Central Statistical Office

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# Economic Trends

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# Contents

# ECONOMIC UPDATE - AUGUST 1994

**(includes data up to 22 August 1994)**

## Summary

- **GDP** at constant factor cost rose by 1.0 per cent between 1994 Q1 and 1994 Q2.

- The annual increase in the **RPI (excluding mortgage interest payments)** fell from 2.4 per cent in June to 2.2 per cent in July.

- **Net lending to consumers** rose from £905 million in 1994 Q1 to £1,410 million in 1994 Q2.

- **Annual growth of M0**, seasonally adjusted, fell to 6.5 per while annual growth of **M4**, seasonally adjusted, fell to 4.8 per cent in July.

## Activity

**Gross domestic product (GDP)**, at constant factor cost rose by 1.0 per cent between 1994 Q1 and 1994 Q2. Excluding oil and gas extraction, GDP rose by 0.8 per cent. Chart 1 shows the accelerating growth of GDP since 1992 Q2.

## Output and expectations

3. There was increased output in all sectors between 1994 Q1 and 1994 Q2. **Output of the production industries** rose by 2.0 per cent, including a rise of 1.3 per cent in manufacturing output over this period. **Services** output rose by 0.6 per cent, while output of the **construction** industries rose by 0.4 per cent between 1994 Q1 and 1994 Q2.

4. The **CBI Monthly Trends Enquiry in manufacturing** revealed that the **output expectations** balance in the next 4 months, seasonally adjusted, fell from 17 per cent in June to 13 per cent in July.

## Indicators of domestic demand

5. **Total domestic expenditure** rose by 0.4 per cent between 1994 Q1 and 1994 Q2. Within this **consumers' expenditure**, shown in chart 2, also rose by 0.4 per cent. More timely figures on the **volume of retail sales** show that in the three months to July, there was a rise of 0.9 per cent on the previous three months and 3.7 per cent on a year earlier.

Chart 1
Gross domestic product
at constant factor cost

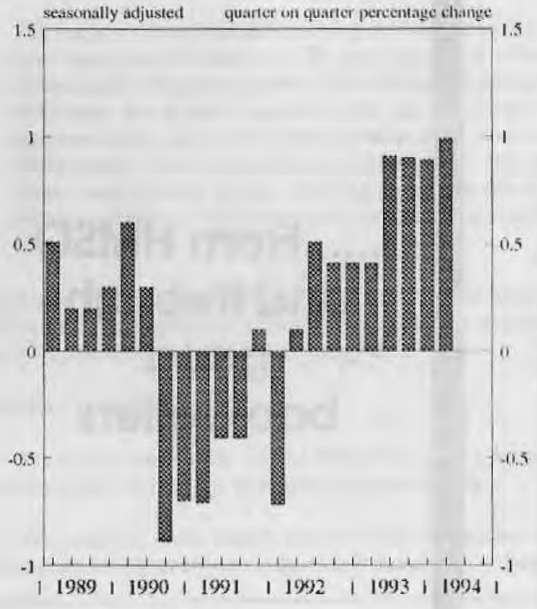
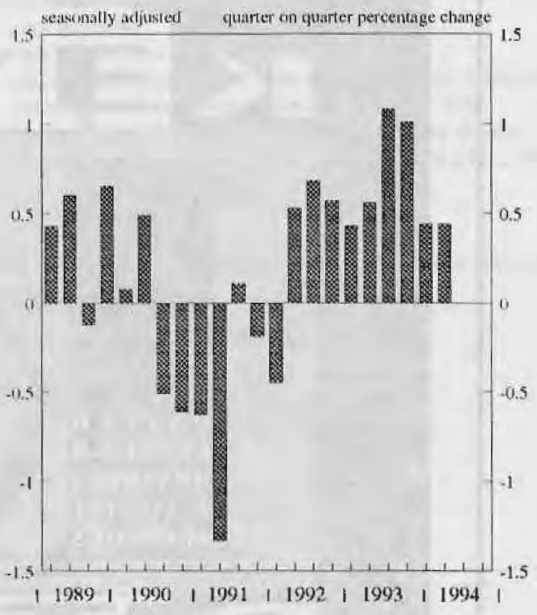



Chart 2
Consumers' expenditure
on goods and services

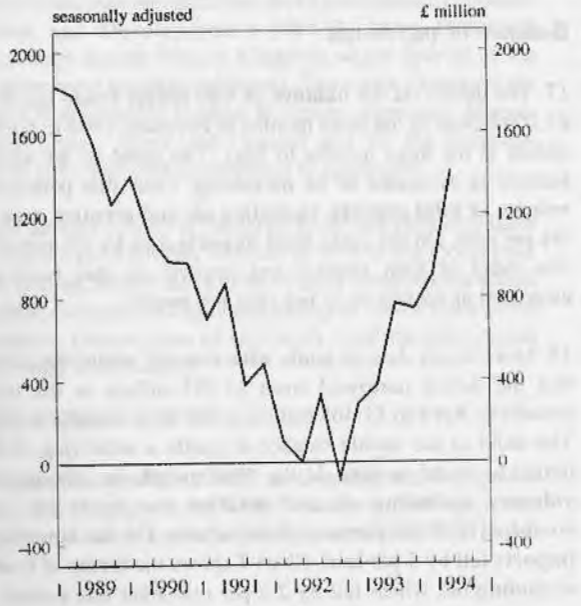



2. The CSO's coincident cyclical indicator continued to rise steadily. Partial information suggest that the **shorter leading index** and the **longer leading index** have also risen recently.

6. The latest figures on **net lending to consumers**, shown in chart 3, show an acceleration in borrowing by consumers. On

the broader coverage net lending, seasonally adjusted, rose from £905 million in 1994 Q1 to £1,410 million in 1994 Q2.

Chart 3
Net lending to consumers
(broader coverage)




7. **Gross domestic fixed capital formation** fell back between 1994 Q1 and 1994 Q2. It fell by 0.3 per cent over this period.

## Prices and wages

8. The 12-month rate of increase of the **retail prices index** (RPI) fell from 2.6 per cent in June to 2.3 per cent in July. **Excluding mortgage interest payments**, the 12-month rate also fell from 2.4 per cent in June to 2.2 per cent in July. This rate is within the government's target range of 1-4 per cent. Chart 4 shows that consumer price inflation (excluding housing costs) in the UK at 1.9 per cent is just below the G7 average of 2 per cent.

9. Annual producer price rises continued to remain historically low. The annual rise in the **output price index for manufactured products** (home sales), seasonally adjusted and excluding food, beverages, tobacco and petroleum, fell from 2.0 per cent in June to 1.9 per cent in July. However there was a pick up in the annual increase in **input prices** (all manufacturing), rose from 2.2 per cent in June to 2.9 per cent in July. This was due mainly to increased import prices. Chart 5 shows the continuing falls in output price rises, as well as the recent increase in the rate of input price rises.

10. **Expectations of price increases** fell back slightly in July. The CBI Monthly Trends Enquiry for manufacturing showed a balance of 13 per cent, seasonally adjusted by the CSO, expecting to raise prices in the next four months.

11. The annual rise in underlying **whole economy average earnings** for Great Britain remained stable at 3¾ per cent in June. Underlying earnings growth remained at 3½ per cent in the service sector and fell from 4½ per cent in May to 4¼ per cent in June in the manufacturing sector.

Chart 4
Consumer price inflation
G7 countries - excluding housing costs

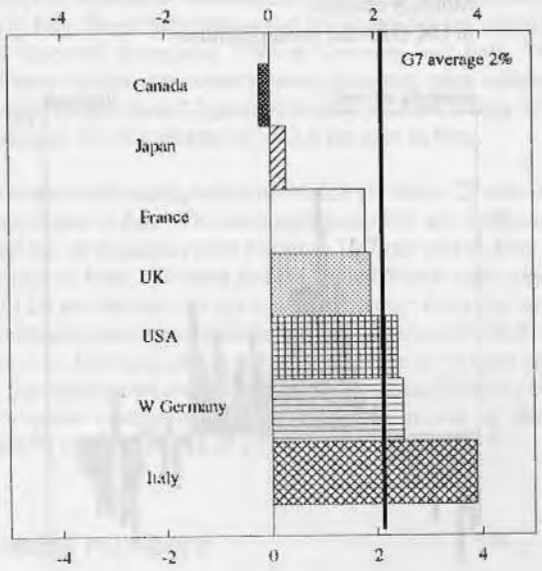
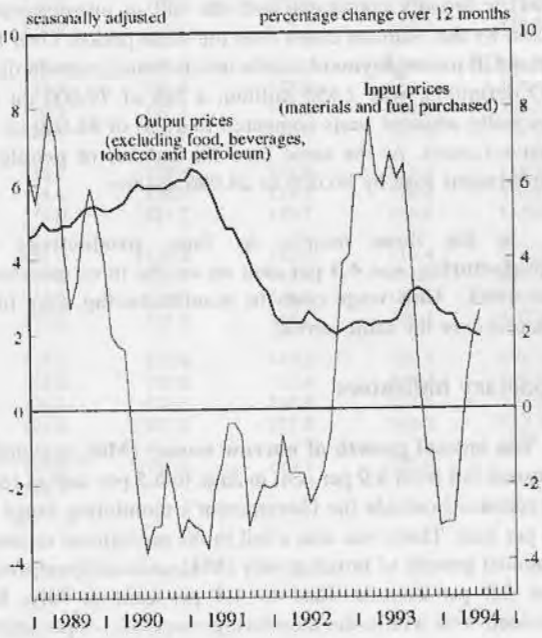


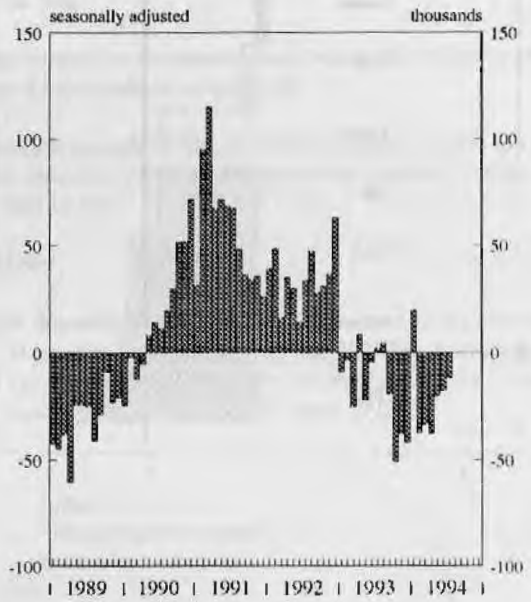

Chart 5
Producer prices



## Labour market and productivity

12. **UK claimant unemployment**, seasonally adjusted, fell in July by 11,800 to 2.632 million, or 9.3 per cent of the workforce. In the three months to July the average monthly fall was 16,700 compared with an average fall of 36,400 in the three months to April. Chart 6 shows the recent slow down in the fall in unemployment.

Chart 6
Monthly changes
in UK claimant unemployment




13. The Spring 1994 **Labour Force Survey** (March to May 1994) is broadly consistent with the fall in unemployment shown by the claimant count over the same period. Over this period **GB unemployment**, on the internationally standardised ILO definition, was 2.650 million; a fall of 79,000 on the seasonally adjusted basis compared to a fall of 83,000 in the claimant count. At the same time the number of **people in employment** rose by 80,000 to 24.986 million.

14. In the three months to June, **productivity in manufacturing** was 4.3 per cent up on the three months to June 1993. **Unit wage costs in manufacturing** were little changed over the same period.

## Monetary indicators

15. **The annual growth of narrow money (M0)**, seasonally adjusted, fell from 6.9 per cent in June to 6.5 per cent in July, but remained outside the Government's monitoring range of 0-4 per cent. There was also a fall in the provisional estimate of annual growth of broad money (**M4**), seasonally adjusted, from 5.0 per cent in June to 4.8 per cent in July. M4 remained well within the monitoring range of 3-9 per cent.

## Government finances

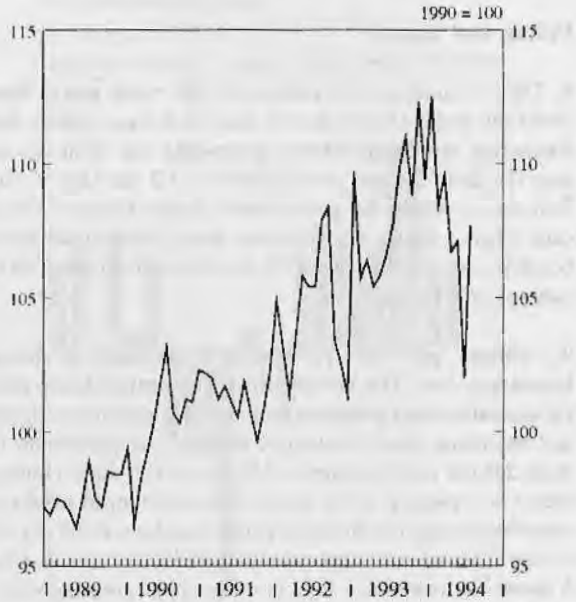
16. The **public sector borrowing requirement (PSBR)** was £12.5 billion in the first four months of 1994/95 - £2.3 billion below that recorded in the first four months of 1993/94. **Excluding privatisation proceeds**, borrowing was £13.4 billion - £4.9 billion below the level in 1993/94.

## Balance of payments

17. The deficit on the **balance of UK visible trade** fell from £3.109 billion in the three months to February 1994 to £2.931 billion in the three months to May. The trend of the visible balance is estimated to be narrowing. Over this period the **volume of total exports, excluding oil and erratics**, rose by 3½ per cent. On the same basis **imports** rose by 1½ per cent. The trend in both exports and imports on this basis are estimated at growth of ½ per cent per month.

18. More timely data on **trade with non-EC countries** shows that the deficit narrowed from £1.755 billion in the three months to April to £1.465 billion in the three months to July. The trend in the visible balance suggests a narrowing of the deficit in recent months. In the three months to July, **export volumes, excluding oil and erratics** rose by ½ per cent compared with the previous three months. On the same basis **imports** fell by 5 per cent. Chart 7 shows the **terms of trade, excluding oil**, which fell by 2½ per cent over this period.

Chart 7
Terms of trade
(excluding oil)



# INTERNATIONAL ECONOMIC INDICATORS

**(includes data up to 19 August 1994)**

## INTRODUCTION

The series presented here are taken from the Organisation of Economic Co-operation and Development's (OECD) Main Economic Indicators, except for the United Kingdom where several of the series are those most recently published. The series shown are for each of the G7 economies (United Kingdom, Germany, France, Italy, United States, Japan and Canada) and for the European Communities (EC) and OECD countries in aggregate.

2. The length and periodicity of the series have been chosen to show their movement over a number of years as well as the recent past. There is no attempt here to make cross country comparisons across cycles. Further, because the length and timing of these cycles varies across countries, comparisons of indicators over the same period should be treated with caution.

## COMMENTARY

3. **Gross domestic product (GDP) at constant market prices** continued to rise strongly in the United States in 1994 Q2. GDP growth, quarter on quarter, rose from 0.8 per cent in 1994 Q1 to 1.0 per cent in 1994 Q2. All the major 7 economies except Italy grew between 1993 Q4 and 1994 Q1.

4. **Consumer price inflation** in the United Kingdom fell from 2.6 per cent in June to 2.3 per cent in July. There were also falls in consumer price inflation in Germany, to 2.9 per cent, and Italy, to 3.6 per cent in July. These falls maintained the gradual deceleration in inflation observed throughout 1994 in Germany and Italy. The United States was the only country where consumer price inflation rose over this period; from 2.5 per cent in June to 2.8 per cent in July. This compares with the recent low of 2.2 per cent in May.

5. The **standardised unemployment** rate fell in France, Canada and the United States in June. The most significant fall was in Canada where the rate of unemployment fell from 10.7 per cent in May to 10.3 per cent in June. In France and the United States, rates edged lower to 12.6 per cent and 5.9 per cent respectively. Over the same period, unemployment rates remained stable in the United Kingdom, at 9.5 per cent, Germany, at 6.6 per cent and Japan at 12.6 per cent in June. The stabilisation of the unemployment rates in Germany and Japan in recent months reflects the return to growth of these economies in the first quarter of 1994.

## 1 Gross domestic product at constant market prices: index numbers

1985 = 100

| | United Kingdom[1] | Germany[2] | France | Italy | EC | United States | Japan[3] | Canada | Major 7 | OECD |
|---|---|---|---|---|---|---|---|---|---|---|
| | FNAO | GABI | GABH | GABJ | GAEK | GAEH | GAEI | GAEG | GAEO | GAEJ |
| 1980 | 90.5 | 94.3 | 92.7 | 93.3 | 92.9 | 88.2 | 82.9 | 86.7 | 88.7 | 88.8 |
| 1985 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1986 | 104.4 | 102.3 | 102.5 | 102.9 | 102.9 | 102.9 | 102.6 | 103.3 | 102.9 | 103.0 |
| 1987 | 109.3 | 103.7 | 104.8 | 106.1 | 105.9 | 106.1 | 107.1 | 107.6 | 106.3 | 106.4 |
| 1988 | 114.8 | 107.5 | 109.5 | 110.5 | 110.4 | 110.3 | 113.8 | 113.0 | 111.0 | 111.0 |
| 1989 | 117.3 | 111.4 | 114.2 | 113.7 | 114.3 | 113.0 | 119.3 | 115.7 | 114.5 | 114.6 |
| 1990 | 117.8 | 118.0 | 117.1 | 116.1 | 117.6 | 114.4 | 125.0 | 115.5 | 117.1 | 117.5 |
| 1991 | 115.2 | 123.4 | 118.0 | 117.5 | 119.3 | 113.7 | 130.3 | 113.3 | 118.1 | 118.4 |
| 1992 | 114.5 | 124.9 | 119.4 | 118.4 | 120.3 | 116.3 | 132.1 | 114.0 | 119.9 | 120.3 |
| 1993 | 116.7 | 122.5 | 118.2 | 117.6 | 119.9 | 120.0 | 132.2 | 116.6 | 121.6 | 122.0 |
| 1991 Q2 | 115.0 | 123.9 | 117.7 | 117.2 | 119.2 | 113.7 | 129.8 | 113.6 | 118.0 | 118.3 |
| Q3 | 114.8 | 123.2 | 118.4 | 117.7 | 119.5 | 114.0 | 130.9 | 113.7 | 118.4 | 118.7 |
| Q4 | 115.1 | 123.7 | 118.8 | 118.5 | 119.9 | 114.0 | 131.7 | 113.7 | 118.7 | 119.0 |
| 1992 Q1 | 114.0 | 125.5 | 119.6 | 119.0 | 120.8 | 114.9 | 132.5 | 113.9 | 119.4 | 119.9 |
| Q2 | 114.1 | 125.4 | 119.4 | 119.0 | 120.6 | 115.6 | 132.1 | 114.0 | 119.6 | 120.1 |
| Q3 | 114.6 | 124.7 | 119.4 | 117.9 | 120.1 | 116.6 | 132.0 | 114.0 | 120.0 | 120.3 |
| Q4 | 115.0 | 123.8 | 119.1 | 117.8 | 119.8 | 118.2 | 131.8 | 114.2 | 120.7 | 120.9 |
| 1993 Q1 | 115.7 | 121.6 | 117.9 | 117.5 | 119.3 | 118.6 | 132.9 | 115.2 | 120.8 | 121.1 |
| Q2 | 116.4 | 122.3 | 118.1 | 117.8 | 119.7 | 119.3 | 132.0 | 116.4 | 121.2 | 121.6 |
| Q3 | 117.2 | 123.3 | 118.4 | 117.0 | 120.2 | 120.1 | 132.2 | 116.8 | 121.7 | 122.2 |
| Q4 | 117.9 | 122.8 | 118.4 | 118.2 | 120.5 | 121.9 | 131.5 | 117.8 | 122.6 | 123.0 |
| 1994 Q1 | 118.7 | 123.5 | 119.0 | 118.2 | .. | 122.9 | 132.5 | 119.1 | 123.5 | .. |
| Q2 | .. | .. | .. | .. | .. | 124.1 | .. | .. | .. | .. |
| Percentage change, latest quarter on corresponding quarter of previous year | | | | | | | | | | |
| 1994 Q1 | *2.6* | *1.6* | *0.9* | *0.6* | .. | *3.6* | *−0.3* | *3.4* | *2.2* | .. |
| Q2 | .. | .. | .. | .. | .. | *4.0* | .. | .. | .. | .. |
| Percentage change, latest quarter on previous quarter | | | | | | | | | | |
| 1994 Q1 | *0.7* | *0.6* | *0.5* | *0.0* | .. | *0.8* | *0.8* | *1.1* | *0.7* | .. |
| Q2 | .. | .. | .. | .. | .. | *1.0* | .. | .. | .. | .. |

1 Estimates due to rebasing to 1990
2 Western Germany (Federal Republic of Germany before unification)
3 GNP

## 2 Consumer prices[1]
## Percentage change on year earlier

| | United Kingdom | Germany[2] | France | Italy | EC | United States | Japan | Canada | Major 7 | OECD |
|---|---|---|---|---|---|---|---|---|---|---|
| 1980 | 18.0 | 5.5 | 13.6 | 21.0 | 13.7 | 13.5 | 8.0 | 10.2 | 12.7 | 13.7 |
| 1985 | 6.1 | 2.2 | 5.8 | 8.6 | 6.2 | 3.5 | 2.0 | 4.0 | 4.0 | 4.8 |
| 1986 | 3.4 | −0.1 | 2.7 | 6.1 | 3.7 | 1.9 | 0.4 | 4.2 | 2.1 | 3.0 |
| 1987 | 4.2 | 0.2 | 3.1 | 4.6 | 3.4 | 3.6 | −0.2 | 4.3 | 2.9 | 3.6 |
| 1988 | 4.9 | 1.3 | 2.6 | 5.0 | 3.6 | 4.1 | 0.5 | 4.0 | 3.3 | 4.3 |
| 1989 | 7.8 | 2.8 | 3.7 | 6.6 | 5.2 | 4.8 | 2.3 | 5.0 | 4.6 | 5.4 |
| 1990 | 9.5 | 2.7 | 3.4 | 6.0 | 5.6 | 5.5 | 3.1 | 4.8 | 5.0 | 5.8 |
| 1991 | 5.9 | 3.5 | 3.2 | 6.5 | 5.1 | 4.2 | 3.3 | 5.6 | 4.3 | 5.2 |
| 1992 | 3.7 | 4.0 | 2.4 | 5.3 | 4.2 | 3.0 | 1.6 | 1.5 | 3.1 | 4.1 |
| 1993 | 1.6 | 4.2 | 2.0 | 4.2 | 3.3 | 3.0 | 1.1 | 1.8 | 2.7 | 3.6 |
| 1993 Q2 | 1.3 | 4.2 | 1.9 | 4.1 | 3.3 | 3.2 | 0.7 | 1.7 | 2.7 | 3.6 |
| Q3 | 1.7 | 4.2 | 2.2 | 4.3 | 3.5 | 2.7 | 1.7 | 1.7 | 2.7 | 3.7 |
| Q4 | 1.6 | 3.8 | 2.1 | 4.1 | 3.2 | 2.7 | 1.0 | 1.9 | 2.5 | 3.5 |
| 1994 Q1 | 2.4 | 3.3 | 1.7 | 4.2 | 3.3 | 2.6 | 1.1 | 0.6 | 2.4 | 3.5 |
| Q2 | 2.6 | 3.1 | 1.8 | 4.0 | 3.2 | 2.3 | 0.5 | 0.1 | 2.2 | 4.1 |
| 1993 Jul | 1.4 | 4.3 | 2.1 | 4.4 | 3.4 | 2.8 | 1.9 | 1.6 | 2.7 | 3.8 |
| Aug | 1.7 | 4.2 | 2.2 | 4.5 | 3.5 | 2.7 | 1.8 | 1.7 | 2.7 | 3.7 |
| Sep | 1.8 | 4.0 | 2.3 | 4.2 | 3.3 | 2.7 | 1.3 | 1.9 | 2.6 | 3.5 |
| Oct | 1.4 | 3.9 | 2.2 | 4.2 | 3.2 | 2.7 | 1.3 | 1.9 | 2.6 | 3.6 |
| Nov | 1.4 | 3.6 | 2.2 | 4.1 | 3.1 | 2.7 | 0.9 | 1.9 | 2.4 | 3.4 |
| Dec | 1.9 | 3.7 | 2.1 | 4.0 | 3.3 | 2.7 | 0.9 | 1.7 | 2.6 | 3.6 |
| 1994 Jan | 2.5 | 3.5 | 1.9 | 4.2 | 3.3 | 2.5 | 1.2 | 1.3 | 2.5 | 3.5 |
| Feb | 2.4 | 3.4 | 1.8 | 4.2 | 3.3 | 2.6 | 1.0 | 0.2 | 2.4 | 3.5 |
| Mar | 2.3 | 3.2 | 1.5 | 4.2 | 3.2 | 2.5 | 1.2 | 0.1 | 2.4 | 3.5 |
| Apr | 2.6 | 3.1 | 1.7 | 4.1 | 3.2 | 2.3 | 0.6 | 0.2 | 2.2 | 3.9 |
| May | 2.6 | 3.0 | 1.7 | 4.1 | 3.2 | 2.2 | 0.8 | −0.1 | 2.2 | 4.2 |
| Jun | 2.6 | 3.0 | 1.8 | 3.8 | 3.1 | 2.5 | 0.6 | 0.0 | 2.2 | 4.3 |
| Jul | 2.3 | 2.9 | .. | 3.6 | .. | 2.8 | .. | .. | .. | .. |

1 Components and coverage not uniform across countries
2 Western Germany (Federal Republic of Germany before unification)

