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Economic Trends

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Introduction

Economic Trends brings together all the main economic indicators. It contains three regular sections of tables and charts illustrating trends in the UK economy.

'Economic Update' is a feature giving an overview of the latest economic statistics. The content and presentation will vary from month to month depending on topicality and coverage of the published statistics. The accompanying table on main economic indicators is wider in coverage than the table on selected monthly indicators appearing in previous editions of *Economic Trends*. Data included in this section may not be wholly consistent with other sections which will have gone to press earlier.

Articles on international economic indicators and the final expenditure prices index appear monthly and an article on regional economic indicators appears every January, April, July and October. Occasional articles comment on and analyse economic statistics and introduce new series, new analyses and new methodology.

Quarterly information on the national accounts and the balance of payments appears in *UK Economic Accounts* which is published every January, April, July and October by The Stationery Office.

The main section is based on information available to the ONS on the date printed in note 1 below and shows the movements of the key economic indicators. The indicators appear in tabular form on left hand pages with corresponding charts on facing right hand pages. Colour has been used to aid interpretation in some of the charts, for example by creating a background grid on those charts drawn to a logarithmic scale. Index numbers in some tables and charts are given on a common base year for convenience of comparison.

Economic Trends is prepared monthly by the Office for National Statistics in collaboration with the statistics divisions of Government Departments and the Bank of England.

Notes on the tables

1. All data in the tables and accompanying charts is current, as far as possible, to 24 September 1997.

2. The four letter identification code at the top of each column of data (eg, DJDD) is ONS's own reference to this series of data on our database. Please quote the relevant code if you contact us requiring any further information about the data.

3. Some data, particularly for the latest time period, is provisional and may be subject to revisions in later issues.

4. The statistics relate mainly to the United Kingdom; where figures are for Great Britain only, this is shown on the table.

5. Almost all quarterly data are seasonally adjusted; those not seasonally adjusted are indicated by NSA.

6. Rounding may lead to inconsistencies between the sum of constituent parts and the total in some tables.

7. A line drawn across a column between two consecutive figures indicates that the figures above and below the line have been compiled on different bases and are not strictly comparable. In each case a footnote explains the difference.

8. 'Billion' denotes one thousand million.

9. There is no single correct definition of *money*. The Government has set monitoring ranges for two aggregates:

M0, the narrowest measure, consists of notes and coin in circulation outside the Bank of England and bankers' operational deposits at the Bank.

M4 comprises notes and coin in circulation with the public, together with all sterling deposits (including *certificates of deposit*) held with UK banks and building societies by the rest of the private sector.

The Bank of England also publish data for liquid assets outside M4.

10. Symbols used:
    .. not available
    - nil or less than half the final digit shown
    + alongside a heading indicates a series for which measures of variability are given in the table on page T77
    † indicates that the data has been revised since the last edition; the period marked is the earliest in the table to have been revised
    * average (or total) of five weeks.

If you have any comments or suggestions about *Economic Trends*, please write to Michael Byrne, Technical Editor, ONS, Zone D4/16, 1 Drummond Gate, London, SW1V 2QQ or e-mail Michael.Byrne@ONS.Gov.UK

Office for National Statistics
October 1997

In brief

Articles

This month we feature three articles.

Prashant Vaze introduces the first official United Kingdom input-output tables, defines them and gives the reasons for producing them (page 34). The implications of the US Boskin report for the UK Retail Prices Index are considered by Michael Baxter. The relevance of the report to the UK and current research into RPI methodology is discussed (page 56). Finally, Linda Murgatroyd and Henry Neuburger consider the production of a household satellite account for the United Kingdom, to complement the traditional economic accounts. The measurement of household production and the reasons for including it in an external satellite account are discussed (page 63).

Fifty years of the Retail Prices Index

To mark the fiftieth anniversary of the RPI, ONS have produced a commemorative fold-out leaflet including, amongst other items, a history of the index, the highs and lows of inflation, the internal purchasing power of the pound and examples of how the 'basket' of goods and services used to calculate the index has changed, between 1947 and today. Copies of this leaflet are available free of charge from the ONS London library on 0171-533 6262.

Recent National Statistics publications

New Earnings Survey 1997, part A: streamlined analyses; description of the survey. The Stationery Office, ISBN 0 11 620935 6, price £22. An overview of the 1997 survey, containing a description of the survey, glossary of terms and definitions and a copy of the questionnaire. Parts B to F, which will be published during October and early November, contain more detailed analyses for employees in particular groups.

Economic Trends Annual Supplement 1997. The Stationery Office, ISBN 0 11 620839 2, price £26.95. Contains long runs of data for up to fifty years, plus notes and definitions corresponding to the tables in the monthly *Economic Trends*.

Input-Output Balances for the United Kingdom 1992 1993 1994 1995. National Statistics, ISBN 1 85774 241 9, price £45.00. The revised input-output balances for 1992, 1993 and 1994 plus a provisional balance for 1995, as compiled for the 1997 National Statistics *Blue Book*. The analyses give a picture of the flows of products in the economy for the year.

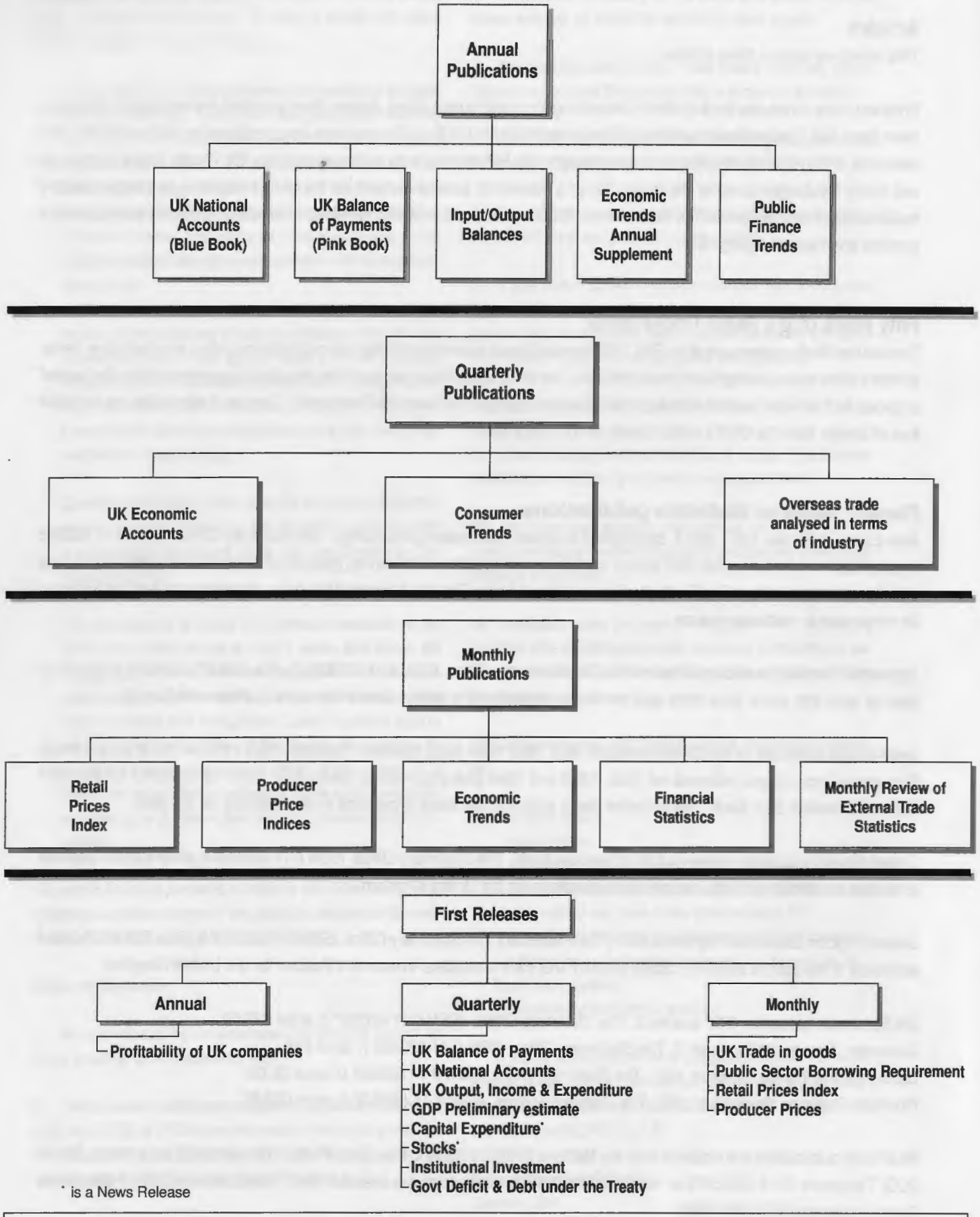
United Kingdom National Accounts 1997 (The Blue Book). The Stationery Office, ISBN 0 11 620899 6, price £32.50. Detailed estimates of national product, income and expenditure for the United Kingdom.

United Kingdom Balance of Payments 1997 (The Pink Book). The Stationery Office, ISBN 0 11 620898 8, price £32.50. Detailed estimates of the current account, capital account and the International Investment Position for the United Kingdom.

UK Economic Accounts: 1997 quarter 2. The Stationery Office, ISBN 0 11 620857 0, price £22.50.
Consumer Trends: 1997 quarter 2. The Stationery Office, ISBN 0 11 620926 7, price £45.
Labour Market Trends, October 1997. The Stationery Office, ISBN 0 11 620891 0, price £6.00.
Financial Statistics, September 1997. The Stationery Office, ISBN 0 11 620878 3, price £22.50.

All of these publications are available from the National Statistics Sales Office, Zone B1/06, 1 Drummond Gate, London, SW1V 2QQ. Telephone 0171-533 5678 or fax 0171-533 5689. Subscriptions are available from The Stationery Office Publications Centre, telephone 0171-873 9090.

United Kingdom Macro-Economic Statistics Publications



* is a News Release

Other publications: *- Retail Prices 1914-1990 - Input/Output Tables - Labour Market Statistics - Family Spending - Sector Classification Guide - Share Ownership - Financial Statistics Explanatory Handbook*

Articles

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Articles published in *Economic Trends*

International economic indicators. Commentary, figures and charts are published monthly.

Final expenditure prices index. Commentary and figures are published monthly.

Regional economic indicators. Commentary, figures and charts are published every January, April, July and October.

United Kingdom national accounts and **balance of payments** quarterly figures are published in *UK Economic Accounts* every January, April, July and October.

Other Articles

1996

November	An international comparison of taxes and social security contributions 1984-1994.
	Overseas trade in services: development of monthly estimates.
	Charities' contribution to GDP: the results of the 1996 ONS survey of charities.
December	Revisions to the United Kingdom Balance of Payments.
	Developments in United Kingdom company securities statistics.
	How far should economic theory and economic policy affect the design of national accounts?

1997

January & February	Regional Accounts 1995: Part 1.
	Balancing GDP: United Kingdom annual input-output balances.
	The Budget: 26 November 1996.
	The economy: recent developments and prospects.
	ONS plans to extend publication of service sector statistics.
	The president's task force on service sector statistics.
March	Employment in the public and private sectors.
	The effects of taxes and benefits upon household income 1995-1996.
	Quarterly integrated economic accounts: the United Kingdom approach.
	International comparisons of GDP per head over time.
April	Methodology series for United Kingdom national accounts.
	Deflation of trade in goods statistics.
June	Regional Accounts 1995: Part 2.
	Competitiveness in manufactures.
August	Research and experimental development (R & D) statistics 1995.
	The Budget: 2 July 1997.
	The economy: developments and prospects.
September	Geographical breakdown of the balance of payments current account.
	Development of a final expenditure prices index.
	Overseas trade in services: publication of monthly estimates.

