can have a significant effect on expectations of monetary policy and thus of longer-term interest rates. Fiscal policy is discussed in Section 2.2.

2.1 Monetary conditions

Interest rates

Official interest rates in the United Kingdom have remained unchanged since the one percentage point cut—from 7% to 6%—on 26 January. By contrast, official interest rates in some other European economies have fallen (see Table 2.A). In Germany, for instance, the Lombard rate was cut by 0.5 percentage points in April, and the discount rate has fallen by 0.75 percentage points since March. In France the reductions have been bigger as exchange rate pressures have eased considerably. Although the intervention rate has declined by just over one percentage point, the 5–10 day repo rate has fallen by three percentage points.

Following the last interest rate cut the markets were discounting a further cut in three-month interest rates of around ¾ percentage point by June. But by early May sterling interest rates (as derived from interest rate futures prices) were expected to remain broadly flat this year, with a possible rise in early 1994 (Table 2.B). In the United States, too, short-term interest rates are expected to rise as recovery takes hold: three-month rates are expected to increase by around ½ percentage point, to 3.6%, during the remainder of this year. European interest rates, on the other hand, are expected to fall further as monetary authorities respond to falling inflation and the slowdown in growth. Three-month euromark rates, for example, are expected to fall from 7½% on 7 May to just 6% by the end of this year.

Although sterling interest rates are now expected to be higher in the near future than was thought likely at the time of the last *Inflation Report*, expected interest rates have actually declined at all maturities beyond six years. Chart 2.1 shows implied forward interest rates on 7 May, and contrasts them with implied rates in early February (when the last *Report* was completed), and with those around the time of the suspension of sterling's ERM membership. The implied rates are derived from the par yield curve on the given date. They represent a

Divisia indices for money

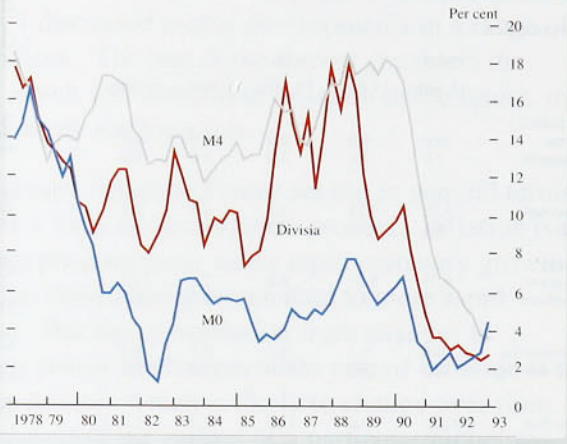
Published targets (more recently monitoring ranges) for the growth of the money supply have been part of the framework for monetary policy in the United Kingdom since 1976. The monetary aggregates for which there are monitoring ranges (M0 and M4) are constructed by adding together their components. Such simple-sum aggregation implicitly assumes that all the components are perfect substitutes for one another from the perspective of holders of these assets. However, components of monetary aggregates differ widely in their ability to provide monetary services and, furthermore, these differences change over time. Treating all components of an aggregate as perfect substitutes may therefore be misleading.

A Divisia index for money attempts to improve on this simple-sum aggregation approach by weighting each component asset according to the extent to which it provides transactions services. The aim is to produce a measure of the total quantity of money held in the economy for transactions purposes. The weight of each component depends on the difference between the rate of interest it offers and the return on a benchmark asset that offers no transactions services, on the grounds that asset holders are willing to forgo interest as the price of 'buying' these transactions services. This difference is described as the 'user cost' of the relevant component. Thus cash and non-interest-bearing deposits have a high user cost and the largest weight in the index, whereas wholesale deposits have a low user cost and a very small or zero weight.

But a Divisia index has a number of shortcomings. The first is the difficulty of measuring the transactions services provided by each monetary asset, when the effects of the variety of other services available to bank and building society account holders and the impact of bank charges and new technology are difficult to isolate. The second concerns the determination of the user cost, in particular the choice of benchmark asset and the representative rates of interest for the component assets. Third, there are difficulties with interpretation; for example, in a Divisia index the weights of the component assets will change as soon as interest rates change, even if no portfolio shifts have yet taken place.

A detailed appraisal of the issues arising from Divisia indices is set out in the article on pages 240–55 of the May *Quarterly Bulletin*. Chart A shows the growth of a constructed aggregate Divisia index and compares it with that of M0 and M4. Of particular interest is the rise in Divisia growth from 1985 Q2 until 1986 Q3, after which it remained strong until the end of 1988. However, between end-1988 and 1992 Q4 Divisia growth fell sharply to below 3%. M4 growth also fell sharply from

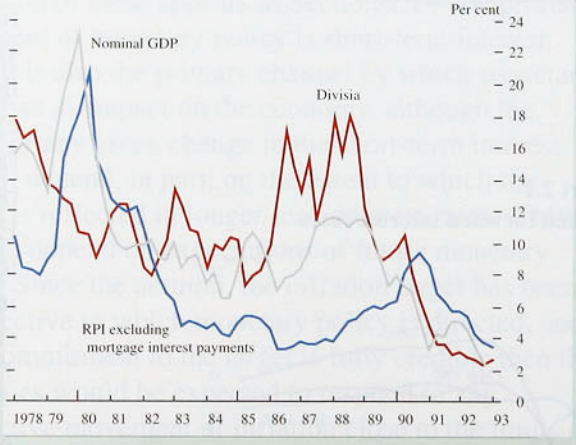
Chart A
Twelve-month growth rates of Divisia, M0 and M4



1990, although its fall was less severe. In 1993 Q1 Divisia growth picked up, albeit slightly, while M4 continued to decelerate.

Chart B shows the growth rates of Divisia, inflation (RPIX) and nominal GDP. Although there does not appear to be any close relationship between Divisia and nominal GDP, Divisia does appear to lead nominal

Chart B
Twelve-month growth rates of Divisia, inflation and nominal GDP



income at a number of important turning points. No such association is immediately apparent between Divisia and inflation. Further analysis using simple statistical causality tests suggests that Divisia has some value as a medium-term indicator of both nominal output and inflation. One advantage of a Divisia index is that it can be explained reasonably well by a simple demand for money equation whereas other aggregates, particularly broad money, have been more difficult to model.

succession of one-year interest rates at future one-year intervals which would, if realised, yield the same return as the relevant longer yields on the date in question. If the term risk premium is small, these implied rates can be interpreted as expected future short interest rates. The yield curves from which they are derived are calculated by fitting curves through observed yields on a large number of government bonds. As a result the shapes of the implied forward yield curves are sometimes difficult to rationalise. The most recent curve in Chart 2.1, for example, shows some slight fluctuation beyond the nine-year maturity, and there is no obvious economic explanation for this. Hence the curves should be interpreted as illustrating expected general trends, rather than offering precise estimates of expected yields.

In this spirit, the most recent data show that interest rates are expected to rise to around 9½%. On average this is around ½ percentage point lower than expectations at the time of the last *Report*, although still over one percentage point above expectations before suspension of sterling's ERM membership. These changes may provide a guide to the credibility of the monetary stance, and to the new framework for monetary policy. In this context it is not surprising that the events of last September apparently raised the market's expectation of long-term inflation in the United Kingdom. But it is encouraging that the implementation of the new framework is beginning to enhance the credibility of monetary policy. Nevertheless, while expectations have improved, they have still not adjusted to the long-run inflation target.

Table 2.C
The sterling exchange rate[a]

	15 Sept.	31 Dec.	5 Feb.[b]	7 May
Sterling ERI[c]	90.9	79.6	77.7	80.9
US dollar	1.89	1.52	1.45	1.58
Deutschmark	2.78	2.45	2.40	2.49
ECU	1.38	1.26	1.23	1.27
SDR	1.31	1.10	1.06	1.11

(a) Close of business.
(b) Quoted in the February *Inflation Report*.
(c) 1985=100.

The exchange rate

Between 15 September 1992, the last day before suspension of sterling's membership of the ERM, and 5 February 1993, the effective sterling exchange rate depreciated by 14.5% (see Table 2.C). The overall index masked a sharp difference between the changes against European and non-European currencies: sterling fell by 10.9% against the Ecu, but by over 23% against the dollar. In the following week sterling depreciated slightly further (to a low point of 76.0 on 11 February), but has since more than recovered that decline. By 7 May the effective rate had risen by 4.1% from its 5 February level, although by rather more against the dollar (9%) than against the deutschmark (3.8%) or the Ecu (3.3%).

Chart 2.2
UK and trade-weighted world interest rate yield curves (April 1993)

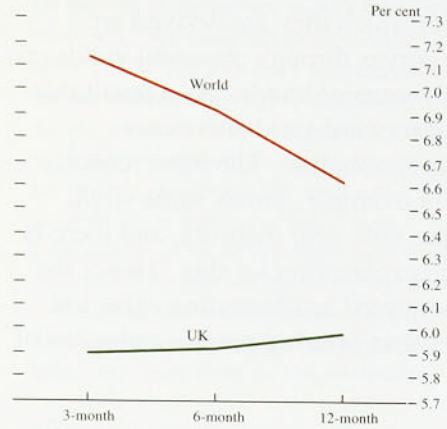
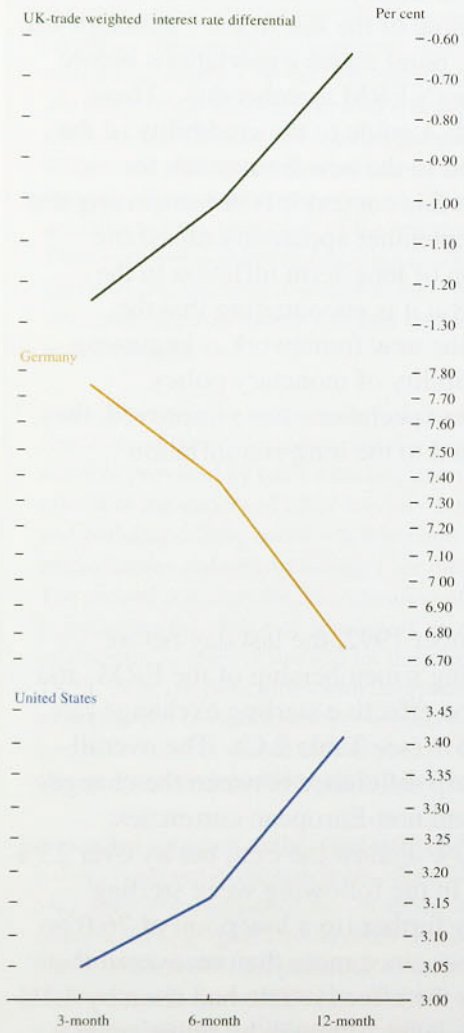


Chart 2.3
Yield curves (April 1993)



The pattern of present and expected interest rates implies a particular path for the sterling exchange rate in the coming year and beyond. Chart 2.2 compares the short-term yield curve for the United Kingdom (over a twelve-month horizon) with a similar yield curve for 'world' interest rates. The latter is calculated by weighting together interest rates in sixteen countries where the weights are those used in the construction of the sterling effective exchange rate index (ERI).(1) The biggest contributions are those of the United States, Germany and France. The slope of the world yield curve is strongly influenced at present by the expectation that European rates will fall further throughout this year.

This can be seen from Chart 2.3 which plots the money-market yield curve for the United States and Germany separately. It also plots the implied interest *differential* between the United Kingdom and the rest of the world, which narrows from around -1.2% for three-month interest rates, to only -0.6% at the twelve-month maturity. On the assumption that the differential in the interest rate is exactly balanced by the expected capital gain from holding sterling over the same period (ie assuming uncovered interest parity), a twelve-month differential of -1% would imply that the markets expected sterling to appreciate by 1% over the next year. But the narrowing of the interest rate differential is such that the expected appreciation of sterling over the next year is likely to be less than that. It should be noted that expected exchange rates calculated in this fashion have a poor record in predicting actual changes.