## 3 Standardised unemployment rates: percentage of total labour force[1]

| | United Kingdom | Germany[2] | France | Italy | EC[3] | United States | Japan | Canada | Major 7 | OECD |
|---|---|---|---|---|---|---|---|---|---|---|
| | GABF | GABD | GABC | GABE | GADR | GADO | GADP | GADN | GAEQ | GADQ |
| 1980 | 6.4 | 2.9 | 6.2 | 7.5 | 6.4 | 7.0 | 2.0 | 7.4 | 5.5 | 5.8 |
| 1985 | 11.2 | 7.1 | 10.2 | 9.6 | 10.8 | 7.1 | 2.6 | 10.4 | 7.2 | 7.8 |
| 1986 | 11.2 | 6.4 | 10.4 | 10.5 | 10.8 | 6.9 | 2.8 | 9.5 | 7.1 | 7.7 |
| 1987 | 10.3 | 6.2 | 10.5 | 10.9 | 10.6 | 6.1 | 2.8 | 8.8 | 6.7 | 7.3 |
| 1988 | 8.6 | 6.2 | 10.0 | 11.0 | 9.9 | 5.4 | 2.5 | 7.7 | 6.1 | 6.7 |
| 1989 | 7.2 | 5.6 | 9.4 | 10.9 | 9.0 | 5.2 | 2.3 | 7.5 | 5.7 | 6.2 |
| 1990 | 6.8 | 4.8 | 8.9 | 10.3 | 8.4 | 5.4 | 2.1 | 8.1 | 5.6 | 6.1 |
| 1991 | 8.8 | 4.2 | 9.4 | 9.9 | 8.7 | 6.6 | 2.1 | 10.2 | 6.3 | 6.8 |
| 1992 | 10.0 | 4.6 | 10.4 | 10.5 | 9.5 | 7.3 | 2.2 | 11.2 | 6.9 | 7.5 |
| 1993 | 10.3 | 5.8 | 11.7 | 10.2 | 10.7 | 6.7 | 2.5 | 11.1 | 6.9 | 7.8 |
| 1994 Q1 | 9.9 | 6.5 | 12.5 | 10.8 | 11.3 | 6.5 | 2.8 | 11.0 | 7.0 | 8.0 |
| Q2 | 9.5 | 6.6 | 12.6 | .. | 11.3 | 6.1 | 2.8 | 10.6 | 6.8 | 7.8 |
| 1993 Jun | 10.3 | 5.7 | 11.7 | – | 10.7 | 6.8 | 2.5 | 11.2 | 7.0 | 7.9 |
| Jul | 10.4 | 5.8 | 11.8 | 10.3 | 10.8 | 6.7 | 2.5 | 11.4 | 7.0 | 7.9 |
| Aug | 10.4 | 5.9 | 11.9 | – | 10.9 | 6.7 | 2.5 | 11.2 | 7.0 | 7.9 |
| Sep | 10.3 | 6.0 | 12.1 | – | 11.0 | 6.6 | 2.6 | 11.1 | 7.0 | 7.9 |
| Oct | 10.2 | 6.2 | 12.2 | 10.7 | 11.1 | 6.6 | 2.7 | 11.1 | 7.0 | 8.0 |
| Nov | 10.1 | 6.3 | 12.4 | – | 11.1 | 6.4 | 2.7 | 10.9 | 6.9 | 7.9 |
| Dec | 9.9 | 6.3 | 12.4 | – | 11.2 | 6.3 | 2.8 | 11.1 | 6.9 | 7.9 |
| 1994 Jan | 10.0 | 6.4 | 12.5 | 10.8 | 11.3 | 6.6 | 2.7 | 11.3 | 7.0 | 8.0 |
| Feb | 9.9 | 6.5 | 12.5 | .. | 11.3 | 6.4 | 2.9 | 11.0 | 7.0 | 8.0 |
| Mar | 9.7 | 6.5 | 12.6 | 10.8 | 11.3 | 6.5 | 2.8 | 10.5 | 7.0 | 8.0 |
| Apr | 9.6 | 6.6 | 12.6 | .. | 11.3 | 6.4 | 2.8 | 10.9 | 6.9 | 7.9 |
| May | 9.5 | 6.6 | 12.7 | .. | 11.3 | 6.0 | 2.8 | 10.7 | 6.8 | 7.8 |
| Jun | 9.5 | 6.6 | 12.6 | .. | 11.3 | 5.9 | 2.8 | 10.3 | 6.7 | 7.8 |

1 Uses an ILO based measure of those without work, currently available for work, actively seeking work or waiting to start a job already obtained
2 Western Germany (Federal Republic of Germany before unification)
3 Excludes Denmark, Greece and Luxembourg

# 4 Balance of payments current account as percentage of GDP

| | United Kingdom | Germany[1,2] | France | Italy | United States[1] | Japan[1] | Canada |
|---|---|---|---|---|---|---|---|
| 1980 | 1.2 | −1.7 | −0.6 | −2.3 | 0.1 | −1.0 | −0.6 |
| 1985 | 0.6 | 2.7 | −0.1 | −0.9 | −3.1 | 3.6 | −1.3 |
| 1986 | −0.2 | 4.5 | 0.3 | 0.4 | −3.5 | 4.3 | −2.8 |
| 1987 | −1.2 | 4.1 | −0.6 | −0.2 | −3.7 | 3.6 | −2.8 |
| 1988 | −3.5 | 4.2 | −0.5 | −0.7 | −2.6 | 2.7 | −3.5 |
| 1989 | −4.4 | 4.9 | −0.5 | −1.2 | −2.0 | 2.0 | −4.1 |
| 1990 | −3.3 | 3.1 | −0.8 | −1.3 | −1.7 | 1.2 | −3.8 |
| 1991 | −1.3 | −1.2 | −0.5 | −1.9 | −0.1 | 2.3 | −4.1 |
| 1992 | −1.8 | −1.2 | 0.3 | −2.3 | −1.1 | 3.1 | −3.8 |
| 1993 | −2.0 | −1.2 | 0.8 | .. | −0.2 | 0.3 | −4.4 |
| 1993 Q3 | −1.4 | −0.6 | 0.4 | 0.6 | −1.7 | 2.9 | −4.1 |
| Q4 | −1.7 | −0.2 | 0.3 | .. | −1.9 | 2.8 | −4.1 |
| 1994 Q1 | .. | −1.5 | .. | .. | −1.9 | 3.1 | −3.9 |

1 Balance as percentage of GNP
2 Western Germany (Federal Republic of Germany before unification)

# 5 Total industrial production: index numbers

1985 = 100

| | United Kingdom[1] | Germany[2] | France | Italy | EC | United States | Japan[3] | Canada[4] | Major 7 | OECD[5] |
|---|---|---|---|---|---|---|---|---|---|---|
| | DVZI | HFGA | HFFZ | HFGB | GACY | HFGD | HFGC | HFFY | GAES | GACX |
| 1980 | 92.6 | 97.3 | 101.8 | 103.6 | 97.6 | 89.1 | 84.4 | 86.2 | 91.0 | 91.3 |
| 1985 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1986 | 102.4 | 102.3 | 100.9 | 103.6 | 102.3 | 100.9 | 99.8 | 99.3 | 101.1 | 101.2 |
| 1987 | 106.5 | 102.7 | 102.8 | 107.6 | 104.7 | 105.9 | 103.3 | 104.1 | 104.9 | 104.9 |
| 1988 | 111.6 | 106.3 | 107.7 | 114.1 | 109.4 | 110.6 | 113.7 | 109.6 | 110.8 | 110.5 |
| 1989 | 114.0 | 111.4 | 112.1 | 117.6 | 113.9 | 112.3 | 120.3 | 109.4 | 114.1 | 114.1 |
| 1990 | 113.6 | 117.2 | 114.2 | 117.6 | 116.0 | 112.3 | 125.4 | 106.0 | 115.7 | 115.8 |
| 1991 | 109.1 | 120.7 | 114.2 | 116.8 | 115.7 | 110.2 | 127.8 | 102.2 | 115.1 | 115.2 |
| 1992 | 108.6 | 118.4 | 112.9 | 116.6 | 114.2 | 112.8 | 120.5 | 102.6 | 114.5 | 114.6 |
| 1993 | 111.3 | 109.7 | 108.6 | 113.8 | 110.3 | 117.5 | 115.3 | 107.4 | 114.5 | 114.5 |
| 1993 Q2 | 110.3 | 109.4 | 108.5 | 112.8 | 110.5 | 116.9 | 116.2 | 106.7 | 114.2 | 114.0 |
| Q3 | 111.7 | 110.0 | 109.1 | 114.0 | 111.5 | 117.7 | 114.9 | 107.8 | 114.6 | 114.7 |
| Q4 | 113.3 | 109.7 | 107.8 | 113.3 | 111.4 | 119.6 | 112.5 | 109.0 | 115.0 | 115.1 |
| 1994 Q1 | 114.3 | 109.5 | 110.3 | 113.2 | 112.1 | 122.0 | 114.4 | 109.3 | 116.5 | 116.6 |
| Q2 | 116.6 | 112.8 | .. | .. | .. | 123.3 | .. | .. | .. | .. |
| 1993 Jun | 110.1 | 109.6 | 109.5 | 112.9 | 110.6 | 117.0 | 115.8 | 107.9 | 114.2 | 114.0 |
| Jul | 111.7 | 108.7 | 110.4 | 114.2 | 111.1 | 117.5 | 114.8 | 106.9 | 114.4 | 114.5 |
| Aug | 111.8 | 110.7 | 110.4 | 116.2 | 112.2 | 117.7 | 114.7 | 107.7 | 114.8 | 114.9 |
| Sep | 111.7 | 110.6 | 110.0 | 111.6 | 111.3 | 117.9 | 115.1 | 108.7 | 114.7 | 114.8 |
| Oct | 113.3 | 110.0 | 109.3 | 113.8 | 111.3 | 118.5 | 111.7 | 108.7 | 114.4 | 114.5 |
| Nov | 113.6 | 109.3 | 110.2 | 113.9 | 111.5 | 119.5 | 113.3 | 109.4 | 115.2 | 115.3 |
| Dec | 113.1 | 109.9 | 109.1 | 112.2 | 111.3 | 120.8 | 112.6 | 109.0 | 115.4 | 115.5 |
| 1994 Jan | 114.1 | 107.9 | 110.4 | 111.9 | 111.0 | 121.4 | 113.1 | 109.3 | 115.7 | 115.7 |
| Feb | 114.8 | 110.1 | 110.1 | 114.1 | 112.6 | 121.8 | 112.6 | 108.8 | 116.2 | 116.4 |
| Mar | 114.2 | 110.6 | 110.9 | 113.5 | 112.7 | 122.8 | 117.5 | 109.9 | 117.7 | 117.6 |
| Apr | 116.3 | 112.5 | 113.2 | 118.2 | 114.8 | 123.0 | 114.8 | 111.3 | 118.1 | 118.1 |
| May | 116.7 | 112.4 | 113.5 | 118.1 | .. | 123.2 | 113.7 | .. | 118.0 | 118.1 |
| Jun | 116.9 | 113.5 | .. | .. | .. | 123.7 | .. | .. | .. | .. |
| Percentage change: average of latest three months on that of corresponding period of previous year | | | | | | | | | | |
| 1994 May | *5.0* | *2.0* | *2.4* | *3.3* | .. | *5.4* | *−1.9* | .. | *3.1* | *3.3* |
| Jun | *5.7* | *3.1* | .. | .. | .. | *5.5* | .. | .. | .. | .. |
| Percentage change: average of latest three months on previous three months | | | | | | | | | | |
| 1994 May | *1.5* | *2.3* | *2.4* | *3.4* | .. | *1.4* | *2.3* | .. | *1.9* | *1.8* |
| Jun | *2.0* | *3.0* | .. | .. | .. | *1.1* | .. | .. | .. | .. |

1 Estimates due to rebasing to 1990
2 Western Germany (Federal Republic of Germany before unification)
3 Not adjusted for unequal number of working days in a month
4 GDP in industry at factor cost and 1986 prices
5 Some countries excluded from area total

# 6 Producer prices (manufacturing)
## Percentage change on a year earlier

| | United Kingdom | Germany[1] | France[2] | Italy | EC | United States | Japan | Canada | Major 7 | OECD |
|---|---|---|---|---|---|---|---|---|---|---|
| 1980 | *15.9* | *7.1* | *9.2* | .. | *11.3* | *13.5* | *14.8* | *13.3* | *13.2* | *13.2* |
| 1985 | *6.2* | *2.1* | *4.4* | *7.8* | *4.9* | *0.9* | *−0.8* | *2.8* | *1.9* | *3.0* |
| 1986 | *1.4* | *−2.3* | *−2.8* | *0.2* | *−0.8* | *−1.4* | *−4.7* | *0.9* | *−1.5* | *−1.1* |
| 1987 | *3.4* | *−0.5* | *0.6* | *3.0* | *1.3* | *2.1* | *−2.9* | *2.8* | *1.1* | *1.5* |
| 1988 | *3.7* | *1.6* | *5.2* | *3.5* | *3.4* | *2.5* | *−0.2* | *4.4* | *2.4* | *3.5* |
| 1989 | *4.8* | *3.4* | *5.3* | *5.9* | *5.0* | *5.1* | *2.1* | *1.9* | *4.4* | *5.3* |
| 1990 | *6.2* | *1.5* | *−1.1* | *4.2* | *2.4* | *5.0* | *1.6* | *0.3* | *3.4* | *3.9* |
| 1991 | *5.4* | *2.1* | *−1.3* | *3.3* | *2.1* | *2.1* | *1.0* | *−1.1* | *1.8* | *2.6* |
| 1992 | *3.1* | *1.7* | *−1.6* | *1.9* | *1.3* | *1.2* | *−0.8* | *0.5* | *0.9* | *1.6* |
| 1993 | *3.9* | *0.0* | *−2.9* | *3.8* | *1.0* | *1.3* | *−1.7* | *3.3* | *0.7* | *1.9* |
| 1993 Q4 | *3.9* | *−0.3* | *−2.2* | *3.9* | *1.3* | *0.3* | *−2.1* | *3.0* | *0.3* | *1.7* |
| 1994 Q1 | *3.1* | *0.0* | *−1.5* | *3.4* | *1.5* | *0.3* | *−2.1* | *3.3* | *0.3* | *2.1* |
| Q2 | *2.2* | *0.3* | .. | .. | .. | *−0.2* | *−2.0* | *4.9* | .. | .. |
| 1993 Jul | *4.0* | *−0.3* | | *4.2* | *1.0* | *1.3* | *−1.7* | *2.8* | *0.8* | *1.9* |
| Aug | *3.9* | *−0.2* | | *4.4* | *1.2* | *0.5* | *−1.8* | *3.4* | *0.4* | *1.8* |
| Sep | *4.0* | *−0.4* | | *4.3* | *1.1* | *0.4* | *−2.0* | *3.0* | *0.3* | *1.6* |
| Oct | *4.0* | *−0.4* | | *4.1* | *1.3* | *0.3* | *−2.1* | *2.9* | *0.2* | *1.6* |
| Nov | *3.6* | *−0.4* | | *3.8* | *1.3* | *0.4* | *−2.1* | *3.0* | *0.3* | *1.8* |
| Dec | *3.9* | *−0.2* | | *3.7* | *1.3* | *0.3* | *−2.2* | *3.1* | *0.3* | *1.8* |
| 1994 Jan | *3.5* | *−0.1* | | *3.6* | *1.5* | *0.3* | *−2.1* | *2.6* | *0.3* | *1.8* |
| Feb | *3.2* | *0.1* | | *3.6* | *1.6* | *0.2* | *−2.2* | *3.4* | *0.3* | *2.1* |
| Mar | *2.9* | *0.1* | | *3.2* | *1.4* | *0.3* | *−2.3* | *3.8* | *0.3* | *2.3* |
| Apr | *2.3* | *0.3* | | *3.0* | *1.5* | *−0.4* | *−2.2* | *4.2* | *0.0* | *3.5* |
| May | *2.2* | *0.4* | | *3.2* | *1.5* | *−0.4* | *−2.0* | *4.9* | *0.1* | *3.9* |
| Jun | *2.1* | *0.5* | | .. | .. | *0.0* | *−1.9* | *5.5* | .. | .. |
| Jul | *1.8* | .. | | .. | .. | .. | .. | .. | .. | .. |

1 Western Germany (Federal Republic of Germany before unification).
2 Producer prices in intermediate goods

# 7 Total employment: index numbers[1]

1985 = 100

| | United Kingdom[2] | Germany[3,4] | France[4] | Italy | EC | United States[4] | Japan | Canada[4] | Major 7 | OECD |
|---|---|---|---|---|---|---|---|---|---|---|
| | DMBC | GAAR | GAAU | GAAS | GADW | GADT | GADU | GADS | GAEU | GADV |
| 1980 | 103.4 | 102 | 101.1 | 100 | 100 | 93 | 95 | 95 | .. | .. |
| 1985 | 100.0 | 100 | 100.0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1986 | 100.1 | 101 | 100.5 | 101 | 101 | 102 | 101 | 103 | 101 | 101 |
| 1987 | 102.1 | 102 | 100.9 | 100 | 102 | 105 | 102 | 106 | 103 | 103 |
| 1988 | 105.4 | 103 | 102.0 | 102 | 104 | 107 | 104 | 109 | 105 | 105 |
| 1989 | 108.1 | 104 | 103.5 | 101 | 106 | 109 | 106 | 111 | 107 | 107 |
| 1990 | 108.8 | 107 | 104.6 | 103 | 107 | 110 | 108 | 112 | 108 | 109 |
| 1991 | 105.9 | 109 | 104.6 | 104 | 108 | 109 | 110 | 110 | 108 | 108 |
| 1992 | 103.2 | 110 | 103.8 | 103 | 106 | 110 | 111 | 109 | 108 | 108 |
| 1993 | 102.0 | 108 | 102.5 | 99 | 104 | 111 | 111 | 110 | 108 | 108 |
| 1992 Q4 | 102.1 | 110 | 102.9 | 102 | 105 | 110 | 111 | 109 | 108 | 108 |
| 1993 Q1 | 101.7 | 108 | 102.5 | 100 | 104 | 109 | 109 | 107 | 107 | 106 |
| Q2 | 101.7 | 108 | 102.8 | 98 | 104 | 111 | 112 | 111 | 109 | 108 |
| Q3 | 102.2 | 108 | 102.7 | 99 | 104 | 113 | 112 | 113 | 109 | 109 |
| Q4 | 102.2 | 107 | 101.8 | 97 | 103 | 113 | 111 | 110 | 109 | 108 |
| 1994 Q1 | 102.0 | 106 | 102.0 | 96 | 103 | 112 | 109 | 108 | 108 | 107 |
| Q2 | .. | .. | .. | 96 | .. | 115 | 113 | 113 | .. | .. |
| 1994 Apr | .. | 106 | .. | 96 | 103 | 113 | 112 | 110 | 109 | 108 |
| May | .. | 106 | .. | .. | 103 | 115 | 113 | 113 | 110 | 109 |
| Jun | .. | .. | .. | .. | .. | 116 | 113 | 116 | .. | .. |
| Percentage change, latest quarter on that of corresponding period of previous year | | | | | | | | | | |
| 1994 Q1 | *0.3* | *−1.9* | *−0.5* | *−4.0* | *−1.0* | *2.8* | *0.0* | *0.9* | *0.9* | *0.9* |
| Q2 | .. | .. | .. | *−2.0* | .. | *3.6* | *0.9* | *1.8* | .. | .. |
| Percentage change latest quarter on previous quarter | | | | | | | | | | |
| 1994 Q1 | *−0.2* | *−0.9* | *0.2* | *−1.0* | *0.0* | *−0.9* | *−1.8* | *−1.8* | *−0.9* | *−0.9* |
| Q2 | .. | .. | .. | *0.0* | .. | *2.7* | *3.7* | *4.6* | .. | .. |

1 Not seasonally adjusted except for the United Kingdom
2 Estimates due to rebasing to 1990
3 Western Germany (Federal Republic of Germany before unification)
4 Excludes members of armed forces

# 8 Average wage earnings in manufacturing[1]
## Percentage change on a year earlier

| | United Kingdom[2] | Germany[3] | France | Italy | EC | United States | Japan | Canada | Major 7 | OECD |
|---|---|---|---|---|---|---|---|---|---|---|
| 1980 | *17.8* | *6.5* | *15.2* | *18.7* | *10.3* | *8.6* | *7.5* | *10.9* | *9.0* | *10.9* |
| 1985 | *9.1* | *4.2* | *5.7* | *11.2* | *7.5* | *4.2* | *3.1* | *4.2* | *5.3* | *5.3* |
| 1986 | *7.7* | *4.0* | *3.9* | *4.8* | *5.0* | *2.0* | *1.4* | *3.0* | *3.0* | *4.0* |
| 1987 | *8.0* | *3.8* | *3.2* | *6.5* | *5.7* | *2.0* | *1.7* | *2.9* | *2.9* | *2.9* |
| 1988 | *8.5* | *4.6* | *3.1* | *6.1* | *5.4* | *2.9* | *4.6* | *3.8* | *4.7* | *4.7* |
| 1989 | *8.8* | *3.5* | *3.8* | *6.1* | *6.0* | *2.8* | *5.8* | *5.5* | *4.5* | *5.4* |
| 1990 | *9.3* | *5.1* | *4.5* | *7.2* | *7.3* | *3.6* | *5.4* | *5.2* | *5.2* | *5.9* |
| 1991 | *8.2* | *5.7* | *4.3* | *9.8* | *7.5* | *2.6* | *3.5* | *4.9* | *4.9* | *4.8* |
| 1992 | *6.6* | *6.2* | *3.6* | *5.4* | *5.6* | *2.6* | *1.0* | *3.1* | *3.1* | *3.8* |
| 1993 | *4.5* | .. | *2.6* | *3.4* | *4.6* | *2.5* | *0.2* | *2.3* | *3.0* | *2.9* |
| 1993 Q3 | *4.4* | .. | *2.3* | *4.1* | *4.6* | *2.5* | *0.4* | *1.5* | *3.0* | *2.9* |
| Q4 | *4.0* | .. | *2.2* | *3.8* | *4.5* | *3.3* | *−0.1* | *1.5* | *2.8* | *3.5* |
| 1994 Q1 | *4.8* | .. | *2.0* | *4.3* | *5.2* | *3.3* | *2.9* | *2.2* | *3.9* | *3.8* |
| Q2 | .. | .. | *2.3* | *4.1* | .. | *2.4* | .. | .. | .. | .. |
| 1993 Jul | *5.0* | .. | *2.3* | *4.1* | *4.6* | *2.5* | *−1.2* | *2.3* | *2.0* | *2.7* |
| Aug | *3.6* | .. | .. | *4.1* | *4.6* | *2.5* | *2.3* | *2.3* | *3.1* | *3.0* |
| Sep | *4.5* | .. | .. | *4.2* | *4.6* | *2.5* | *1.5* | *1.5* | *3.2* | *3.1* |
| Oct | *3.8* | .. | *2.2* | *3.9* | *4.5* | *3.3* | *0.6* | *1.5* | *3.2* | *3.8* |
| Nov | *4.0* | .. | .. | *3.9* | *4.5* | *2.5* | *1.7* | *1.5* | *3.1* | *3.8* |
| Dec | *4.0* | .. | .. | *3.6* | *4.5* | *3.3* | *−1.1* | *1.5* | *1.8* | *2.4* |
| 1994 Jan | *4.8* | .. | *2.0* | *4.0* | *4.5* | *2.5* | *4.5* | *1.5* | *3.9* | *3.8* |
| Feb | *4.4* | .. | .. | *4.3* | *4.5* | *3.3* | *1.7* | *1.5* | *3.1* | *3.0* |
| Mar | *5.3* | .. | .. | *4.5* | *5.2* | *3.3* | *2.4* | *1.5* | *3.1* | *3.8* |
| Apr | *4.7* | .. | *2.3* | *4.6* | *5.2* | *2.4* | *1.9* | *1.5* | *3.1* | *3.8* |
| May | *4.0* | .. | .. | *4.6* | *4.5* | *2.4* | *0.6* | *2.2* | *3.1* | *3.8* |
| Jun | .. | .. | .. | *3.0* | .. | *2.4* | .. | .. | .. | .. |

1 Definitions of coverage and treatment vary among countries
2 Figures for Great Britain refer to weekly earnings; others are hourly
3 Western Germany (Federal Republic of Germany before unification)

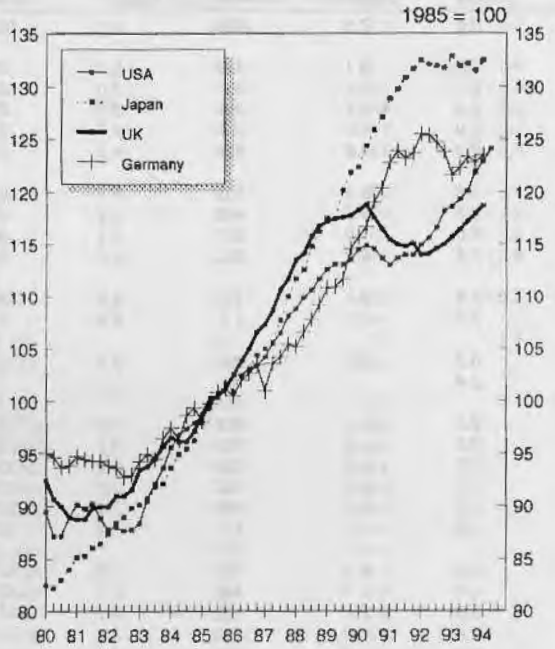
# 9 Retail Sales (volume): index numbers