For articles published in earlier issues see the list in issue 509 (March 1996) of *Economic Trends*. Copies of articles may be obtained from the Publications Unit, Marketing and Customer Service Division, Office for National Statistics, Zone B1/12, 1 Drummond Gate, London SW1V 2QQ, on payment of £2.00 per copy for articles within the last year, and £4.00 per copy for articles prior to this. The appropriate remittance should accompany each order. Cheques, etc, should be made payable to Office for National Statistics.

Economic update - October 1997

By Philip Blackburn and Adrian Richards, Economic Assessment - Office for National Statistics

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Overview

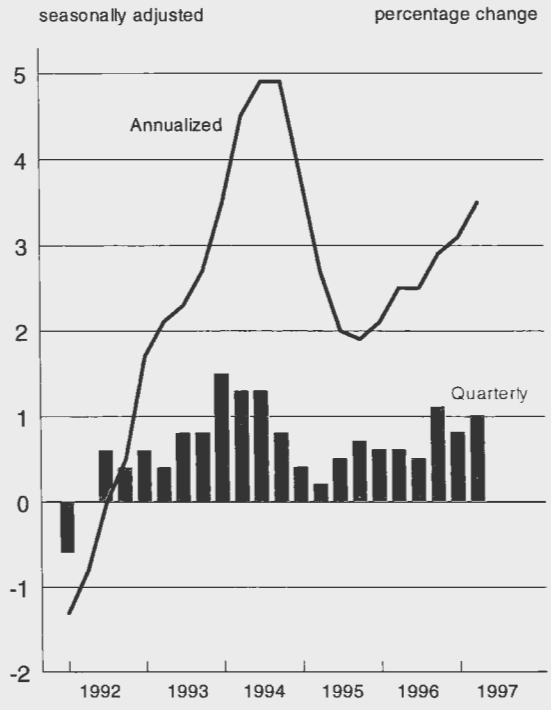
GDP growth accelerated slightly in the second quarter, following a small downward revision to growth in the first quarter. GDP has grown strongly over the last three quarters, with annualized GDP growth in the second quarter, at its highest level since the first quarter of 1995. Driving GDP growth has been strong activity in the service sector, and an acceleration of growth in consumers' expenditure. Domestic demand accelerated sharply in the second quarter, driven by strong consumer spending, and boosted by a "pick-up" in investment. Consumers' expenditure growth was concentrated on durable goods, consistent with the spending of building society windfalls. Despite the strength of consumer spending on goods, the pattern of supply in the second quarter continued to be characterised by strong activity in services and weaker growth in production. Strong domestic expenditure was accompanied by strong growth in external trade. However, imports of goods and services accelerated more strongly than exports, acting to dampen the expenditure measure of GDP growth. The UK's world trade position in goods appears to have improved, as exports of goods grew more strongly than imports, resulting in a narrowing of the balance of trade in goods deficit. The latest trade data, also showed an improvement, as the UK's trade deficit with non-EU countries narrowed, and underlying non-EU exports grew more strongly than non-EU imports. There is not yet clear evidence that the appreciation in sterling has adversely impacted on export volumes of goods. Despite stable costs in the economy, and a continued fall in trade prices, headline inflation rose for the fourth month in succession, although underlying inflation fell. However, the overall rise in retail prices is not attributable to increasing demand pressures on goods and services. A combination of a tightening in monetary policy, budget measures feeding directly into prices and irregular seasonal effects, has exerted upward pressure on the retail price index. Labour costs in particular, have remained relatively stable, despite the continued reduction in spare capacity in the labour market, as shown by a strong increase in employment in the second quarter, and a sharp fall in unemployment during August.

GDP Activity

GDP at constant factor cost (including and excluding oil and gas extraction) grew by 1% in the second quarter of 1997, a slight acceleration from the first quarter of 1997. As shown in chart 1, between 1996 Q2 and 1997 Q2, GDP grew by 3.5%, the highest growth on this basis for 2 years. GDP growth for the first quarter of 1997 was revised downwards from 0.9% to 0.8% and in the second quarter, GDP was revised upwards from 0.9% to 1%. Overall GDP growth in the first half of 1997 remained unchanged. The pattern of growth of demand in the second quarter changed from the first quarter, with an acceleration in consumer demand, and stronger investment demand. The increase in domestic demand was partly met by an increase in external supply. Growth of supply continued to be driven by strong service sector output, with a slight "pick-up" in production output.

Chart 1

Gross domestic product at constant factor cost

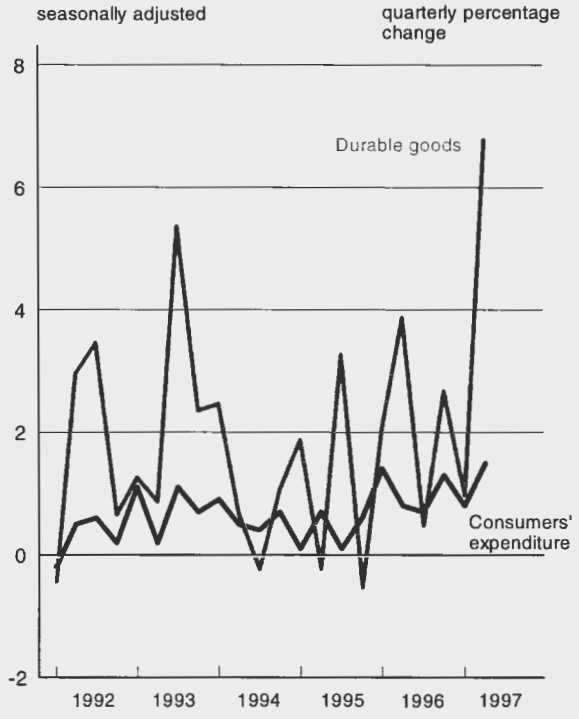


Domestic demand

Domestic demand grew more strongly than GDP in the second quarter, driven by an acceleration in consumer demand. Consumers' expenditure grew by 1.5% between 1997 Q1 and 1997 Q2, following a temporary slowdown in the first quarter. Between 1996 Q2 and 1997 Q2, consumers' expenditure grew by 4.4%, compared with GDP at constant market prices growth of 3.6%. As visible from chart 2, the acceleration in consumer demand was characterized by a sharp rise in spending on durable goods, and stable spending growth on non-durables and services. Within durables, there were sharp rises in expenditure on vehicles, which accounts for nearly half the total, audio-visual equipment and electrical and gas appliances. Spending growth on other durable categories either fell or remained relatively stable. Increased consumers' expenditure on durable goods was consistent with the spending of building society windfalls in the second quarter. However, a substantial proportion of windfall payouts were not received until June, and these may not have been spent before the end of the second quarter. This is confirmed by strong retail sales, boosted by record sales in household goods stores. Original estimates of the scale of spending in household goods stores were revised upwards. The latest retail sales figures for August suggest the growth in consumer spending remains strong. The volume of retail sales grew by 2.1% in the three months to August, representing a slight acceleration from the second quarter growth rate. Sales in household goods stores increased in August, following a fall in July. In the three months to August, sales in household goods store grew by 8.2%, a pick-up from Q2, which was 6.7%.

The strength of consumer demand in the second quarter is illustrated by an acceleration in consumer credit, with particular high levels in May and June. However, the latest data shows consumer credit falling slightly in the three months to July to £2.8 billion from £2.9 billion in the three months to April. The acceleration in demand for credit in the second quarter may have reflected increased confidence from consumers, who anticipate increased wealth, and from lenders, who have improved the availability of credit. Consumer confidence also reflects a perception of increased willingness to spend and borrow by households. The EC/Gfk consumer confidence index remained unchanged, at a balance of +8 in September, the highest level since June 1988, and just below the record peak of +10 in June 1987. For the last five months, the index has been at similar levels to the height of the "consumer boom" in the late 1980s. Demand for total personal borrowing accelerated in the three months to July, indicating expectations of increased personal sector wealth. Total net personal borrowing, seasonally adjusted, was £9.4 billion in the three months to July, compared to £8.7 billion in the three months to April, whilst net borrowing secured on dwellings, seasonally adjusted, rose strongly to £6.5 billion from £5.8 billion, suggesting continued strong demand for housing.

Chart 2
Consumers' expenditure and durable goods

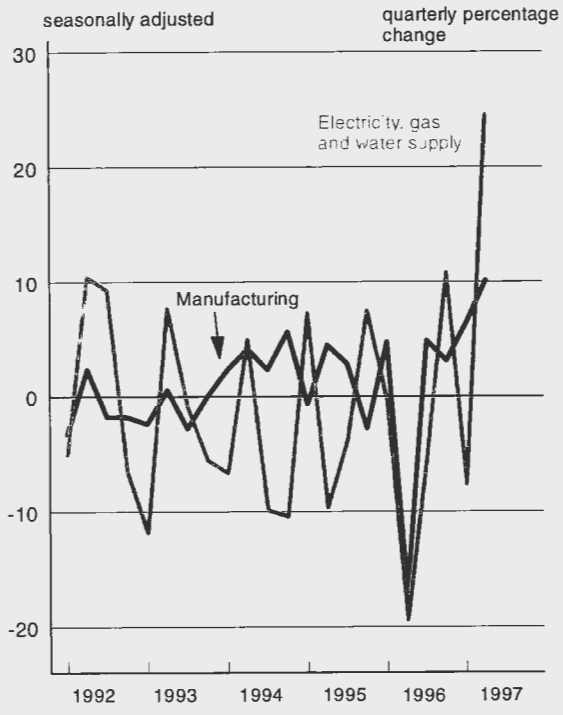


As consumers' expenditure accelerated between 1997 Q1 and 1997 Q2, and GDP grew strongly, investment demand "picked up". As chart 3 shows, there were sharp rises in investment in all production industries, particularly the energy industries, where output has also grown strongly. Investment in aircraft which boosted overall investment in the first quarter, fell slightly in the second quarter, but remained at a high level. Plant and machinery investment grew strongly, and dwelling investment picked up, confirming increased activity in the housing sector. Investment was revised downwards in the first quarter following the fall in the estimate of construction output, but was revised upwards in the second quarter as further survey evidence became available.

Domestic expenditure, which grew in the second quarter at its highest level for 2 years, was accompanied by strong growth in external trade. Despite an acceleration in demand for exports of goods and services, import demand was significantly stronger. This acted to dampen the expenditure measure of GDP growth. A fall in net trade occurred at a time when on the one hand, sterling appreciated, lowering the price and therefore, the value of imports, but on the other hand, consumer demand accelerated, with an acceleration in demand for imports. GDP

growth was boosted by an accumulation of stocks which were aligned upwards fractionally.