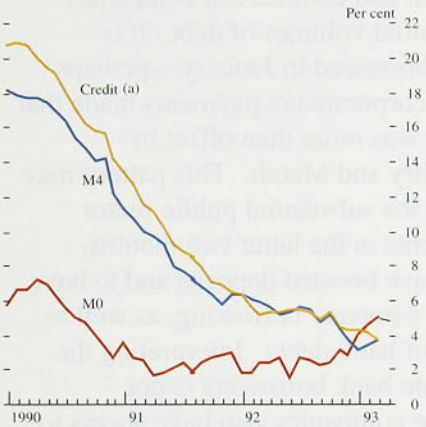
Monetary and credit aggregates

The monetary and credit aggregates continued to offer conflicting signals in the first quarter. M0 growth rose above its target (now monitoring) range of 0%–4%, while M4 growth remained below its interim monitoring range of 4%–8% (subsequently widened to a range of 3%–9% in the March 1993 Budget). There was some evidence from the monthly figures that M4 growth was beginning to rise, but growth in the private sector credit counterpart remained weak (see Chart 2.4).

M0 continued to grow rapidly during the first quarter of 1993. Its twelve-month growth rate rose to 4.9% in March (from 2.8% in December). Shorter-run growth

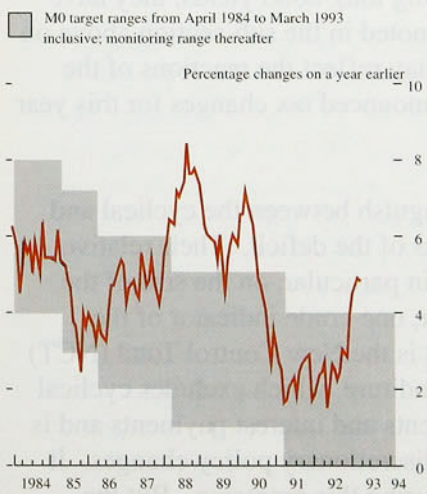
(1) The construction of the sterling ERI is described in more detail in the November 1988 edition of the *Bank of England Quarterly Bulletin*.

Chart 2.4
Twelve-month growth rates of M0, M4 and the credit counterpart to M4



(a) Bank and building society lending to the private sector.

Chart 2.5
Growth rates of M0



rates have been rapid, with six-month and three-month annualised growth rates of 7.1% and 9.5% respectively. Growth slowed a little in April, although the twelve-month rate remained outside the monitoring range, at 4.8%—see Chart 2.5. Much, but not all, of the strength of M0 can be explained by faster growth of the value of retail sales, and the impact of lower interest rates (which lower the opportunity cost of holding cash). Other factors, such as changes in the composition of expenditure, may also be important.

M4 growth slowed further towards the end of last year, and M4 actually fell in January, when the twelve-month increase was only 3.1%—the lowest rate since the monthly series began in June 1983. The weakness of M4 was consistent with a number of other nominal indicators, reflecting the relatively flat profile for real demand and output, coupled with falling inflation. But in the past two months M4 has risen again, taking the three-month annualised growth rate to 5.3% in March, and the twelve-month rate to 3.6%. The main credit counterpart to M4—bank and building society sterling lending to the rest of the private sector—may, however, be a more timely indicator of future nominal demand because banks and building societies tend to act as liability managers, seeking to vary deposits according to the profitability of lending opportunities. Credit rose by 0.4% in the first quarter, the smallest quarterly increase for over 25 years. In March credit actually fell by 0.2%. As a result the twelve-month growth rate fell to 3.7%, from 4.1% in February.

Examination of the sectoral money and credit figures shows that borrowing was focused largely in the personal sector, but that the growth in deposits was more equally spread. Within the personal sector, net borrowing by individuals from banks and building societies was £1.9 billion. Borrowing amounted to £4.6 billion, compared with £3.8 billion in 1992 Q4, and is consistent with a recovery, albeit from a very low level, in personal spending and the housing market. Borrowing for house purchase increased by £4.2 billion (1.4%), up £0.5 billion on the fourth quarter. Although recent reports in the press have suggested stronger activity in the housing market, this has not yet fully filtered through to the lending figures. This may be because enquiries have not yet resulted in completions.

Consumption borrowing increased 0.9% in the first quarter, after 0.5% (adjusted for a loan transfer) in the previous quarter—consistent with the rising trend in

Chart 2.6
Private sector net sterling borrowing from banks and building societies(a)

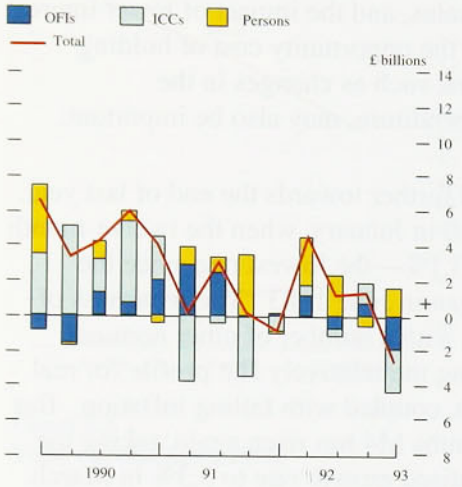


Table 2.D
General government finances

£ billions; figures in italics as a percentage of GDP

		Bank estimate	1993 FSBR forecast	
	1989/90(P)	1992/93	1993/94(T)	1997/98
Expenditure	201	260	280	342
	38 1/4	*43 1/2*	*44 1/2*	*43 1/4*
of which, New Control Total				
	175.1	231	244	284
	33 1/4	*38 1/2*	*38 3/4*	*35 3/4*
Receipts	207	224	229	311
	39 1/2	*37 1/2*	*36 1/2*	*39 1/4*
PSBR(a)	-8	36 1/2	50	30
	-1 1/2	*6*	*8*	*3 3/4*
Privatisation proceeds	4	8	5 1/2	1
PSBR excluding privatisation proceeds	-4	44 1/2	55 1/2	31
	-3/4	*7 1/2*	*8 3/4*	*4*
Expected direct revenue gain from the 1993 Budget measures	—	—	*0.1*	*1.7*
Memo items: Net public sector debt ratio (b)	*28*	*33 1/2*	*39 1/4*	*43/4*

P: Peak of cycle.
T: Trough of cycle.

(a) Public corporations market and overseas borrowing accounts for the difference between expenditure less receipts and the PSBR.
(b) Net public sector debt at end-March as a percentage of money GDP in four quarters centred on end-March.

retail sales seen over the quarter. Unincorporated businesses both reduced their bank and building society deposits and repaid debt during the first quarter. The repayment of debt, in the region of £0.6 billion, was the largest repayment by unincorporated businesses since the series began. This may reflect continued financial restructuring.

Although their deposits increased by £2.0 billion in the first quarter, industrial and commercial companies (ICCs) repaid substantial volumes of debt. It is estimated that ICCs borrowed in January—perhaps reflecting the heavy corporate tax payments made that month—but that this was more than offset by repayments in February and March. This pattern may be the counterpart to the substantial public sector borrowing requirements in the latter two months, which are likely to have boosted deposits and to have reduced the need for company borrowing, as well as assisting repayment of bank debts. Interpreting the behaviour of corporate bank borrowing is not straightforward, since companies also have access to other sources of finance. In the first quarter ICCs raised £2.6 billion from sterling capital issues.

2.2 Fiscal policy

Since the last *Inflation Report* the fiscal measures announced in the March Budget have reinforced the medium-term credibility of the new monetary framework. Although the announcement of the revised PSBR projection of £50 billion for 1993/94 had the effect of raising long bond yields, they have since fallen back, as noted in the sub-section above on interest rates. This may reflect the reactions of the markets to the pre-announced tax changes for this year and next.

It is difficult to distinguish between the cyclical and structural components of the deficit. Their relative magnitudes depend, in particular, on the size of the output gap. However, one crude indicator of the structural component is the New Control Total (NCT) for government expenditure, which excludes cyclical social security payments and interest payments and is designed to capture discretionary policy changes. It has risen markedly during this recession. But the Autumn Statement measures, coupled with a resumption of growth, should reduce it substantially. As Table 2.D shows, government estimates suggest that the NCT will, on the basis of average GDP growth

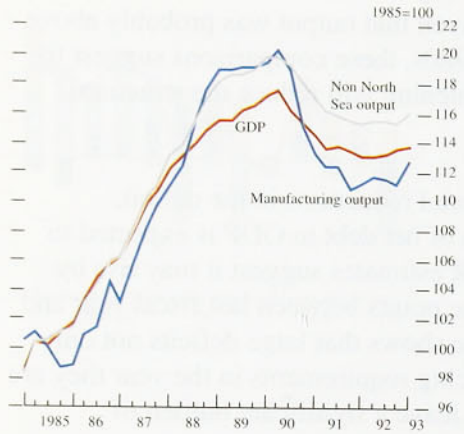
of 2.6% per annum over the next five years, decline to 35¾% of GDP in 1997/98 from a peak of 38¾% in the present fiscal year. This would still be higher than in the second half of the 1980s: the average between 1984/85 and 1989/90 was 34.6% of GDP. Government estimates suggest that tax receipts will be 1.7 percentage points higher as a proportion of GDP in 1997/98 as a *direct* result of the tax changes announced in this year's Budget. Although this change represents a tightening of the fiscal stance relative to 1992/93, receipts are still likely to be lower in 1997/98 than in the late 1980s. Given that output was probably above trend in the late 1980s, these comparisons suggest the planned fiscal tightening will reduce the structural deficit.

Even with substantial reductions in the deficit, however, the ratio of net debt to GDP is expected to rise further. FSBR estimates suggest it may rise by over 16 percentage points between last fiscal year and 1997/98. This rise shows that large deficits not only create large financing requirements in the year they are incurred, but also leave a significant burden of financing for future generations.

3 Demand and output

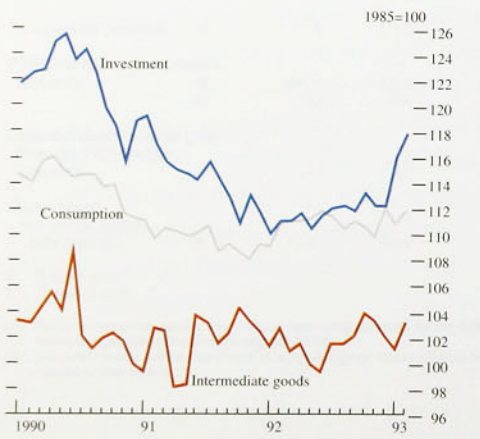
In the long run the rate of inflation is determined by monetary growth. But in the short run the speed at which inflation adjusts to the underlying rate implied by monetary policy depends on supply and demand in goods markets. If output is high relative to 'normal' output or 'productive potential' then inflation will, other things being equal, rise. And if potential output exceeds actual output there will be downward pressure on inflation. Short-run changes in the inflation rate reflect the size of this 'output gap'. In this section we discuss the most recent evidence on output, and hence the output gap, and on total demand which will influence short-run movements in total output.

Chart 3.1
Domestic output



Preliminary estimates suggest that GDP rose by around ¼% in the first quarter of 1993, with non-oil output rising by more than ½%. Domestic demand also appears to have risen in the first quarter, and survey data suggest that further increases in demand and output may be expected in the second quarter. Although the increases in output have been a little stronger than expected (especially in manufacturing) the gap between actual and potential output remains sizeable, although it is difficult to measure with any precision.