1985 = 100

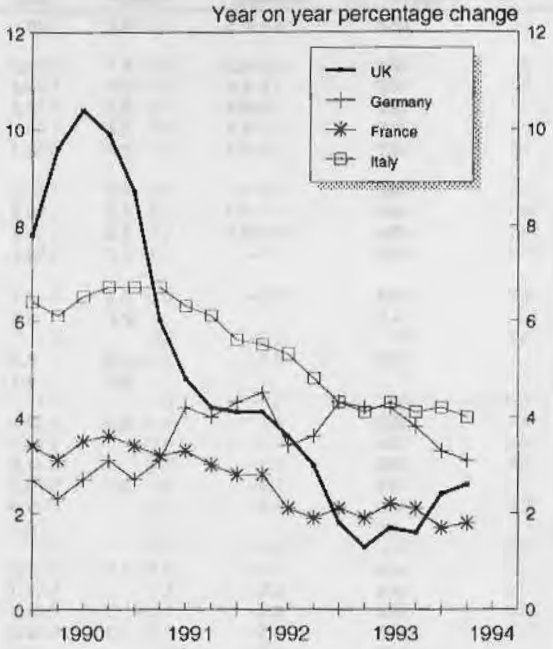
| | United[2] Kingdom | Germany[1] | France | Italy | EC | United States | Japan | Canada | Major 7 | OECD |
|---|---|---|---|---|---|---|---|---|---|---|
| | FAAM | GADD | GADC | GADE | GADH | GADA | GADB | GACZ | GAEW | GADG |
| 1980 | 86.4 | 103.3 | 101.0 | 83.1 | 94.5 | 84.0 | 103.2 | 83.6 | 89.9 | 90.7 |
| 1985 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1986 | 105.3 | 103.4 | 102.4 | 106.8 | 104.5 | 105.5 | 101.5 | 104.6 | 104.5 | 104.4 |
| 1987 | 110.6 | 107.5 | 104.5 | 112.0 | 108.8 | 108.4 | 107.1 | 110.3 | 108.3 | 108.1 |
| 1988 | 117.5 | 111.1 | 107.9 | 109.5 | 111.8 | 112.6 | 111.4 | 114.6 | 112.0 | 111.8 |
| 1989 | 119.9 | 114.1 | 109.5 | 117.1 | 116.1 | 115.6 | 115.8 | 114.5 | 115.4 | 115.3 |
| 1990 | 120.8 | 123.7 | 110.3 | 114.4 | 119.2 | 116.4 | 121.7 | 112.0 | 117.3 | 117.4 |
| 1991 | 119.4 | 130.7 | 110.3 | 111.3 | 120.0 | 114.0 | 124.2 | 100.4 | 116.3 | 116.6 |
| 1992 | 120.2 | 128.2 | 110.5 | 117.0 | 120.4 | 117.6 | 120.8 | 101.6 | 117.8 | 117.8 |
| 1993 | 124.4 | 122.8 | 110.7 | 113.3 | 118.1 | 123.8 | 114.9 | 104.7 | 119.8 | 118.9 |
| 1994 Q1 | 127.3 | 123.2 | 112.5 | .. | 117.9 | 129.4 | 114.2 | 110.6 | 122.6 | 121.6 |
| Q2 | 128.5 | .. | 109.9 | .. | .. | .. | .. | .. | .. | .. |
| 1993 Oct | 125.6 | 121.7 | 108.8 | 110.3 | 116.6 | 126.7 | 113.3 | 105.7 | 120.7 | 119.5 |
| Nov | 126.1 | 122.0 | 109.1 | 114.2 | 117.7 | 127.4 | 113.6 | 105.8 | 121.5 | 120.3 |
| Dec | 126.1 | 121.3 | 110.1 | 105.2 | 116.2 | 129.0 | 112.4 | 106.5 | 121.5 | 120.3 |
| 1994 Jan | 127.3 | 121.8 | 112.9 | 114.5 | 118.9 | 127.3 | 115.7 | 107.4 | 122.2 | 121.0 |
| Feb | 126.8 | 122.9 | 110.7 | .. | 116.5 | 129.4 | 113.0 | 110.9 | 122.0 | 120.9 |
| Mar | 127.7 | 124.8 | 113.9 | .. | 118.4 | 131.6 | 113.9 | 113.5 | 123.7 | 122.8 |
| Apr | 128.3 | 114.4 | 108.6 | .. | 114.6 | 130.0 | 111.1 | 111.5 | 121.5 | 120.2 |
| May | 128.5 | 121.4 | 110.6 | .. | .. | 129.5 | .. | 113.1 | 121.6 | .. |
| Jun | 128.7 | .. | 110.7 | .. | .. | .. | .. | .. | .. | .. |
| Jul | 129.2 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Percentage change average of latest three months on that of corresponding period of previous year | | | | | | | | | | |
| 1994 Jun | *3.9* | .. | *−1.3* | .. | .. | .. | .. | .. | .. | .. |
| Jul | *3.7* | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Percentage change average of latest three months on previous three months | | | | | | | | | | |
| 1994 Jun | *1.0* | .. | *−2.3* | .. | .. | .. | .. | .. | .. | .. |
| Jul | *0.9* | .. | .. | .. | .. | .. | .. | .. | .. | .. |

1 Western Germany (Federal Republic of Germany before unification)
2 Estimates due to rebasing to 1990

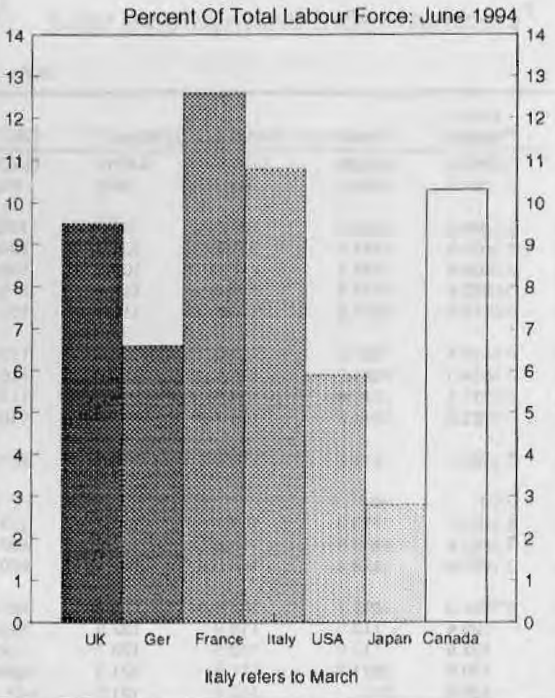
## Chart I: Gross domestic product



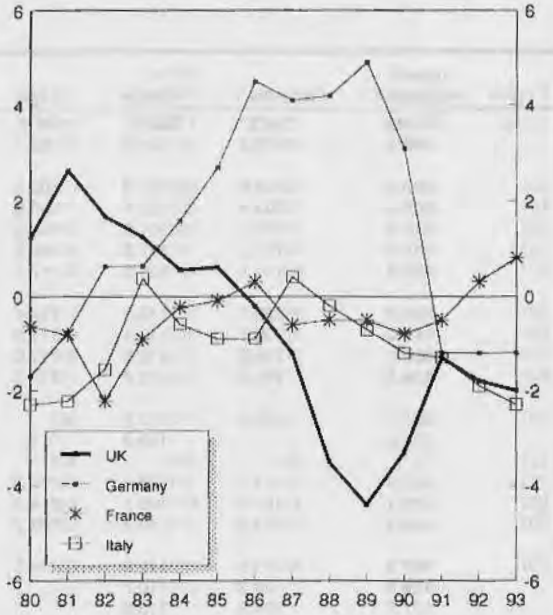

## Chart II: Consumer price index



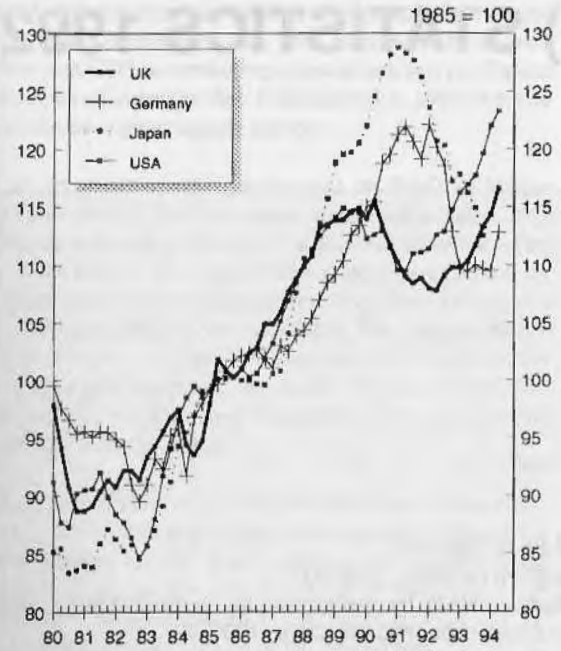

## Chart III: Standardised unemployment



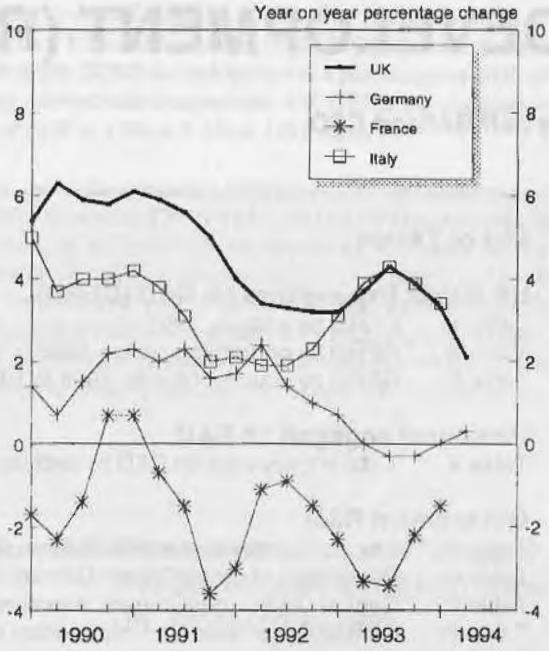

## Chart IV: Current account balance - percentage of GDP at market prices



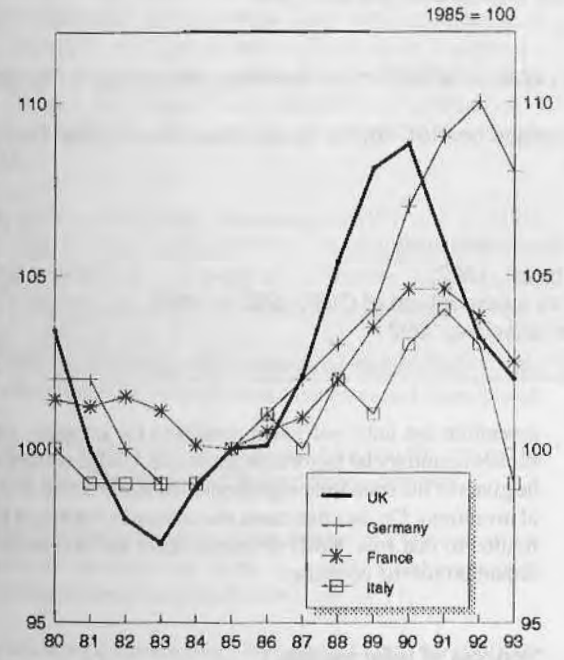
## Chart V: Industrial production



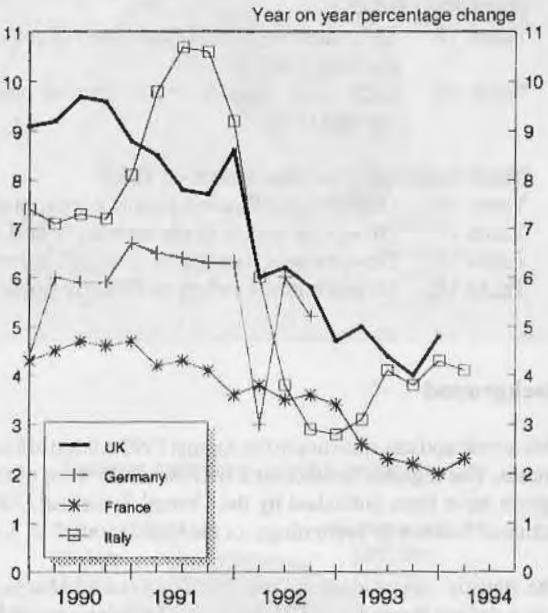

## Chart VI: Producer price inflation




## Chart VII: Employment




## Chart VIII: Wage earnings (manufacturing)



# RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D) STATISTICS 1992

by Jeff Golland CSO

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## Background

This article updates statistics in the August 1993 edition of Economic Trends. The regional breakdowns are new whilst most of the other figures have been published by the Central Statistical Office, the Office of Science & Technology, or the OECD (refs 1, 2, 3, 6, 7, 9).

The statistics are consistent with OECD's Frascati Manual (ref 4) which defines Research and Experimental Development (R&D) and gives guidelines on how to measure expenditure and employment on R&D. The manual is applied throughout the OECD so it is possible to make comparisons between countries (refs 7, 8, 9).

R&D is defined as creative work undertaken systematically to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this knowledge to devise new applications.

Care should be exercised when using R&D statistics for economic analysis. R&D can lead to the technological inventions that are necessary for a successful innovative economy. However, such inventions are not a sufficient condition for success - many other economic and social factors are important. Undue weight should not be given to the economic significance of R&D's role as a generator of inventions. On the other hand, the economic benefit of R&D is not limited to that role: R&D develops skills and techniques that are important for the economy.

## Sources of information

Performers and funders of R&D are divided into four sectors: Government, Businesses, Higher Education Institutions (HEIs), and the Private Non-Profit (PNP) sector. Definitions are provided at the end of this article.

The CSO conducts an annual survey of Central Government R&D which is addressed to all Government departments. The survey collects data on expenditure and employment for outturn and planning years. Detailed recent results are in the statistical supplement to OST's *Forward Look of Government-funded Science, Engineering and Technology 1994* (ref 1).

The CSO also conducts an annual survey of R&D in businesses. The survey of activity in 1992 is reported in ref 3. That survey was the last in a series of annual surveys based on a small panel of the largest spenders on R&D identified in the 1989 large scale benchmark survey. This year CSO is conducting a benchmark survey of about 5,000 businesses asking about their R&D activity in 1993. In future years there will be smaller sample surveys.

Statistics on expenditure and employment on R&D in Higher Education Institutions (HEIs) are based on information collected by Higher Education Funding Councils for administrative purposes. This information is adjusted using estimates of the relative proportions of time and money spent on research and teaching. These proportions are from a survey of HEIs in the mid-1980s. The proportions are likely to have changed since then because of reforms in the structure and funding of higher education, and increasing student numbers. HEI R&D statistics are therefore less reliable than those for the government and business sectors.

Much less R&D is performed in the PNP sector than in any of the other sectors. PNP R&D expenditure estimates use statistics on Government funding of PNP R&D reported in the Government R&D survey, and assume that annual changes in other funding of PNP R&D follow the same pattern as funding of HEI R&D. PNP R&D statistics are the least reliable of the four sectors.

## Summary of trends

Measuring expenditure and employment on R&D is difficult because of the subjective judgements that have to be made about the dividing line between R&D and other activities. There are discontinuities in the series arising from the interpretation of definitions, and because of changes in the actual or perceived status of organisations (chapter 1.1 of ref 1 details this). Significance should not be given to small percentage changes between years, but some general conclusions can be drawn.

In 1991, R&D expenditure as a percentage of GDP was about the same in the UK (2.1%) as in the OECD (2.3%) and EC (2.0%). The pattern over time has been different: since 1981 the UK proportion has fallen whilst in nearly all other countries it has risen (ref 8).

Within the UK, the 1980s saw a fall in the percentage of R&D funded by Government but a rise in funds from businesses and from abroad.

In the 1990s, R&D performed in businesses has been affected by the recession and less demand for R&D for defence purposes.

Business R&D is becoming more concentrated in a few industries. This reflects an international trend in middle sized economies towards national industrial specialisation (see ref 11).

In higher education an increasing proportion of funds for R&D are from specific research grants and contracts, which includes funds from the Government's Research Councils, and less from general university income.

## The tables

### Gross Domestic Expenditure on R&D (GERD) (tables 1-3)

These tables show the performers and funders of R&D in the UK. Measuring expenditure on R&D **performed** within each sector avoids problems of omission and double counting that can arise when measuring funds provided for R&D. Gross domestic expenditure on R&D (GERD) is the sum of R&D performed in the four sectors. Table 1 shows that in 1992 UK GERD was £12.6 billion in cash terms. GERD is often quoted as a percentage of GDP when making international comparisons. UK GERD has declined from 2.3% of GDP in 1986 to 2.1% in 1992 (table 2).

Table 1 shows the interaction between funders and performers. For example it shows that £7930m was spent on R&D performed within businesses. Of this, £5650m was funded by businesses from their own resources; £1094m was provided by Government; and £1186m came from abroad. The funds from abroad include funds from overseas parent companies; contracts for R&D projects; support for R&D provided through European Union schemes; and international collaborative projects typically for aerospace or defence products.

**Figure 1 Gross expenditure on Research and Development (GERD) in the UK, by sectors, 1992**

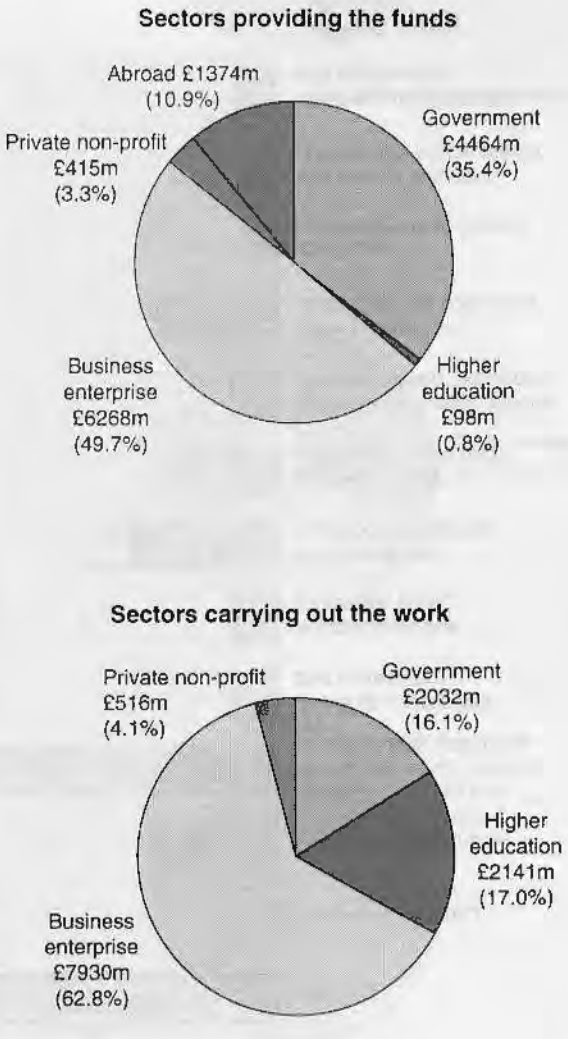
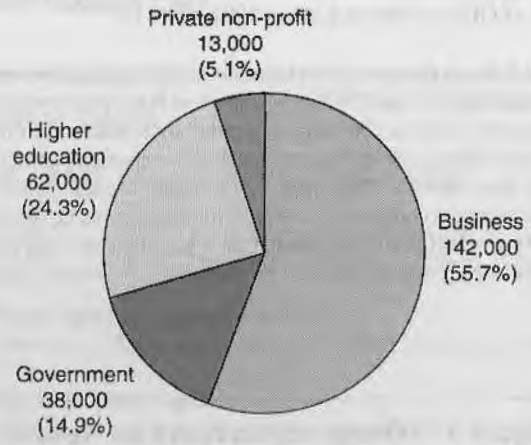


**Figure 2 Total employment on R&D by sectors, 1992 (Full time equivalents)**




### Research and Development total employment (table 4)

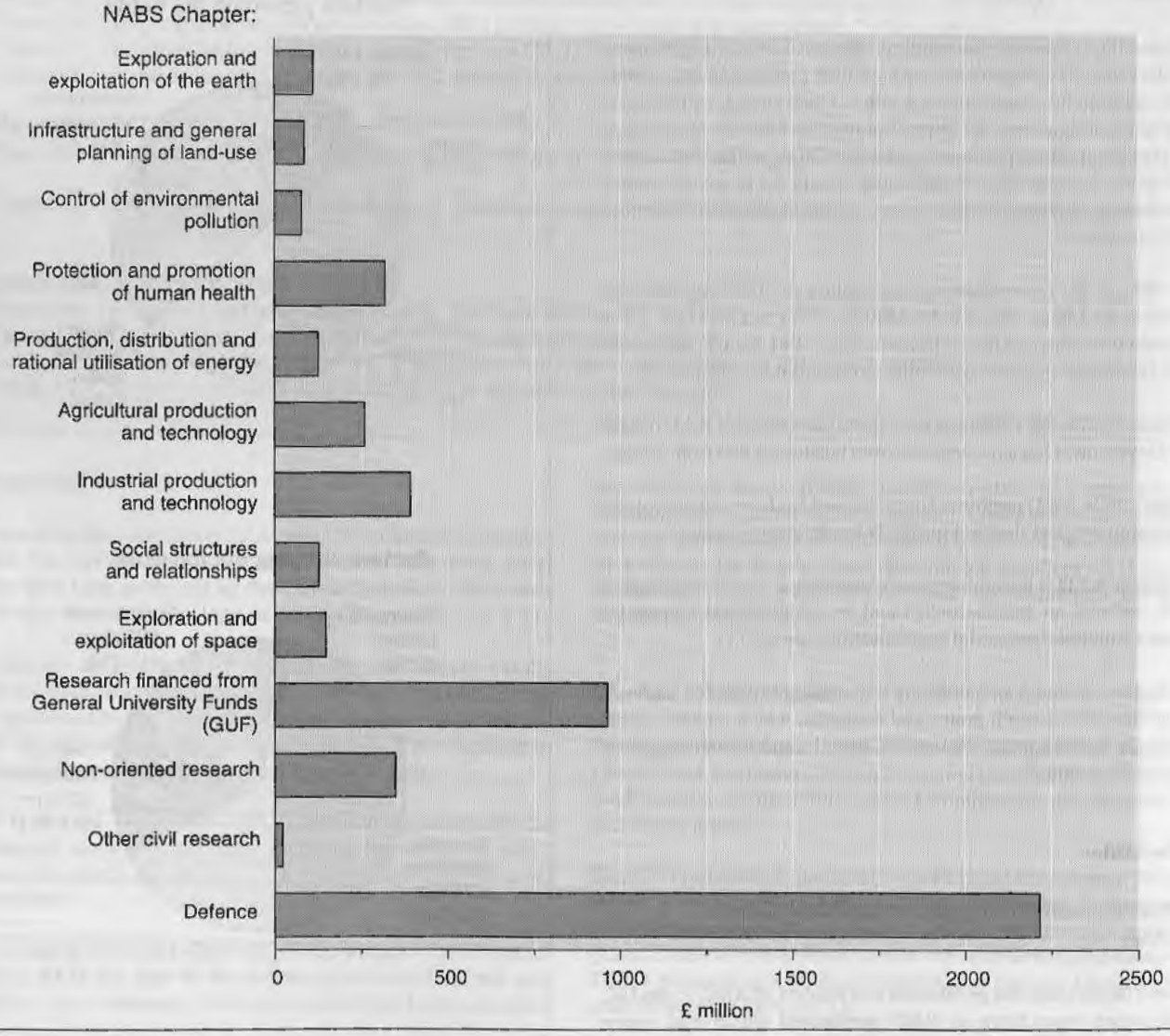
Employment on R&D is given in Full Time Equivalents (FTEs). For example, a full-time member of staff spending half their time on R&D and half their time on other activities would be counted as 0.5 FTE. The categories of staff (researchers etc) are defined in the Frascati Manual. Staff administering R&D are included as well as those directly engaged on projects.

There has been a decline in total R&D employment since 1988 due to a fall in R&D staff employed by businesses (table 4).

### Central Government expenditure and employment on R&D (tables 5-9)

A department's gross expenditure on R&D is its expenditure on intramural R&D (R&D performed within the department) plus its expenditure on R&D performed outside the department (extramural R&D).

**Figure 3 Central Government net expenditure on R&D by socio-economic objectives, 1992-93**



When summing departmental gross expenditure across Government the flow of R&D funds between departments is deducted to avoid double counting.

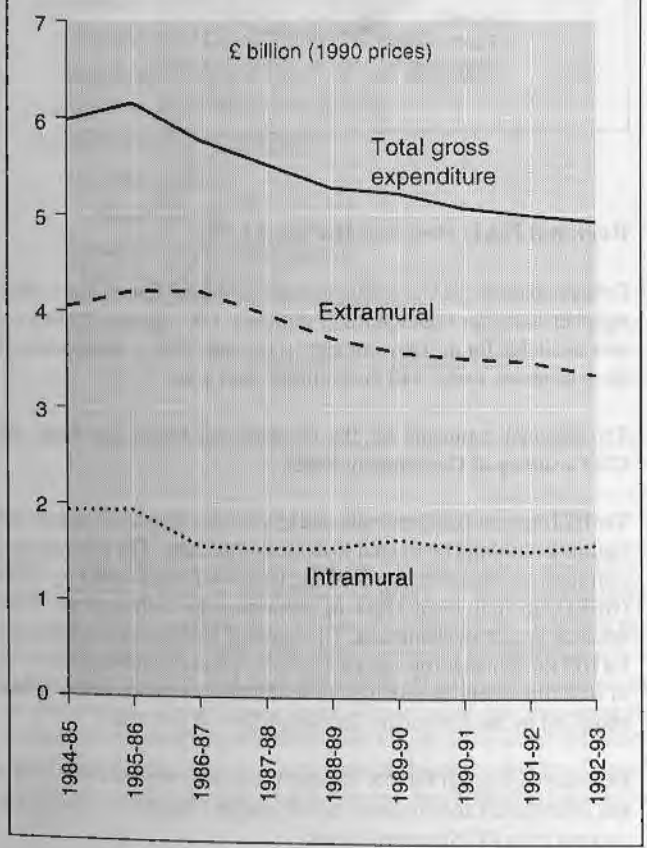
Net expenditure is gross expenditure minus receipts for R&D. The sum of departments' net expenditures is the R&D element of the government's budget expenditure. This is used for international comparisons of Government appropriations for R&D (such as table 19). The UK has a high proportion of Central Government expenditure devoted to R&D for defence purposes.