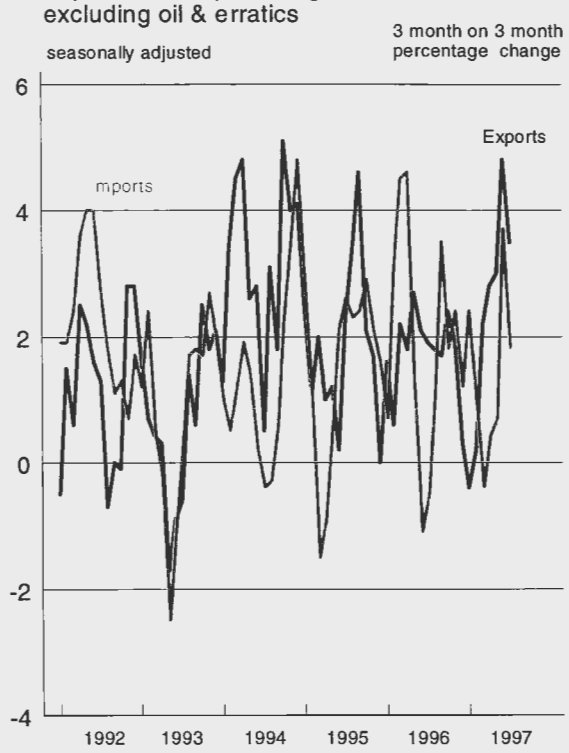
Chart 3
Gross domestic fixed capital formation at constant prices by industry



External demand and supply

Despite a significant fall in the value of net exports of goods and services in the second quarter, later data shows the UK's trade position in goods with the rest of the world, improved during the three months to July as the deficit on the balance of UK trade in goods narrowed to £2.1 billion from £2.7 billion in the three months to April. The UK's trade position improved both with the European Union and non-EU countries. Over this period, the volume of exports of goods (including oil and erratics) to the world from the UK rose strongly, by 3.3%, driven by continued growth of manufactures, and boosted by a "pick-up" in exports of food, beverages and tobacco and basic materials. Imports of goods (including oil and erratics), rose by 3.0%, boosted by strong growth in finished manufactures. The underlying trade position appears even more favourable, suggesting the strong appreciation of sterling against European currencies has not yet adversely impacted on export volumes. In the three months to July, the volume of total exports of goods, excluding oil and erratics, rose slightly more strongly by 3.5%. On the same basis imports of goods increased less strongly, by 1.8%. Despite the sharp appreciation of sterling since October 1996, and strong consumer demand for goods, total imports and exports of goods have grown at similar rates so far in 1997. Although there was a significant acceleration in import growth in the second quarter, at a time when domestic demand accelerated, export volumes also rose strongly, suggesting external demand also remains robust. Underlying exports and imports of goods tell a different story for the first half of 1997. Strong external demand for ships and aircraft, was offset by weak demand for precious stones and silver, leaving total exports relatively undistorted. However, as shown in chart 4, underlying imports of goods were significantly weaker than total imports as aircraft imports, particularly in the first quarter, boosted volumes, and imports of precious stones and silver remained strong in both quarters.

Chart 4
Exports and imports of goods excluding oil & erratics



More timely data on trade showed, the UK's trade position with non-EU countries improved in the three months to August, with the trade in goods deficit narrowing to £1.1 billion from £1.7 billion in the three months to May 1997. This was mainly due to a minimal deficit in July. Export volume growth was strong over the period, but was boosted by a sharp rise in July, due to the "one-off" export of an oil rig to Norway. In value terms the oil rig accounted for near to £400 million of total exports in July. Import growth grew less strongly than exports with rises in June and July, but a sharp fall in August. The underlying trade position shows exports and imports growing less strongly, with exports rising faster than imports. In the three months to August, export volumes, excluding oil and erratics grew strongly, by 3.7%, compared with the three months to May. On the same basis import volumes, grew less strongly, by 3.0%.

Trade prices continued to fall in June due to the persistent strength of sterling. The pace of the fall, which had previously stabilised, appears to have gained some momentum. Export and

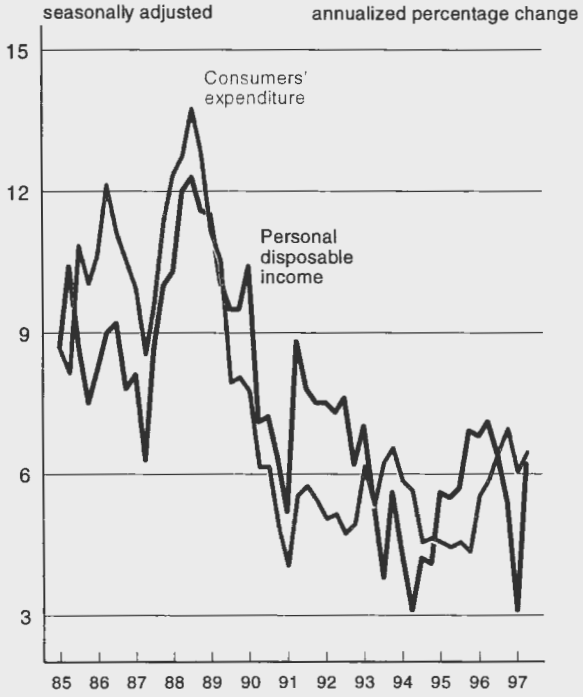
import prices of goods (excluding oil and erratics), not seasonally adjusted, fell by 1.8% and 1.5% respectively in the three months to July. Prices of exports have fallen by 3.0% in 1997, so the latest three month fall suggests exporters are still compensating for the rise in sterling. More timely data shows prices of both non-EU exports and imports falling in the three months to August, suggesting that sterling's recent strengthening against the US dollar in the second quarter may have impacted on trade prices. A "pick-up" in prices of exports and imports in August is consistent with the recent recovery of the US dollar.

Income

Total domestic income accelerated between 1997 Q1 and 1997 Q2, but at a slower pace than expenditure. Domestic income at current prices increased by 1.4% in the second quarter, compared with domestic expenditure at current prices, which grew by 1.7%. Quarterly, growth in income from employment decelerated from 2.0% in the first quarter to 1.0% in the second quarter, and was below the growth of consumers' expenditure. However, growth in the first half of 1997 was stronger than growth in consumers' expenditure at current prices over the same period. A deceleration in employment growth in the second quarter and a significant fall in the size and number of bonuses supplementing earnings compared with the first quarter, explain the fall in income from employment. Domestic income was boosted by a recovery in gross trading profits, which accelerated strongly following a fall in profits in the first quarter, and stable strong growth in other income. The alignment adjustment supplemented the growth in profits.

Despite the strength of consumer demand in the economy, personal disposable income grew significantly faster than consumers' expenditure. The savings ratio rose from 10.4% in the first quarter to 11.7% in the second quarter. In the first half of 1997, however, as shown in chart 5, personal disposable income and consumers' expenditure grew at similar rates. Personal income was boosted in the second quarter from other personal income which grew by 6.6%. The driving force behind this was a sharp rise in personal sector dividends and interest. The rise was split equally between life assurance and pension funds and persons. Within life assurance and pension funds, the rise was mainly in dividends, whilst for persons, the rise was mainly in interest receipts, paid by banks and building society. This is consistent with the rise in the interest rate and the surge in bank and building society deposits during the second quarter. Interest payments by other persons actually fell, despite the rise in interest rate. Disposable income was also boosted by a fall in UK taxes on income, following the 1 percentage point reduction in the basic rate of tax effective from April.

Chart 5
Personal disposable income and consumers' expenditure at current prices



Output

A strong service sector continued to drive output growth in the second quarter, with services growth remaining stable from the first quarter. Output of the service industries grew by 1.2%, compared with weaker production, which grew by 0.6% in the second quarter. Growth within services was widespread across most industries, but the pattern of growth changed from the first quarter. Post and telecommunications showed the strongest growth, with a sharp acceleration from the first quarter. However, business services and finance, which grew strongly in the previous two quarters, slowed significantly in the second quarter, while growth remained robust in distribution, hotels and catering due to strong growth in motor, retail and distributive trades. Within business services, the slowing of growth was attributable to a sharp rise in the financial services adjustment dampening the strong growth in financial intermediation. Interest receipts and payments are deducted from financial intermediation services to give a better indication of activity in this sector. Growth in other output components remained weaker than services between 1997 Q1 and 1997 Q2, with the exception of energy supply, which rose sharply. Manufacturing output grew by 0.3% in the second quarter following upward revisions to the output estimate, agricultural output "picked up" slightly, and growth in construction accelerated from the first quarter due to a fall in the estimate of construction output in the first quarter. The

combination of construction and manufacturing output revisions were the main reason behind the changing path of GDP growth, which showed an increase in activity from 1997 Q1 to 1997 Q2. Along with an acceleration in supply, demand for construction also accelerated in the second quarter, as the volume of new construction orders in Great Britain, seasonally adjusted, rose by 4.4%, boosted by a sharp rise in demand for infrastructure. However, demand fell back in the three months to July, as new orders fell by 5% compared to the three months to April, with a sharp fall in infrastructure orders in July. Over the period, sharp falls in public housing and private commercial orders and a lesser fall in public non-housing rises were stronger than a strong rise in private housing orders and lesser rises in private industrial and infrastructure orders.

Overall production grew more strongly in the three months to July, boosted by a sharp rise in the output of the electricity, gas and water supply industries. Output of energy recovered from weak supply in the three months to April as a return to normal temperatures in May, and colder temperatures in June and July, increased demand. Manufacturing remained flat in the three months to July. Discounting energy output, production output grew by 0.2% over the period. Sectorally, production of durable goods fell, as output of cars decelerated sharply, more than offsetting a rise in output of other durables, and production of non-durables also fell. Output of the investment goods industries rose in the three months to July, as investment in transport equipment rose strongly. Output in the largest production sector - intermediate goods - recovered strongly, driving overall production growth. The recovery in output of intermediate goods was due to a increase in supply of fuels, responding to stronger demand for energy.

Following flat manufacturing output in the three months to July, manufacturers' expectations of future growth appear modest. The CBI Monthly Trends Enquiry in manufacturing reported the output expectations balance in the next 4 months, not seasonally adjusted, rising marginally from 16% in August to 17% in September. This partly reflects the fears that export orders will fall sharply. The CBI export orders balance, not seasonally adjusted, improved slightly from -37% in August to -35% in September, but remains at a high negative level. Expectations of rising prices from manufacturers remained low in September.

Prices and wages

Despite apparent upward pressure on retail prices, the underlying inflation environment appears stable. Costs of supplying goods and services in the economy show no signs of increasing, despite increasing claims on these resources from growing consumer demand, particularly for goods. Production costs, as shown by manufacturing input prices, have continued to fall, on a 12-month basis, since June 1996. The rate of the fall in prices reached a trough in April 1997 and has since stabilised. Input prices (all manufacturing), seasonally adjusted, showed deflation of 7.9% in the 12 months to August. The deflation rate fell slightly compared with July, as input prices rose in August, due to a "pick up" in crude oil prices. Over the year, there have been significant falls across most input price categories - prices of chemicals, crude oil, domestically produced and imported food and other imported materials have fallen most sharply over the year. Lower input costs to manufacturers have moderated product prices. Growth in output prices for manufactured products (home sales), not seasonally adjusted, over the 12 months to August, stabilsed at 1.4%. Over this period, output prices, excluding excise duties, and seasonally adjusted, rose by 0.5%. The rate of change in output prices has stabilised at historically low levels so far in 1997.