Chart 3.2
Industrial production



3.1 Output and the output gap

The preliminary estimate of GDP in the first quarter suggests that total output rose by 0.2%, the third successive quarterly increase in GDP. Excluding North Sea output, the rise is estimated at 0.6%. No detailed sectoral disaggregation is yet available, but the monthly data on industrial output indicate that much of the recovery has been in manufacturing, where output rose by 1.2% in the three months to February over the previous three months (see Chart 3.1). This rise was the largest since February 1992, and was broadly based. Disaggregating industrial production by class of good, most of the recent increase has come in investment goods, with output up by 2.6% in the three months to February over the previous three months. Over the same period, output of consumer goods was up 0.9%, whereas output of intermediate goods fell by 0.9% (see Chart 3.2).

Chart 3.3
Capacity utilisation

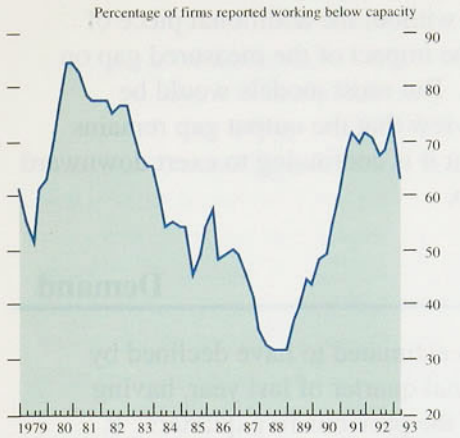


Chart 3.4
Output gap: deterministic trend measure

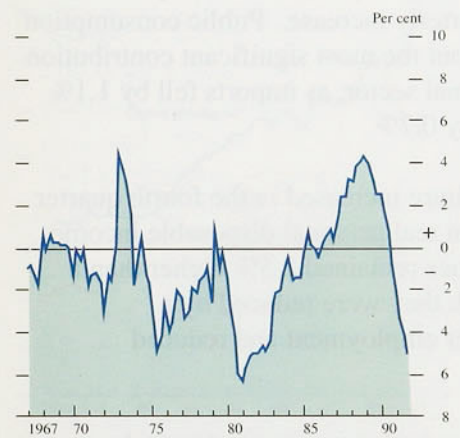
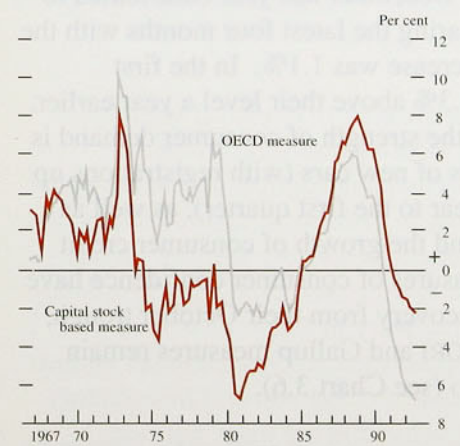


Chart 3.5
Output gap: production based approaches



The recent increase in output is unlikely to have been sufficiently rapid to narrow the output gap (the gap between actual output and the level of output consistent with a constant rate of inflation). But Chart 3.3 shows that the percentage of firms reported in the latest CBI Survey as working below capacity fell from 73% in January to 63% in April—the lowest figure since the beginning of 1991. The other CBI utilisation measures also suggest an increase in the rate of capacity utilisation, although it remains low by historical standards.

Statistical estimates of the size of the output gap vary widely. There are two main approaches to the measurement of 'potential' output. The first identifies a trend in previous output growth and extrapolates it into the future. Such trends can be calculated in numerous ways. But they share a common implicit assumption that the trend in output is independent of other economic forces. Chart 3.4 shows the output gap implied by a simple deterministic trend with structural breaks.(1)

The second method of measuring potential output attempts to take account of changes to productive capacity over the course of the cycle. Such measures are based on explicit 'production functions'—relationships between output and inputs of labour, capital and raw materials—and their assessment of the output gap will depend on assumptions about the growth of both the capital stock and the labour force. Two measures based on such techniques are shown in Chart 3.5 which presents the OECD estimate of the output gap (based on an explicit production function) and a series which is based on estimates of capacity derived solely from changes in the capital stock. The two can be seen to vary widely in their assessment of the size of the gap not only at present, but also on many occasions in the past (including the previous recession). They also differ from the simple trend-based measure shown above.

The variation in the estimates of the gap in the past is important, for it will also lead to differences in the degree to which a given gap is believed to influence inflation. An estimate of the size of the present gap is not, therefore, sufficient to enable conclusions to be drawn about the future path of inflation. This depends also on the relationship between the calculated output gap and actual inflation in the past. Although the

(1) The major breaks occur in 1975 Q3, 1984 Q4 and 1990 Q2. The assumed growth rates are as follows: before 1975, 2.2% per annum; between 1975 and 1984, 0.7% per annum: between 1984 and 1990, 3.3% per annum; and after 1990, 2.2% per annum.

estimates of the current gap which are generally quoted are in the range of 3% to 7%, it is not clear that such estimates are useful without the additional piece of information about the impact of the measured gap on inflation in the past. But most models would be consistent with the view that the output gap remains sufficiently large that it is continuing to exert downward pressure on inflation.

Table 3.A
Expenditure components of GDP at constant prices, Q4 1992
Percentage change

	Quarterly change	Twelve-month change
Consumers' expenditure	0.3	1.3
Public consumption	0.2	-1.2
Investment	-0.8	0.7
Stockbuilding(a)	-0.5	-0.4
Domestic demand	-0.3	0.4
Exports	0.7	1.9
Imports	-1.1	3.6
GDP(b)	0.2	0.1

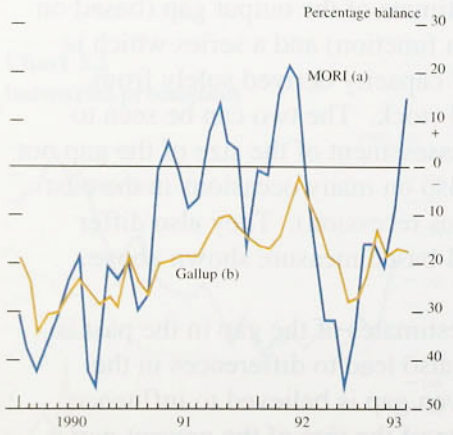
(a) Contributions to GDP growth.
(b) Expenditure estimate.

3.2 Demand

Domestic demand is estimated to have declined by around ¼% in the final quarter of last year, having increased in each of the previous five quarters. It nevertheless remained 0.4% above its level a year earlier (see Table 3.A). The fall was more than accounted for by a reduction in corporate expenditure: investment fell by 0.8%, while faster destocking reduced growth by almost ½%. Consumers' expenditure rose by 0.3%, the third successive quarterly increase. Public consumption also rose, by 0.2%, but the most significant contribution came from the external sector, as imports fell by 1.1% while exports rose by 0.7%

Consumers' expenditure increased in the fourth quarter despite a sharp fall in real personal disposable income (-0.8%). Real incomes remained 2.5% higher than a year earlier, although they were reduced by a combination of lower employment and reduced overtime working.

Chart 3.6
Indices of consumer confidence



(a) Response to enquiry concerning the general economic situation in the country.
(b) Based upon five questions concerned with households' finances and their assessment of economic conditions.

Latest indicators suggest that consumer demand grew sharply in the first quarter. Comparing the three months to March with the previous three months, the volume of retail sales rose by 1.6%, although the apparent weakness of sales in December last year contributed to this increase. Comparing the latest four months with the previous four, the increase was 1.1%. In the first quarter, sales were 3.3% above their level a year earlier. Further evidence of the strength of consumer demand is contained in the sales of new cars (with registrations up almost 12% in the year to the first quarter), as well as the increase in M0 and the growth of consumer credit (see Section 2). Measures of consumer confidence have also continued the recovery from their October trough, although both the MORI and Gallup measures remain lower than a year ago (see Chart 3.6).

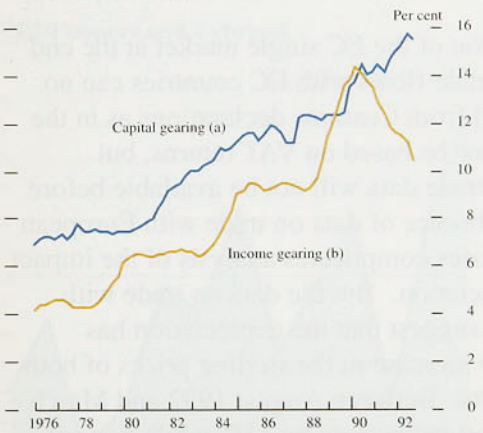
Personal sector debt, gearing and the housing market

High levels of personal debt and debt servicing costs appear to have acted as a constraint on the recovery of

personal sector demand in the past two years, but this effect now seems to have diminished. Falls in interest rates have already had a marked effect on income gearing (the ratio of interest payments to disposable income). Chart 3.7 shows that, for the personal sector as a whole, income gearing has declined from a peak of around 14% during 1990 to an estimated level of only around 10.3% at the beginning of this year. This is still higher than at any time before 1989, but the reduction will have been sufficient to ease constraints on many borrowers—especially younger borrowers whose propensity to consume may be relatively high.

A further constraint on consumption may have been the level of indebtedness. Capital gearing (outstanding lending as a proportion of net financial and tangible wealth) has continued to rise throughout the recession, as asset values (house prices) have fallen. At the same time it is likely that individuals have reduced their desired levels of borrowing as they reassess their likely lifetime income and wealth. But recent evidence suggests that the housing market may be recovering. The Halifax house price index rose by 1.4% in March and a further 1.6% in April, more than offsetting the total fall recorded since last September. This rise in prices accords with the anecdotal evidence of increased interest in the housing market since the new year, with the recovery in lending for house purchase, and with the recorded rise in turnover, as particulars delivered rose again in March (albeit from a very low base).

Chart 3.7
Personal sector gearing



(a) Borrowing from banks and building societies as a proportion of personal sector financial and physical assets.
(b) Gross personal sector interest payments as a proportion of disposable income.

The recent Budget measure to double the stamp duty threshold on property purchases from £30,000 to £60,000 is likely to assist the pick-up in activity, especially among first-time buyers. The Council of Mortgage Lenders estimate that only 23% of first-time buyers made property purchases of less than £30,000 in 1992, but 82% purchased properties for less than £60,000.

The rise in house prices will have particular significance for those households whose mortgage debts are greater than the value of the home on which they are secured. A note on negative equity was published in the August *Bank of England Quarterly Bulletin*. Bank estimates of the scale of negative equity have risen reflecting further falls in the Halifax house price index (unadjusted). The number of households with negative equity is thought to have risen to 1.8 million in the first quarter of this year, from 1.0 million in the second quarter of last year. The aggregate shortfall has also grown, to reach an estimated level of £11.7 billion, or £6,500 per household. The

extent of negative equity is likely to have fallen a little from these estimates, following the rise in house prices in April. If prices were to remain at their new level for the rest of the second quarter, the number of households with negative equity could fall below 1½ million.

The precise estimates of numbers and value of negative equity are particularly sensitive to the house price used in the calculation. The estimates also depend on a number of factors which are not well measured. These include possessions, which serve to reduce the estimates, and further advances and mortgage arrears which serve to increase them. If these factors are ignored, then using the Department of the Environment index, which is available to the fourth quarter of last year, the number would be closer to 1.05 million, and the value to £5.9 billion.