Figures in tables 5 and 8 for Government's net expenditure on R&D differ from Government funding figures in tables 1 and 3. The two sets of figures can be reconciled. Tables 1 to 3 are based on information supplied by R&D **performers** whilst tables 5 to 8 contain expenditure figures reported by Government departments (**funders**). The gap is mainly accounted for by differences in the reporting of Government contracts with businesses for certain types of defence R&D and R&D performed abroad but funded by the UK Government.

The figures for Central Government intramural R&D are a little lower than those for R&D performed by the Government sector in tables 1 and 2 because the latter include estimates for the National Health Service, Local Authorities and some externally funded work in DTI agencies.

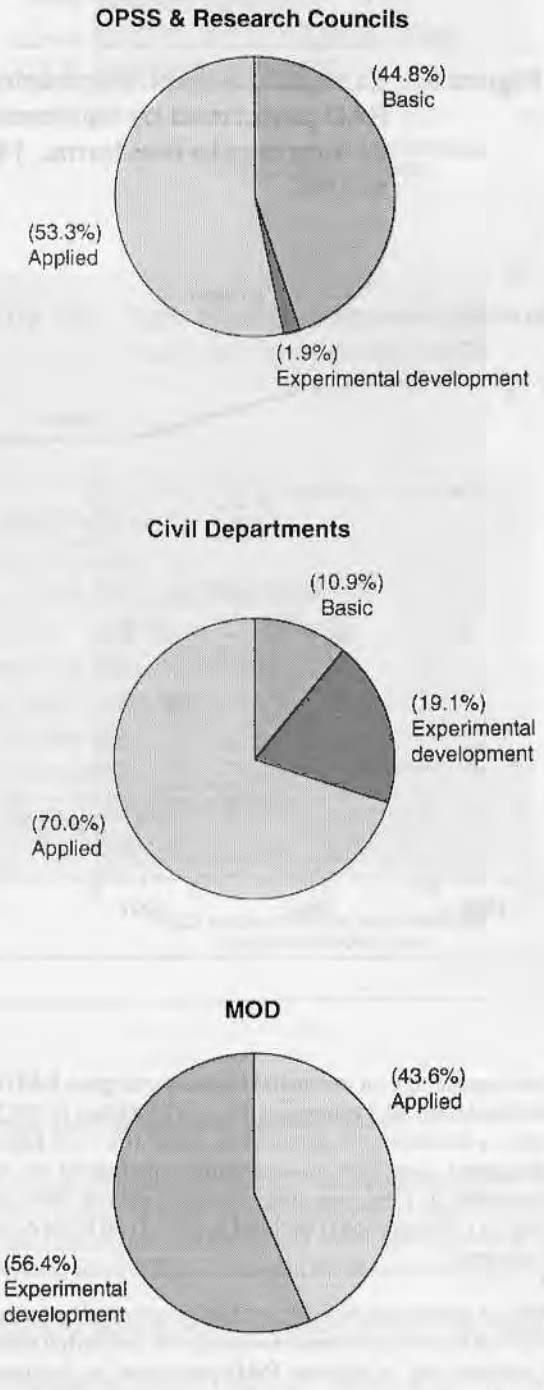
Table 5 shows that in 1992-93 Central Government's gross expenditure on R&D was £5449m, of which £1754m was spent in Government establishments.

**Figure 4 Central Government gross expenditure on R&D in real terms, 1984-85 to 1992-93**




Gross expenditure by the Office of Science and Technology, the Research Councils, and the Higher Education Funding Councils was £2088m (table 6); this sum is sometimes called the science budget and represents public funding for the advancement of knowledge. Most of the R&D expenditure by other departments serves the delivery of services, policy making, regulation and the promotion of economic development.

**Figure 5 Central Government current expenditure on Intramural R&D by type of activity, 1992-93**

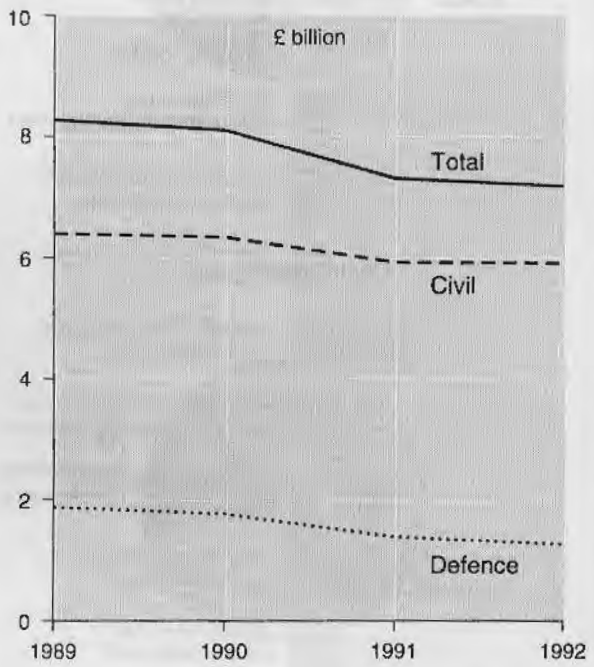


Current intramural expenditure by Central Government is analysed by type of R&D (see "definitions" below; capital expenditure is not measured on this basis). Table 7 shows that civil departments undertake mainly applied research whilst the majority of R&D in MoD establishments is experimental development. Research Council institutes conduct a higher proportion of basic research than elsewhere within Central Government.

### Business Enterprise expenditure on R&D (tables 10-13)

Since 1989 statistics have been collected separating civil and defence. Defence includes all R&D programmes undertaken primarily for defence reasons, regardless of their content or whether they have secondary civil applications.

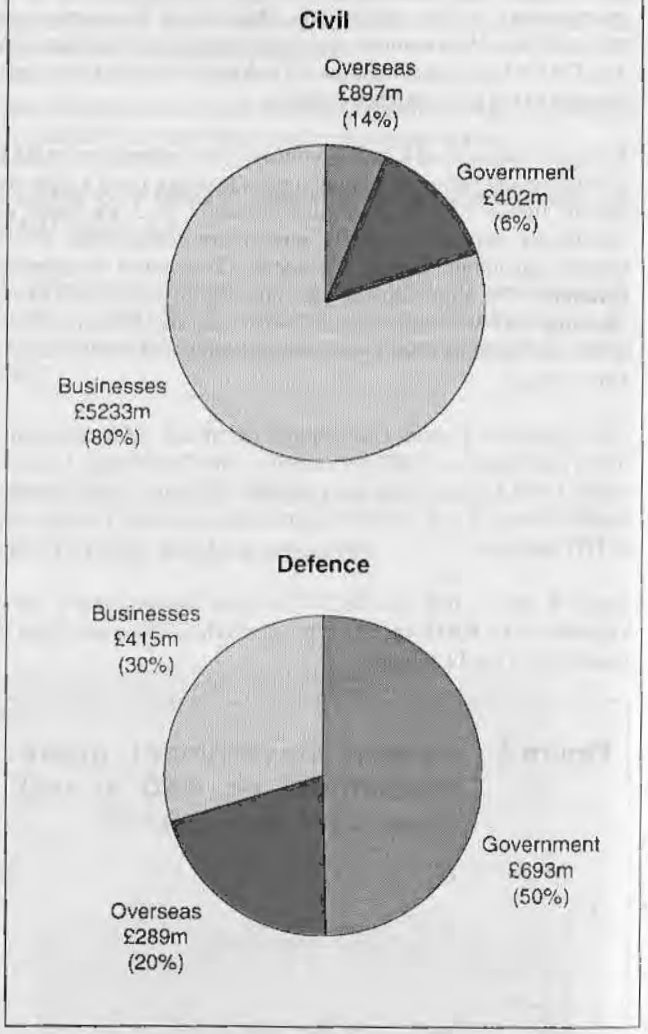
**Figure 6 Expenditure on civil and defence R&D performed by Business Enterprises in real terms, 1989 to 1992**




Total expenditure on intramural business enterprise R&D (BERD) increased from £7.8 billion in 1991 to £7.9 billion in 1992 in cash terms , a decline of 2% in real terms (table 10). Civil R&D, which represented over 82% of expenditure performed by Business Enterprises in 1992, was little changed between 1991 and 1992 (table 11). Defence R&D declined by 8% in real terms between the two years.

Table 12 shows that 80% of civil R&D performed by businesses in 1992 was funded by businesses with only 6% funded by Government. In contrast half of defence R&D performed by businesses was funded by Government.

**Figure 7 Sources of funds for Business Enterprise R&D, 1992**




### Regional R&D statistics (tables 14-15)

Policy makers in the Commission of the European Union have asked member states for regional R&D statistics. UK regional figures are now available for the Government sector and HEIs; a breakdown of the businesses sector will be available next year.

The regional estimates for the Government sector are from the CSO's survey of Government R&D.

The HEI regional R&D estimates are less reliable than the Government figures and should be treated with special caution. The expenditure estimates are obtained by allocating total R&D performed by HEIs (HERD) to individual HEIs in proportion to their income from research grants and contracts. The regional R&D personnel figures for HEIs are obtained by applying factors, representing the proportion of staff time spent on research, to staff statistics for each institution compiled by the University Statistical Record (ref 10).

Estimates are given for UK standard economic regions (NUTS1 - see definitions) and for areas qualifying as Objective 1 Areas for support from EU Structural Funds.

**Figure 8(i) Estimated regional HERD in 1992**

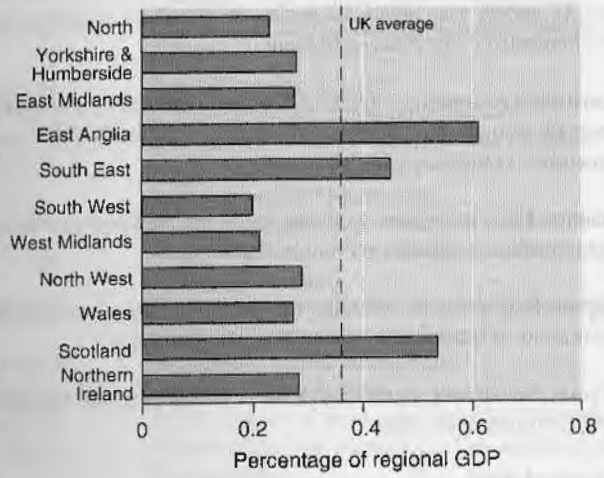



**Figure 8(ii) Estimated regional GOVERD in 1992**

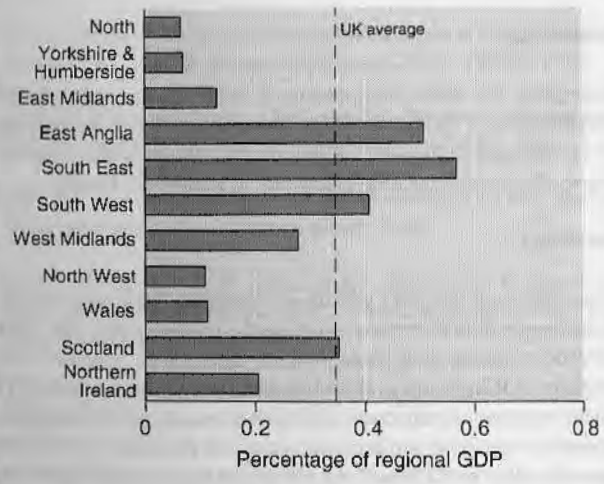



**Figure 9(i) Estimated Higher Education regional R&D employment in 1992**

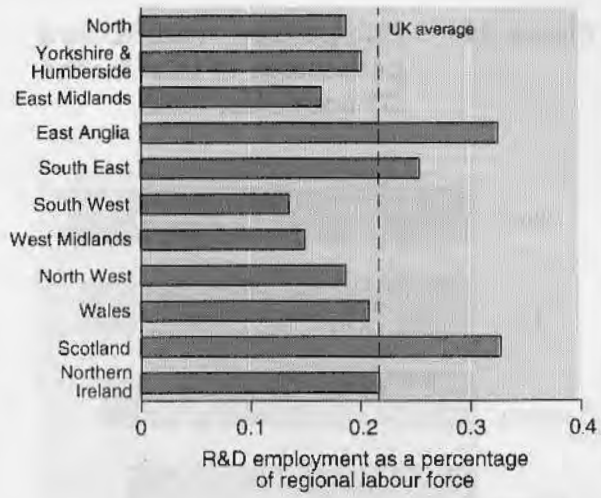
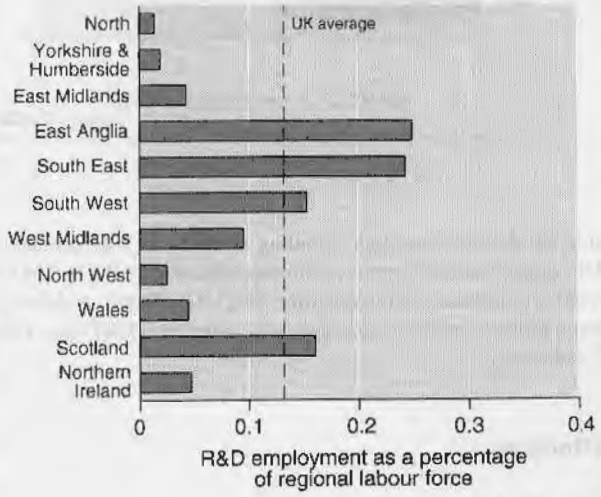



**Figure 9(ii) Estimated Government regional R&D employment in 1992**




The South East of England has by far the highest number of personnel, and largest expenditure on R&D, of the eleven NUTS1 regions. This reflects the greater size of the South East. To adjust for this difference, the R&D expenditure estimates are also shown as a percentage of GDP, and the R&D personnel estimates are shown as a percentage of the labour force. These ratios are also used in international comparisons. Within the UK they show that the South East, East Anglia, and Scotland, have the highest concentrations of R&D activity performed by Government and Higher Education in 1992.

**International comparisons (tables 16-19)**

Although the guidelines in the Frascati Manual are generally followed, methods of collecting R&D data do vary from country to country (refs 7 and 8 discuss national variations). When making international comparisons, small differences should not be treated as significant.

The figures for Japan shown in the tables are OECD estimates.

Table 16 shows the trend in GERD as a percentage of GDP for the

G7 countries in the period 1987 to 1992. The pattern has been fairly consistent over the period, with Germany, Japan and the United States at the top; Canada and Italy at the bottom; and the UK and France in the middle. Figures for 1992 are shown in figure 10.

**Figure 10 Comparison of GERD as a percentage of GDP for the G7 countries, 1992**

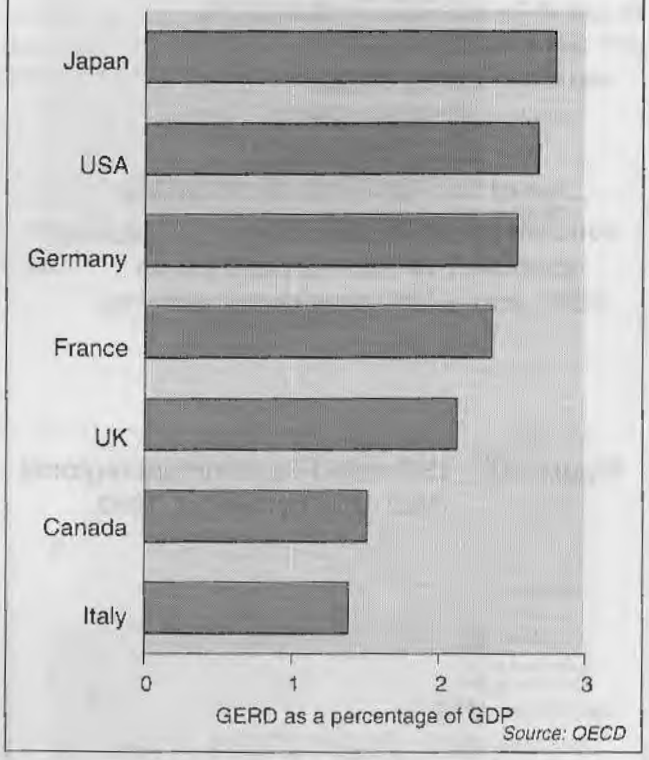



Table 18 shows government funding of R&D as a percentage of GDP. France has the highest percentage allocated to R&D. The UK occupies a middle-ranking position. The USA, France and the UK devote proportionately more resources to defence R&D than other G7 countries.

## Definitions

### Type of R&D

**Basic or fundamental research** is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view.

**Applied research** is research undertaken with either a general or a particular application in view.

**Experimental Development** is the use of the results of basic and applied research directed to the introduction of new materials, processes, products, devices and systems, or the improvement of existing ones. It should include the prototype or pilot plant stage, design and drawing required during R&D and innovative work done on contracts with outside organisations, government departments, and public bodies. Firms in the aerospace industry are asked to include expenditure on development batches.

### Sectors of the Economy

The four sectors of the economy are defined in a CSO publication (ref 5), except that higher education is identified separately as recommended in the Frascati Manual.

**Central Government** includes the central government departments, research councils, higher education funding councils, NDPBs, and Executive Agencies.

**Business Enterprises** include private businesses, public corporations, and research associations serving businesses.

**Higher Education** includes the former polytechnics and central institutions in Scotland as well as the old universities.

**Private Non-Profit** sector makes up the remainder and includes medical research charities.

### Regional data

Data is classified using the Nomenclature of Territorial Units for Statistics (NUTS) developed by EUROSTAT. NUTS provides a single, uniform breakdown of territorial units for the production of Community statistics. NUTS is a three-level hierarchical classification system. In the UK NUTS1 regions correspond to the UK's eleven Standard Economic Regions. NUTS2 regions are individual counties or groups of counties, and NUTS3 regions are individual counties and metropolitan counties.

### Rounding

Throughout the tables components of totals have been rounded independently of the totals. Therefore the rounded totals will not always be equal to the sums of the rounded components. Symbols follow the conventions used elsewhere in Economic Trends.

### Revisions

Some figures in the 1993 edition of Economic Trends have been revised in the light of improvements to the methodology. The 1991 GOVERD figures have been revised upwards to include CSO estimates of R&D work in DTI Agencies funded from outside DTI and the extra patient care costs arising from research in the NHS. The expenditure on these two areas increases the previously published figure for 1991 by £255m. They are not included in the figures for earlier years and so there is a discontinuity in the series between 1990 and 1991.

### Discontinuities

Chapter 1.1 of ref 1 gives the details. Major discontinuities arise from the transfer of UKAEA from the Government to the business sector from 1986 and reclassifying Scottish Agricultural Research Institutes as Government sector, rather than PNP, from 1992.

## Abbreviations

| | |
|---|---|
| BERD | Business Expenditure on R&D |
| EU | European Union |
| EUROSTAT | The Statistical Office of the European Communities |
| FTE | Full Time Equivalent |
| G7 | Group of Seven countries, comprising: UK, Germany, France, Italy, Japan, Canada, USA. |
| GBAORD | Government Budget Appropriations or Outlays for R&D |
| GDP | Gross Domestic Product |
| GERD | Gross (Domestic) Expenditure on R&D |
| GOVERD | Government Intramural Expenditure on R&D |
| HEFC | Higher Education Funding Council |
| HEIs | Higher Education Institutions |
| HERD | Higher Education Expenditure on R&D |
| MSTI | Main Science and Technological Indicators (an OECD publication) |
| NABS | Nomenclature for the Analysis and Comparison of Scientific Programmes and Budgets |
| NDPB | Non-Departmental Public Body |
| NHS | National Health Service |
| NUTS | Nomenclature of Territorial Units for Statistics |
| OECD | Organisation for Economic Co-operation and Development |
| OPSS | Office of Public Service and Science (see also OST) |
| ORD | Other (Private Non-Profit) R&D |
| OST | Office of Science and Technology (part of OPSS) |
| PNP | Private Non-Profit |
| R&D | Research and (Experimental) Development |
| UKAEA | United Kingdom Atomic Energy Authority |
| USR | Universities Statistical Record |

## References


(1) *Forward Look of Government-funded Science, Engineering and Technology 1994*, Statistical Supplement, OST, HMSO 1994.

(2) CSO Business Monitor MO14 1989, *Industrial Research and Development Expenditure and Employment*, HMSO, 1991.

(3) CSO First Release CSO(93)188 17 December 1993, *Business Enterprise Research and Development 1992.*

(4) *Proposed Standard Practice for Surveys of Research and Experimental Development* (The Frascati Manual), OECD Paris 1981. Next edition due in 1994.

(5) CSO Business Monitor MA23 1991, *Sector classification for the National Accounts.*

(6) CSO First Release CSO(94)42 4 March 1994, *Gross Domestic Expenditure on Research and Development 1992.*

(7) *Main Science and Technological Indicators 1994/1*, OECD, Paris 1994.

(8) *International Comparisons of Research and Development Spending*, Cabinet Office, December 1992, HMSO.

(9) *Research and Development: Annual Statistics 1993*, Eurostat, Luxembourg 1993, Theme 9 Series C.

(10) *University Statistics 1992-93*, volumes 1 and 3, University Statistical Record, Cheltenham 1994.

(11) *The Technological Specialisation of Advanced Countries*, Archibugi, D and M Pianta (1992), Kluwer Publishers, London.

## Table 1 Gross Expenditure on Research & Development (GERD) by sectors 1992 (1)(2)

£m

| Sectors providing the funds | Sectors carrying out the work: Government | Higher education | Business enterprise | Private non-profit | Totals | £m Performed Abroad r |
|---|---|---|---|---|---|---|
| Government | 1724 | 1504 | 1094 | 142 | **4464** | 391 |
| Higher education | 1 | 97 | - | - | **98** | .. |
| Business enterprise | 207 | 165 | 5650 | 246 | **6268** | .. |
| Private non-profit | 66 | 246 | - | 103 | **415** | .. |
| Abroad | 34 | 129 | 1186 | 25 | **1374** | .. |
| **TOTAL** | **2032** | **2141** | **7930** | **516** | **12619** | .. |
| **Civil** | | | | | | |
| Government | 1022 | 1476 | 401 | 134 | **3033** | 221 |
| Higher education | 1 | 97 | - | - | **98** | .. |
| Business enterprise | 139 | 145 | 5235 | 246 | **5765** | .. |
| Private non-profit | 45 | 246 | - | 103 | **394** | .. |
| Abroad | 20 | 129 | 897 | 25 | **1071** | .. |
| **TOTAL** | **1227** | **2093** | **6533** | **508** | **10361** | .. |
| **Defence** | | | | | | |
| Government | 702 | 28 | 693 | 8 | **1431** | 170 |
| Higher education | - | - | - | - | **-** | .. |
| Business enterprise | 68 | 20 | 415 | - | **503** | .. |
| Private non-profit | 21 | - | - | - | **21** | .. |
| Abroad | 14 | - | 289 | - | **303** | .. |
| **TOTAL** | **805** | **48** | **1397** | **8** | **2258** | .. |

**Notes:**
1 Government total includes Central Government and estimates of National Health Service and Local Authority R&D.
2 PNP estimates are based largely on trends in the Higher Education sector.
r = revised from figures appearing in First Release CSO (94) 42

## Table 2 Gross Expenditure on R&D (GERD) in the UK by performing sector, 1986 to 1992

| | 1986 | 1987 | 1988 | 1989 | 1990 | 1991r | 1992 |
|---|---|---|---|---|---|---|---|
| **Sector carrying out the work** | | | | | | | |
| **Expenditure in cash terms (£m):** | | | | | | | |
| Performed by: | | | | | | | |
| Government (1) | 1212 | 1264 | 1360 | 1534 | 1566 | 1879 | 2032 |
| Higher education | 1288 | 1460 | 1575 | 1689 | 1873 | 2020 | 2141 |
| Business enterprise | 5951 | 6335 | 6922 | 7650 | 8099 | 7768 | 7930 |
| Private non-profit (2) | 317 | 324 | 370 | 415 | 481 | 494 | 516 |
| **TOTAL** | **8768** | **9383** | **10227** | **11288** | **12019** | **12161** | **12619** |
| **Expenditure in real terms (£m 1990 Prices)(3) :** | | | | | | | |
| Performed by: | | | | | | | |
| Government (1) | 1575 | 1559 | 1572 | 1658 | 1566 | 1767 | 1840 |
| Higher education | 1673 | 1800 | 1820 | 1825 | 1873 | 1900 | 1939 |
| Business enterprise | 7730 | 7814 | 8000 | 8267 | 8099 | 7305 | 7182 |
| Private non-profit (2) | 411 | 400 | 428 | 449 | 481 | 465 | 467 |
| **TOTAL** | **11390** | **11573** | **11820** | **12198** | **12019** | **11437** | **11429** |
| **Total as % of GDP(4)** | **2.29** | **2.22** | **2.18** | **2.20** | **2.19** | **2.13** | **2.12** |

Notes:

1 Government total includes Central Government and estimates of National Health Service and Local Authority R&D.

2 PNP estimates are based largely on trends in the Higher Education sector.

3 Using the GDP deflator adjusted for the abolition of domestic rates.

The deflators are:

| 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|
| 77.0 | 81.1 | 86.5 | 92.5 | 100.0 | 106.3 | 110.4 |

4 Gross Domestic Product at market prices (average based) based on the UN definition.

Values are: £m

| 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|
| 383632 | 421891 | 469760 | 514241 | 549386 | 571782 | 594183 |

r = The 1991 figures for R&D performed by Government have been revised upwards to include CSO estimates of R&D work in DTI Agencies funded from outside DTI, and the extra patient care costs arising from research in the NHS. The expenditure on these two areas increases the previously published figure for 1991 by £255m. Revisions have not been made to the figures or earlier years and so there is a discontinuity in the series between 1990 and 1991.