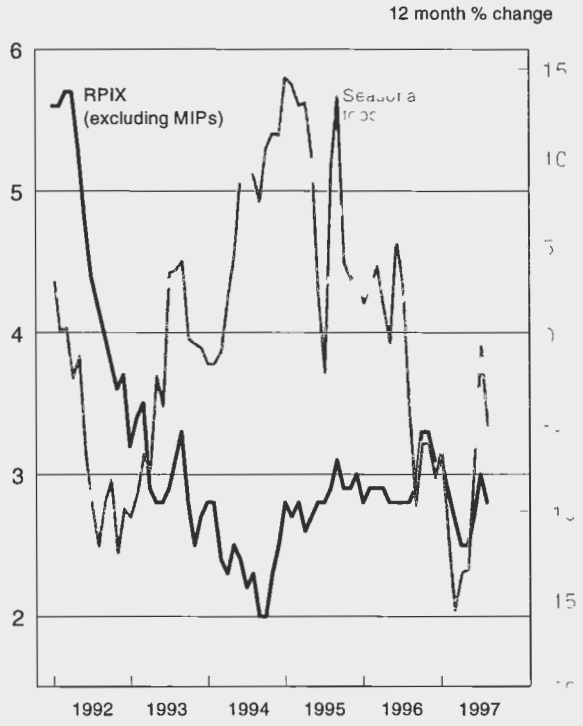
Production and service sector labour costs also currently show little indication of fueling inflation. Underlying whole economy average earnings for Great Britain rose by a ¼ percentage point to 4½% in July, despite earnings growth remaining stable across the sectors. The upward pressure was due to the upward revision in construction earnings. Service sector earnings are growing at the national average, although growth has slowed from a peak of 5% in February 1997. Production and manufacturing earnings are growing just below the national average. The only signs of upward pressure on costs are shown by growth in unit wage and salary costs. Annual growth of whole economy wages and salaries per unit of output was 2.7% in the first quarter, an acceleration from 1.6% in the fourth quarter of 1996. Following flat manufacturing output in the three months to July, annual growth in manufacturing wages and salaries per unit of output accelerated to 3.1% over this period from 2.9% in the three months to June.

Despite stable costs in the economy, and a continued fall in import prices as sterling remained strong against EU and non-EU currencies, headline retail price inflation rose for the fourth month in succession. However, the overall rise in retail prices is not attributable to increasing demand pressures on goods and services, as illustrated by a fall in the underlying rate of inflation. The upward pressure on the index has originated from a combination of a tightening in monetary policy, budget measures feeding through directly into prices and irregular seasonal effects. This is apparent from retail price growth excluding housing costs and indirect taxes, which has remained relatively

low and stable. The 12-month rate of increase of the retail prices index (RPI) rose to 3.5% in August 1997 - an increase of 1.1 percentage points since April 1997. Excluding mortgage interest payments (RPIX) the 12-month rate fell to 2.8%, edging closer from the government's target of 2.5%, and further excluding indirect taxes (RPIY), the rate fell to 2.1%.

The main upward effect to the headline rate in July continued to be caused by rising housing costs compared to stable costs the same time last year. Higher mortgage interest payments, following increased lending rates set in response to July's interest rate rise, were responsible for the relative increase in costs. The effect of the interest rate rise in August has yet to feed into the mortgage interest payments component of the index. In response to interest rate changes, mortgage lenders adjust their rates at different times and the effect on the RPI spills over into different months. Lesser upward effects came from July's Budget measures - tobacco prices rose more sharply than last year and the cost of foreign holidays has increased following the increase in insurance premium tax. The downward pressure on the underlying rate came from a significantly smaller rise in seasonal food, compared to last year. The smaller rise was attributable to a lesser rise in unprocessed potatoes than a year earlier. As illustrated in chart 6, the recent price movements in seasonal food, have closely followed movements in overall RPIX. A lesser downward effect came from stable prices of non-seasonal food, which rose the same time last year. Despite consumers' expenditure on goods accelerating significantly faster than expenditure on services, there has been no inflationary pressures on goods, whilst service sector inflation has edged up. The annual growth differential between goods and services widened in August, although the divergence of inflation between the sectors remains significantly less pronounced than in the first two quarters of 1997. Annual growth in the price of goods fell to 2.4% in August, following the downward effects already mentioned and growth of prices for services rose to 3.0%, due to higher prices of foreign holidays.

Chart 6
Retail price changes

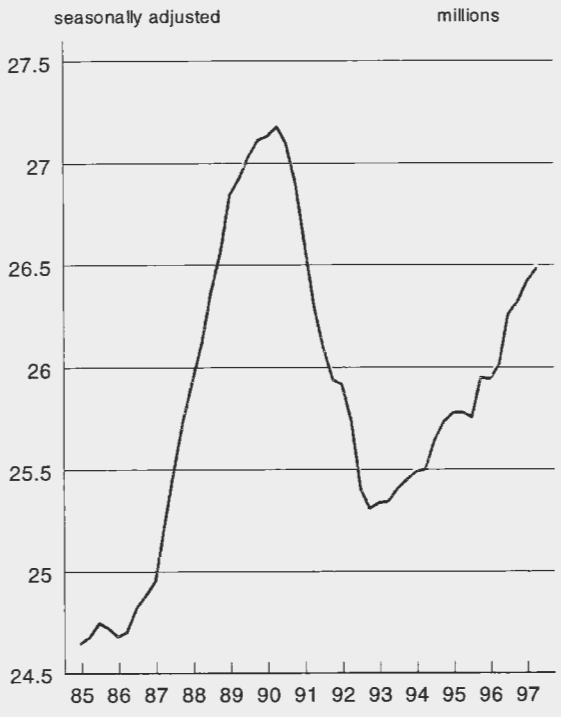


Labour Market

Latest indicators of labour market activity suggest demand for labour remains strong. Rising employment, concentrated in rapidly expanding services, a prolonged fall in unemployment, point towards a marked increase in labour activity. However, there are still no clear signs of capacity constraints due to shortages of labour supply, particularly as average earnings growth have remained relatively stable, since the impact of higher and increased bonuses has fallen out of the comparison.

Latest employment data for the second quarter confirmed strong demand, although growth in the workforce decelerated from the first quarter. However, upwards revisions to the workforce, following the benchmarking of the series using the 1996 Annual Employment Survey, show a more significant acceleration in demand since 1996 than previously reported. As chart 7 shows, the size of the workforce is still well below the last peak, in 1990. Workforce in employment increased by 64,000 in the second quarter and by 471,000 between 1996 Q2 and 1997 Q2. The revisions accounted for an increase of 64,000 over this latter period. Employment expansion between 1996 Q2 and 1997 Q2, occurred mainly in services, although manufacturing employment has steadily increased. However, following flat manufacturing output in the three months to July, manufacturers in Great Britain reduced employment by 6,000 over the period, but increased employment by 4,000 over the year.

Chart 7
UK workforce in employment



The falling trend in unemployment confirms labour demand has been strong for a prolonged period. UK claimant unemployment, seasonally adjusted, fell by 48,600 in August - the eighteenth consecutive monthly fall. The number of unemployed on the claimant count is now at its lowest level since August 1980 - 1.5 million, or 5.3% of the workforce. Most of the monthly fall can be explained by a low level in the number of seasonally adjusted inflows. The effect in July of a smaller number of inflows of 18-24 year olds than usual for the month, may have continued into August. Despite difficulties in assessing the falling trend in unemployment due to the impact of the JSA, evidence from the October 1996 to June 1997 shows an acceleration in trend from the rate of 15,000 to 20,000 estimated in October 1996, to 20,000 to 35,000.

The stock of vacancies rose in August to reach a record high, which suggests labour demand has continued to grow. However, this is misleading, as the Employment Service announced that the stock level has been distorted upwards for some time. Unfilled vacancies at jobcentres in the UK, seasonally adjusted, rose by 6,900 in July to reach a total of 292,000. The stock has been overestimated by approximately 40,000 following errors found in the new computer system. The incorrect vacancies will be removed from the stocks by overstating the number of outflows over the coming months. The supply of vacancies (or inflows) fell in August, and has been at a low level for the last three months, relative to high levels between February and May.

Placements, an indicator of labour turnover, fell sharply in August and remains at a low level.

Monetary indicators & Government finances

The annual growth of narrow money (M0), seasonally adjusted, decelerated from 5.8% in July to 5.0% in August 1997. Meanwhile, annual growth of broad money (M4), seasonally adjusted, decelerated from 12.0% in July to 11.6% in August, but still remains at a high level.

In August 1997, the public sector borrowing requirement (PSBR) was £1.1 billion. For the first five months of the financial year 1997-98, the PSBR was £5.6 billion, significantly lower than the £12.3 billion in the financial year 1996-97. Customs & Excise receipts were significantly higher than last August, boosted by increased tobacco tax revenues following the duty increase in the July budget. Excluding privatization proceeds the PSBR was £6.6 billion in the first five months of 1997-98, compared with £15.1 billion in 1996 97.

Forecast for the UK Economy

A comparison of independent forecasts, September 1997

The tables below are extracted from HM Treasury's "FORECASTS FOR THE UK ECONOMY" and summarise the average and range of independent forecasts for 1997 and 1998, updated monthly.

	Independent Forecasts for 1997		
	Average	Lowest	Highest
GDP growth (per cent)	3.4	3.0	4.2
Inflation rate (Q4)			
- RPI	3.2	2.0	4.6
- RPI excl MIPS	2.5	1.9	3.7
Unemployment (Q4,mn)	1.49	1.40	1.70
Current Account (£,bn)	-2.6	-11.8	2.4
PSBR (1997-98,£ ,bn)	11.5	7.0	15.2

	Independent Forecasts for 1998		
	Average	Lowest	Highest
GDP growth (per cent)	2.5	1.7	3.6
Inflation rate (Q4)			
- RPI	3.2	1.7	4.6
- RPI excl MIPS	2.9	2.1	4.0
Unemployment (Q4, mn)	1.36	0.96	1.59
Current Account (£,bn)	-9.5	-17.3	0.2
PSBR (1998-99,£,bn)	6.0	0.7	13.0

NOTE: "FORECASTS FOR THE UK ECONOMY" gives more detailed forecasts, covering 24 variables and is published monthly by HM Treasury, available on annual subscription, price £75,. Subscription enquiries should be addressed to Miss Jehal, Publishing Unit, Room 53a, HM Treasury, Parliament Street, London SW1P 3AG (0171 270 5607).

International Economic Indicators - October 1997

by Sue Holloway, Economic Assessment - Office for National Statistics

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Overview

Most of the new data this month is from Canada, which is the subject of a special Country Focus.

Activity

As well as new data for Canada, US **gross domestic product** (GDP) data was revised upwards for 1997 Q2, giving a percentage change on the previous year of 3.5% - slightly down on the first quarter, but still very strong.

In France, Q2 **industrial production** was up 2.5% on the previous quarter - the largest quarterly increase for three years - and 3.1% on the previous year. German data was revised upwards in both Q1 and Q2, giving year on year increases of 3.5% - to show strong annual growth for the third successive quarter.

Demand

Retail sales volume in Germany picked up again in June, giving a total increase in Q2 of 3.1% on the previous quarter, but only 1% on the previous year.

Inflation

Consumer price inflation averaged just under 2% in the EU15 countries in July, with most countries showing little change on previous months. It fell a little under 0.3 percentage points in Japan, to 1.9%, but remains significantly above post-1993 levels. It fell back to 2.2% in the US, after a slight rise in June, and is well down on 3.0% at the start of 1997. Likewise **producer price inflation** showed little change in most countries in the same month, although June data for Italy showed a pick-up of approximately 0.5 percentage points, giving a year on year increase in producer prices in Q2 of 1.2%. Producer prices have stabilised in the US since the second quarter of 1997.