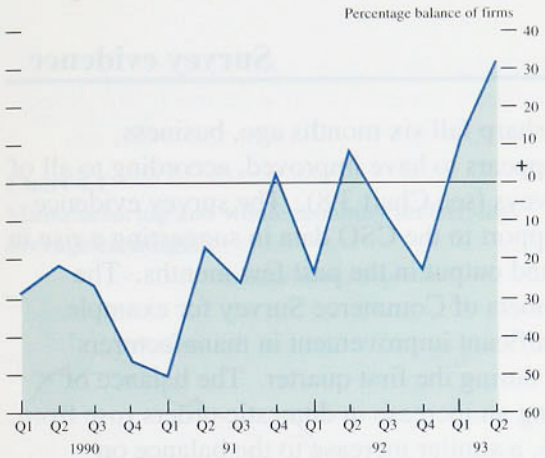
Overseas trade

With the completion of the EC single market at the end of 1992, data on trade flows with EC countries can no longer be obtained from Customs declarations as in the past. Data will now be based on VAT returns, but aggregate visible trade data will not be available before June 1993. The absence of data on trade with European Community countries complicates analysis of the impact of sterling's depreciation. But the data on trade with non-EC countries suggest that the depreciation has resulted in a sharp increase in the sterling prices of both imports and exports. Between August 1992 and March 1993 non-oil import prices rose by 15% while non-oil export prices rose by just under 10% implying a slight fall in the terms of trade. The volumes of both exports and imports have continued to grow sharply. Between August 1992 and March 1993, exports (excluding oil and erratics) rose by almost 12% while imports on the same basis rose by almost 11%.

It seems probable that the growth in export volumes to the EC has slowed in recent months, reflecting the general weakness of demand in Europe, and in Germany in particular. Weakness in their home countries may also have encouraged European producers to make greater efforts to penetrate the UK market, especially given the growing evidence of recovery in UK demand. In addition, sterling's depreciation has been smaller against the EC than against the rest of the world. These factors suggest that the improvement in the trade position *vis-à-vis* the EC may be relatively less than that for other countries. But the 'J-curve' effect, whereby prices react faster to exchange rate changes than do volumes, may

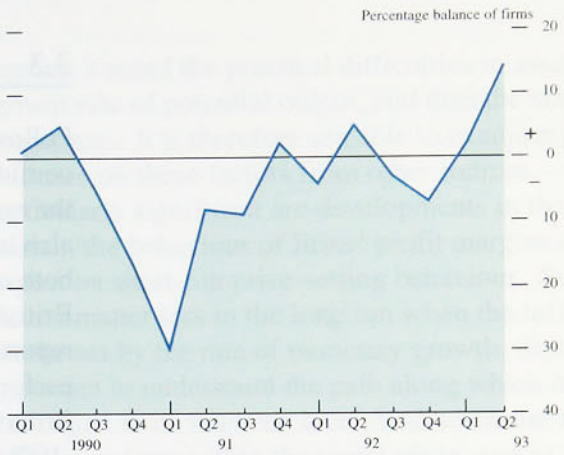
Chart 3.8
Survey data on business optimism

CBI Industrial Trends Survey



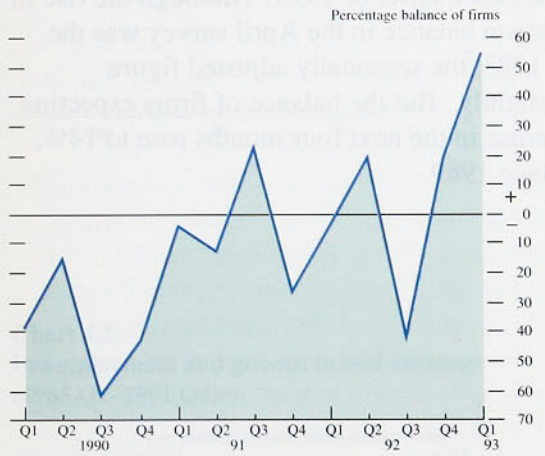
Optimism regarding the general business situation.

CBI Industrial Trends Survey



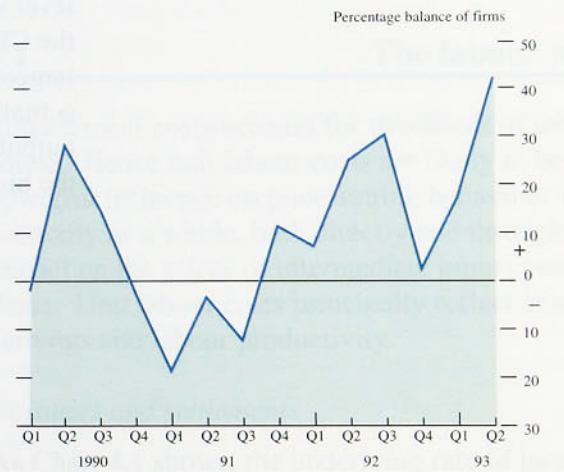
Expected trend in volume of output in next four months.

CBI/Coopers and Lybrand



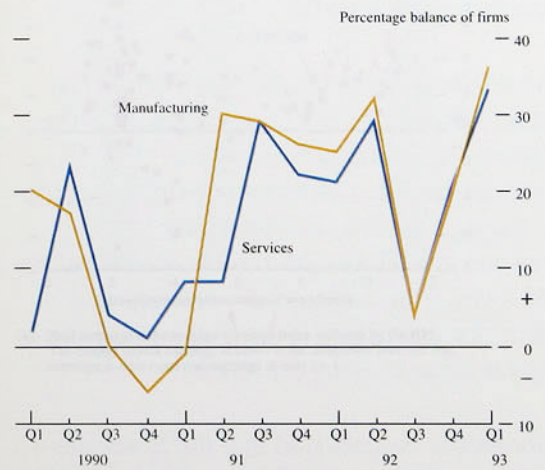
Optimism regarding the overall business situation with respect to the previous three months.

Dun and Bradstreet



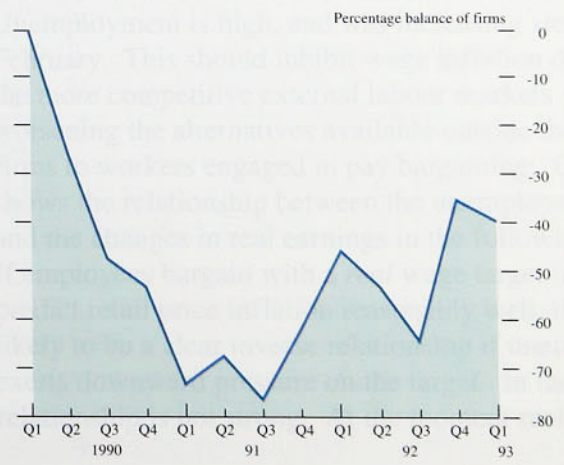
Firms expecting net sales to improve during the next three months.

British Chambers of Commerce



Firms expecting profitability to improve in the next twelve months.

Building employers' confederation



Firms expecting more work.

imply that initially there will be a greater relative worsening in the trade position with non-EC countries than with EC countries following the depreciation of sterling.

3.3 Survey evidence

Following a sharp fall six months ago, business confidence appears to have improved, according to all of the main surveys (see Chart 3.8). The survey evidence also lends support to the CSO data in suggesting a rise in both orders and output in the past few months. The British Chambers of Commerce Survey for example reports a significant improvement in manufacturers' performance during the first quarter. The balance of firms reporting an increase in domestic orders rose from -10% to +7%, a similar increase to the balance on reported deliveries. The balances in the service sector rose by a little less, but orders now stand at their highest level since the first quarter of 1990. Although the rise in the CBI optimism balance in the April survey was the largest since 1983, the seasonally adjusted figure actually fell slightly. But the balance of firms expecting output to increase in the next four months rose to 14%, the highest since 1989.

Price dynamics 4

Chart 4.1
Manufacturing and whole economy underlying average earnings

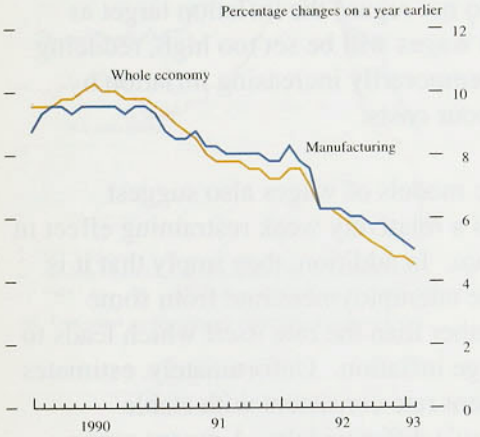
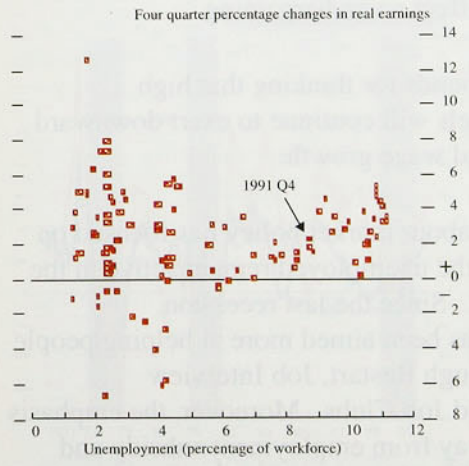


Chart 4.2
Unemployment and growth in real earnings (1965 Q1–1991 Q4)[a]



(a) Real earnings is the average earnings index deflated by the RPI. The change in real earnings at time t is the difference between real earnings at time t and real earnings at time $t + 1$.

Section 3 noted the practical difficulties in assessing the growth rate of potential output, and thus the size of the output gap. It is therefore sensible to examine indirect evidence on these factors from other sources. Particularly significant are developments in the labour market, the behaviour of firms' profit margins and their impact on short-run price-setting behaviour. Such factors matter less in the long run when the inflation rate will be set by the rate of monetary growth. But it is important to understand the path along which inflation will adjust to its long-run level, both to ensure that inflation is kept within the target range, and as a benchmark against which to measure the 'news' on inflation from period to period.

4.1 The labour market

Employment costs account for two thirds of total value added. Hence unit labour costs are likely to be a powerful influence on price-setting behaviour in the economy as a whole, both directly and through their impact on the prices of intermediate inputs purchased by firms. Unit labour costs principally reflect changes in earnings and labour productivity.

Earnings and settlements

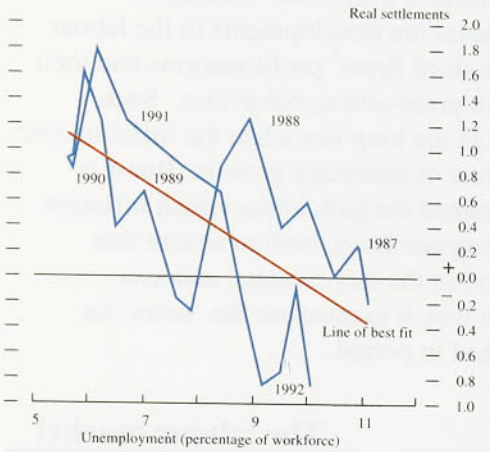
As Chart 4.1 shows, the underlying rate of increase of earnings in the economy as a whole declined from 5% in November to 4½% in February. In manufacturing the decline was from 5¾% to 5% over the same period. Unemployment is high, and was increasing steadily until February. This should inhibit wage inflation directly in the more competitive external labour markets and by worsening the alternatives available outside their own firms to workers engaged in pay bargaining. Chart 4.2 shows the relationship between the unemployment rate and the changes in real earnings in the following year.[1] If employees bargain with a *real* wage target in mind and predict retail price inflation reasonably well, there is likely to be a clear inverse relationship if unemployment exerts downward pressure on the target. In fact the relationship is not strong. At the moment real earnings

(1) Hence this is not a conventional Phillips curve that relates increases in nominal earnings to the unemployment rate.

are still increasing quite rapidly; earnings deflated by the Tax and Prices Index rose by 3.6% in the year to February 1993, despite the fact that the unemployment rate was 9.4% in February 1992, and rose to 10.6% a year later.