## Table 3 Gross Expenditure on R&D (GERD) in the UK by source of funds, 1986 to 1992

| | 1986 | 1987 | 1988 | 1989 | 1990 | 1991r | 1992 |
|---|---|---|---|---|---|---|---|
| **Sector providing funds** | | | | | | | |
| **Expenditure in cash terms (£m):** | | | | | | | |
| Funded by: | | | | | | | |
| Government (1) | 3541 | 3640 | 3665 | 4032 | 4225 | 4316 | 4464 |
| Higher education | 54 | 65 | 77 | 81 | 84 | 90 | 98 |
| Business enterprise | 4199 | 4643 | 5331 | 5788 | 6007 | 5994 | 6268 |
| Private non-profit (2) | 174 | 195 | 217 | 253 | 309 | 362 | 415 |
| Abroad | 800 | 840 | 937 | 1134 | 1394 | 1399 | 1374 |
| **TOTAL** | **8768** | **9383** | **10227** | **11288** | **12019** | **12161** | **12619** |
| **Expenditure in real terms (£m 1990 Prices) (3) :** | | | | | | | |
| Funded by: | | | | | | | |
| Government (1) | 4600 | 4489 | 4235 | 4357 | 4225 | 4059 | 4043 |
| Higher education | 70 | 80 | 89 | 88 | 84 | 84 | 89 |
| Business enterprise | 5455 | 5726 | 6162 | 6255 | 6007 | 5637 | 5677 |
| Private non-profit (2) | 226 | 241 | 251 | 273 | 309 | 340 | 376 |
| Abroad | 1039 | 1036 | 1083 | 1224 | 1394 | 1316 | 1244 |
| **TOTAL** | **11390** | **11573** | **11820** | **12198** | **12019** | **11437** | **11429** |
| **Total as % GDP (4)** | **2.29** | **2.22** | **2.18** | **2.20** | **2.19** | **2.13** | **2.12** |

**Notes:**
1 Government total includes Central Government and estimates of National Health Service and Local Authority R&D.
2 PNP estimates are based largely on trends in the Higher Education sector.
3 Using the GDP deflator adjusted for the abolition of domestic rates (see Table 2).
4 Gross Domestic Product at market prices (average based) based on the UN definition (see Table 2).
r = revised (see table 2)

## Table 4 Total employment on R&D by sectors, 1986 to 1992

| | Full time equivalents, 000 | | | | |
|---|---|---|---|---|---|
| | Government | Higher education | Business enterprise | Private non-profit | Total |
| 1986 | 38 | 52 | 188 | 13 | 291 |
| 1987 | 38 | 53 | 185 | 12 | 288 |
| 1988 | 37 | 55 | 185 | 13 | 290 |
| 1989 | 36 | 55 | 176 | 14 | 281 |
| 1990 | 37 | 57 | 165 | 15 | 274 |
| 1991 | 36 | 59 | 150 | 14 | 260 |
| 1992 | 38 | 62 | 142 | 13 | 255 |

## Table 5 Central Government expenditure on R&D, 1984-85 to 1992-93

| | 1984-85 | 1985-86 | 1986-87 | 1987-88 | 1988-89 | 1989-90 | 1990-91 | 1991-92 | 1992-93 |
|---|---|---|---|---|---|---|---|---|---|
| **At current prices (£m)** | | | | | | | | | |
| Intramural | 1368 | 1451 | 1207 | 1256 | 1348 | 1524 | 1556 | 1614 | 1754 |
| Extramural (1) | 2868 | 3150 | 3243 | 3227 | 3227 | 3317 | 3518 | 3703 | 3695 |
| **Total Gross Expenditure** | **4236** | **4601** | **4450** | **4483** | **4575** | **4841** | **5075** | **5317** | **5449** |
| less receipts | 271 | 348 | 188 | 169 | 183 | 203 | 240 | 269 | 251 |
| **Total Net Expenditure** | **3964** | **4253** | **4263** | **4314** | **4392** | **4638** | **4835** | **5048** | **5199** |
| **In real terms (£m 1990 prices) (2)** | | | | | | | | | |
| Intramural | 1931 | 1940 | 1568 | 1549 | 1558 | 1647 | 1556 | 1518 | 1589 |
| Extramural (1) | 4047 | 4211 | 4213 | 3980 | 3729 | 3585 | 3518 | 3482 | 3347 |
| **Total Gross Expenditure** | **5978** | **6151** | **5781** | **5529** | **5287** | **5232** | **5075** | **5000** | **4935** |
| less receipts | 383 | 465 | 244 | 208 | 211 | 219 | 240 | 253 | 227 |
| **Total Net Expenditure** | **5595** | **5687** | **5537** | **5321** | **5076** | **5012** | **4835** | **4747** | **4708** |
| **As a percentage of total gross expenditure** | | | | | | | | | |
| Intramural | 32 | 32 | 27 | 28 | 29 | 31 | 31 | 30 | 32 |
| Extramural (1) | 68 | 68 | 73 | 72 | 71 | 69 | 69 | 70 | 68 |
| **Total Gross Expenditure** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |

**Notes:**

1 Including work performed overseas, but excluding UK contribution to EU budget in respect of R&D. This contribution was estimated to be £251m in 1992 (based on the total cost of EU R&D programmes and the UK's contributions to the total EU budget).

2 Using the GDP deflator adjusted for the abolition of domestic rates (see table 2).

## Table 6 Destination of gross Central Government expenditure on R&D, 1992-93

| | Intramural expenditure(1) | | | Extramural expenditure | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Current | Capital | Total Intramural | Higher Education | Business Enterprise | Other Extramural | Overseas | Total Extramural | TOTAL GROSS EXPENDITURE |
| **OPSS** | - | - | - | 3 | - | 17 | - | 20 | 20 |
| **Research Councils** | | | | | | | | | |
| **AFRC** | 92 | 8 | 100 | 30 | - | - | - | 31 | 131 |
| **ESRC** | 4 | - | 4 | 38 | - | - | - | 38 | 43 |
| **MRC** | 127 | 22 | 149 | 82 | - | 6 | 5 | 92 | 242 |
| **NERC** | 108 | 21 | 129 | 32 | - | - | 2 | 34 | 162 |
| **SERC** | 131 | 21 | 152 | 199 | - | 72 | 104 | 376 | 528 |
| **Total OPSS and Research Councils** | 462 | 72 | 534 | 384 | 1 | 95 | 111 | 591 | 1125 |
| **Higher Education Funding Councils** | | | | | | | | | |
| **HEFC** | - | - | - | 963 | - | - | - | 963 | 963 |
| **Total Higher Education Funding Councils** | - | - | - | 963 | - | - | - | 963 | 963 |
| **Civil Departments** | | | | | | | | | |
| **MAFF** | 84 | 8 | 92 | 9 | 6 | 1 | - | 16 | 108 |
| **DFE** | 7 | - | 7 | 29 | - | 7 | - | 36 | 43 |
| **ED** | 5 | - | 5 | 5 | 43 | 1 | - | 49 | 54 |
| **DOE** | 31 | 1 | 31 | 7 | 32 | 4 | - | 42 | 74 |
| **DH** | 28 | 2 | 30 | 21 | 2 | 3 | - | 26 | 56 |
| **DSS** | - | - | - | 1 | 1 | - | - | 2 | 3 |
| **HSC** | 8 | 2 | 10 | 3 | 18 | 1 | - | 22 | 32 |
| **HO** | 11 | 1 | 12 | 2 | 6 | 1 | - | 9 | 21 |
| **DNH** | 14 | 1 | 15 | 2 | - | - | - | 3 | 17 |
| **ODA** | 16 | 1 | 16 | 22 | 2 | 5 | 32 | 61 | 77 |
| **DTI** | 52 | - | 52 | 14 | 251 | 1 | 77 | 342 | 394 |
| **DOT** | 35 | 4 | 39 | 1 | 2 | - | - | 3 | 42 |
| **NI departments** | 22 | - | 22 | 2 | 9 | - | - | 12 | 34 |
| **SO** | 60 | 7 | 67 | 9 | 1 | 2 | - | 13 | 80 |
| **WO** | - | - | - | 1 | - | - | - | 1 | 1 |
| **Other departments** | 14 | - | 14 | 1 | - | - | - | 1 | 15 |
| **Total civil departments** | 388 | 27 | 415 | 128 | 374 | 26 | 110 | 637 | 1052 |
| **Total civil R&D** | 850 | 99 | 949 | 1475 | 375 | 120 | 221 | 2192 | 3140 |
| **MOD (2)** | 722 | 83 | 805 | 29 | 1296 | 8 | 170 | 1504 | 2309 |
| **TOTAL** | 1572 | 183 | 1754 | 1504 | 1671 | 129 | 391 | 3695 | 5449 |
| of which: | | | | | | | | | |
| **Natural Sciences & Engineering** | .. | .. | 1704 | 1163 | 1619 | 114 | 385 | 3282 | 4986 |
| **Social Sciences & Humanities** | .. | .. | 50 | 341 | 52 | 14 | 6 | 414 | 464 |

Notes:

1 Includes intramural R&D funded by other departments.

2 MOD's extramural expenditure with business's includes £556 million spent on international collaborative projects.

**Table 7 Central Government current expenditure on intramural R&D by department and type of activity, 1992-93. (1)**

£m

| | Basic | Applied | Experimental development | TOTAL |
|---|---|---|---|---|
| OPSS | - | - | - | - |
| **Research Councils** | | | | |
| AFRC | 64 | 28 | - | 92 |
| ESRC | 4 | - | - | 4 |
| MRC | 57 | 70 | - | 127 |
| NERC | 27 | 72 | 9 | 108 |
| SERC | 55 | 76 | - | 131 |
| **Total OPSS & Research Councils** | **207** | **246** | **9** | **462** |
| **Civil departments** | | | | |
| MAFF | 13 | 45 | 26 | 84 |
| DFE | - | 7 | - | 7 |
| ED | - | 3 | 2 | 5 |
| DOE | 2 | 28 | 1 | 31 |
| DH | - | 15 | 13 | 28 |
| DSS | - | - | - | - |
| HSC | - | 7 | 1 | 8 |
| HO | - | 8 | 3 | 11 |
| DNH | 12 | 2 | - | 14 |
| ODA | 1 | 12 | 3 | 16 |
| DTI | - | 39 | 13 | 52 |
| DOT | - | 29 | 6 | 35 |
| NI departments | 3 | 18 | 2 | 22 |
| SO | 12 | 46 | 2 | 60 |
| WO | - | - | - | - |
| Other departments | 1 | 10 | 3 | 14 |
| **Total civil departments** | **42** | **271** | **74** | **388** |
| **Total civil** | **250** | **517** | **83** | **850** |
| MoD | - | 315 | 407 | 722 |
| **TOTAL** | **250** | **832** | **490** | **1572** |

**Notes:**

1 Higher Education Funding Councils have no intramural expenditure on R&D. Their funds are allocated to Higher Education Institutions whose expenditure falls in the Higher Education sector.

**Table 8 Central Government net expenditure on R&D by socio-economic objectives, 1992-93, using the Nomenclature for the Analysis and Comparison of Science Programmes and Budgets (NABS) developed by EUROSTAT.(1)(2)**

| Description | | £000 | Percentage of chapter totals | Percentage of overall total |
|---|---|---|---|---|
| **Chapter 1** | **Exploration and exploitation of the Earth** | | | |
| 1.0 | General research | 89149 | 79.8 | |
| 1.3 | Earth's crust and mantle excluding sea-bed | 2069 | 1.9 | |
| 1.4 | Hydrology | 2630 | 2.4 | |
| 1.5 | Sea and oceans | 1564 | 1.4 | |
| 1.6 | Atmosphere | 16347 | 14.6 | |
| **total 1** | | **111759** | **100.0** | **2.1** |
| **Chapter 2** | **Infrastructure and general planning of land-use** | | | |
| 2.0 | General research | 5002 | 5.9 | |
| 2.1 | General planning of land-use | 10946 | 12.8 | |
| 2.2 | Construction and planning of buildings | 27112 | 31.7 | |
| 2.3 | Civil engineering | 23578 | 27.6 | |
| 2.4 | Transport systems | 13833 | 16.2 | |
| 2.5 | Telecommunication systems | 105 | 0.1 | |
| 2.6 | Water supply | 4887 | 5.7 | |
| **total 2** | | **85463** | **100.0** | **1.6** |
| **Chapter 3** | **Control of environmental pollution** | | | |
| 3.0 | General research | 28317 | 36.3 | |
| 3.1 | Water pollution | 17510 | 22.4 | |
| 3.2 | Atmospheric pollution | 12446 | 15.9 | |
| 3.3 | Soil and substratum pollution | 3144 | 4.0 | |
| 3.4 | Noise and vibration | 1519 | 1.9 | |
| 3.5 | Radioactive pollution | 10559 | 13.5 | |
| 3.6 | Thermal pollution | 26 | 0.0 | |
| 3.7 | Pollution by solid waste material | 4371 | 5.6 | |
| 3.9 | Other scientific research on the pollution of the environment | 140 | 0.2 | |
| **total 3** | | **78032** | **100.0** | **1.5** |
| **Chapter 4** | **Protection and promotion of human health** | | | |
| 4.0 | General research | 246005 | 77.1 | |
| 4.1 | Medical research, hospital treatment, surgery | 8253 | 2.6 | |
| 4.2 | Preventive medicine | 3500 | 1.1 | |
| 4.3 | Biomedical engineering and medicines | 9734 | 3.1 | |
| 4.4 | Occupational medicine | 7511 | 2.4 | |
| 4.5 | Nutrition and food hygiene | 26463 | 8.3 | |
| 4.6 | Drug abuse and addiction | 664 | 0.2 | |
| 4.7 | Social medicine | 7308 | 2.3 | |
| 4.8 | Hospital structure and organisation of medical care | 5489 | 1.7 | |
| 4.9 | Other medical research | 4146 | 1.3 | |
| **total 4** | | **319073** | **100.0** | **6.1** |
| **Chapter 5** | **Production, distribution and rational utilisation of energy** | | | |
| 5.0 | General research | 3020 | 2.4 | |
| 5.1 | Fossil fuels and their derivatives | 6776 | 5.4 | |
| 5.2 | Nuclear fission | 66387 | 52.6 | |
| 5.3 | Nuclear fusion | 19700 | 15.6 | |
| 5.4 | Renewable energy sources | 23239 | 18.4 | |
| 5.5 | Rational utilisation of energy | 814 | 0.6 | |
| 5.9 | Other research on production, distribution and rational utilisation of energy | 6373 | 5.0 | |
| **total 5** | | **126309** | **100.0** | **2.4** |
| **Chapter 6** | **Agricultural production and technology** | | | |
| 6.0 | General research | 43598 | 16.7 | |
| 6.1 | Animal products | 25724 | 9.9 | |

| | | | | |
|---|---|---|---|---|
| 6.2 | Fishing and fish-farming | 13961 | 5.4 | |
| 6.3 | Veterinary medicine | 38053 | 14.6 | |
| 6.4 | Crops | 90856 | 34.9 | |
| 6.5 | Forestry and timber production | 20813 | 8.0 | |
| 6.6 | Food technology | 14499 | 5.6 | |
| 6.9 | Other research on agricultural production and technology | 13018 | 5.0 | |
| **total 6** | | **260522** | **100.0** | **5.0** |
| **Chapter 7** | **Industrial production and technology** | | | |
| 7.0 | General research | 403762 | 103.1 | |
| 7.1 | Increasing economic efficiency and competitiveness | 3576 | 0.9 | |
| 7.2 | Manufacturing and processing techniques and materials research | 1141 | 0.3 | |
| 7.3 | Extraction and processing of non-energy minerals and derived products | 166 | 0.0 | |
| 7.5 | Manufacture of motor vehicles and other means of transport | -21185 | -5.4 | |
| 7.7 | Electrical and electronic engineering | 899 | 0.2 | |
| 7.8 | Mechanical and instrument engineering and other metal industries | 2494 | 0.6 | |
| 7.9 | Other manufacturing industries | 834 | 0.2 | |
| **total 7** | | **391687** | **100.0** | **7.5** |
| **chapter 8** | **Social structures and relationships** | | | |
| 8.0 | Research of a general nature | 26426 | 20.7 | |
| 8.1 | Education, training, recurrent education and retraining | 75517 | 59.3 | |
| 8.2 | Cultural activities | 2079 | 1.6 | |
| 8.3 | Management of businesses and institutions | 3261 | 2.6 | |
| 8.4 | Improvement of working conditions | 507 | 0.4 | |
| 8.5 | Social security systems | 4028 | 3.2 | |
| 8.6 | Political structure of society | 948 | 0.7 | |
| 8.7 | Social change, social processes and social conflicts | 4487 | 3.5 | |
| 8.9 | Other research with regard to society | 10114 | 7.9 | |
| **total 8** | | **127366** | **100.0** | **2.5** |
| **Chapter 9** | **Exploration and exploitation of space** | | | |
| 9.0 | Research of a general nature | 62847 | 42.5 | |
| 9.1 | Scientific exploration of space | 3141 | 2.1 | |
| 9.2 | Applied research programmes | 80510 | 54.4 | |
| 9.3 | Launch systems | 1156 | 0.8 | |
| 9.4 | Space laboratories and space travel | 287 | 0.2 | |
| **total 9** | | **147941** | **100.0** | **2.8** |
| **Chapter 10** | **Research financed from General University Funds (GUF)** | | | |
| **total 10** | | **963300** | **100.0** | **18.5** |
| **Chapter 11** | **Non-oriented research** | | | |
| 11.0 | Multi-disciplinary research | 61396 | 17.6 | |
| 11.1 | Mathematics and natural sciences | 255314 | 73.3 | |
| 11.4 | Agricultural sciences | 19295 | 5.5 | |
| 11.5 | Social sciences and humanities | 12322 | 3.5 | |
| **total 11** | | **348327** | **100.0** | **6.7** |
| **Chapter 12** | **Other civil research** | | | |
| **total 12** | | **23177** | **100.0** | **0.4** |
| **Chapter 13** | **Defence** | | | |
| **total 13** | | **2215590** | **100.0** | **42.6** |
| **TOTAL** | | **5198546** | **100.0** | **100.0** |

**Notes:**
1Subject codes where expenditure is nil are not listed.
2EUROSTAT is the Statistical Office of the European Communities.

## Table 9 Total personnel engaged on R&D within Central Government, by department, 1986-87 to 1992-93 (1)

full time equivalents

| | 1986-87 | 1987-88 | 1988-89 | 1989-90 | 1990-91 | 1991-92 | 1992-93 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | total | of which: researchers | technicians | supporting staff |
| OPSS | - | - | - | - | - | - | - | - | - | - |
| Research Councils | | | | | | | | | | |
| AFRC | 4856 | 4626 | 4286 | 4211 | 4000 | 3480 | 3523 | 1930 | 226 | 1367 |
| ESRC | 101 | 101 | 110 | 111 | 113 | 115 | 111 | - | - | 111 |
| MRC | 3646 | 3626 | 3339 | 3263 | 3239 | 3303 | 3340 | 1130 | 1228 | 982 |
| NERC | 2474 | 2475 | 2529 | 2720 | 2836 | 2967 | 2936 | 1495 | 476 | 965 |
| SERC | 2780 | 2717 | 2706 | 2729 | 2678 | 2511 | 2683 | 1017 | 307 | 1360 |
| **Total OPSS and Research Councils** | **13857** | **13545** | **12970** | **13034** | **12866** | **12376** | **12593** | **5571** | **2237** | **4785** |
| **Civil Departments** | | | | | | | | | | |
| MAFF | 1924 | 1919 | 2201 | 1801 | 2514 | 2420 | 2552 | 937 | 578 | 1037 |
| DFE | 13 | 13 | 12 | 12 | 8 | 20 | 62 | 34 | - | 28 |
| ED | 73 | 174 | 186 | 199 | 211 | 204 | 211 | 105 | 7 | 99 |
| DOE | 897 | 909 | 867 | 890 | 916 | 847 | 731 | 424 | 63 | 244 |
| DHSS | 632 | 552 | - | - | - | - | - | - | - | - |
| DH | - | - | 617 | 628 | 634 | 613 | 588 | 279 | 173 | 136 |
| DSS | - | - | 14 | 18 | 20 | 19 | 19 | 14 | - | 5 |
| HSC | 105 | 113 | 113 | 98 | 96 | 107 | 214 | 113 | 26 | 75 |
| HO | 278 | 253 | 244 | 251 | 264 | 279 | 286 | 201 | 20 | 66 |
| DNH | - | - | - | - | - | - | 336 | 222 | 57 | 57 |
| ODA | 306 | 211 | 200 | 211 | 189 | 238 | 241 | 167 | 39 | 35 |
| DTI | 1257 | 1236 | 1083 | 1078 | 1084 | 962 | 1006 | 510 | 126 | 370 |
| DOT | 652 | 660 | 638 | 614 | 644 | 633 | 695 | 348 | 68 | 279 |
| NI departments (2) | 508 | 502 | 495 | 526 | 544 | 518 | 315 | 53 | 158 | 104 |
| SO (3) | 393 | 399 | 453 | 486 | 490 | 457 | 2042 | 698 | 636 | 708 |
| WO | 10 | 9 | 10 | 11 | 16 | 18 | 2 | - | - | 2 |
| Other departments | 1085 | 1108 | 1099 | 1070 | 710 | 681 | 431 | 113 | 101 | 217 |
| **Total civil departments** | **8133** | **8058** | **8232** | **7893** | **8340** | **8016** | **9730** | **4217** | **2052** | **3461** |
| **Total civil** | **21990** | **21603** | **21202** | **20927** | **21206** | **20392** | **22323** | **9788** | **4289** | **8246** |
| **MOD** | 16331 | 16258 | 16206 | 15282 | 15831 | 15597 | 15304 | 5276 | 2354 | 7674 |
| **TOTAL PERSONNEL** | **38321** | **37861** | **37408** | **36209** | **37037** | **35989** | **37627** | **15064** | **6643** | **15920** |

**Notes:**

1 A full description of discontinuities is given in chapter 1.1 of reference 1.

2 Figures prior to 1992-93 includes staff engaged on activities no longer considered to be R&D.

3 Figures for 1992-93 include staff at Scottish Agricultural Research Institutes, Scottish Agricultural College and Scottish Natural Heritage.