Labour Market

Average earnings growth picked up in Japan in July to 4.2%, from 2.8% in the previous month, and April data for Germany also showed an acceleration of approximately 0.7 percentage points, although this was from a very subdued rate. **Total employment** fell in Japan in July, month on month and **unemployment** figures were also revised downwards for the same period.

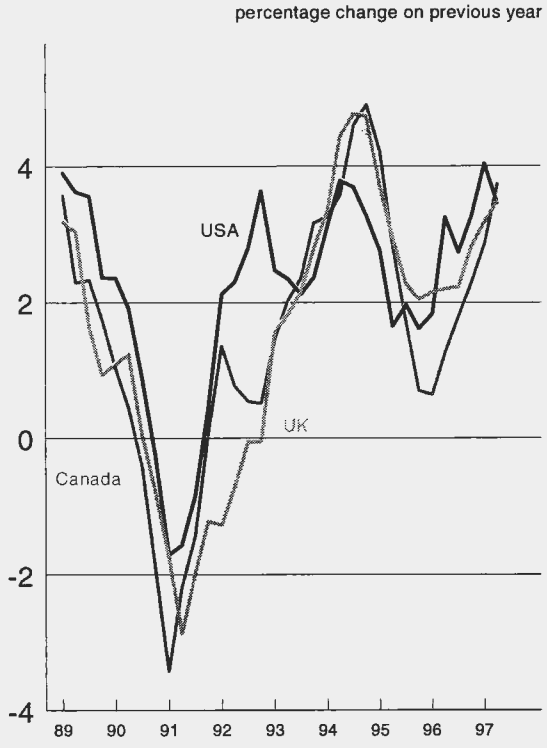
Notes

The series presented here are taken from the OECD's Main Economic Indicators, except for the United Kingdom. They are shown for each of the G7 economies and for the European Union (EU) and OECD countries in aggregate.

Comparisons of indicators over the same period should be treated with caution, as the length and timing of the economic cycles varies across countries.

FOCUS ON CANADA

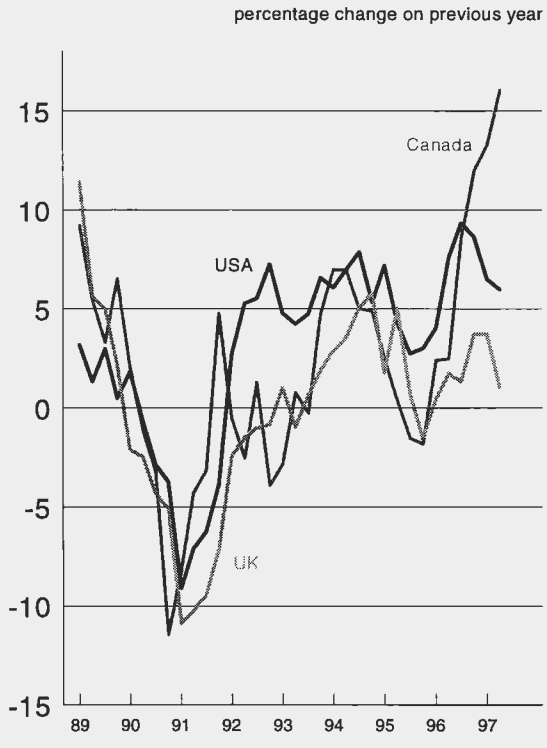
GDP growth



GDP has continued to grow strongly in Canada since the beginning of 1996, although as the chart above shows, the slowdown in 1995 was more pronounced than in the USA or the UK. While private final consumption growth moves in line in all three countries, it is just under 60% of GDP in Canada, compared with 63% in the UK and 67% in the US. Canadian government final consumption has fallen from a peak of 21% of GDP in 1991 and 1992, to just under 18% in 1997 Q2 - higher than in the US (15%), but lower than in the UK (nearly 20%). However, gross fixed capital formation is a significantly higher percentage of GDP in Canada - 24% in 1997, compared with 18% in the US and 17% in the UK, and, as the chart opposite shows, it is continuing to grow very strongly - up 13% on the previous year in 1997 Q1, and 16% on the previous year in 1997 Q2.

Industrial production showed an increase of 1.3% on the previous quarter in 1997 Q2, and 4.8% on the previous year. Year on year quarterly growth of industrial and manufacturing output has been accelerating since the middle of 1996, with output of consumer goods growing particularly strongly in 1997. This contrasts with the strong growth of expenditure on capital formation, which has been the main area of GDP growth.

GFCF growth



Consumers' expenditure has continued to grow strongly. Retail sales volume for Q1 was revised upwards, and edged up slightly, quarter on quarter, in Q2, giving an increase of 6.5% on the same period a year ago. Price inflation remained moderate in July, with consumer and producer price growth showing little change on the previous month. A large fall in the prices of petroleum and coal production was offset by rises in other areas. Likewise a fall in the consumer price of fuel and electricity was offset by a rise in the price of services.

In the Canadian labour market, total employment edged up slightly in July - quarterly figures have shown increases on the previous year in every quarter since the beginning of 1993 - broadly in line with changes in the US and UK labour markets. However, unemployment, while continuing to fall in June and July to its lowest level for nearly two years, still remains substantially higher than in the US and the UK at just over 9%.

The Canadian current account deficit as a percentage of GDP widened to 1.5% in 1997 Q2. While exports grew more strongly than imports in 1994 and 1995, imports began to outpace exports in 1996. For the last three quarters, year on year, import growth has accelerated and been consistently stronger than export growth.

1 Gross domestic product at constant market prices

	United Kingdom	Germany[1]	France	Italy	EU	United States	Japan	Canada	Major 7	OECD
Percentage change on a year earlier										
	ILFX	ILFY	ILFZ	ILGA	ILGB	ILGC	ILGD	ILGE	ILGF	ILGG
1989	2.2	3.6	4.3	2.9	3.6	3.4	4.8	2.5	3.5	3.5
1990	0.4	5.9	2.5	2.2	3.0	1.3	5.2	–0.2	2.4	2.6
1991	–2.0	12.4	0.8	1.1	3.0	–0.9	3.8	–1.8	1.4	1.4
1992	–0.5	1.8	1.1	0.6	0.9	2.7	1.0	0.8	1.7	1.7
1993	2.1	–1.1	–1.3	–1.2	–0.5	2.3	0.3	2.2	1.0	1.1
1994	4.3	2.9	2.8	2.2	3.0	3.5	0.7	4.1	2.8	2.8
1995	2.7	2.1	2.1	2.9	2.5	2.0	1.3	2.3	2.0	1.9
1996	2.3	1.4	1.5	0.7	1.7	2.8	3.7	1.5	2.5	2.6
1996 Q2	2.2	1.1	1.0	0.6	1.4	3.2	3.4	1.2	2.5	2.7
Q3	2.2	1.8	1.6	0.8	1.9	2.7	3.5	1.8	2.5	2.7
Q4	2.8	2.2	2.1	0.2	2.2	3.3	3.0	2.3	2.7	3.0
1997 Q1	3.2	2.8	1.1	–0.4	2.0	4.0	2.6	2.8	3.0	3.0
Q2	3.5	..	..	..	..	3.5	..	3.7	..	..
Percentage change, latest quarter on previous quarter										
	ILGH	ILGI	ILGJ	ILGK	ILGL	ILGM	ILGN	ILGO	ILGP	ILGQ
1995 Q2	0.5	0.8	0.1	0.2	0.4	0.1	1.0	–0.3	0.3	0.2
Q3	0.5	–	0.2	0.5	0.3	0.8	0.3	0.3	0.5	0.6
Q4	0.5	–0.3	–0.3	0.1	–	0.6	1.3	0.2	0.5	0.5
1996 Q1	0.6	–0.1	1.3	0.4	0.6	0.4	2.0	0.3	0.7	0.9
Q2	0.6	1.5	–0.2	–0.4	0.5	1.5	–0.3	0.4	0.8	0.8
Q3	0.6	0.7	0.8	0.7	0.7	0.3	0.3	0.8	0.4	0.5
Q4	1.1	0.1	0.2	–0.5	0.3	1.1	0.9	0.7	0.8	0.8
1997 Q1	1.0	0.4	0.2	–0.2	0.4	1.2	1.6	0.9	1.0	0.9
Q2	0.9	..	..	..	..	0.9	..	1.2	..	..

1 Data available for unified Germany since 1991

2 Total industrial production

	United Kingdom	Germany[1]	France	Italy	EU	United States	Japan[2]	Canada[3]	Major 7	OECD[4]
Percentage change on a year earlier										
	ILGR	ILGS	ILGT	ILGU	ILGV	ILGW	ILGX	ILGY	ILGZ	ILHA
1989	2.1	4.8	3.7	3.1	3.9	1.8	5.7	–0.2	3.1	3.4
1990	–0.3	5.2	1.5	–	2.1	–0.2	4.2	–3.3	1.4	1.7
1991	–3.3	3.7	–1.2	–0.7	–0.1	–2.0	1.9	–4.2	–0.5	–0.4
1992	0.3	–2.6	–1.2	–0.3	–1.2	3.2	–5.7	1.1	–0.4	–0.3
1993	2.2	–7.2	–3.8	–2.3	–3.2	3.4	–4.3	4.5	–0.6	–0.6
1994	5.4	3.6	4.0	5.3	4.8	5.0	1.2	6.9	4.2	4.3
1995	2.1	2.0	2.1	5.5	3.6	3.3	3.4	3.5	3.2	3.0
1996	1.1	0.5	0.5	–1.7	0.5	2.8	2.7	1.7	1.8	2.0
1997 Q1	1.3	3.5	1.0	–1.3	1.8	4.5	6.0	3.6	3.8	3.7
Q2	1.6	3.5	3.1	..	3.4	4.0	6.5	4.8	4.0	4.2
Percentage change, latest quarter on previous quarter										
	ILHB	ILHC	ILHD	ILHE	ILHF	ILHG	ILHH	ILHI	ILHJ	ILHK
1995 Q4	–0.1	–1.3	–2.0	0.9	–0.3	0.3	2.0	–0.3	0.3	0.4
1996 Q1	0.2	0.6	1.2	–2.4	–0.3	0.4	0.7	0.6	0.3	0.4
Q2	0.3	0.9	0.4	–0.5	0.5	1.5	–0.4	0.2	0.7	0.7
Q3	0.7	1.2	1.0	–0.8	0.9	0.8	1.8	2.1	1.0	1.0
Q4	0.4	–0.3	–0.6	–1.0	–0.1	1.1	2.2	0.5	0.8	0.8
1997 Q1	–	1.6	0.2	0.9	0.6	1.1	2.3	0.8	1.2	1.1
Q2	0.6	1.0	2.5	..	2.0	0.9	–	1.3	0.9	1.2
Percentage change: latest month on previous month										
	ILKB	ILKC	ILKD	ILKE	ILKF	ILKG	ILKH	ILKI	ILKJ	ILKK
1997 Apr	0.8	0.4	3.2	–0.1	2.3	0.4	–0.3	1.3	0.5	1.1
May	–0.9	–1.0	–1.3	–0.5	–1.8	–	4.1	0.2	0.4	–
Jun	1.8	2.7	–0.1	..	0.9	0.2	–2.8	–0.3	–	–
Jul	0.6	3.5	..	..	..	0.2	0.7	..	..	..