There is more sign of an inverse relationship if unemployment rates are compared with the real earnings increases expected by trades union leaders when pay settlements are concluded. Chart 4.3 shows this using polling data on expectations and IRS data on settlements. This illustrates the problem which arises if wage bargainers do not regard the inflation target as credible; nominal wages will be set too high, reducing employment and temporarily increasing inflation by increasing unit labour costs.

Chart 4.3
Unemployment and real settlements using data from Barclays' BASIX survey (1986 Q4–1992 Q4)(a)



Note: Dates refer to the first quarter in each year.

(a) Real settlement figure is IRS 3-month median settlement deflated by the 12-month rise in RPI inflation forecast by trades union general secretaries.

Many econometric models of wages also suggest unemployment has a relatively weak restraining effect in the United Kingdom. In addition, they imply that it is the deviation of the unemployment rate from some equilibrium rate rather than the rate itself which leads to rises or falls in wage inflation. Unfortunately, estimates of the unemployment rate consistent with stable inflation (the 'NAIRU') differ widely. A recent paper identified a large number of studies which had attempted to evaluate the NAIRU in the United Kingdom over the past twenty-five years. Table 4.A shows that the range of estimates varies considerably both within and across decades. There is, therefore, a considerable degree of uncertainty about what will happen to nominal wage growth when the end of rapid reductions in retail price inflation starts to affect wage bargaining.

Table 4.A
NAIRU estimates for the United Kingdom (claimant definition)(a)

	Period within which the estimates fall			
	1969–73	1974–80	1981–87	1988–90
NAIRU range	1.6%–5.6%	4.5%–7.3%	5.2%–9.9%	3.5%–8.1%
Actual U rate	2.5%	3.8%	10.1%	6.8%
Number of estimates	11	13	15	5

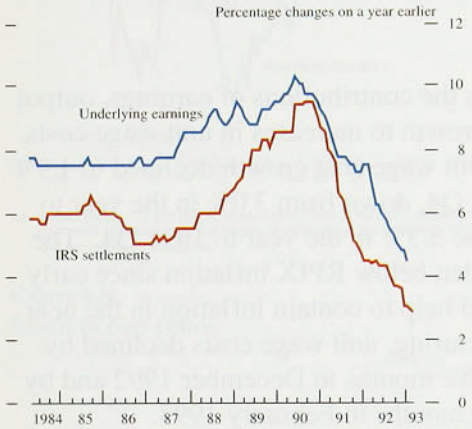
(a) R Cromb, 'A survey of recent econometric work on the NAIRU', *Journal of Economic Studies* (1993, forthcoming).

There are some grounds for thinking that high unemployment levels will continue to exert downward pressure on nominal wage growth:

- Government labour market policy has focused on ensuring that the unemployed remain active in the labour market. Since the last recession, expenditure has been aimed more at helping people find jobs, through Restart, Job Interview Guarantees and Job Clubs. Moreover, the emphasis has shifted away from employment subsidy and employment placement and towards the provision of training for those looking for work.

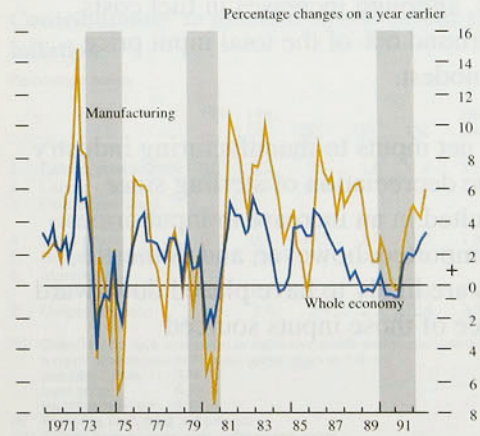
- Some econometric models find that the lower the level of trades union membership, the lower the level of unemployment consistent with stable

Chart 4.4
Whole economy wage settlements and earnings[a]



(a) Data ranges are determined by availability of settlements data.

Chart 4.5
Labour productivity



inflation. Trades union membership (based on data from the Certification Officer) fell considerably over the 1980s, from 57% of employees in 1979 to 44% in 1990.

- The composition of the unemployed is different from that in the early 1980s; more come from skilled and professional occupations; they may be looking for jobs more actively because their financial loss due to unemployment is greater.

- The fall in pay settlements over the last three months has been more pronounced than the fall in earnings growth. Settlements are often treated as a leading indicator of earnings growth, although, in practice, turning points in settlement rates have tended to coincide with turning points in the growth of earnings. The Industrial Relations Services measure of whole economy settlements fell from 3.6% in the three months to December to 2.9% in the three months to March (see Chart 4.4). In manufacturing, according to the CBI, settlements fell to 2.5% in 1993 Q1 (excluding companies freezing pay for up to six months), which compares with 2.9% in 1992 Q4. Service sector wage increases continue to exceed those in manufacturing industry. The CBI Pay Databank Survey shows private service sector pay awards averaging 2.8% in 1993 Q1. In November 1992, the Government announced funding arrangements for public pay predicated on public sector pay increases in 1993 falling between 0% and 1.5%.

Labour productivity

The annual rate of growth of productivity in the whole economy has continued to rise, reaching 3.2% in 1992 Q4 (see Chart 4.5). In manufacturing industry productivity was on average 5.9% higher in 1992 Q4 than in the same period a year earlier. Monthly figures show no sign of a slowdown: the twelve-month rise to February 1993 in productivity in manufacturing was 7.8% the same as in January, but higher than December (6.2%) and November (5.5%).

During the early stages of this recession firms did not hoard labour to the same extent as during the previous two downturns. The rate of labour shedding increased in the second half of 1992. As Chart 4.5 indicates, it is not unprecedented for such productivity growth to occur in the recovery phase. But there is probably less labour hoarding to unwind this time, so employment growth

Table 4.B
Contributions of earnings and productivity to unit wage costs

(a) Whole economy

Twelve-month percentage changes in:

Period		Output	Employment	Labour productivity	Earnings per employee	Unit wage costs
1990		0.7	0.7	-0.1	9.9	10.1
1991		-2.5	-2.8	0.4	7.8	7.4
1992		-0.4	-2.8	2.4	6.4	3.9
1992	Q1	-1.1	-2.9	1.8	8.3	6.4
	Q2	-0.4	-2.4	2.0	6.5	4.4
	Q3	-0.4	-2.9	2.7	5.6	3.0
	Q4	0.1	-3.0	3.2	5.2	1.9

(b) Manufacturing industry

Twelve-month percentage changes in:

Period		Output	Employment	Labour productivity	Average earnings	Unit wage costs
1990		-0.5	-1.9	1.5	9.4	7.8
1991		-5.2	-6.6	1.5	8.2	6.5
1992		-0.8	-5.4	5.0	6.6	1.6
1992	Q1	-1.9	-6.6	4.9	8.6	3.6
	Q2	-0.7	-5.1	4.7	6.0	1.2
	Q3	-0.7	-4.7	4.1	6.2	1.9
	Q4	0.4	-5.2	5.9	5.7	-0.2

Chart 4.6
Retail prices and unit wage costs

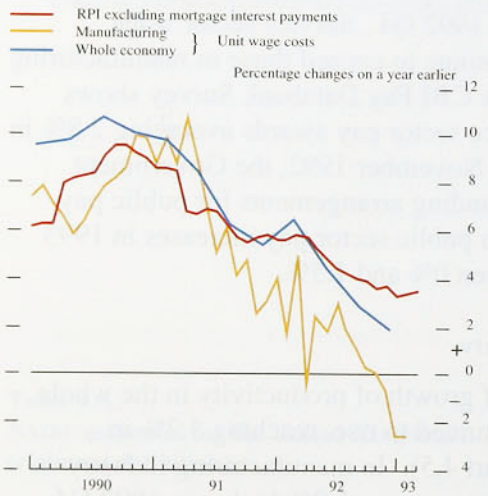


Table 4.C
Manufacturers' input price inflation(a)

Percentage changes on a year earlier

		Materials(b)	Fuel(b)	Total(b)	All manufacturing
1990		-1.7	2.7	-0.9	-0.2
1991		-3.3	1.5	-2.2	-1.2
1992		-1.6	2.6	-0.7	0.5
1992	Q1	-1.8	0.2	-1.3	-0.1
	Q2	-3.3	2.2	-2.2	-1.2
	Q3	-4.4	3.2	-2.9	-0.8
	Q4	3.3	4.6	3.8	4.0
1993	Jan.	6.2	2.8	5.5	6.4
	Feb.	7.9	2.6	6.5	7.1
	Mar.	6.8	7.6	7.0	8.4

(a) Materials and fuels purchased by the manufacturing sector.
(b) Excluding food, drink and tobacco manufacturing industries.

may pick up sooner, particularly if the costs of employment adjustment are now less. The falls in unemployment in February and March, the much smaller fall in the workforce in employment in 1992 Q4 (91,000 compared with 398,000 in 1992 Q3) and, in February 1993, the smallest monthly fall in manufacturing employment since the first half of last year, all support this conclusion.

Unit wage costs

Table 4.B tabulates the contributions of earnings, output and employment growth to increases in unit wage costs. Whole economy unit wage cost growth declined to 1.9% in the year to 1992 Q4, down from 3.0% in the year to the third quarter and 5.3% in the year to 1991 Q4. The growth rate has fallen below RPIX inflation since early 1992, which should help to contain inflation in the near future. In manufacturing, unit wage costs declined by 0.7% over the twelve months to December 1992 and by 2.6% in the twelve months to February 1993.

4.2 Input costs

It is important to examine other input costs faced by businesses. The CSO compiles an input price series for manufacturing industries which includes the cost of raw materials and fuels, but not, unfortunately, bought-in services. Table 4.C shows recent trends in input price inflation for manufacturers, and illustrates that the costs of these inputs fell in 1990 and 1991, and through much of 1992. Price declines were particularly common for material purchases, although increases in fuel costs (which comprise around 6% of the total input price index) have been modest.

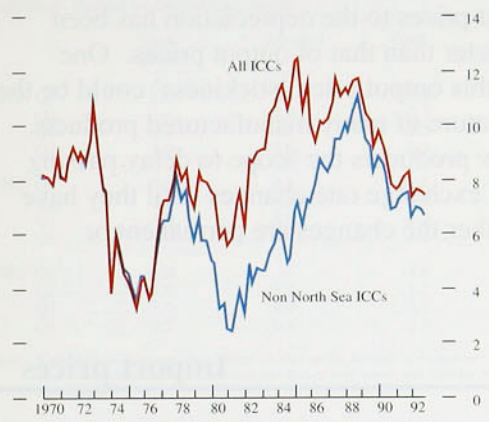
Almost half of the net inputs to manufacturing industry are imported, so the depreciation of sterling since September has resulted in an increase in input prices. Not all inputs are imported, however, and domestic demand conditions are likely to have placed downward pressure on the price of those inputs sourced domestically.

4.3 Business margins and the return to capital

Profitability

The profitability of the existing capital stock is a guide to the pressures on producers to alter prices and costs as

Chart 4.7
Profitability[a]



(a) Actual profits as a percentage of net capital stock at current replacement cost, with adjustments for the impact of inflation on stock appreciation and for capital consumption.