## Table 10 Expenditure on R&D performed by Business Enterprises, by broad product group, 1986 to 1992

**(i) in cash terms (£m):**

| | 1986 | 1987 | 1988 | 1989 | 1990r | 1991 | 1992 | % change 1986 to 1992 |
|---|---|---|---|---|---|---|---|---|
| **All product groups** | **5951** | **6335** | **6922** | **7650** | **8099** | **7767** | **7930** | **33** |
| All manufactured products | 5070 | 5372 | 5933 | 6512 | 6979 | 6644 | 6866 | 35 |
| Chemicals and pharmaceuticals | 1038 | 1303 | 1574 | 1691 | 1957 | 1886 | 2086 | 101 |
| Mechanical engineering | 218 | 241 | 225 | 265 | 310 | 310 | 316 | 45 |
| Electronics | 2000 | 1902 | 2161 | 2253 | 2383 | 2180 | 2275 | 14 |
| Other electrical engineering | 153 | 142 | 147 | 114 | 126 | 102 | 104 | -32 |
| Motor vehicles | 394 | 451 | 468 | 484 | 501 | 525 | 538 | 37 |
| Aerospace | 830 | 871 | 850 | 1090 | 1122 | 1121 | 1021 | 23 |
| Other manufactured products | 438 | 463 | 509 | 614 | 579 | 519 | 528 | 21 |
| Non-manufactured products | 880 | 964 | 989 | 1138 | 1120 | 1124 | 1063 | 21 |

**(ii) in real terms (£m 1990 prices) (1):**

| | 1986 | 1987 | 1988 | 1989 | 1990r | 1991 | 1992 | % change 1986 to 1992 |
|---|---|---|---|---|---|---|---|---|
| **All product groups** | **7731** | **7813** | **8000** | **8267** | **8099** | **7304** | **7182** | **-7** |
| All manufactured products | 6586 | 6626 | 6857 | 7037 | 6979 | 6247 | 6219 | -6 |
| Chemicals and pharmaceuticals | 1348 | 1607 | 1819 | 1827 | 1957 | 1774 | 1889 | 40 |
| Mechanical engineering | 283 | 297 | 260 | 286 | 310 | 292 | 286 | 1 |
| Electronics | 2598 | 2346 | 2498 | 2435 | 2383 | 2050 | 2060 | -21 |
| Other electrical engineering | 199 | 175 | 170 | 123 | 126 | 96 | 94 | -53 |
| Motor vehicles | 512 | 556 | 541 | 523 | 501 | 494 | 487 | -5 |
| Aerospace | 1078 | 1074 | 982 | 1178 | 1122 | 1054 | 924 | -14 |
| Other manufactured products | 569 | 571 | 588 | 664 | 579 | 488 | 478 | -16 |
| Non-manufactured products | 1143 | 1189 | 1143 | 1230 | 1120 | 1057 | 963 | -16 |

**Notes:**

1 Using the GDP deflator (see table 2)

## Table 11 Expenditure on civil and defence R&D performed by Business Enterprises, 1989 to 1992

**(i) in cash terms (£m)**

| | Civil | | | | Defence | | | |
|---|---|---|---|---|---|---|---|---|
| | 1989 | 1990 | 1991 | 1992 | 1989 | 1990 | 1991 | 1992 |
| **All product groups** | **5923** | **6339** | **6301** | **6532** | **1727** | **1761** | **1466** | **1397** |
| All manufactured products | 4872 | 5314 | 5264 | 5545 | 1640 | 1665 | 1379 | 1321 |
| Chemicals and pharmaceuticals | 1673 | 1944 | 1870 | 2066 | 19 | 14 | 17 | 20 |
| Mechanical engineering | 175 | 171 | 160 | 208 | 90 | 139 | 150 | 108 |
| Electronics | 1539 | 1703 | 1662 | 1750 | 715 | 680 | 518 | 525 |
| Other electrical engineering | 108 | 121 | 99 | 103 | 5 | 5 | 3 | 1 |
| Motor vehicles | 476 | 485 | 515 | 522 | 8 | 16 | 10 | 16 |
| Aerospace | 335 | 355 | 474 | 397 | 755 | 767 | 647 | 623 |
| Other manufactured products | 566 | 536 | 485 | 500 | 48 | 44 | 34 | 28 |
| Non-manufactured products | 1051 | 1025 | 1037 | 987 | 87 | 96 | 87 | 76 |

**(ii) in real terms (£m 1990 prices)(1):**

| | Civil | | | | Defence | | | |
|---|---|---|---|---|---|---|---|---|
| | 1989 | 1990 | 1991 | 1992 | 1989 | 1990 | 1991 | 1992 |
| **All product groups** | **6401** | **6339** | **5926** | **5916** | **1866** | **1761** | **1379** | **1265** |
| All manufactured products | 5265 | 5314 | 4951 | 5022 | 1772 | 1665 | 1297 | 1196 |
| Chemicals and pharmaceuticals | 1808 | 1944 | 1758 | 1871 | 21 | 14 | 16 | 18 |
| Mechanical engineering | 189 | 171 | 150 | 188 | 97 | 139 | 141 | 98 |
| Electronics | 1663 | 1703 | 1563 | 1585 | 773 | 680 | 487 | 475 |
| Other electrical engineering | 117 | 121 | 93 | 94 | 5 | 5 | 3 | 1 |
| Motor vehicles | 514 | 485 | 484 | 473 | 9 | 16 | 9 | 15 |
| Aerospace | 362 | 355 | 446 | 360 | 816 | 767 | 608 | 565 |
| Other manufactured products | 612 | 536 | 456 | 452 | 52 | 44 | 32 | 25 |
| Non-manufactured products | 1136 | 1025 | 975 | 894 | 94 | 96 | 82 | 69 |

**Notes:**
1 Using the GDP deflator (see table 2)

## Table 12 Sources of funds for Business Enterprise R&D, 1986 to 1992

£m, cash terms

| | | Government | Overseas | Mainly own resources (1) | Total |
|---|---|---|---|---|---|
| **1986** | | 1392 | 727 | 3832 | **5951** |
| **1987** | | 1267 | 760 | 4308 | **6335** |
| **1988** | | 1177 | 831 | 4914 | **6922** |
| **1989** | | 1312 | 1023 | 5315 | **7650** |
| **1990** | | 1355 | 1255 | 5489 | **8099** |
| **1991** | | 1135 | 1240 | 5393 | **7767** |
| **1992** | | 1094 | 1186 | 5649 | **7930** |
| of which: | civil | 402 | 897 | 5233 | 6532 |
| | defence | 693 | 289 | 415 | 1397 |

%

| | | Government | Overseas | Mainly own resources (1) | Total |
|---|---|---|---|---|---|
| **1986** | | 23 | 12 | 65 | **100** |
| **1987** | | 20 | 12 | 68 | **100** |
| **1988** | | 17 | 12 | 71 | **100** |
| **1989** | | 17 | 13 | 69 | **100** |
| **1990** | | 17 | 15 | 68 | **100** |
| **1991** | | 15 | 16 | 69 | **100** |
| **1992** | | 14 | 15 | 71 | **100** |
| of which: | civil | 6 | 14 | 80 | 100 |
| | defence | 50 | 21 | 29 | 100 |

**Notes:**
1 Includes own funds and funds from other UK businesses.

## Table 13 Total personnel engaged on R&D within Business Enterprises, 1986 to 1992

Full time equivalents, 000

| | | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|
| **Scientists and engineers** | | 87 | 87 | 89 | 85 | 80 | 75 | 71 |
| of which: | civil | | | 66 | 64 | 62 | 58 | |
| | defence | | | | 19 | 16 | 12 | 13 |
| **Technicians, laboratory assistants and draughtsmen** | | 49 | 49 | 46 | 46 | 41 | 36 | 34 |
| of which: | civil | | | 37 | 33 | 29 | 28 | |
| | defence | | | | 9 | 8 | 7 | 6 |
| **Administrative, clerical, industrial and other staff** | | 52 | 49 | 50 | 45 | 44 | 39 | 37 |
| of which: | civil | | | 36 | 35 | 33 | 30 | |
| | defence | | | | 9 | 9 | 7 | 6 |
| **TOTAL** | | **188** | **185** | **185** | **176** | **165** | **150** | **142** |

## Table 14 Estimated regional breakdown of expenditure on intramural R&D in the Government and Higher Education sectors, 1992 (1)(2)

| Regions | R&D performed within Higher Education Institutions (HERD) | | R&D performed within Government Establishments (GOVERD)(2) | |
|---|---|---|---|---|
| | £m | % of regional GDP | £m | % of regional GDP |
| North | 67 | 0.23 | 19 | 0.06 |
| Yorkshire & Humberside | 132 | 0.28 | 33 | 0.07 |
| East Midlands | 109 | 0.28 | 52 | 0.13 |
| East Anglia | 133 | 0.61 | 111 | 0.51 |
| South East | 946 | 0.45 | 1189 | 0.57 |
| South West | 92 | 0.20 | 188 | 0.41 |
| West Midlands | 107 | 0.21 | 139 | 0.28 |
| North West | 172 | 0.29 | 64 | 0.11 |
| **Total England** | **1758** | **0.35** | **1795** | **0.36** |
| Wales | 70 | 0.27 | 29 | 0.11 |
| Scotland | 275 | 0.54 | 181 | 0.35 |
| Northern Ireland | 38 | 0.28 | 28 | 0.20 |
| **UK Total (3)** | **2141** | **0.36** | **2032** | **0.34** |

**1992 HERD and GOVERD by Objective One Areas(4)**

| Areas | £m | % of area GDP | £m | % of area GDP |
|---|---|---|---|---|
| Merseyside | 55 | 0.50 | 9 | 0.08 |
| Highlands & Islands | - | - | 3 | 0.10 |
| Northern Ireland | 38 | 0.28 | 28 | 0.20 |

**Notes:**

1 Regional breakdown is based on the NUTS1 (Nomenclature of Territorial Units for Statistics) classification developed by the Statistical Office of the European Communities.

2 These statistics relate to R&D performed in each sector. For example, the figures for Government R&D expenditure include R&D in government establishments only; they do not include government grants and contracts for R&D performed in businesses or in HEIs.

3 Government total includes Central Government plus estimates of NHS and Local Authorities R&D.

4 Objective One areas are areas which qualify for support from EU Structural Funds.

## Table 15 Estimated regional breakdown of personnel engaged on R&D in the Government and Higher Education sectors, 1992 (1)

| Region | R&D performed within Higher Education Institutions(2) | | R&D performed within Government Establishments(3) | |
|---|---|---|---|---|
| | Full time equivalents 000 | as a % of the regional Labour Force(4) | Full time equivalents 000 | as a % of the regional Labour Force(4) |
| North | 2.7 | 0.19 | 0.19 | 0.01 |
| Yorkshire & Humberside | 4.9 | 0.20 | 0.46 | 0.02 |
| East Midlands | 3.4 | 0.16 | 0.87 | 0.04 |
| East Anglia | 3.5 | 0.32 | 2.70 | 0.25 |
| South East | 22.8 | 0.25 | 21.78 | 0.24 |
| South West | 3.2 | 0.13 | 3.58 | 0.15 |
| West Midlands | 3.8 | 0.15 | 2.42 | 0.09 |
| North West | 5.6 | 0.19 | 0.74 | 0.02 |
| **Total England** | **49.7** | **0.21** | **32.75** | **0.14** |
| Wales | 2.7 | 0.21 | 0.57 | 0.04 |
| Scotland | 8.0 | 0.33 | 3.99 | 0.16 |
| Northern Ireland | 1.5 | 0.22 | 0.32 | 0.05 |
| **UK Total** | **61.9** | **0.22** | **37.63** | **0.13** |

**Objective One Areas, 1992(5)**

| Areas | Full time equivalents 000 | as a % of the area Labour Force(4) | Full time equivalents 000 | as a % of the area Labour Force(4) |
|---|---|---|---|---|
| Merseyside | 1.5 | 0.22 | 0.12 | 0.02 |
| Highlands & Islands | - | - | 0.05 | 0.04 |
| Northern Ireland | 1.5 | 0.22 | 0.32 | 0.05 |

**Notes:**

1 Regional breakdown is based on the NUTS1 (Nomenclature of Territorial Units for Statistics) classification developed by the Statistical Office of the European Communities.

2 Higher education figures are shown to fewer decimal places than government figures because the estimation method used is less reliable.

3 Government sector covers Central Government only. NHS and Local Authorities are excluded.

4 Labour Force figure used is a head count. An estimate of the labour force in full-time equivalents (FTE) is not available. Using the head count figure gives a lower percentage than a FTE figure would give.

5 Objective One areas are areas which qualify for support from EU Structural Funds.

**Table 16 OECD Science and Technology indicators**
**Gross Expenditure on R&D: International Comparisons, 1987 to 1992**

| | Year | UK | Germany (1) | France | Italy | Japan (2) | Canada | USA |
|---|---|---|---|---|---|---|---|---|
| **Gross Domestic** | 1987 | 421.9 | 506.7 | 440.1 | 418.6 | 924.9 | 235.5 | 2518.1 |
| **Product (GDP)(3)** | 1988 | 469.8 | 555.7 | 485.0 | 460.5 | 1038.4 | 261.4 | 2766.8 |
| **(£ billion at ppp)(4)** | 1989 | 514.2 | 622.0 | 544.0 | 512.1 | 1174.8 | 288.4 | 3070.7 |
| | 1990 | 549.4 | 696.2 | 590.5 | 554.0 | 1304.3 | 306.7 | 3278.9 |
| | 1991 | 571.8 | 862.1 | 662.3 | 623.7 | 1503.5 | 334.4 | 3590.9 |
| | 1992 | 594.2 | 904.1 | 672.1 | 637.7 | 1542.3 | 340.7 | 3729.7 |
| **Gross Expenditure** | 1987 | 9.4 | 14.6 | 10.0 | 5.0 | 24.3 | 3.3 | 71.6 |
| **on R&D (GERD)** | 1988 | 10.2 | 15.9 | 11.0 | 5.6 | 27.8 | 3.6 | 77.7 |
| **(£ billion at ppp)(4)** | 1989 | 11.3 | 17.9 | 12.7 | 6.4 | 32.8 | 3.9 | 84.7 |
| | 1990 | 12.0 | 19.1 | 14.3 | 7.2 | 37.7 | 4.4 | 89.7 |
| | 1991 | 12.2 | 22.8 | 16.0 | 8.3 | 43.1 | 5.0 | 95.9 |
| | 1992 | 12.6 | 22.9 | 15.8 p | 8.8 p | 43.1 | 5.1 p | 99.8 |
| **GERD as a percentage** | 1987 | 2.22 | 2.88 | 2.27 | 1.19 | 2.63 | 1.42 | 2.84 |
| **of GDP** | 1988 | 2.18 | 2.86 | 2.28 | 1.22 | 2.67 | 1.37 | 2.81 |
| | 1989 | 2.20 | 2.87 | 2.33 | 1.24 | 2.80 | 1.36 | 2.76 |
| | 1990 | 2.19 | 2.75 | 2.42 | 1.30 | 2.89 | 1.45 | 2.74 |
| | 1991 | 2.13 | 2.65 | 2.42 | 1.32 | 2.87 | 1.50 | 2.67 |
| | 1992 | 2.12 | 2.53 | 2.36 p | 1.38 p | 2.80 | 1.51 p | 2.68 |

*Source: MSTI 1994/1 (OECD)*

**Notes:**
1 The figures before 1991 exclude the former East Germany.
2 Data for Japan are adjusted by OECD.
3 GDP at market prices, based on the UN definition.
4 Amounts are converted to £ sterling using the purchasing power parities (ppp) developed by the OECD.
p = provisional

**Table 17 International comparison of Gross Expenditure on R&D by sector of performance and source of funds, 1992**

| | UK | Germany | France (1) | Italy | Japan (2) | Canada | USA |
|---|---|---|---|---|---|---|---|
| **Percentage by sector of performance** | | | | | | | |
| Government | 16.1 | 15.2 | 22.2 p | 23.6 p | 8.9 | 18.8 p | 11.4 |
| Business enterprise | 62.8 | 67.8 | 61.1 p | 56.3 p | 73.5 | 53.6 p | 68.0 |
| Higher education | 17.0 | 16.6 | 15.9 p | 20.2 p | 12.8 | 26.4 p | 17.2 |
| Other | 4.1 | 0.4 | 0.8 p | - | 4.7 | 1.1 p | 3.4 |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| **Percentage by source of funds** | | | | | | | |
| Government | 35.4 | 37.4 | 48.8 | 47.8 p | 17.4 | 44.2 p | 46.2 |
| Business enterprise | 49.7 | 59.5 | 42.5 | 46.8 p | 76.0 | 41.1 p | 51.2 |
| Abroad | 10.9 | 2.5 | 8.0 | 5.3 p | 0.1 | 9.9 p | - |
| Other | 4.1 | 0.5 | 0.7 | - | 6.5 | 4.7 p | 2.7 |
| **Total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

*Source: MSTI 1994/1 (OECD)*

**Notes:**
1 Data by source of funds are for 1991.
2 Data for Japan are OECD estimates.
p= provisional

**Table 18 Government funding of civil and defence R&D, as a percentage of GDP, 1987 to 1992**

% of GDP

| | UK | Germany (1) | France (2) | Italy | Japan (3) | Canada | USA |
|---|---|---|---|---|---|---|---|
| **TOTAL** | | | | | | | |
| 1987 | 1.02 | 1.11 | 1.39 | 0.75 | 0.48 | 0.57 | 1.27 |
| 1988 | 0.93 | 1.06 | 1.36 | 0.80 | 0.46 | 0.56 | 1.22 |
| 1989 | 0.90 | 1.06 | 1.36 | 0.73 | 0.46 | 0.57 | 1.19 |
| 1990 | 0.88 | 1.04 | 1.42 | 0.74 | 0.45 | 0.58 | 1.17 |
| 1991 | 0.88 | 1.05 | 1.38 | 0.76 | 0.45 p | 0.61 p | 1.17 |
| 1992 | 0.87 | 1.03 p | 1.27 | 0.80 | 0.46 p | 0.63 p | 1.16 |
| **CIVIL** | | | | | | | |
| 1987 | 0.57 | 0.97 | 0.89 | 0.70 | 0.46 | 0.53 | 0.40 |
| 1988 | 0.54 | 0.93 | 0.86 | 0.72 | 0.44 | 0.51 | 0.39 |
| 1989 | 0.51 | 0.93 | 0.86 | 0.66 | 0.43 | 0.52 | 0.41 |
| 1990 | 0.51 | 0.90 | 0.85 | 0.69 | 0.43 | 0.54 | 0.44 |
| 1991 | 0.49 | 0.93 | 0.88 | 0.70 | 0.42 p | 0.57 p | 0.47 |
| 1992 | 0.50 | 0.92 p | 0.83 | 0.74 | 0.43 p | 0.59 p | 0.48 |
| **DEFENCE** | | | | | | | |
| 1987 | 0.45 | 0.14 | 0.50 | 0.05 | 0.02 | 0.04 | 0.87 |
| 1988 | 0.40 | 0.13 | 0.51 | 0.08 | 0.02 | 0.05 | 0.83 |
| 1989 | 0.39 | 0.14 | 0.50 | 0.08 | 0.02 | 0.04 | 0.78 |
| 1990 | 0.37 | 0.14 | 0.57 | 0.05 | 0.02 | 0.04 | 0.73 |
| 1991 | 0.40 | 0.11 | 0.50 | 0.06 | 0.03 p | 0.04 p | 0.70 |
| 1992 | 0.37 | 0.11 p | 0.44 | 0.06 | 0.03 p | 0.04 p | 0.68 |

*Source: OECD databank (July 1994)*

**Notes:**

1 The figures before 1991 exclude the former East Germany.
2 There is a discontinuity between 1991 and 92.
3 Data for Japan are adjusted by OECD.
p = provisional

**Table 19 International comparison of Government funding of R&D in 1992 by socio-economic objective (percentage distribution)**

| | | UK | Germany p | France | Italy | Japan(1) p | Canada p | % USA |
|---|---|---|---|---|---|---|---|---|
| Agriculture, forestry and fishing | | 5.0 | 2.7 | 3.9 | 2.5 | 3.6 | 12.2 | 2.2 |
| Industrial development | | 7.5 | 13.3 | 7.5 | 16.2 | 3.9 | 9.5 | 0.3 |
| Energy | | 2.4 | 4.7 | 3.9 | 3.6 | 21.3 | 5.5 | 4.5 |
| Infrastructure | | 1.6 | 1.9 | 0.6 | 0.7 | 1.9 | 4.8 | 2.4 |
| Environmental protection | | 1.5 | 3.6 | 1.1 | 2.2 | 0.5 | 2.1 | 0.7 |
| Health | | 6.1 | 3.3 | 4.6 | 6.4 | 2.9 | 7.8 | 15.1 |
| Social development and services | | 2.5 | 2.6 | 0.8 | 4.7 | 1.0 | 2.1 | 1.2 |
| Earth and atmosphere | | 2.1 | 2.8 | 1.1 | 1.2 | 1.1 | 3.5 | 1.2 |
| Advancement of knowledge(2) | | 25.2 | 48.1 | 30.8 | 44.6 | 50.8 | 35.0 | 3.9 |
| Civil space | | 2.8 | 5.9 | 9.8 | 7.2 | 7.1 | 9.6 | 9.9 |
| Defence | | 42.6 | 10.5 | 34.6 | 7.1 | 5.9 | 6.2 | 58.6 |
| Not elsewhere classified | | 0.4 | 0.7 | - | 3.6 | - | 1.8 | - |
| **Total** | **%** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| | **£m(3)** | **5198.5** | **9297.8** | **8558.5** | **5106.4** | **7081.1** | **1983.0** | **43090.7** |

*Source: OECD databank (July 1994)*

**Notes:**
1 Data for Japan are adjusted by OECD.
2 Advancement of knowledge is mainly R&D in higher education funded from General University Funds, and NABS non-orientated research.
3 Amounts are converted to £ sterling using the latest purchasing power parities (ppp) developed by the OECD.
p= provisional

# UK VISIBLE TRADE STATISTICS - THE INTRASTAT SYSTEM


**A JOINT REPORT BY**

**Kevin Williamson : Central Statistical Office and Fiona Porter : Tariff and Statistical Office of HM Customs & Excise**


This article is a full report on the Intrastat quality review, the initial results of which were given in CSO News Release (94)94, published on 12 May 1994

## INTRODUCTION

The method used to compile statistics on trade in goods based on Customs documentation was discontinued for trade between member states of the European Community (EC) at the beginning of 1993. It was replaced by a new EC wide system called Intrastat[1]. This involves extra summary information on VAT returns together with detailed returns direct from the largest traders, instead of information compiled from data provided on Customs declarations at the UK frontier. Although less burdensome overall than the previous system, Intrastat does rely upon over 30,000 UK traders reporting all their transactions with other member states accurately and every month. These 30,000 traders are less than a quarter of those trading with other Member States, but their trade accounts for about 97½% of the value of intra-EC trade.

Given the extent of the change in method, publication of intra-EC trade data was suspended during the early part of 1993, to enable the trade to implement their systems and become familiar with the new procedures. Publication of quarterly aggregate estimates restarted in June 1993, followed by monthly aggregates in October 1993 and detailed data from November 1993. During this time both the CSO and Customs and Excise had been monitoring the quality of the data and pattern of response. A number of difficulties were apparent and the two Departments agreed on a major review in December 1993. The need for this was underlined by the doubts expressed publicly by some economic analysts and other users of the statistics about the quality of the results produced by Intrastat. The Treasury and Civil Service Select Committee in its report on the November 1993 Budget subsequently lent its voice to this unease. It recommended that the CSO should undertake a special study and publish the findings. The review carried out jointly by CSO and Customs expanded and accelerated an already scheduled review of the Intrastat system, and included a review of the methodology used to produce analyses of the trade statistics from the Intrastat data.

## MAIN FINDINGS

The main conclusions, which confirm those published earlier[2], are that:

- the administrative and computer systems were processing traders' returns accurately;
- most returns were accurate but with some overall small scale errors which were measured during the review;
- some traders were slow to submit complete returns and it was difficult to estimate accurately for this missing data.

Thus the estimates for 1993 are now reasonably certain. Estimates for more recent months, and especially those for April and May 1994, may be subject to further significant revisions as late data arrive from traders.

Interpretation of the estimates has also been helped by allowance for a reporting error in the old system, known as the Rotterdam effect, which led to an over-recording of UK imports from EC countries and a balancing under-recording of UK imports from non-EC countries; it amounted to £2.1 billion in 1992. Taking account of this, the difference in estimated growth rates of EC and non-EC imports between 1992 and 1993 is more than halved (see appendix C).

## THE EFFECT ON THE TRADE FIGURES

During the review, and largely as a result of a major compliance exercise by Customs, additional data has been reported by traders. The combined effect of the review and this late data have been to raise the estimated level of 1993 UK exports to the EC by £0.4 billion and the level of 1993 UK imports from the EC by £0.5 billion from those published in April. A breakdown of these revisions is given in table 1.

A somewhat more significant impact of the review has been to identify the need for significant adjustments to be included in the initial estimates produced by CSO for the UK's intra-EC trade in any month using data from the Intrastat system. In effect these adjustments are to compensate for late and incomplete returns from traders. The method adopted to adjust for non-response (one normally used for adjusting for non-response in statistical inquiries to businesses) has been unable to operate accurately on Intrastat data. Two factors (mainly partial response but also the effect of missing trade histories for some traders) make it necessary to add £320 million and £260 million to the initial monthly estimates for the UK's EC imports and exports respectively. Table 2 details these and other minor adjustments resulting from the review.

CSO has reworked the adjustments made to the data for seasonal variation and introduced a revised methodology for the deflation of trade data resulting in changes to the price and volume indices calculated from the data. The graphs in this article illustrate the changes to the different series of data[3].

## THE REVIEW

This report describes the review up-dating the estimates and expanding information published on 12 May 1994. Both Customs and CSO recognised that there were several critical areas of the Intrastat system where, if any problems existed, the overall quality of the statistics would be significantly affected. Resources were targeted to investigate these areas.

Given the size of the collection system - some 30,000 traders and some 1 million items per month - the review has been a major exercise. It was planned so that all parts of the system were examined and their functioning checked. Thus it covered data recording by individual traders, through to receipt and processing of

1 A fuller description of the Intrastat system is given in EconomicTrends No. 471, January 1993, pages 188 to 190

2 Details summarised in CSO News Release (94)94 published on 12 May 1994.

3 The most recent published statistics for UK visible trade are for months up to May 1994 published in CSO First Release (94)164 on 9 August 1994.

Table 1

## Details of revisions to the statistics for United Kingdom trade in goods with other Member States of the European Community in 1993

(£ million)

| 1993 data as published by CSO in First Releases dated: | UK Imports from EC countries | UK Exports to EC countries | UK Balance of Trade with EC countries |
|---|---|---|---|
| 14 April 1994 | 67411 | 63500 | -3911 |
| 12 May 1994 (including initial results from Quality assurance programme) | 67730 | 63510 | -4220 |
| 9 August 1994 (data as included in 1994 Pink Book) | 67899 | 63945 | -3954 |
| **Net revisions to 1993 data (difference between 14 April and 9 August figures)** | **+488** | **+445** | **-43** |
| Made up of: | | | |
| a) **Revisions to Data (primarily the receipt of late returns, but also the correction of some erroneous returns)** | **+499** | **+1233** | **+734** |
| b) **Other changes following the Quality Assurance programme** | **-11** | **-788** | **-777** |
| of which: | | | |
| Removal of adjustments for partial response[1] | -1200 | -1200 | 0 |
| Incorporation of adjustments for errors in recording | +960 | +299 | -661 |
| Revisions to adjustments for freight costs and other coverage adjustments | +229 | +113 | -116 |

Note [1] These adjustments were made in advance of late returns of data. They have been removed after inclusion of the data at a) and the information on errors in recording.