1 Data available for Unified Germany from 1991
2 Not adjusted for unequal number of working days in a month
3 GDP in industry at factor cost and 1986 prices
4 Some countries excluded from area total

3 Retail Sales (volume)

	United Kingdom	Germany	France	Italy	EU	United States	Japan	Canada	Major 7	OECD
Percentage change on a year earlier										
	ILHL	ILHM	ILHN	ILHO	ILHP	ILHQ	ILHR	ILHS	ILHT	ILHU
1989	2.1	3.3	1.5	8.5	3.2	2.2	3.3	–0.4	2.1	2.1
1990	0.7	7.5	0.7	–2.0	2.0	0.6	5.3	–1.9	2.0	2.0
1991	–1.3	6.0	–0.2	–3.0	–	–2.5	2.0	–4.4	–1.0	–1.0
1992	0.7	–2.8	0.3	5.2	1.0	3.2	–1.0	2.5	2.0	2.0
1993	3.0	–3.9	0.2	–2.9	–1.0	4.5	–3.0	3.4	1.0	1.0
1994	3.7	–1.0	–0.2	–6.1	–1.0	5.7	–	6.3	2.9	2.9
1995	1.2	1.0	0.1	–4.3	–	2.6	1.0	0.1	1.9	1.0
1996	2.9	–	–0.3	..	–1.0	3.7	1.0	0.8	0.9	1.9
1997 Q1	4.8	–	–1.3	..	–1.0	4.4	5.0	4.6	2.8	2.8
Q2	5.4	1.0	1.0	..	..	..	–5.1	6.2	..	..
Percentage change, latest quarter on previous quarter										
	ILHV	ILHW	ILHX	ILHY	ILHZ	ILIA	ILIB	ILIC	ILID	ILIE
1995 Q3	0.2	–2.0	1.4	1.1	1.0	1.0	1.0	1.1	–	0.9
Q4	0.7	–1.0	–3.1	–8.8	–2.0	0.7	–	–0.8	–0.9	–0.9
1996 Q1	0.4	1.0	2.7	..	1.0	1.4	2.0	0.2	1.9	1.9
Q2	1.3	2.0	–1.8	..	–	1.0	–2.0	–0.2	–	–
Q3	0.9	–1.0	–0.2	..	–1.0	0.4	–1.0	1.2	–	–
Q4	1.2	–2.0	0.4	..	–1.0	0.8	2.0	1.5	0.9	–
1997 Q1	1.3	1.0	0.3	..	1.0	2.2	6.0	2.0	1.8	2.8
Q2	1.8	3.1	0.5	..	..	..	–11.3	1.3	..	..
Percentage change, latest month on previous month										
	ILKL	ILKM	ILKN	ILKO	ILKP	ILKQ	ILKR	ILKS	ILKT	ILKU
1997 Apr	0.1	10.5	1.5	..	3.1	–0.9	–17.0	1.0	–1.8	–1.8
May	1.2	–7.6	1.7	..	–2.0	–	2.2	1.0	–0.9	–0.9
Jun	0.8	5.2	–3.7	..	..	..	–1.1	–0.2	..	..

4 Consumer prices[1]

	United Kingdom	Germany[2]	France	Italy	EU	United States	Japan	Canada	Major 7	OECD[3]
Percentage change on a year earlier										
	FRAN	HVLL	HXAA	HYAA	HYAB	ILAA	ILAB	ILAC	ILAD	ILAE
1989	7.8	2.9	3.4	6.6	5.2	4.9	2.2	5.0	4.5	6.2
1990	9.5	2.7	3.5	6.0	5.7	5.4	3.1	4.8	5.0	6.8
1991	5.9	3.7	3.2	6.5	5.2	4.2	3.2	5.6	4.3	6.1
1992	3.7	5.0	2.4	5.3	4.5	3.1	1.7	1.5	3.2	5.0
1993	1.6	4.4	2.1	4.2	3.5	3.0	1.2	1.9	2.7	4.3
1994	2.4	2.7	1.7	3.9	3.0	2.5	0.8	0.2	2.3	4.4
1995	3.5	1.9	1.7	5.4	3.2	2.8	–0.1	2.2	2.4	5.5
1996	2.4	1.5	2.1	3.8	2.5	3.0	0.1	1.5	2.2	5.1
1995 Q3	3.7	1.7	1.8	5.8	3.1	2.6	0.1	2.4	2.4	5.7
Q4	3.2	1.8	1.9	5.9	3.0	2.7	–0.6	2.0	2.2	5.7
1996 Q1	2.8	1.5	2.1	5.0	2.8	2.8	–0.4	1.4	2.3	5.5
Q2	2.2	1.5	2.4	4.2	2.6	2.8	0.1	1.5	2.2	5.0
Q3	2.1	1.5	1.8	3.5	2.3	3.0	0.2	1.3	2.2	4.8
Q4	2.6	1.4	1.7	2.7	2.3	3.1	0.5	2.0	2.4	4.8
1997 Q1	2.7	1.7	1.5	2.4	2.1	2.9	0.6	2.1	2.2	4.5
Q2	2.7	1.6	0.9	1.6	1.7	2.3	2.1	1.6	2.0	4.2
1997 Jan	2.8	1.8	1.8	2.7	2.3	3.0	0.6	2.2	2.3	4.6
Feb	2.7	1.7	1.6	2.4	2.2	3.0	0.6	2.1	2.3	4.5
Mar	2.6	1.5	1.1	2.2	1.9	2.8	0.5	2.0	2.0	4.3
Apr	2.4	1.4	0.9	1.7	1.6	2.5	1.9	1.7	2.1	4.2
May	2.6	1.7	0.9	1.6	1.8	2.2	2.0	1.5	1.9	4.1
Jun	2.9	1.7	1.0	1.4	1.8	2.3	2.2	1.8	2.1	4.2
Jul	3.3	1.8	1.0	1.6	1.9	2.2	1.9	1.8	2.0	4.2

1 Components and coverage not uniform across countries
2 Data available for Unified Germany from 1991
3 OECD data includes 'higher inflation' countries (Mexico and Turkey)

5 Producer prices (manufacturing)

	United Kingdom	Germany[1]	France[2]	Italy	EU	United States	Japan	Canada	Major 7	OECD[3]
Percentage change on a year earlier										
	EUAA	ILAF	ILAG	ILAH	ILAI	ILAJ	ILAK	ILAL	ILAM	ILAN
1989	5.0	3.4	5.2	5.9	4.9	5.2	2.1	1.9	4.4	5.8
1990	5.8	1.4	–0.9	4.2	2.5	4.9	1.6	0.3	3.3	4.7
1991	4.8	2.2	–1.2	3.3	2.2	2.1	1.1	–1.0	1.9	3.3
1992	2.3	1.6	–1.1	1.9	1.4	1.3	–1.0	0.5	0.9	2.3
1993	2.6	0.1	–2.1	3.7	1.3	1.3	–1.6	3.3	0.8	2.1
1994	2.3	0.8	1.2	3.8	2.2	0.6	–1.7	5.6	0.8	3.3
1995	4.4	2.1	5.2	7.9	4.5	2.0	–0.7	8.1	2.5	6.1
1996	2.0	0.2	–2.7	1.9	0.7	2.6	–0.7	0.5	1.3	3.9
1995 Q3	5.0	2.4	5.4	8.9	4.8	1.6	–0.7	7.7	2.6	6.1
Q4	4.6	1.6	2.4	7.2	3.6	2.2	–0.7	5.8	2.3	5.8
1996 Q1	3.5	0.8	–0.8	4.8	1.9	2.2	–0.9	1.7	1.6	4.7
Q2	2.3	0.1	–2.7	1.6	0.6	2.4	–0.9	0.4	1.1	3.7
Q3	1.2	–0.2	–3.8	0.4	–0.1	2.8	–0.7	–	1.0	3.6
Q4	0.8	0.2	–3.1	0.8	0.2	3.1	–0.6	–0.2	1.2	3.7
1997 Q1	0.5	0.3	–2.3	0.9	0.3	2.0	–0.3	0.2	0.8	3.1
Q2	..	0.7	–0.9	1.2	0.7	0.4	1.8	1.1	0.7	2.8
1997 Apr	0.5	0.4	–1.4	0.7	0.4	0.7	1.8	1.5	0.8	2.8
May	0.6	0.6	–1.0	1.1	0.7	0.3	1.7	0.8	0.6	2.8
Jun	0.6	0.8	–0.4	1.6	1.1	–0.1	1.8	1.0	0.6	2.8
Jul	..	0.9	..	..	1.2	–0.1	1.9	1.0	0.6	2.9

1 Data available for Unified Germany from 1991
2 Producer prices in intermediate goods
3 OECD includes 'higher inflation' countries (Mexico and Turkey)

6 Average wage earnings in manufacturing[1]

	United Kingdom[2]	Germany[3]	France	Italy	EU	United States	Japan[4]	Canada	Major 7	OECD
Percentage change on a year earlier										
	ILAY	ILAO	ILAP	ILAQ	ILAR	ILAS	ILAT	ILAU	ILAV	ILAW
1989	8.76	3.9	3.9	6.0	5.6	3.2	5.6	5.4	4.3	4.4
1990	9.50	4.2	4.9	7.3	6.4	3.1	5.1	4.7	4.2	5.3
1991	7.75	6.6	4.7	9.8	7.0	3.0	3.5	4.8	5.0	6.0
1992	5.50	7.1	4.0	5.4	5.6	2.9	1.3	3.4	2.9	2.8
1993	4.25	5.4	2.5	3.7	4.4	1.9	0.4	2.1	3.7	3.7
1994	5.00	2.9	1.9	3.3	4.2	2.8	2.2	1.6	2.7	2.7
1995	4.00	3.3	2.4	3.1	3.3	2.7	3.0	1.4	2.6	3.4
1996	4.75	5.2	2.4	1.8	..	3.5	2.6	3.2	3.4	3.3
1995 Q2	4.50	2.6	2.4	2.3	3.3	2.7	2.4	0.9	3.5	2.6
Q3	4.00	3.5	2.5	3.5	4.1	3.6	3.2	2.4	2.6	3.4
Q4	4.00	5.2	2.5	3.9	4.0	2.7	2.4	2.0	3.4	3.4
1996 Q1	4.25	7.1	2.3	1.9	..	2.7	1.7	1.8	3.4	3.4
Q2	4.25	6.7	2.3	2.1	..	3.5	1.6	3.0	2.5	3.4
Q3	4.50	4.3	2.6	1.7	..	2.6	4.9	3.8	3.4	3.3
Q4	4.75	2.9	2.6	1.6	..	3.5	2.3	4.1	3.3	3.3
1997 Q1	4.50	0.8	3.0	4.0	..	3.4	5.2	3.3	3.3	3.3
Q2	4.25	..	2.7	3.8	..	2.5	2.7	1.7	3.3	3.3
1997 Mar	4.50	..	..	4.0	..	4.3	2.7	3.3	..	..
Apr	4.25	1.5	2.7	3.9	..	2.5	2.7	3.0	..	..
May	4.25	..	..	3.8	..	3.4	2.8	2.9	..	..
Jun	4.25	..	..	3.7	..	2.5	2.8	–0.6	..	..
Jul	4.25	..	..	..	..	2.5	4.2	..	..	..