Chart 4.8
Profit to cost ratios

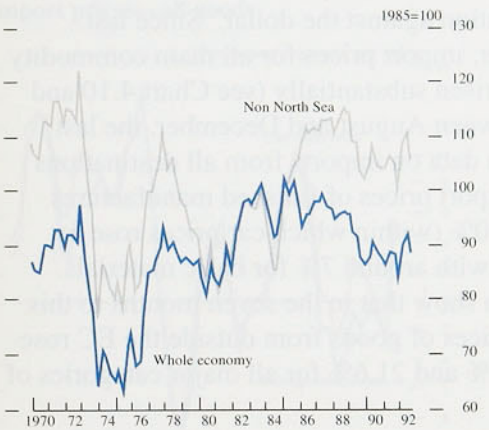


Table 4.D
Contributions[a] to manufacturers' output price inflation[b]

Percentage points

		1991	1992				1993	
			Q1	Q2	Q3	Q4	Jan.	Feb.
1	Labour productivity	0.7	2.2	2.1	1.8	2.6	3.5	3.5
2	Labour costs	3.6	3.8	2.6	2.7	2.5	2.3	2.3
3	Unit labour costs (3=2-1)	2.9	1.6	0.5	0.9	-0.1	-1.2	-1.2
4	Input prices	-0.7	-0.4	-0.7	-1.0	1.2	1.8	2.2
5	Bought-in services[c]	2.3	1.8	1.1	0.9	1.2	1.0	1.0
6	Margins[d] (6=7-(3+4+5))	0.5	-0.2	2.0	1.9	0.1	1.0	0.6
7	Output prices[e]	4.9	2.8	2.9	2.7	2.4	2.7	2.6

(a) Calculated for each component as the twelve-month growth rate scaled by weights derived from 1984 input-output tables as follows:
unit labour costs 0.44
input prices 0.33
bought-in services 0.23
(b) Excluding food, drink and tobacco.
(c) Proxied by unit labour costs in the service sector.
(d) Figures may not add to totals because of rounding.
(e) Percentage change on a year earlier.

well as invest in new capacity.[1] Pre-tax profit rates—profits divided by the net capital stock valued at current replacement cost—have fallen in this recession, but they remain relatively buoyant in comparison with previous downturns. More recently, it appears that the decline in pre-tax profit rates has slowed, with the all-ICCs measure averaging 7.4% in 1992, compared with 7.9% in 1991 (Chart 4.7).

Business mark-ups

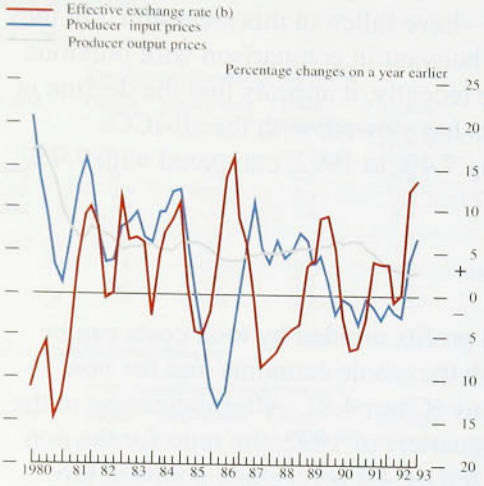
Measures of total profits divided by total costs can be calculated for both the whole economy and the non North Sea economy (Chart 4.8). After increasing in the second and third quarters of 1992, the ratio for the non North Sea sector fell by 4.4 percentage points in the fourth quarter, because of rising costs and falling profits. This ratio is now higher than in both the mid-1970s and the early 1980s, so the pressure to restore margins as the economy recovers is unlikely to give rise to substantial inflationary pressure, although a short-run effect is to be expected.

Another way to assess profitability is to compare movements in producer output prices (excluding food, drink and tobacco industries) with weighted movements in manufacturers' costs (Table 4.D). This also indicates that, given the length of the recession, profit margins have held up relatively well in recent years. In the initial stages of the downturn, falling input prices ensured that the increase in unit labour costs did not cause producers to pare their margins in the face of increased competition.

The evidence on profitability, mark-ups, and comparisons of input and output prices suggests that profitability has been maintained during the recent recession. The effect of the sterling depreciation on profit margins depends on how input and output prices will be affected by the lower exchange rate. In turn, this depends on the extent to which the goods making up these indices are homogeneous and traded in internationally competitive markets. Although there appears to be a relatively close correlation between movements in the exchange rate and input prices, output

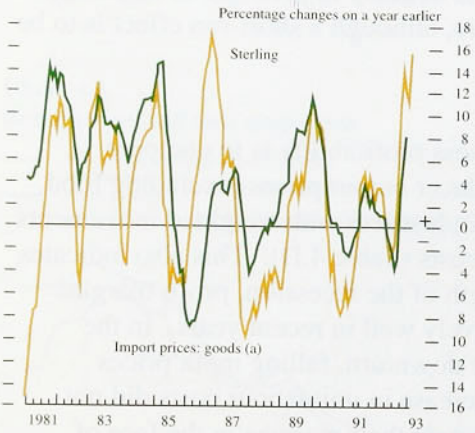
(1) Unfortunately, precise data on the capital stock are difficult to obtain. The measures here use data provided by the CSO on the net capital stock of ICCs valued at replacement cost. The measures may not capture fully the extent of capital consumption and scrapping, and so may overstate the value of the capital stock. As only annual estimates are provided, quarterly observations have been interpolated by the Bank. Moreover, data for 1992 are Bank projections. These limitations mean that large revisions are possible.

Chart 4.9
Producer prices(a) and the exchange rate



(a) PPI series excludes food, drink and tobacco industries.
(b) An increase in this measure reflects a depreciation.

Chart 4.10
The exchange rate and import prices



+ means price rise or sterling depreciation.

(a) Unit value index.

Table 4.E
UK import prices (goods only)

Percentage change on previous period

		Food, drink and tobacco		Basic materials		Fuels		Semi-manufactured goods		Finished manufactured goods	
1991		-0.9		-10.9		-5.0		-2.6		4.3	
1992	Q1	—		-1.1		-10.5		-1.8		-0.8	
	Q2	0.9		—		2.0		-0.9		-1.6	
	Q3	-2.7		-3.4		—		-0.9		—	
	Q4	4.5		4.7		11.5		4.6		7.4	
Aug.–Dec.		6.4	*9.4*	7.1	*8.2*	18.0	*17.6*	7.4	*9.3*	9.8	*9.9*
Aug.–Mar.			*17.9*		*14.1*		*21.6*		*14.8*		*15.7*

Note: Figures in italics are prices of imports from outside the EC. Data on trade with the EC temporarily ceased to be published in January. Total figures are on the *Overseas Trade Statistics* basis. Non-EC figures are on the *Balance Of Payments* basis.

prices show a much more stable trend (see Chart 4.9). Data for 1992 Q4 and for early 1993 suggest that the response of input prices to the depreciation has been significantly greater than that of output prices. One explanation for this output price 'stickiness' could be the heterogeneous nature of many manufactured products, which may allow producers the scope to delay passing on the impact of exchange rate changes until they have established whether the changes are permanent or temporary.

4.4 Import prices

Import prices fell in the two years before sterling's departure from the ERM. This resulted from lower growth in competitor countries, weak demand in the United Kingdom and the delayed impact of earlier sterling appreciation against the dollar. Since last autumn, however, import prices for all main commodity categories have risen substantially (see Chart 4.10 and Table 4.E). Between August and December, the last month for which data on imports from all destinations are available, import prices of finished manufactures rose by almost 10% (within which car prices rose by 14%) compared with around 7% for basic materials. More recent data show that in the seven months to this March import prices of goods from outside the EC rose by between 14.1% and 21.6% for all major categories of imports.

Reflecting the earlier weakness of import prices of materials, which account for almost two thirds of the index, input prices for materials and fuels purchased by manufacturers fell during 1990 and 1991. During the first nine months of 1992, input prices (seasonally adjusted) were broadly flat. In the eight months to April 1993, however, prices rose by 10.1% (7.2% seasonally adjusted).

Measurement of import prices

Where available, the import price data used are unit value indices (UVIs). These indices are base weighted. However, since the weights are determined by trade patterns prevailing in earlier periods, the data should be treated with some caution. An alternative way of measuring import prices is to use average value indices (AVIs). This method produces a current weighted index. If the composition of imports changes over time, the AVI and UVI measures are likely to diverge. In fact, as

Table 4.F
UK import prices: total

Percentage changes on the previous quarter

		Total goods	Services	Total
1990	Q1	1.0	2.3	0.9
	Q2	—	1.9	0.7
	Q3	-3.8	1.1	-2.3
	Q4	1.0	-5.6	-1.3
1992	Q1	-1.9	0.3	-1.6
	Q2	1.0	6.3	2.0
	Q3	-1.0	5.0	1.2
	Q4	—	-5.4	-1.7
1992	Q1	-1.0	—	-1.4
	Q2	1.0	1.2	1.2
	Q3	-3.0	8.0	0.3
	Q4	8.2	0.4	5.3

Note: These data are average value indices (AVIs) on the *Balance of Payments* basis. Unit value indices of services and thus of total goods and services are unavailable.

Chart 4.11
Import prices—all goods

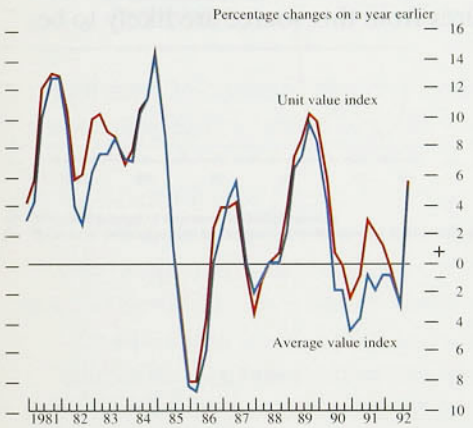


Table 4.G
Commodities prices breakdown

Percentage changes on previous quarter

	1992 Q1	Q2	Q3	Q4	1993 Q1
UK-weighted all-items index (£)	3.0	1.7	-7.3	16.7	20.7
Economist all-items index (£)	2.0	0.3	-5.1	14.4	12.2
Economist all-items index (SDR)	0.8	3.1	-5.0	-1.5	7.2
of which:					
Agricultural non-foods	4.1	4.2	-8.7	3.4	24.3
Metals	2.9	4.4	-0.3	-9.8	1.4
Foods	-1.7	0.3	-7.1	3.8	3.9

shown in Chart 4.11, the growth in the two measures has in the past been quite similar.(1) During 1992 Q4, import prices of total goods rose by 8.2% on the AVI measure compared with 9.1% using the UVI.

Commodity prices

About 42% of imports are used as inputs rather than for satisfying final demand. Most imports of raw materials fall into the former category. This is one avenue through which inflation elsewhere in the world can be imported to the United Kingdom, unless the exchange rate moves to offset it.

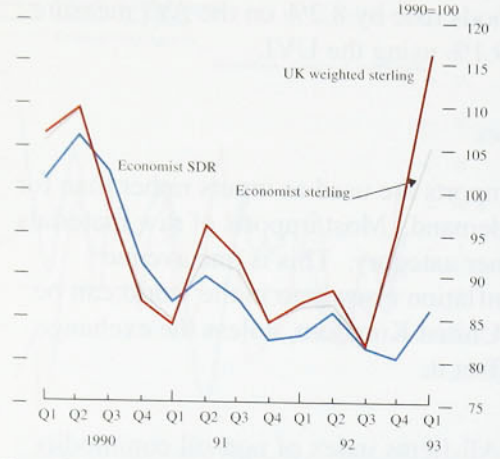
The Economist All-Items index of non-oil commodity prices measured in SDRs rose by 7.2% in the first quarter of the year, compared with the previous quarter. The largest price increases in the first quarter of the year were in agricultural products excluding foodstuffs, and most notably in timber which rose by more than 30%. Timber prices were particularly affected by restrictions on supply related to environmental concerns, but the rise in commodity prices has been quite widespread. Cotton prices rose significantly. Food prices, notably sugar, rose further after the increase in the fourth quarter. But during the second quarter, commodity prices have fallen back somewhat.