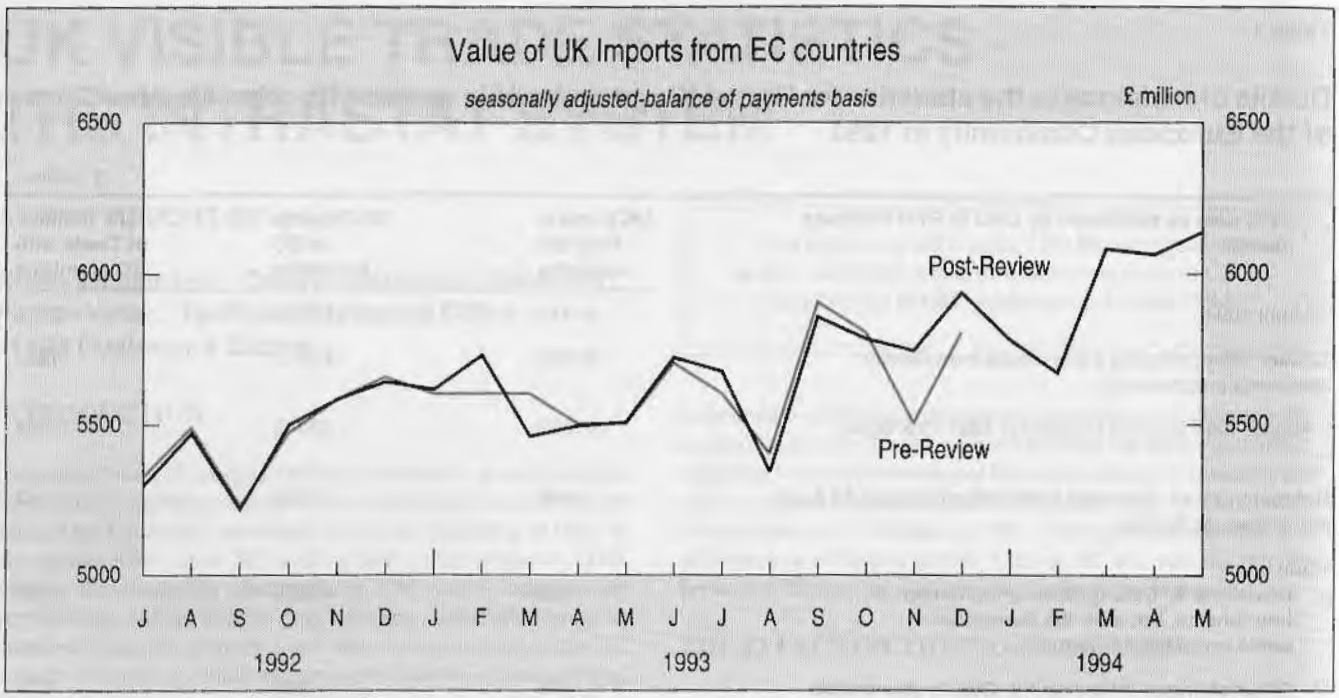
Table 2

## Adjustments arising from the Quality Assurance Programme included in the visible trade statistics released by CSO on 9 August 1994

(£ million)

| UK Imports from other EC Countries | Jan 94 | Feb 94 | Mar 94 | Apr 94 | May 94 |
|---|---|---|---|---|---|
| 1. Partial Response | +30 | +45 | +70 | +125 | +290 |
| 2. Missing trade histories | 0 | 0 | 0 | +10 | +30 |
| 3. Errors in recording | +78 | +79 | +93 | +83 | +79 |
| 4. Revisions to freight and other adjustments | +19 | +19 | +21 | +19 | +19 |
| Total value of adjustments made | +127 | +143 | +194 | +257 | +418 |
| **UK Exports to other EC Countries** | **Jan 94** | **Feb 94** | **Mar 94** | **Apr 94** | **May 94** |
| 1. Partial Response | +25 | +40 | +85 | +130 | +230 |
| 2. Missing trade histories | 0 | 0 | 0 | +10 | +30 |
| 3. Errors in recording | +27 | +27 | +29 | +25 | +25 |
| 4. Revisions to freight and other adjustments | +10 | +10 | +10 | +9 | +9 |
| Total value of adjustments made | +62 | +77 | +134 | +194 | +294 |

N.B. For months prior to January 1994, adjustments 1) and 2) are set to zero, as work has shown that by this time partial response and the effect of missing trader histories are negligible. These two adjustments are both revised each month, using the profile illustrated above. Thus, when statistics for June 1994 are published, adjustment 1) for May 1994 will be reduced to +£125 million for intra-EC imports, and to +£130 million for intra-EC exports. Adjustments 3) and 4) are constant adjustments applied to each month's trade and do not change over time.



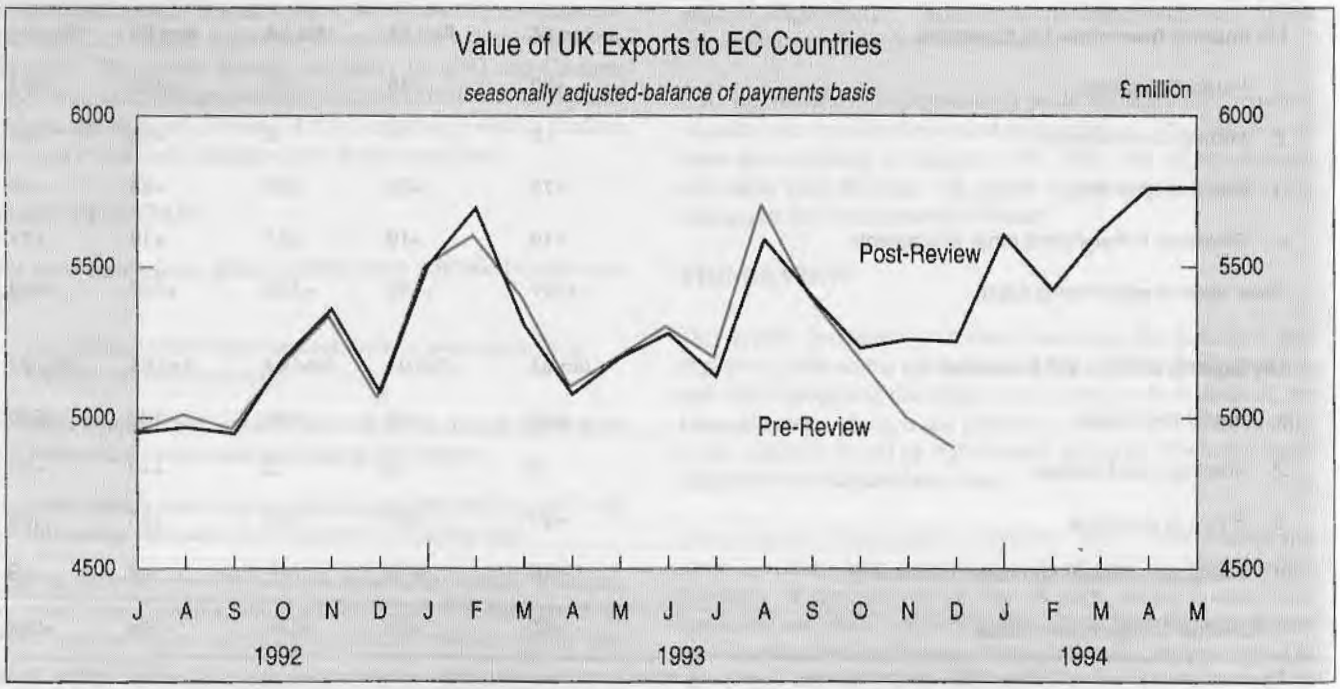

declarations by Customs and the systems for producing the trade statistics in both Customs and CSO. As Customs are the authority responsible for the collection and compilation of the trade statistics within the UK, the major part of the work involved in the review was carried out by Customs personnel.

The review has incorporated information drawn from visits by Customs officials to over 12,000 traders, each visit involving audit checks on the trader's recording systems. Special visits were also made to categories of traders whose operations appeared to allow greater scope for misreporting, and to traders operating within specific commodity areas where reporting problems were thought to exist[4]. In addition to these checks, other exercises were carried out on the administrative and computer systems that make up the Intrastat system. Detailed analyses of Customs' large data base of trade documents were also carried out as part of the checks.

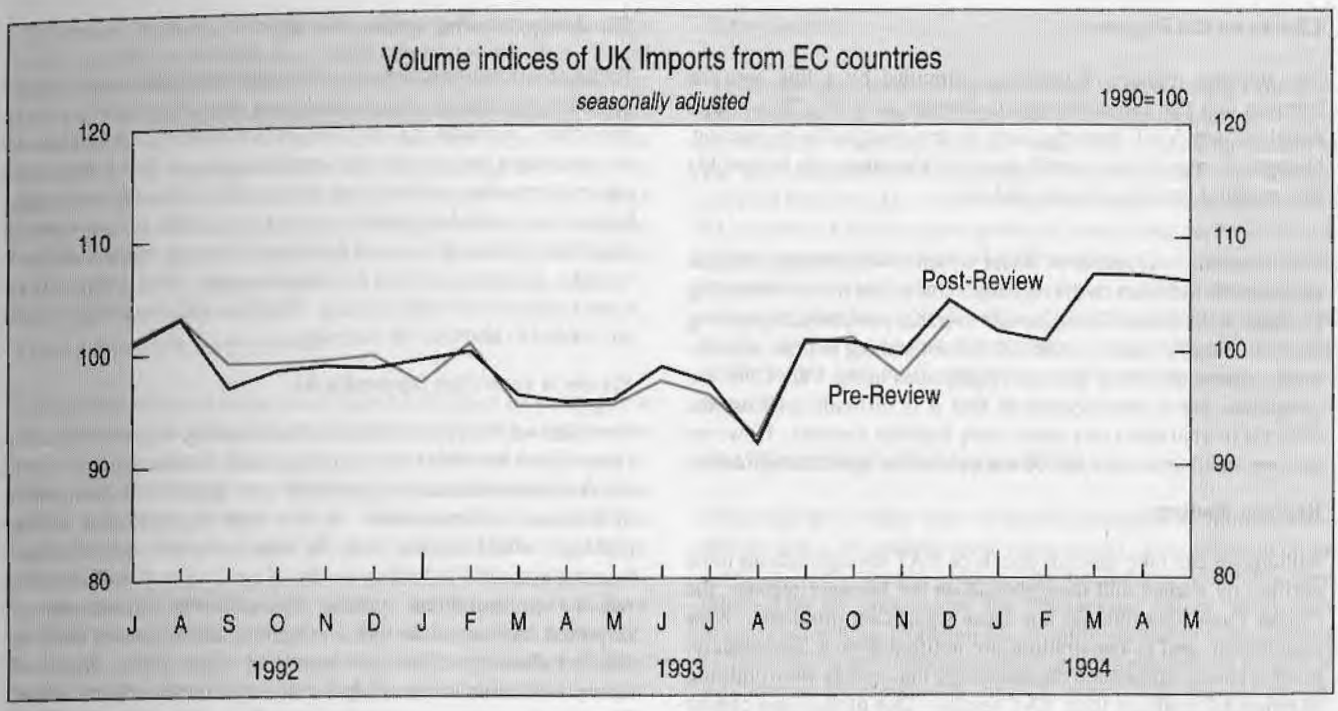
The work on the review has involved significant resources on the part of Customs. Although a review exercise had already been planned, the extent of the work has been much greater than had been anticipated.

In the CSO, work revolved around reviewing the system for deflating the data being received from the Intrastat system, as well as reviewing the adjustments made to convert the trade statistics onto a balance of payments basis. This involved checks on the validity and scale of all adjustments made to the statistics to compensate for the effects of the switch to the Intrastat system.

As part of the review, CSO and Customs personnel have met regularly to plan the work programme and discuss findings to ensure that the review was as thorough as possible and that all significant parts of the process were investigated. This also included inviting




4 These were areas where the nature of trade in the commodity could cause problems with reporting (e.g. oil trade), or where users of the statistics involved with particular industries had raised concerns about the quality of the statistics coming from Intrastat (eg steel trade).



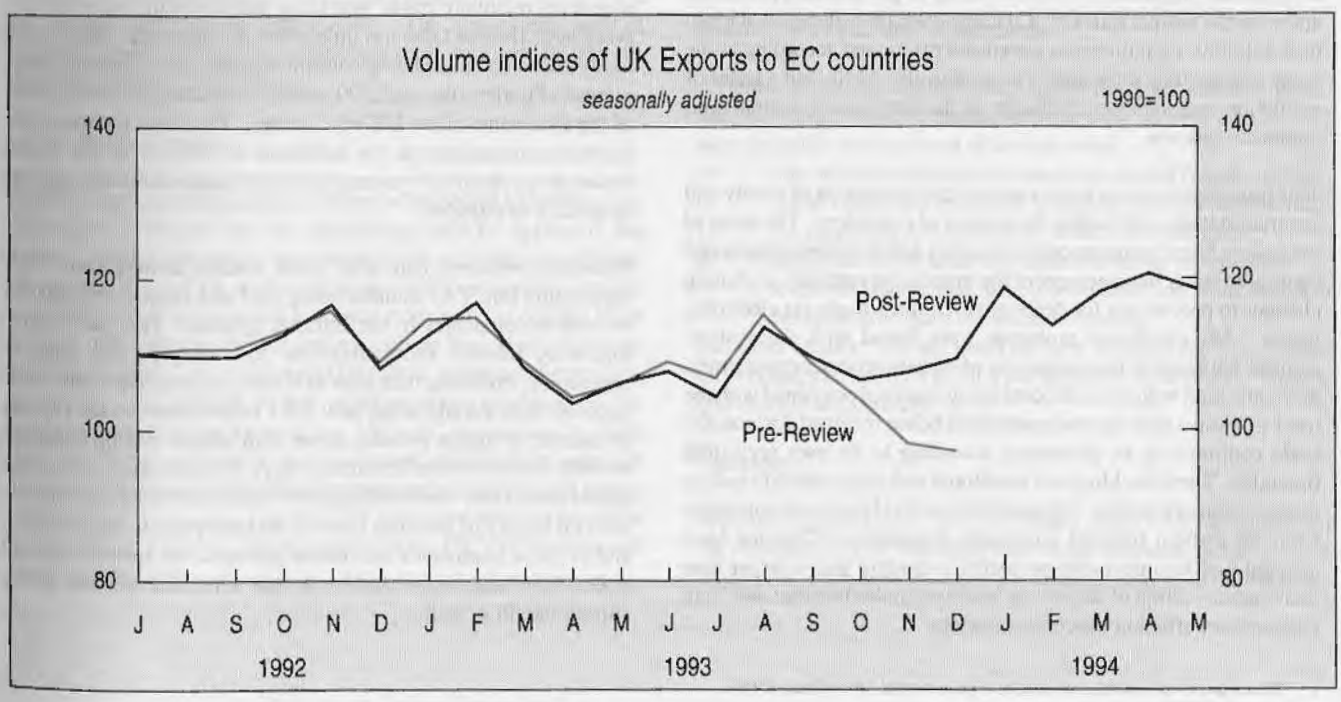

users of the statistics to put forward their own thoughts on areas worthy of investigation. As a result, CSO and Customs believe that the review has been a thorough and complete appraisal of the Intrastat system in the UK.

## REVIEW OF CUSTOMS SYSTEMS AND PROCEDURES

### Register of Traders - Purpose

The register of traders is a key part of the Intrastat system. It must contain details for all companies registered for VAT in the UK who trade with other EC countries, both importers and exporters, along with historic details on their pattern of trade. This detail is used to determine which traders operate above the value of trade thresholds set as part of Intrastat. Only larger companies have to provide detailed monthly declarations, lessening the overall burden on business of the system. The register is also used to monitor those companies who operate below the thresholds, whose only obligation is to report the total value of their trade on their periodic VAT returns.

Without a complete and up-to-date register, it would not be possible to identify accurately traders that have not responded for any month. This is necessary as part of the system for estimating the value of trade that these non-responding companies would have been expected to report. Linked to this is the use of the register to identify very large companies so that they can be chased for returns and to identify persistent non-responding companies, allowing Customs staff to target traders for personal visits. The register is thus vital for the administration of the Intrastat system.



**Checks on the Register**

The Intrastat register of traders is provided by a link between Intrastat and the system for the collection of VAT. This allows details of any VAT changes, such as new companies registering, changes in registration details and deregistrations, to be quickly incorporated into the Intrastat register.

There were specific types of trader which it was thought possible might not be included on the register or that might not be submitting Intrastat declarations. These include overseas companies registering and then directly trading in the UK and not making returns, and also fiscal representatives of overseas companies in the UK. Overseas companies are a complication in that it is difficult for Customs officials to visit them and assess their Intrastat systems. However they are small in number and do not represent a significant problem.

**Register findings**

Although it can take time for details of VAT de-registrations to be notified by traders and incorporated on the Intrastat register, the checks found that this did not cause significant problems. New registrations and re-registrations are notified almost immediately. Further checks eliminated the possibility that traders were omitting to report EC trade on their VAT returns. One of the main checks involved a list of traders purchasing an individual commodity type obtained from a separate source and checked against the details held on the register. Investigations of overseas based traders and fiscal representatives found no evidence to suggest the register is deficient. The register is thus regarded as complete and up-to-date.

**The Intrastat processing system**

A comprehensive and effective processing system is vital to the production of timely and accurate statistics. A team of Customs officials was thus set up to carry out an audit of the processing system within Customs to identify any problem areas. As stated above, Customs receive declarations from some 30,000 traders per month covering some 1 million items. It is thus a major task to ensure that the returns are processed quickly and accurately. The pattern of response from traders is that the majority of returns are received in the week before and the two weeks after the due date for returns (ie. two to four weeks after the end of any month). This peaking causes a significant logistical problem in trying to get this data processed and onto the system quickly. Customs have procedures in place to deal with this; eg returns are sorted and prioritised according to the value of trade they represent. The system also carries out a series of validation and consistency checks on the data once it is input onto computer systems.

This processing system is thus vital to the production of timely and accurate statistics including the control of reminders. The audit of the system found some procedural matters which are being tightened up to give better management of the processing pathway, including changes to procedures for dealing with returns made via electronic media. No significant problems were found with the system. Limited backlogs in the processing of data do arise at certain times, due to the high volume of EC data being received combined with the need to ensure that the documentation being received for non-EC trade continues to be processed according to its own very tight timetable. These backlogs are monitored and action taken to reduce them as soon as possible. The audit did not find large scale omissions from the system through misplaced documents. Customs have adapted well to unforeseen problems in dealing with a larger than anticipated volume of data being received under Intrastat and have produced an efficient processing system.

**The data processing system overall**

The fact that these two key areas of the Intrastat system - register and computer processing - can be said to be working correctly is very important. As a result, it is possible to say that the statistics produced by the system are an accurate representation of the information reported by traders, and that the system is able to identify traders that have not responded allowing estimates to be made for the value of their trade. However, special features of Intrastat make it difficult to make accurate estimates for non-response. Also a minority of traders make errors in their returns. Therefore additional adjustments are needed to improve the estimates.

**Errors in recording (appendix A)**

It was known that errors existed in the recording of goods under the system prior to 1/1/93 based on Customs documentation, due to errors or omissions made by traders or their agents in the completion of Customs documentation. It was thus expected that similar problems would be seen with the data collected under Intrastat. Intrastat in the UK includes a system of audit visits to traders during which their individual systems for recording transactions are inspected. As part of the visit a sample of transactions is taken for detailed checking. From the results of these checks an overall measure of errors in recording is calculated for the traders visited. The initial results suggested that, on average, the value of the UK's EC imports was under-recorded by 1.25%, whilst the value of the UK's EC exports was under-recorded by 0.25%. Further analysis now suggests that the adjustment should be 1.5% and 0.5%, respectively (about £80 million and £25 million per month).[5] This under-recording appears, on available evidence, to be fairly evenly spread across commodities. Customs undertook special studies into commodity areas identified by trade associations and other users of the statistics as particularly suspect (for example, iron and steel, confectionery, paper), which did not identify any specific problems.

**Estimation system**

The method of estimating for non-response used in Intrastat is based on the method used in most other statistical inquiries to businesses. It applies growth ratios calculated from the values of trade reported by responding traders in both the current and base periods to the value of trade reported by non-responding traders in the base period. Tests have shown that the ratios produced by the system for each month are relatively stable, and show that the treatment of outliers (very large rises or falls) has little effect on the ratios. This is most likely due to UK trade being concentrated in a comparatively small number of traders (the top 3,500 trading companies account for 80% of the total value of the UK's EC trade). To reduce the use of the estimation procedures to the minimum the returns for the largest traders are pursued early to ensure that their trade details are reported as quickly as possible.

However, problems can arise when traders change their VAT registration (the VAT number being used as a unique identifier for individual companies in the Intrastat system). This can happen following internal reorganisations and mergers and sales of companies. Problems then arise as it is not yet possible to link trade histories from the old to the new VAT registrations on the register of traders. A similar problem arises with traders starting to submit monthly returns for the first time as there will be no data for the base period even if they were trading then. Thus, the revised registrations have no history of previous trade in the base period. As a result, if any of these companies are non-responders, the system finds nil trade in the base period and by default estimates nil trade in the current month as well.

5 This compares with recording and valuation errors on the UK's non-EC trade of 0% on imports and 0.75% on exports.

The review measured the size of this effect and concluded that this under-estimation problem was a relatively minor one. It is of most significance when the initial estimates for any particular month are produced, and reduces as time passes and the rate of response for that month improves. To allow for it, CSO makes an adjustment to the first published estimate for every month by adding £30 million to each side of the account (UK EC imports and exports), thus giving no net effect on the balance of trade. This figure is based on analyses of the Customs database of returns received from such companies. This adjustment reduces to zero over the following two months.

**Partial Response (appendix B)**

Of more significance is that some traders have been submitting first declarations for a month that do not include full details of their trade in that month. Later declarations are then received for the rest of their trade. If these are received after the estimates are compiled for publication, these estimates will be deficient. This is essentially a compliance problem because traders are in breach of the regulations if complete returns are not received within ten working days of the month end. But this is a tight deadline and companies can have difficulty in completing returns on time when invoices arrive late, and some submit data independently for the branches of their business. Customs have identified persistent defaulters and are working on this vigorously.

The pattern of receipt at Customs of these partial responses to Intrastat has been analyzed. As soon as partial response was identified as a problem the CSO, on the advice of Customs, started to include adjustments to the estimates coming from the Intrastat system. The adjustments were revised in May 1994 following further work on the pattern of partial response. Work has continued on analyzing the results of this aspect of the Intrastat system. This led to a further revision of the adjustments which were included with the visible trade statistics for April 1994 released on 8 July 1994. The size of the initial adjustments made to both UK's EC imports and exports has been significantly increased and they are applied on a decreasing scale to estimates for the latest five months. Partial response is assumed to be negligible for earlier months.

The adjustments currently applied are detailed in appendix B and in table 2. The current adjustments made by CSO add £290 and £230 million to the initial estimates for the most recent month for the UK's EC imports and exports respectively. The adjustments will be revised as improvements in response are seen as a result of Customs actions to improve compliance.

**Scale of adjustments**

Tables 1 and 2 summarise the net effect of the above adjustments on figures for 1993 and how the adjustments will be applied in the future. These adjustments are relatively minor in the overall scale of the statistics and six months after the month concerned compare with the level of adjustments routinely made to third country trade figures. The adjustments for traders with no base histories on the register, for errors in recording and for partial response together add, on average, 7% and 5% to the initial estimates produced by the Intrastat system of the value of the UK's EC imports and exports respectively for any month. As time passes and response improves for each month, the effects of traders with no base history and partial response reduce to zero, leaving only the adjustment for errors in recording of 1.5% and 0.5% per month for the UK's EC imports and exports to be made.

**Other factors**

"Hidden transit" movements occur when goods coming from non-EC countries to the UK clear EC Customs boundaries, quite legitimately, in another Member State. The onward movement to the UK should then be recorded in Intrastat, but it was thought possible that it might not be, leading to an under-recording of UK's EC imports. Customs have details of traders that carried out such importing procedures prior to 1/1/93, and they were able to carry out an exercise to visit the largest of these to check their current recording practices. No significant omissions in recording were found. It was found that either traders were no longer importing goods in this way or, if they were, such trade was being reported correctly.

**The "Rotterdam" effect (appendix C)**

Comments from many users of the data produced by Intrastat were that the UK's EC imports were under-stated. Interpretation of the statistics for EC imports produced by the Intrastat system has been affected by the presence of the "Rotterdam" effect. This arises because some trade from non-EC countries in transit through other EC Member States before clearing Customs procedures in the UK was incorrectly reported as intra-EC trade under the old system when it should have been recorded as from the non-EC country. Intrastat records these movements more accurately. It is now calculated that the old system over-stated imports into the UK from EC countries by £2,100 million in 1992 (and that imports from non-EC countries were under-stated by the same amount). If this value of trade is taken into account, the growth between 1992 and 1993 in the value of UK imports from EC countries would be measured to be much closer to that from non-EC countries (10% and 14% respectively, compared with published figures of 6% and 18%).

Although they both concern goods arriving in the UK via other Member States, hidden transit and the "Rotterdam" effect are separate. The former was thought to be a possible source of error in the Intrastat system, and the latter is a correction of a fault in the old system for collecting trade statistics resulting from the introduction of Intrastat.

## REVIEW OF CSO METHODOLOGY

**Balance of Payments Adjustments**

As stated above, the adjustments made to the basic Intrastat data to convert it to a balance of payments basis were all reviewed. Errors were found in the treatment of several areas:

a) adjustments to imports to remove the cost of freight services;
b) correction to the treatment of repairs to ships and aircraft;
c) the recording of movements of second-hand ships;
d) adjustments for some EC trade still being reported on Customs Documents, which were suffering from delays in being entered onto the Intrastat system;

and other factors. The net result of these changes has been to add, on average, £20 and £10 million per month to the UK's EC imports and exports respectively.

**Deflators**

With the introduction of Intrastat, many companies have taken on the responsibility of reporting their trade movements for the first time. As a result there has been a noticeable change in the data they

are reporting. It is thought that as well as goods being classified differently (and possibly more accurately) than in the old system, details of the actual volume (net weight) of goods being moved is more accurately reported. The availability of a full year's data for 1993 on the UK's EC trade prices has enabled CSO to estimate new deflators for EC trade. The introduction of these new deflators, along with revisions to those for non-EC trade, have meant that combining these two set of deflators has produced upward revisions of roughly 1% in both import and export world deflators. Appendix D contains details of the changes in methodology, with the graphs in this article illustrating the effects of the changed methodology on EC volume indices.