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

7 Total employment [1]

	United Kingdom	Germany[2,3]	France[3]	Italy	EU	United States[3]	Japan	Canada[3]	Major 7	OECD
Percentage change on a year earlier										
	ILIF	ILIG	ILIH	ILII	ILIJ	ILIK	ILIL	ILIM	ILIN	ILIO
1989	2.9	1.5	1.6	–0.5	1.7	2.1	2.0	2.0	1.8	1.9
1990	0.6	2.8	0.8	1.4	1.6	0.5	1.9	0.7	1.2	1.2
1991	–2.9	2.0	0.1	1.3	0.1	–0.9	1.9	–1.9	–	–
1992	–2.6	–1.4	–0.6	–1.1	–1.7	0.6	1.1	–0.5	–	–0.4
1993	–1.1	–1.1	–1.3	–4.2	–2.0	1.5	0.2	1.2	–	–0.2
1994	0.9	–0.4	0.1	–1.6	–0.2	3.2	–	2.2	1.3	1.2
1995	0.8	–0.3	1.0	–0.6	0.5	1.4	0.1	1.6	0.8	0.9
1996	1.2	–1.2	–0.2	0.4	0.1	1.5	0.5	1.3	0.6	0.8
1996 Q4	1.7	–1.4	–0.4	0.2	0.1	2.1	0.9	1.3	1.0	1.0
1997 Q1	1.7	–1.5	–0.3	–0.1	0.1	2.5	1.6	1.0	1.4	1.3
Q2	1.9	..	..	0.1	..	2.4	1.4	1.8	..	..
Percentage change,latest quarter on quarter										
	ILIP	ILIQ	ILIR	ILIS	ILIT	ILIU	ILIV	ILIW	ILIX	ILIY
1995 Q3	–0.1	0.4	0.2	1.2	0.4	0.8	0.1	2.1	0.5	0.6
Q4	0.4	0.1	–0.1	–0.7	–	–0.3	–1.2	–2.4	–0.4	–0.4
1996 Q1	0.3	–2.0	–0.1	–1.3	–1.0	–1.2	–1.6	–1.9	–1.4	–1.3
Q2	0.1	0.5	–0.1	1.2	0.6	2.0	3.1	3.5	1.9	1.8
Q3	0.7	0.2	–0.2	1.2	0.6	1.2	0.5	2.0	0.8	0.8
Q4	0.5	–0.1	–	–0.8	–0.1	0.1	–1.0	–2.3	–0.3	–0.3
1997 Q1	0.3	–2.1	–	–1.6	–1.0	–0.8	–0.9	–2.1	–1.0	–1.0
Q2	0.3	..	..	1.4	..	1.9	2.9	4.3	..	..
Percentage change, latest month on previous month										
	ILKV	ILKW	ILKX	ILKY	ILKZ	ILLA	ILLB	ILLC	ILLD	ILLE
1997 Apr	..	..	..	..	..	0.4	1.3	0.8	..	..
May	..	..	..	..	..	0.7	0.9	3.1	..	..
Jun	..	..	..	..	..	0.6	0.8	2.4	..	..
Jul	..	..	..	..	..	0.7	–0.5	0.5	..	..

1 Not seasonally adjusted except for the United Kingdom
2 Data available for Unified Gemany from 1991
3 Excludes members of armed forces

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

	United Kingdom	Germany[2]	France	Italy	EU	United States	Japan	Canada	Major 7	OECD
	GABF	GABD	GABC	GABE	GADR	GADO	GADP	GADN	GAEQ	GADQ
1989	7.3	5.6	9.3	10.0	8.7	5.3	2.3	7.5	5.7	6.3
1990	7.0	4.8	9.0	9.1	8.1	5.6	2.1	8.1	5.6	6.1
1991	8.8	4.2	9.5	8.8	8.4	6.9	2.1	10.4	6.4	6.8
1992	10.1	4.6	10.4	9.0	9.1	7.5	2.2	11.3	6.9	7.4
1993	10.5	7.9	11.7	10.3	10.8	6.9	2.5	11.2	7.2	8.0
1994	9.6	8.4	12.3	11.4	11.1	6.1	2.9	10.4	7.1	7.9
1995	8.7	8.2	11.7	11.9	10.8	5.6	3.1	9.5	6.8	7.6
1996	8.2	9.0	12.4	12.0	10.9	5.4	3.3	9.7	6.8	7.6
1995 Q3	8.7	8.3	11.6	12.0	10.8	5.7	3.2	9.4	6.8	7.6
Q4	8.5	8.5	12.0	11.9	10.8	5.6	3.3	9.4	6.8	7.6
1996 Q1	8.4	8.9	12.3	12.0	10.9	5.6	3.3	9.5	6.9	7.6
Q2	8.3	8.9	12.4	12.0	10.9	5.4	3.5	9.6	6.9	7.6
Q3	8.2	9.0	12.5	12.0	10.9	5.3	3.3	9.8	6.8	7.5
Q4	7.8	9.3	12.6	12.0	10.9	5.3	3.3	9.9	6.8	7.5
1997 Q1	7.4	9.6	12.5	12.2	10.8	5.3	3.3	9.6	6.8	7.5
Q2	..	..	..	..	..	4.9	3.5	9.4	..	..
1997 Mar	7.2	9.7	12.5	12.3	10.8	5.2	3.2	9.3	6.7	7.4
Apr	7.0	9.6	12.5	12.4	10.8	4.9	3.3	9.6	6.6	7.3
May	6.9	9.8	12.6	..	10.8	4.8	3.6	9.5	6.6	7.3
Jun	..	..	..	..	..	5.0	3.5	9.1	..	..
Jul	..	..	..	..	..	4.8	3.4	9.0	..	..

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 Data available on Unified Germany from January 1993

9 Balance of payments current account as percentage of GDP

	United Kingdom	Germany[1,2]	France	Italy	United States[1]	Japan[1]	Canada
	ILAZ	ILBA	ILBB	ILBC	ILBD	ILBE	ILBF
1985	0.6	0.6	–	–0.3	–3.1	3.6	–1.3
1990	–3.4	3.2	–0.8	–1.5	–1.6	1.2	–3.4
1991	–1.4	–1.0	–0.5	–2.1	–0.1	2.1	–3.8
1992	–1.7	–0.9	0.3	–2.4	–1.0	3.0	–3.6
1993	–1.7	–0.8	0.7	1.0	–1.5	3.1	–3.9
1994	–0.4	–1.0	0.6	1.4	–2.1	2.8	–2.7
1995	–0.5	–1.0	0.7	2.5	–1.8	2.1	–0.9
1996	–	–0.6	1.3	3.3	–1.9	1.4	0.5
1995 Q1	0.2	–1.2	1.2	1.7	–1.9	2.2	–0.8
Q2	–0.8	–0.6	0.9	2.9	–2.0	2.3	–2.3
Q3	–0.8	–0.8	0.1	3.1	–1.8	2.2	–1.0
Q4	–0.7	–1.4	0.6	2.2	–1.4	1.9	0.3
1996 Q1	–0.7	–0.6	1.7	2.1	–1.8	1.4	0.2
Q2	0.4	–0.8	0.8	3.6	–1.9	1.4	1.2
Q3	–0.2	–0.4	1.4	4.7	–2.2	1.4	0.8
Q4	0.3	–0.5	1.4	3.0	–1.9	1.5	–0.3
1997 Q1	0.8	–1.2	3.0	3.0	–2.1	1.5	–0.4
Q2	..	..	..	..	..	..	–1.5

1 Balance as percentage of GNP
2 Data available for Unified Germany from July 1990

10 World trade in goods[1]

	Export of manufactures			Import of manufactures			Export of goods			Import of goods			Total trade	
	Total	OECD	Other	Total	OECD	Other	Total	OECD	Other	Total	OECD	Other	manufactures	goods
Percentage change on a year earlier														
	ILIZ	ILJA	ILJB	ILJC	ILJD	ILJE	ILJF	ILJG	ILJH	ILJI	ILJJ	ILJK	ILJL	ILJM
1985	5.0	5.5	2.5	4.1	7.1	–1.9	3.9	3.9	4.9	1.0	3.5	5.6	4.5	3.7
1990	4.8	5.1	4.1	5.7	5.7	6.1	4.6	4.8	4.0	4.5	5.1	2.9	5.3	4.6
1991	3.3	2.5	6.9	5.5	3.8	10.8	3.8	3.3	5.1	4.8	3.4	9.2	4.4	4.3
1992	4.8	3.3	10.4	5.4	4.5	8.2	4.0	3.7	5.0	5.1	4.2	7.6	5.1	4.5
1993	3.8	1.7	11.6	3.8	1.1	11.1	4.6	2.3	10.8	3.9	1.6	10.3	3.8	4.3
1994	10.1	10.2	9.8	10.3	11.9	6.4	8.5	9.1	6.9	8.9	10.0	5.9	10.3	8.7
1995	8.0	8.3	7.2	8.1	8.9	6.2	7.1	7.1	7.0	6.7	6.7	6.6	8.0	6.8
1996 Q1	7.6	5.6	14.6	8.5	6.4	14.2	6.9	5.0	12.1	7.6	5.1	14.3	8.1	7.3
Q2	7.7	5.9	13.8	7.7	5.4	13.8	7.1	5.3	11.7	7.2	4.7	13.8	7.7	7.1
Q3	8.2	7.1	12.0	8.3	6.5	12.9	8.2	6.9	11.3	7.8	5.8	12.9	8.3	8.0
Q4	7.9	6.7	11.8	..	..	..	..	..	..	..	..	..	..	..
Percentage change, latest quarter on previous quarter														
	ILJN	ILJO	ILJP	ILJQ	ILJR	ILJS	ILJT	ILJU	ILJV	ILJW	ILJX	ILJY	ILJZ	ILKA
1995 Q1	1.1	1.6	–0.4	0.7	0.9	0.1	1.2	1.2	1.0	0.6	0.6	0.7	0.9	0.9
Q2	0.9	0.9	0.9	0.9	1.1	0.5	0.6	0.6	0.6	0.9	1.0	0.6	0.9	0.7
Q3	2.4	1.3	6.3	2.3	1.2	5.2	2.1	1.2	4.7	2.0	0.9	4.9	2.3	2.1
Q4	1.1	1.4	0.2	1.0	1.5	–0.2	0.8	1.1	0.1	0.5	0.7	–0.1	1.1	0.6
1996 Q1	3.0	1.8	6.6	4.1	2.5	8.3	3.2	2.0	6.3	4.1	2.5	8.3	3.5	3.7
Q2	1.0	1.3	0.2	0.2	0.2	0.1	0.7	0.9	0.2	0.5	0.6	0.2	0.6	0.6
Q3	2.9	2.4	4.7	2.9	2.3	4.3	3.2	2.7	4.3	2.5	1.9	4.1	2.9	2.9
Q4	0.8	1.1	–	..	..	..	..	..	..	..	..	..	..	..

1 Data used in the World and OECD aggregates refer to Germany after unification

Regional Economic Indicators

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Overview

- Over the year to June 1997, employment rose in all regions, except Yorkshire and Humberside, and Scotland.

- Scotland's industrial production grew sharply by 7.3% between 1996 Q1 and 1997 Q1, despite production slowing in 1997 Q1.

- The Confederation of British Industry (CBI) reported output growth weakening in the majority of regions in the four months to July. However, more manufacturers in the majority of regions expect an improvement in growth.

- The supply of new housing grew modestly in 1997 Q2 compared with l996 Q2. Despite the modest increase in supply, increased demand for all housing (new and second-hand) has driven up house prices in all regions over the year.