Commodity prices have risen despite the low level of activity in the major economies, even after allowing for special supply factors. Output in the major six economies is growing at an annual rate of about 1½%, and its level is significantly below trend. The recovery in North America, and more recently in the United Kingdom, may exert an impact on certain commodity prices but it is unlikely that this alone accounts for their buoyancy in the first quarter.

The Economist All-Items index uses weights based on the values of commodity imports to all OECD countries in 1984–86.(2) UK imports, however, contain a higher proportion of non-food agricultural products than these weights suggest. This means that commodity price developments may have a larger impact on the United Kingdom than the OECD-based Economist All-Items index would indicate. UK-weighted non-oil

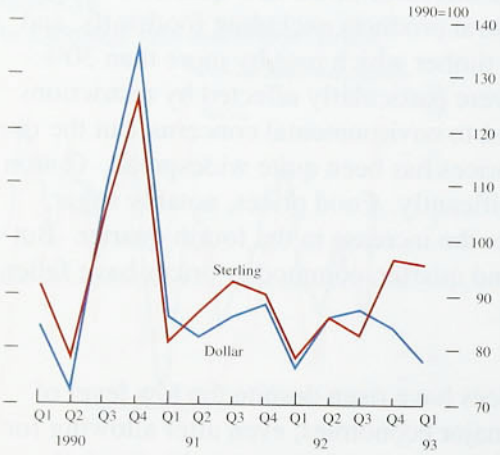
(1) When the growth rates diverge the AVI is usually lower because this measure captures the substitution away from goods for which prices are increasing most rapidly.
(2) Net of intra-EC commodity trade covered by the Common Agricultural Policy.

Chart 4.12
Sterling and SDR commodity prices



Source: Economist all-items index, Bank UK weighted commodity index.

Chart 4.13
Sterling and dollar oil prices(a)



(a) Measured by close-dated Brent crude.

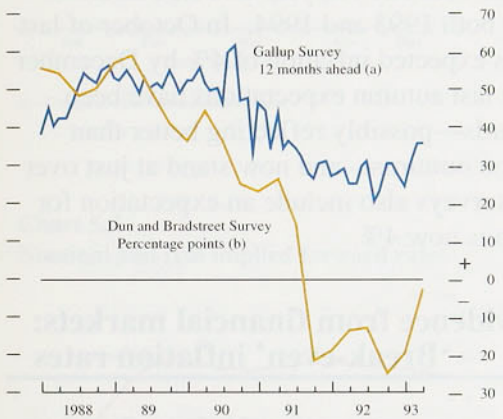
commodity prices rose by over 20% in the first quarter, following a rise of around 17% in the fourth quarter. The marked rise in the UK index in the first quarter reflects the timing of the large increase in non-food agricultural product prices (see Table 4.G). As with the Economist index, however, commodity prices have fallen back from their last quarter levels.

The price of oil, as measured by close-dated Brent crude, was $18.3 per barrel in the first quarter, slightly lower than in the previous quarter. The trading range for oil prices was comparatively stable in the first quarter. The February OPEC meeting agreed a cut in production for the second quarter of the year but the markets remain sceptical that this will be fully achieved. There is little prospect that Iraqi exports will resume in the short term, but even without this the market seems set to continue to be well supplied. Sterling oil prices fell by 0.7% in the first quarter, after rising substantially in the fourth, so further cost pressures from this source are likely to be muted.

Prospects for inflation 5

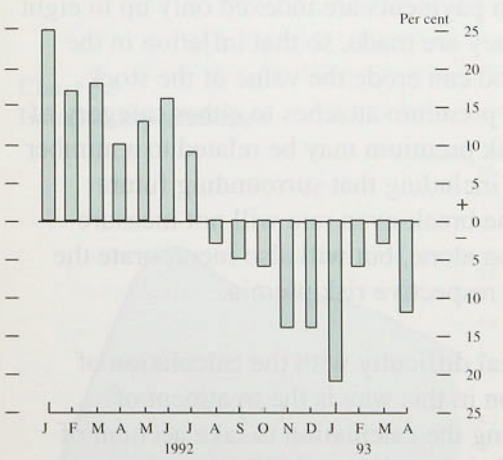
The outlook for inflation depends on both the starting point (discussed in Section 1), and the interaction between monetary policy (Section 2) and the state of the real economy which determines the speed with which inflation adjusts to its long-run rate (Sections 3 and 4). This section analyses the prospects for inflation. It presents information on private sector expectations of inflation derived both from direct surveys and independent forecasts, and indirect inferences from the yields of government securities. The section concludes with Bank projections for inflation over the next two years based on the analysis presented above. An essential element in this is a comparison between the projections in the February *Report* and both the current projections and the actual outturn for inflation over the past three months. Differences between the earlier and current projections reflect the 'news' that has emerged since the February *Report*.

Chart 5.1
Dun and Bradstreet Survey on expectations of selling prices and EC/Gallup consumer inflation expectations



(a) Weighted average of responses to Gallup question.
(b) Balance of those expecting an increase (+) or decrease (–) in their selling prices.

Chart 5.2
Gallup Survey of employees' price expectations(a)



(a) Percentage balance expecting inflation to be more than 4% over the coming year.

5.1 Surveys of inflation expectations

Survey evidence suggests that, on balance, expectations of future inflation are higher now than before suspension of sterling's ERM membership. The April *CBI Industrial Trends Survey* showed a balance of 10% of respondents expecting a rise in domestic output prices over the next four months, compared with 11% in January and -3% last October. Even allowing for the normal seasonal increase at this time of year, price expectations are still higher than six months ago. The *Dun and Bradstreet Survey* on expectations of selling prices paints a similar picture. The balance of respondents still expect prices in the following three months to be lower than a year earlier, but the balance is much less than in the previous two quarters (see Chart 5.1). The *EC/Gallup Survey* of consumer inflation expectations also indicates diminishing disinflationary pressures. In March and April one-year ahead inflation expectations were at their highest since June 1991—although still low by historical standards (see Chart 5.1).

Gallup also publishes a more detailed monthly survey of wage and price expectations, in which around 1,000 employees are asked what percentage increase in prices they expect over the next twelve months. Chart 5.2

shows the balance of respondents expecting inflation to exceed 4% over the relevant period. The survey suggests that the proportion of employees expecting inflation to remain within the target range exceeds the proportion expecting inflation to exceed the top of the range by 12%.

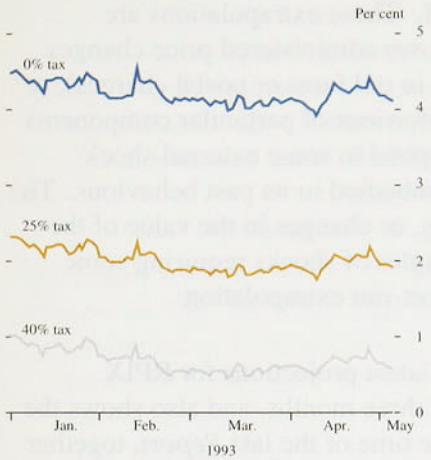
The *Barclays/NOP Survey* of the general public in March also indicates that expectations of inflation one-year ahead are just above 4%. The two-year ahead expectation is rather higher, at 5%. By contrast, the *Smith New Court/Gallup Survey* of fund managers suggests a gradual reduction in year-end RPI inflation expectations for both 1993 and 1994. In October of last year respondents expected inflation of 4% by December 1993. But since last autumn expectations have been revised downwards—possibly reflecting better than expected inflation outturns—and now stand at just over 3%. The latest surveys also include an expectation for end-1994, which is now 4%.

5.2 Evidence from financial markets: 'Break-even' inflation rates

A potentially more accurate source of information about expectations of future inflation comes from a comparison of yields on index-linked gilts (IGs) and conventional gilts. Such 'break-even' inflation rates are calculated by subtracting the yield on index-linked bonds from the yield on conventional gilts of similar maturity. In practice, the assumption that index-linked gilts are independent of inflation is unlikely to be valid. In the first place, index-linked gilts are not perfectly indexed: coupon payments are indexed only up to eight months before they are made, so that inflation in the intervening period can erode the value of the stock. Second, if a risk premium attaches to either category of bond (and the risk premium may be related to a number of uncertainties, including that surrounding future inflation) then the break-even rate will not measure expected inflation alone, but will also incorporate the difference in the respective risk premia.

One final practical difficulty with the calculation of expected inflation in this way is the treatment of taxation. Adapting the calculation to take account of taxation is straightforward enough, but the assumption regarding the rate of tax paid by the marginal taxpayer has a significant impact on the level of the break-even rate. Chart 5.3 shows that break-even rates can vary by over three percentage points at present, depending on the

Chart 5.3
Break-even inflation rates[a]



(a) Comparison between assumed tax rates.

Chart 5.4
Nominal and real implied forward rates

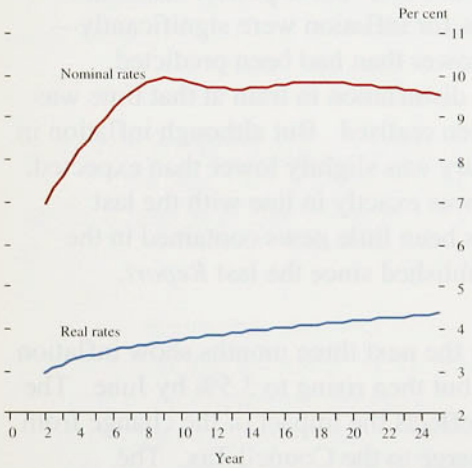
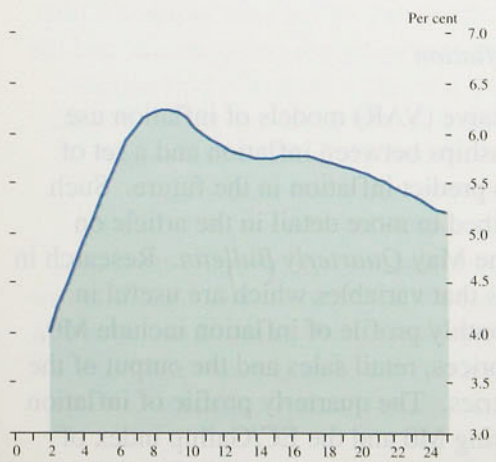


Chart 5.5
Inflation expectations[a]



(a) At close of business 7 May 1993: derived from conventional and index-linked yield curves.

tax assumption. Such wide variation, when coupled with the other problems associated with the calculation of these rates, creates difficulties with the use of such calculations as estimates of future inflation.

Ignoring the problems of risk premia, and assuming that the marginal rate of tax paid by the marginal investor is zero (which is consistent with that investor being a pension fund, for example), it is possible to derive a continuous profile for the term structure of inflation. Section 2 above discussed the calculation of implied forward interest rates from the yield curve for conventional gilt-edged securities. In an analogous fashion it is possible to derive a continuous term structure of real returns on index-linked gilts (see Chart 5.4). The difference between the nominal and real implied forward rates provides a measure of the expected rate of inflation at any point over the next twenty-five years. The resulting inflation profile is shown in Chart 5.5. This indicates that inflation is expected to rise from just over 4% in two years time to an average rate of a little over 5% from around six years onwards.