### Seasonal Adjustment

Seasonal adjustment of the trade statistics is a problem for CSO. The introduction of the Intrastat system has led to a discontinuity with the patterns seen prior to 1/1/93. As data for new months has become available, CSO has had to rework the adjustment of all earlier months relatively frequently. This allowed Intrastat data to be given a greater weight in the assessment of recent seasonal patterns, rather than relying on patterns derived from data collected prior to 1/1/93. It will be early 1996 before sufficient information is available from the Intrastat system to enable new seasonal patterns to be estimated more firmly. Until that time, further revisions to the monthly (but not annual) pattern of the statistics may prove necessary, particular to data over the Christmas and New Year holiday period.

## FUTURE ACTIONS

The review has not identified any parts of the Intrastat system in the UK as causing significant omissions in the recording of goods. However, it has allowed CSO and Customs to identify areas where further action can be taken to improve the system.

The adjustments made by CSO to early estimates from the Intrastat system for partial response and for the effects of traders with no base histories on the register are necessary due to problems with companies not complying fully with the Intrastat system. If companies submitted full and complete returns by the due date for each month neither of these adjustments would be necessary. Customs are implementing procedures to improve compliance from companies. This involves looking particularly at the compliance of large traders, identifying traders who consistently make partial responses and taking action to improve their response including if necessary the imposition of penalties and fines. They are also considering the benefits of introducing a separate estimation procedure for the largest traders to provide more accurate estimates than those produced mechanically by the computer system.

The problem of traders with no base history on the register will be corrected both by improved compliance procedures at Customs, and more importantly by activating the procedure to move the base period to a more recent month to reduce the numbers with missing histories.

Linked to this work in improving the response to Intrastat is a commitment to reduce the lag currently experienced in the publication of the detailed results from Intrastat. CSO resumed publication of monthly aggregate estimates on UK trade with other Member States on 11 October 1993. Since then it has published aggregate details for UK trade with the EC for a month ten weeks after the end of that month. The full detailed statistics for a month are made available approximately fourteen weeks after the end of the month. Customs are committed to a challenging timetable of reducing this delay in publication to ten or eleven weeks by the end of March 1995, as published in the Customs and Excise Management Plan 94/5. Progress though essentially depends on traders being able to speed up their response. Aggregate estimates are usually prepared when response reaches 90% and detailed estimates when it reaches 95% of the value of trade.

The estimates for under-recording are the result of a new exercise initiated as part of the Intrastat system. This exercise will continue and is being reviewed to allow improvements to be made. There is also the need for extra analyses to be carried out to check whether the errors vary in size over time and whether they are seasonal. All of these will require more data than currently available, which will be provided by the samples of transactions being reported through the continuing programme of trader assessment visits.

The adjustments incorporated for freight costs will be checked and up-dated. This will mainly be on the basis of the subsidiary Intrastat inquiry into freight costs but some refinement of the calculation of the costs is now also seen to be necessary.

The UK is also active with France, Germany and the Netherlands in carrying out detailed comparisons of the recording under the Intrastat system of goods moving between these countries. In this exercise, the recording of specific commodities where analysis has revealed significant shortfalls in the recording of imports will be looked at. This will be done by checking how transactions are being recorded at either end of the movement of the goods, ie how the goods are recorded as an export in one country and as an import in the receiving country. The exercise is currently scheduled for completion in March 1995, with the results being used to help improve, if shown to be necessary, the Intrastat system in the UK and in other Member States.

## CONCLUSION

The Intrastat system is a major component in the measures involved with the creation of the Single European Market. The introduction of such a new recording system has been a major task for Customs and Excise and the CSO. The quality review[6] has investigated possible sources of error in the system without finding significant omissions in the recording of goods.

However, problems with ensuring early and complete responses from companies have lead to problems with the quality of the early results for any month coming from the Intrastat system. CSO have found it necessary to include adjustments in the initial aggregate estimates produced under Intrastat for any month to improve their accuracy and reduce the need for large scale revisions in later estimates. Further work will be carried out to monitor the causes of these adjustments to allow changes to be made as necessary, with Customs taking action to reduce their impact. Whilst these adjustments improve the quality of initial estimates from the Intrastat system, they are based on averages and do not remove the need for further revisions as late returns arrive, which might sometimes need to be significant for the most recent month or two.

Revisions will also be needed to the statistics published by CSO as more information allows a refinement of the calculation of seasonal adjustment to the Intrastat data.

The interpretation of the trade statistics is complicated by the "Rotterdam" effect, which corrects for a defect present in the old system of recording.

6 In addition to this review, Customs has recently published the results of an evaluation of the Intrastat System which was undertaken as part of a full review of all the changes to Customs procedures resulting from the completion of the Single Market on 1 January 1993. This concentrated primarily on the effects on business and in particular their costs. Copies of the report - entitled Single Market Policy Evaluation: Intrastat - are available from the Tariff and Statistical Office.

Customs and CSO will be carrying out further work to monitor the quality of the Intrastat data, and will also be involved in continuing exercises with other Member States to identify and investigate possible discrepancies in the recording of trade.

## ACKNOWLEDGEMENT

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# APPENDIX A

## ESTIMATION OF ERRORS IN RECORDING OF INTRA-EC VISIBLE TRADE UNDER INTRASTAT

### Background

Prior to 1 January 1993, all trade statistics were derived from information given on Customs documentation. As no goods could enter or leave the UK without this documentation, the statistics were comprehensive, with one minor exception. Some traders were granted a concession to allow them to export goods more freely. In this they made a simplified entry at the time of export, which was followed by a full declaration at a later time. It was found that in a small number of cases the later documentation was not provided, leading to a small amount of under-recording of trade. A regular monitoring exercise was established to allow the level of under-recording to be quantified so that adjustments could be included in the aggregate statistics produced by CSO.

Given that the Intrastat system is a simplified reporting system and that it represented a new reporting responsibility for many respondents, it was considered possible that similar errors and omissions in recording might occur. It was thus considered important to devise a system of checks to monitor how well the system was understood and complied with by traders. These checks would also allow the effect of any errors in recording to be quantified, and the Intrastat figures corrected as necessary.

### Method

The monitoring takes place through a survey of individual traders carried out during visits to traders made by local VAT officers. The main aim of these visits is to check the systems in place at the trader to ensure they are capable of delivering accurate, comprehensive and timely Intrastat declarations. If this is found to be the case, the officer then undertakes a sampling exercise involving two sets of checks. First, the officer selects some supplementary declaration (SD) lines at random and checks them against the source documents (usually the financial invoices covering the transaction). The SD value and any discrepancy between it and the source document are recorded together with error codes to identify the cause of the mistake. The second set of checks involves the same principle of comparing reported values against actual values, but this time the officer starts with a random selection of source documents and compares them with the information reported on the SD's.

The selection of traders to take part in the exercise is not entirely random. The programme of visits was initially set up to allow major traders to be visited first, providing an early validation of the major part of the value of trade being recorded under Intrastat. By the end of March 1995 returns will have been received on **all** Intrastat traders.

The information collected allows the calculation of measues of the level of under or over reporting for individual traders. Three main types of error can be identified:

(i) **Missing trade** - trade that has been omitted from the SD's, leading to under-recording, e.g. transactions not included due to administrative errors

(ii) **Extra trade** - trade that has been erroneously included on the SD's, leading to over-recording, e.g. non-EC trade recorded as EC trade

(iii) **Value errors** - incorrect valuation of trade on SD's, which can lead to under- or over-recording depending on the nature of the error, e.g. manual keying errors, values reported in currencies other than sterling.

To allow a correction to the aggregate statistics to be made, an overall average error rate is needed. This is calculated by weighting together the results from individual traders using the average monthly total value of trade carried out by each trader.

**Results**

There are about 30,000 Intrastat traders of whom about 24,000 return SD's each month. By June 1994 results from VAT officer visits to some 12,000 traders had been received and processed. The import traders visited usually account for some 85% of the total value of trade reported each month, while the traders included for exports account for 70%. Although some returns were unusable, sufficient numbers remained to enable reliable estimates to be produced for 1993.

Traders are grouped into size bandings according to the level of trade they carry out. The table below shows the results obtained so far by each size band and overall results as well: (negative figures indicate that there is a net under-recording of goods occurring, which results in an additive adjustment being needed to make the aggregate statistics complete).

**Net errors in the recording of trade (% of total value reported)**

| Size band (average annual value of total trade) | UK Imports from EC countries | UK Exports to EC countries |
|---|---|---|
| A (over £35mn) | -1.94 | -0.66 |
| B (between £5 and £35mn) | -1.16 | -0.07 |
| C (between £1 and £5mn) | -0.48 | -0.99 |
| D (between £0.5 and £1mn) | -3.04 | -2.11 |
| E (less than £0.5mn) | -2.55 | -1.85 |
| **Overall results** | **-1.65** | **-0.55** |

On the basis of the above, the adjustments applied by CSO to correct for a general under-recording problem add **1.5%** to the value of intra-EC imports and **0.5%** to the value of intra-EC exports. These differ slightly from the adjustments introduced in the initial results of the Quality Assurance programme[7] of 1.25% and 0.25% respectively. At that time, it was thought that there was some degree of overlap between adjustments being made for partial response (see appendix B). It has now proved possible to construct these adjustments to eliminate any overlap, leading to the slight revision to the adjustments for errors in recording.

**Developments**

The above adjustments are an average derived from all the information reported to date. As more data comes in, further analyses will be undertaken to monitor how the level of under-recording is changing over time and whether there are any seasonal patterns.

The programme of visits to traders was initially targeted at the largest 3,500 traders who account for 80% of the total value of trade, together with traders that were not compliant or that had been rendering significantly deficient returns. This was due to the dual purpose of the visit of increasing response and compliance with the Intrastat system as well as gathering information on errors in recording. As a consequence, the sampling rate for the largest traders (bands A and B) has been much higher than for smaller traders. This will not have affected the overall results due to the incorporation of weighting by size of trader when calculating the overall error rates. In future, the visit programme will be targeted more towards non-compliant and smaller traders. The methodology is being reviewed to consider whether any changes are needed to reflect this shifting emphasis.

As stated above, some of the returns received as part of the exercise were unusable. A review has been started to try and increase the quality of information being reported under this exercise. One aim of the review is to simplify the inquiry forms and provide more guidance on sampling methodology to make the task of carrying out the exercise easier for the VAT officers. It is expected that although this will reduce the levels of unusable data it will not alter the under-recording estimates to any great degree.

# APPENDIX B

## PARTIAL RESPONSE IN THE INTRASTAT SYSTEM

**Background**

Traders are allowed to report the trade they carry out in any month on any number of Supplementary Declarations (SD's), providing they are all received by the due date (10 working days after the month end). A partial responder is a trader who submits more than one SD for a month.

If a partial declarant declares some but not all of their trade by the time the statistics are collated, there are two effects which could make the figures deficient. Firstly, and most significantly, the deficiency in the traders declarations produces an overall under-declaration of trade. Secondly, this deficiency in reporting has an indirect and smaller effect through the system for estimating the value of trade carried out by non-respondent traders. The estimates for non-response are calculated by applying the average growth rate seen for those traders that have declared trade in both the base period and the current period to the value of trade seen in the base period for these non-responding traders. Partial declarations may cause the growth rate, and hence the non-response estimates calculated from it, to be understated.

It has been possible to identify the traders who make these partial declarations and analyze their pattern of reporting. This has allowed estimates of the effect at the aggregate level to be made. CSO use these to adjust the aggregate figures.

**Methods and Results**

Initially, because of the small amount of information available, a rather crude calculation was used to calculate the effect and the adjustments were set at £100 million per month for both intra-EC imports and exports. More detailed analyses have now been carried out which, along with the availability of data for a greater number of months, has allowed a more sophisticated methodology to be used. The data set used provides details on the pattern and value of partial response for each month in 1993. It detects when a partial responder is first identified, ie when a second declaration is received. It then identifies, by the week it occurs, the value of trade declared by these responders, allowing their pattern of reporting to be seen.

This data set shows that partial responders generally declare only once after their initial declarations. However, these late declarations

7 Details summarised in CSO News Release (94)94 published on 12 May 1994

can be received many months after the initial ones. It also shows that the problem of partial response was much greater in the first five months of 1993 than for later months. This is not surprising given the need for many traders to set up and establish new administrative systems to produce their Intrastat declarations. However, since that time the pattern and level of partial response has been relatively stable and can be used to predict reasonably reliably the value of trade missing due to partial response at any point in time.

At present, the first aggregate statistics for any month are published 10 weeks after the end of the month in the form of CSO First Releases[8]. The first detailed figures are published some five weeks later and are thereafter updated at four weekly intervals when the detailed statistics for later months are produced (the four weekly cycle is part of the gradual improvement in the timeliness of publication which Customs are working towards). An analysis of the data for June to November 1993 inclusive has been carried out to provide average values of the partial response received after the first statistics are published, as well as the value received between each of the publication dates. The former gives the initial adjustments to be made to the first published statistics and the latter the decreasing size of the adjustments needed for any month (as time goes by, more and more of the partial response is received and incorporated into the published detailed statistics). The adjustments required are shown in the table below:-

| | Imports | Exports |
|---|---|---|
| First estimates | £325m | £250m |
| First details | £160m | £150m |
| Second details | £105m | £105m |
| Third details | £ 80m | £ 60m |
| Fourth details | £ 65m | £ 45m |
| Fifth details | £ 50m | £ 30m |
| Sixth details | £ 35m | £ 20m |

## Partial Response and Under-recording

Partial response arises when late returns are sent in by a company after its original response has been sent. There are two main reasons why this occurs:-

(i) late returns by parts of a company's business (for example, separate branches or accounting entities within one company) or by the freight agents used by the company.

(ii) missing individual transactions due to processing errors or non-availability of information when the initial return was made.

Qualitative work undertaken on the largest Intrastat traders suggests that the first of these two reasons is the most common and also the most significant in terms of the value of trade involved. Such missing trade will not be picked up by the under-recording monitoring (see Appendix A for more details on this exercise). This is because the visiting officer will find that the trader's system is not capable of producing accurate, comprehensive and timely results and so they will not carry out the sampling exercise.

The second type, although less significant, **will** be detected by the under-recording exercise in part. Normally the sampling exercise will be done several months after a period. In many instances the late partial response items will have been declared before the sample is taken and so will not be detected. However, for others the items will still not have been declared before the sample is taken and so will be picked up and thereby reflected in the under-recording estimates. Consequently there is a degree of overlap between the under-recording estimates produced in Appendix A and the partial response adjustments shown above.

## Adjustments made by CSO to the aggregate statistics

To remove this duplication, the partial response adjustments are truncated. Information from the under-recording exercise has allowed us to assume that all partial response received 6 months after the month end are picked up by the under-recording exercise. The adjustments for partial response included in the aggregate statistics published by CSO are thus as follows:-

| | Imports | Exports |
|---|---|---|
| First estimates | £290m | £230m |
| First details | £125m | £130m |
| Second details | £ 70m | £ 85m |
| Third details | £ 45m | £ 40m |
| Fourth details | £ 30m | £ 25m |
| Fifth details | £ 0m | £ 0m |
| Sixth details | £ 0m | £ 0m |

Table 2 in the main text of this article illustrates how these adjustments are applied in practice, showing the adjustments for partial response applied to the aggregate statistics for January to May 1994 inclusive.

The indirect effect of partial response via the non-response estimates (described at the start of this appendix) has also been investigated. The system of estimation excludes traders that show very high or very low growth rates between the value of their trade in the base period and the current period. Consequently, the most significant partial responders will be excluded, thereby having no effect at all on the non-response estimates. Those partial responders that are included in the non-response calculations have a minimal effect on the estimates.

## Developments

Partial response is largely a compliance problem; it would not exist if traders provided full and complete data by the due date. The largest partial response traders have already been targeted for compliance visits. In addition, all persistent partial responders are being identified with a view to improving their compliance and thereby minimising the problem.

The level and pattern of partial response will continue to be monitored in order to keep the adjustments that have to be made as up-to-date and accurate as possible. Consideration will also be given to making estimates for individual traders as a way of improving the early trade figures. The indirect effects will also continue to be looked at to ensure there are no significant distortions to the non-response estimates.

8 The most recent published statistics for UK visible trade are for months up to May 1994 published in CSO First Release (94)164 on 9 August 1994

# APPENDIX C

## THE "ROTTERDAM" EFFECT ON IMPORTS INTO THE UNITED KINGDOM

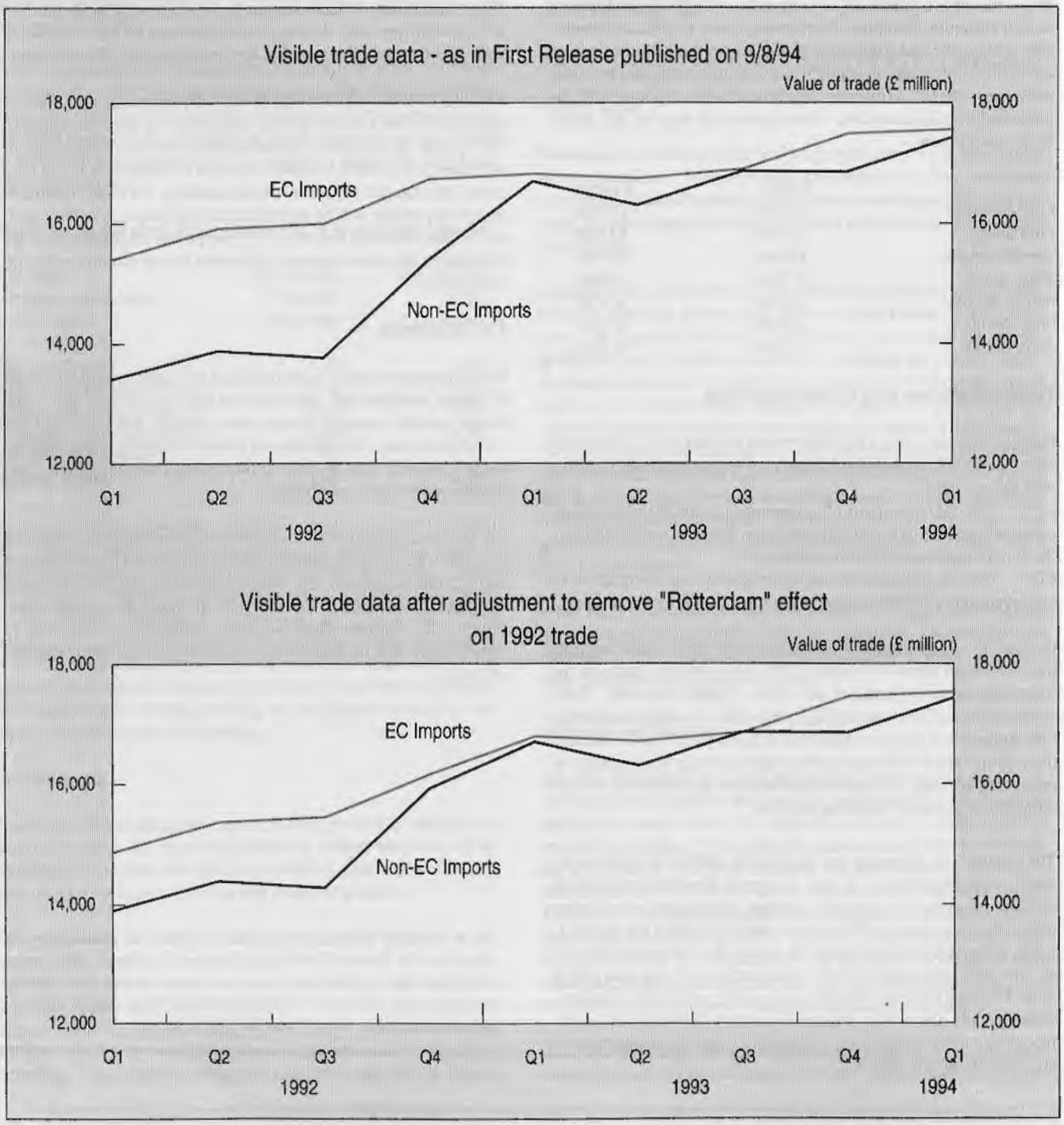
### Background

Prior to the introduction of Intrastat, all trade statistics were derived from information given on Customs documentation. Goods of non-EC origin could arrive direct into the UK or via another Member State first and enter the UK under transit arrangements. These transit goods could enter the UK in one of two ways.

First, the goods could clear Customs on entry into the other Member State and enter "free circulation" before moving to the UK. In these circumstances the goods would be reported as EC imports to the UK and are known as hidden transit movements.

Alternatively the goods could transit through the other Member State under Customs controls and only clear Customs formalities on arrival in the UK. This would be the more common option. In these circumstances the movements should be recorded as imports from non-EC countries. However, it was known that on occasion these goods were erroneously reported by the traders or their agents as imports from EC countries. This has been named the "Rotterdam" effect as the most common source of these errors arose when goods were imported via the Rotterdam free port. Such misreporting causes the EC imports figures to be overstated and the non-EC figures understated.

As a consequence of the concerns of users that imports into the UK from EC countries seemed to be increasing at a much slower rate in 1993 than imports from non-EC countries, the level of mis-recording of 1992 movements due to the "Rotterdam" effect was investigated.



**Results**

It was possible to analyze the Customs database of movements in 1992 to extract "Rotterdam" effect goods; all items of non-EC origin that cleared Customs in the UK but which were declared with an EC country of despatch. All EC imports already in free circulation (ie having cleared Customs in another Member State) were excluded from the data set. This identification of the goods involved was made possible by using the procedure codes that were quoted on the Customs documentation for such imports.

The table below shows the total values for 1992 (rounded to the nearest £25 million) and the countries that this trade was erroneously declared to be from:-

| | |
|---|---|
| Netherlands | £ 800m |
| Germany | £ 475m |
| Belgium/Luxembourg | £ 275m |
| France | £ 250m |
| Spain | £ 100m |
| Ireland | £ 50m |
| Denmark | £ 50m |
| Italy | £ 50m |
| Portugal/Greece | £ 25m |
| **Total** | **£2075m** |

The table below and the graphs above illustrate the effect of removing this £2,075 million from the value of UK imports from EC countries in 1992, and adding it to the figures for non-EC imports, on comparisons of the growth rates in the value of trade between 1992 and 1993:-

| | **Unadjusted data** | | **Adjusted data** | |
|---|---|---|---|---|
| Imports into UK from: | EC | Non-EC | EC | Non-EC |
| 1992 | £64,017m | £56,430m | £61,942m | £58,505m |
| 1993 | £67,899mn | £66,724mn | £67,899m | £66,724m |
| Change 1992 to 1993 | +£3,882m | +£10,294m | +£5,957m | +£8,219m |
| % Change 1992 to 1993 | + 6.1% | +18.2% | + 9.6% | +14.0% |

Although differences in the patterns remain, the growth rates in the value of UK imports from EC and non-EC countries are much closer after adjusting the figures for 1992.

The effect on specific commodity areas varies. In some the effect is below average; for example, under 3% of the UK's steel imports from EC countries were misreported in 1992 compared to the 3.3% average. In others the effect is significantly larger; for example, over 70% of the UK's reported imports of coal from EC countries in 1992 were in fact imports from non-EC countries.

This is a one-off effect that will not be repeated. Essentially a mis-reporting under the old system has been detected and corrected by the introduction of Intrastat. It is not possible to amend the detailed published figures but CSO are able to publish adjusted aggregate figures.

# APPENDIX D

## DEFLATION

The indicators of price movement ("deflators") for individual commodities used in the calculation of price and volume indices are based mainly on the value and quantity information collected by Customs in the trade statistics.

Until the introduction of the Intrastat system, the series were compiled from "whole world" deflators. Thus a single world price was calculated for each commodity. However, the introduction of Intrastat in January 1993 resulted in a delay in provision of data in respect of trade with the EC. This lead to a need for separate deflators for EC and non-EC trade. As a result, from the start of 1993, non-EC series were compiled using non-EC based deflators. Initially, it was not possible to produce EC based deflators from the data coming from the Intrastat system. This was due to the new reporting procedures which are included in Intrastat (ie a shift of reporting responsibilities onto individual companies rather than on agents) resulting in some EC trade being classified differently in Intrastat compared to the old system. When EC trade figures were first published the calculation of price and volume indices at the aggregate levels involved using detailed deflators derived from non-EC data which were weighted together according to the importance of commodities in EC trade so as to reflect differences in the pattern seen in the composition of EC and non-EC trade.

Once data was available in respect of all twelve months of 1993 it became possible to select true EC deflators. These were introduced in the CSO First Release published on 12 May 1994. At the same time the opportunity was taken to reassess the non-EC deflators. With the availability of separate EC and non-EC price information it became clear that since September 1992 and the exit of sterling from the Exchange Rate Mechanism, EC and non-EC prices have moved somewhat differently. Thus the EC and non-EC deflators have been calculated completely independently of each other from September 1992. The combined effect of these changes on the indices for the volume of EC trade is illustrated in the graphs in the main article.

A particular problem arises for the EC deflators between 1992 and 1993. Prices were rising strongly at the time following sterling's depreciation. At a detailed level a number of prices calculated from the Intrastat data for 1993 appear to be inconsistent with those calculated from Customs documents for EC trade in 1992. The EC deflators have therefore been adjusted to make their growth between November and December 1992 and January and February 1993 the same as for non-EC deflators. This link was used because sterling's exchange rate moved similarly against EC and non-EC currencies over this period.

The current deflators depend almost entirely on the data reported on Customs documents and Intrastat returns. Within this they make some use of adjusted producer price indices where the calculated prices are particularly erratic. The CSO has now started to collect export price quotations from manufacturers and will be using these in the calculation of trade deflators as soon as enough reliable data is available.

A more detailed description of the new deflation system entitled "Methodological notes on deflation of trade statistics" is available from the CSO on request.