5.3 Outside forecasts

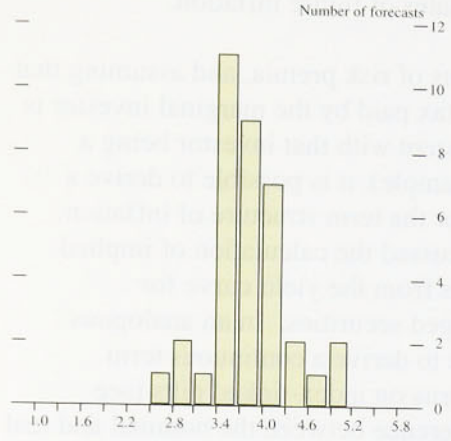
Charts 5.6 and 5.7 show the latest projections of RPIX inflation from 36 independent forecasters, including City firms, academic institutions and other private sector organisations. Comparing these forecasts with those at the time of publication of the previous *Report* it is clear that the variance of the distribution of forecasts for inflation at the end of this year is now less than before, and that the median has fallen slightly, to 3.6%. The variance of the distribution of the end-1994 forecasts is also lower. Both the median and the mode of the distribution are around 4%. Of the 36 forecasters, 18 expect inflation to be at or below 4% by the end of next year, whereas in February this view was shared by only 12 forecasters.

5.4 Bank projections

The short-run outlook

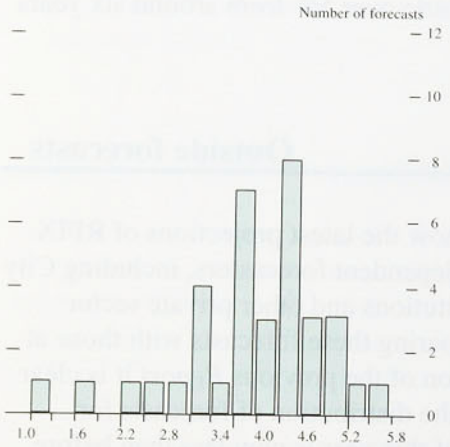
As in the February *Inflation Report*, projections of inflation over short and longer-term horizons are presented below. These are based on statistical and structural models of inflation. In the short-term model,

Chart 5.6
Distribution of private sector forecasts for inflation in 1993 Q4



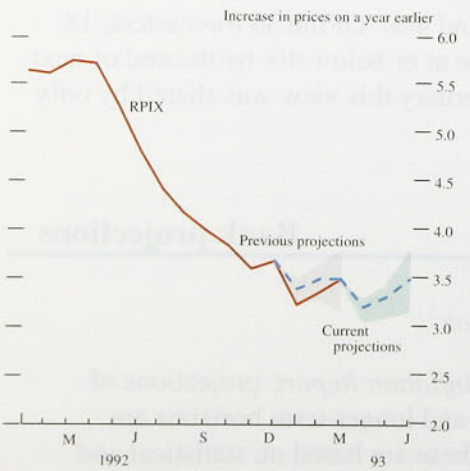
Range of forecast values (RPIX percentage changes on a year earlier).

Chart 5.7
Distribution of private sector forecasts for inflation in 1994 Q4



Range of forecast values (RPIX percentage changes on a year earlier).

Chart 5.8
RPIX inflation projections and outturns



The range is defined as the central projection plus or minus the average error on such forecasts in the past.

the projections of inflation are based on statistical extrapolation of recent trends in a number of components of the RPI. These extrapolations are modified to reflect known administered price changes (for example, changes in rail fares or postal charges), or where the short-run behaviour of particular components is thought likely to respond to some external shock which is not already embodied in its past behaviour. The depreciation of sterling, or changes in the value of the green pound, are examples of shocks requiring some modification to the short-run extrapolation.

Chart 5.8 presents the latest projections for RPIX inflation over the next three months, and also shows the projections made at the time of the last *Report*, together with the recent outturns. The difference between projection and outturn may simply be the result of errors in the modelling of short-run inflation, but where errors become large and persistent it may be that the divergence represents 'news' about inflation which constitutes information relevant to policy. Thus last autumn the outturns for inflation were significantly—and persistently—lower than had been predicted, suggesting that the disinflation in train at that time was greater than had been realised. But although inflation in January and February was slightly lower than expected, the March outturn was exactly in line with the last forecast. There has been little news contained in the inflation figures published since the last *Report*.

The projections for the next three months show inflation declining in April, but then rising to 3.5% by June. The initial fall largely reflects the impact of the change from the Community Charge to the Council Tax. The subsequent rise is expected to be broadly based and is associated with the direct pass-through of higher import prices into domestic retail prices.

VAR models of inflation

Vector autoregressive (VAR) models of inflation use historical relationships between inflation and a set of other variables to predict inflation in the future. Such models are described in more detail in the article on pages 231–9 of the May *Quarterly Bulletin*. Research in the Bank suggests that variables which are useful in predicting the monthly profile of inflation include M0, producer output prices, retail sales and the output of the production industries. The quarterly profile of inflation is predicted by using M0 and the EC/Gallup index of consumer confidence.

It is important to understand the way in which these variables were chosen. Although it is possible to estimate VAR models which have a structural interpretation (that is, which can be interpreted in terms of a plausible economic model), the models used here were selected solely on the basis of their ability to track inflation.

The latest forecasts from the two preferred VAR models are broadly consistent in suggesting that inflation may begin to rise during the course of 1994. But their projections for 1993 conflict, with the monthly model offering a central estimate of RPIX inflation rising above the target range in May. This is also at odds with the extrapolative model, the projections from which are likely to be more soundly based in the short-run reflecting the known adjustments it incorporates, and the more detailed examination of the components of inflation which is undertaken in that approach. The size of the standard errors on the VAR forecasts should also be noted. Although the central estimate from the monthly VAR model is slightly over 4% this year, a 95% confidence interval around this estimate would embrace any rate of inflation between 1% and 7%.

VAR models can be useful additions to the range of techniques available for analysing current and prospective developments. Where the models are unanimous in their projections it is likely to be easier to draw robust conclusions. But where models conflict the projections derived from structural models become increasingly important.

Longer-term structural projections

In the absence of major shocks, projections for inflation over a two-year horizon are unlikely to change substantially within a three-month period. But new information can be grouped into three categories:

- The outturn for inflation compared with expectations. As noted above, the outturns for twelve-month RPIX inflation were a little lower than expected in January and February, but exactly as predicted in March.

- The outturn for the other factors which determine the RPIX projections compared with expectations. This includes changes to the exchange rate and other variables, such as asset prices, labour market conditions and output data, which contain some

short-run information on the likely outturn for inflation.

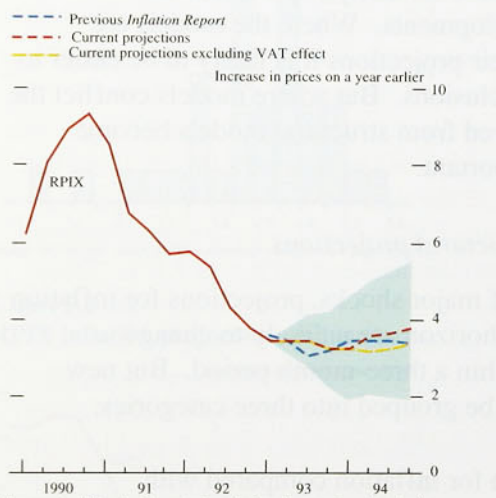
- The announcement of future measures which are likely to have some effect on prices. The increases in indirect taxes announced in the March Budget, including the extension of VAT to domestic fuel and power, are an example.

The first of these factors shows that there has been little 'news' in the outturn for inflation itself. But the second set of factors contains several pieces of information which lead to a revision of the projections. The most important of these is the 5% rise in the exchange rate since the February *Report*. If the exchange rate were assumed to remain unchanged at an effective index of 81 (compared with 77.2 at the time of the February *Report*), inflation would be expected to be about one percentage point lower both this year and next. Among other indicators, wages have risen less than expected—leading to a slight downward revision to expected inflation—while the increase in output, which has been greater than expected, acts in the opposite direction.

The third factor is the impact of the extension of VAT announced in the Budget. The 8% VAT rate for domestic fuel and power is likely to add around 0.4% to the headline RPI from April 1994.

Taking all of these factors together, the central projection for RPIX inflation is shown in Chart 5.9. Inflation is likely to fall during the remainder of this year, as the impact of the earlier depreciation is partly offset by the subsequent recovery in sterling, and the disinflationary impact of the output gap persists. But as recovery gathers pace this disinflationary effect will diminish. At the same time, headline RPI inflation is likely to rise around the turn of the year as interest rate cuts drop out of the twelve-month comparisons, and the reduction in MIRAS will add a further ¼ percentage point to the headline rate in the second quarter of next year. These may feed into the rate at which wage settlements and earnings rise. Nevertheless, 'underlying' inflation (RPIX inflation *excluding* the impact of the VAT extension) will probably remain broadly flat during 1994, at just over 3%. Allowing for the VAT extension, however, RPIX inflation is likely to rise from the second quarter of next year—although it is still likely to remain within the target range.

Chart 5.9
RPIX inflation projections and outturns



The range is defined as the central projection plus or minus the absolute average error on consumer price inflation projections since 1985. The projection is based on broadly unchanged policy, with the exchange rate in the second quarter of 1993 set at 81.0 (£ ERI), DM 2.49 and $1.57.

On balance, the changes since the last *Inflation Report* have lowered slightly both the expected inflation rate and the probability of breaching the 4% limit during the course of this year. The impact next year of the Budget measures, together with the uncertainties surrounding the rate at which the output gap is likely to narrow, suggest that the probability of breaching the target next year may be a little greater than previously envisaged, but the Bank's central expectation still is that the target will be met. Any further increase (decrease) in the exchange rate would lower (raise) the probability of breaching the target.

6 Conclusions

Inflation, as measured by RPIX, has remained within the target range throughout the period since the February *Report*. During that period new information about the likely course of future inflation has been of three main kinds. First, real activity is rising more rapidly than had been expected three months ago. Most of the indicators relating to the real economy, including output, retail sales and employment, point to increasing levels of activity. Second, the exchange rate, as measured by the sterling effective exchange rate index, is some 5% higher than at the time of the February *Report*. Third, in the March Budget the Chancellor announced increases in indirect taxes, to take effect both this year and next, which will raise the measured rate of underlying inflation. The rise in the exchange rate is not independent of the news about activity, indeed in large part it follows from it. This increase in the exchange rate has lowered somewhat the risk of breaching the top of the target range towards the end of this year and the early part of next. In the very short run, there is likely to be a further fall in underlying inflation as the Council Tax enters the index to replace the Community Charge. But this effect is likely to be short-lived. Nevertheless, apart from changes in indirect taxes, the outlook to the end of 1994 is no worse, and probably slightly better, than it was at the time of the February *Report*.

The principal reason for our judgment that RPIX inflation is likely to remain in the 3%–4% range over the next eighteen months or so is that the inflation rate for domestically produced goods is likely to remain low. The output gap will probably remain negative for some time to come, exerting downward pressure on inflation. The upward pressure on prices comes from the continuing pass-through of depreciation to domestic prices and broader VAT coverage as announced in the March Budget. In the absence of any change in indirect taxes, inflation would probably be roughly constant over the next year or so. Broader VAT means that underlying inflation as conventionally measured may rise in 1994.

As discussed in the February *Report*, it is evident that expectations of inflation are not yet consistent with the target range for inflation of 1%–4%. Both direct surveys of expectations and also the indirect evidence from implied forward market interest rates suggest that many

people have yet to be convinced that the target will be met in the long run. But the longer underlying inflation remains within the target range the more credibility will grow over time.

Looking to the end of 1994 and beyond, the principal uncertainty concerns the response of domestic factor costs—wages and profits—to the loss of purchasing power resulting from depreciation of the currency. If total profits and wages rise because of a *volume* effect, rather than an increase in profit margins per unit of output or earnings per head, then the increase in nominal demand consistent with the monetary stance will lead to rising real activity and continuing low inflation. A continuing determination on the part of the authorities to meet the inflation target will help to ensure that increases in wages and profits are real increases, reflecting higher output and productivity, rather than nominal increases reflecting only higher unit costs. It is vital in this context that the inflation target be seen as a framework for policy over a long period, and that monetary and fiscal policy should be consistent with achieving the target on a sustained basis.

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