The Labour Market

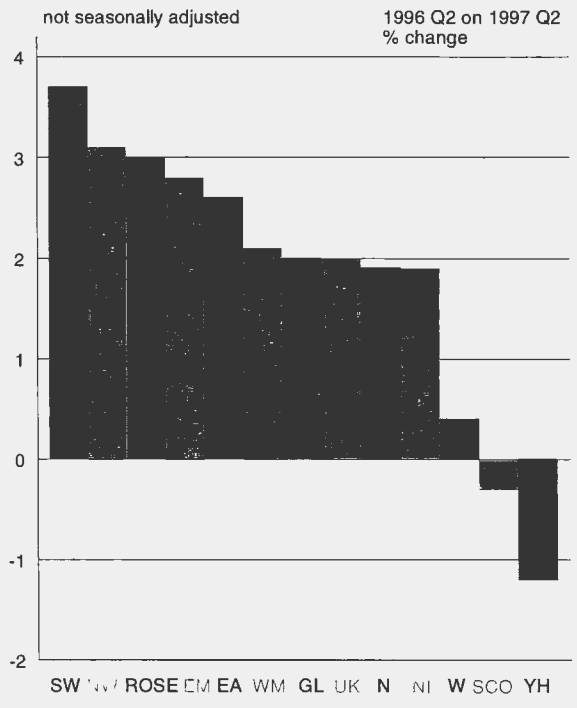
The number of **employees in employment** in the UK, not seasonally adjusted, rose by 2.0% between June 1996 and June 1997. Over this period, employment rose in all regions, except Yorkshire and Humberside and Scotland. As shown in chart 1, employment grew particularly strongly in the South West, North West, Rest of the South East, East Midlands and East Anglia.

Total employment in the UK, as measured by the Labour Force Survey, increased by 1.8% between Spring 1996 (March to May) and Spring 1997. Employment rose in all regions except Yorkshire and the Humber, where employment fell by 0.5%. The strongest increases were in Northern Ireland (up 5%), the South West (up 3.8%) and London (up 3.4%). The rise in Northern Ireland, and the South West was split evenly between male and female employment, but in London, most of the rise was in male employment.

The number of **claimant unemployed** fell sharply in all regions of the UK in the three months to August. Over the period, the **rate of unemployment** to total workforce fell most sharply in Merseyside, Wales, London and Northern Ireland. Merseyside still had the highest rate of unemployment to total workforce in August, at 10.2%, and London still had by far the highest number of claimant unemployed. The differential between the highest regional unemployment rate (Merseyside) and the lowest (the South East (GOR)), narrowed by 0.3 percentage points over the period.

Chart 1

Employees in employment
(all industries)



Long-term claimant unemployment as a percentage of the workforce fell across all regions between April 1997 and July 1997. Rates fell most sharply in Merseyside, Northern Ireland, the North East, and London. Merseyside had the highest long-term unemployment rate in July of 4.3%, but the differential between the highest and lowest rate (South East) narrowed by 0.2 percentage points between April and July.

The **ILO unemployment** rate in the UK, as a percentage of the economically active, in the UK fell to 7.1% in Spring 1997 from

8.2% in Spring 1996. The rate fell in all regions over this period, except Wales, and Yorkshire and the Humber, with the most significant falls occurring in Merseyside, the West Midlands, London and Northern Ireland. The North East had the highest unemployment rate in the Spring at 9.8%, and the South East (GOR) and the South West the lowest at 5.2%.

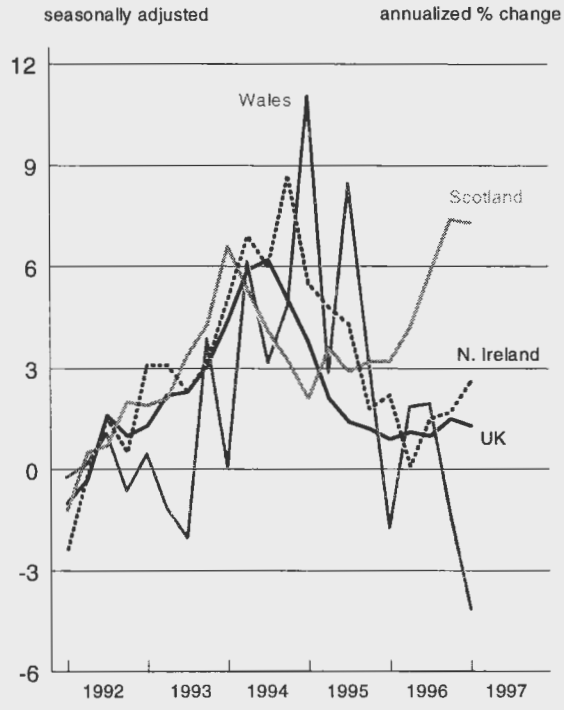
Production

Industrial production, which comprises of manufacturing, mining and quarrying, including oil and gas extraction and output of the electricity, gas and water industries, remained flat in the UK between 1996 Q4 and 1997 Q1. Production continued to fall in Wales over this period, following a sharp turn-around from strong positive growth in 1996 Q3, and production growth slowed in Scotland, following strong growth in the previous three quarters. Conversely, industrial production grew strongly in Northern Ireland, following subdued production in the previous quarter. Between 1996 Q1 and 1997 Q1, industrial production increased by 1.3% in the UK. As illustrated in chart 2, over this period, Scotland had even more striking growth of 7.3%, despite growth slowing in 1997 Q1, Northern Ireland enjoyed strong growth of 2.6%, while Wales saw production fall by 3%. The strong and consistent growth of industrial production in Scotland is due to a sharp rise in output of the electronics industry (which is allocated a large weighting in the index). The latest available industrial production data for the UK shows a rise in growth of 0.6% in 1997 Q2. While manufacturing grew by only 0.3%, a sharp rise in energy output boosted overall production, as a return to normal temperatures in May, and colder temperatures in June and July, increased demand for energy.

Manufacturing

The Confederation of British Industry (CBI) reported growth of output weakening in the majority of regions, but more manufacturers' in the majority of regions expect an improvement in growth . All regions except Wales, the South West, the North, the East Midlands, and the South East, reported positive **output** balances (firms reporting rises in output less those reporting falls) in the four months to July 1997. However, compared with the previous four months, output balances in the UK overall, were slightly down, with some regions reporting a sharp return to growth, but other regions reporting growth weakening sharply. Northern Ireland, East Anglia and the North West, reported strong growth, following a fall in growth in the previous four months. Wales, the East Midlands, the North, and the South West, now reported an overall fall in output, following growth in

Chart 2
Index of industrial production



the previous four months. Expectations of growth improved significantly from four months ago in East Anglia, and marginally in the North West, although expectations in Northern Ireland deteriorated despite the "pick-up" in growth of output. Following weaker growth in output, Wales and the East Midlands expectations of future growth deteriorated significantly. These two regions were the only ones expecting output to fall in the next four months.

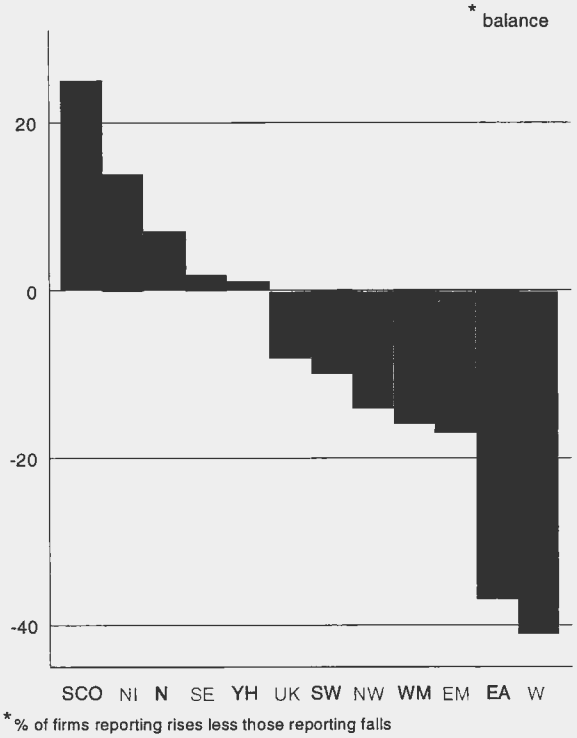
The largest rises in **firms working below capacity** were reported in the North, East Anglia, the East Midlands, and Wales. Manufacturers in the North, the East Midlands and Wales also reported a sharp drop in output, suggesting there has been a significant fall in demand in these regions. Conversely, East Anglia, reported a sharp rise in output, despite a large rise in firms at below capacity production.

The overall picture of demand was mixed in the four months to July, although overall demand appears to have slowed. On balance, more manufacturers in Northern Ireland and the North West reported stronger demand, whereas those in Wales, the West Midlands, and the South West reported weaker demand. **The volume of new orders** is expected to increase in all regions, except Wales and Yorkshire and Humberside. Expectations in Wales, the West Midlands and the South West have deteriorated sharply following a fall in demand in the past four months, but so to have expectations in Northern Ireland,

despite a "pick-up" in demand. Demand is expected to increase at a slower rate in the majority of regions, than the previous four months. Expectations markedly improved in the North, where output in the past four months remained stable, and the South East, where more manufacturers reported rising output.

Chart 3

CBI Manufacturing volume of new export orders in July 1997 for next four months



*% of firms reporting rises less those reporting falls

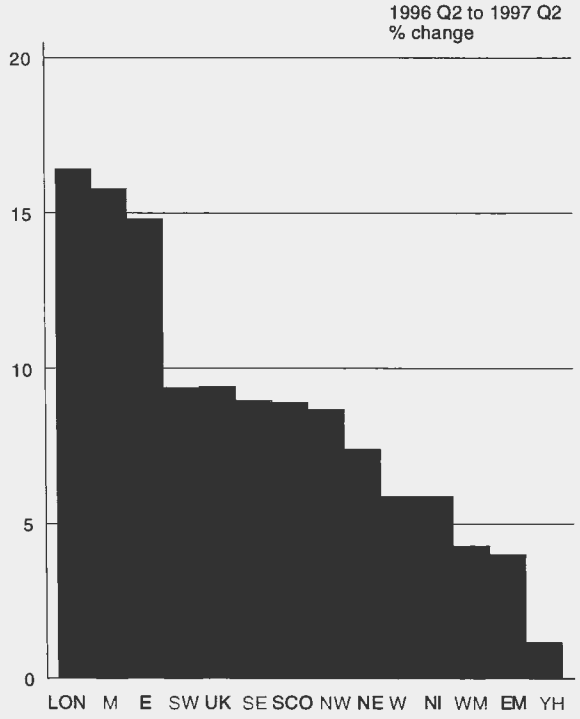
External demand weakened in all regions, except Northern Ireland, the East Midlands, and the North West. All regions reported falling export orders in the past four months - most significantly in East Anglia, Wales, and the South West. Export orders are expected to weaken further in these latter regions in the four months from July, along with the East Midlands, the North West and the West Midlands. However, more manufacturers in the remaining regions expect a strengthening in external demand. As chart 3 shows, overall, the consensus is mixed, suggesting sterling's appreciation will continue to adversely affect demand for export orders in some regions, but in others, future demand will grow despite a strong current exchange rate. All regions, except Scotland and Yorkshire and Humberside, expect stronger domestic demand than external demand. Northern Ireland and Scotland have by far the strongest expectations of combined rising domestic and external demand. Conversely, Wales, expect the sharpest fall in demand of all regions. Overall, manufacturers in the UK expect external demand to weaken at a similar rate to domestic demand.

The Housing Market

The supply of housing grew modestly compared with last year. **Dwellings started** in England during 1997 Q2 increased by 4.0% compared with 1996 Q2. However, the regional picture is mixed with some regions enjoying sharp increases in supply, but others seeing supply fall modestly. The strongest increase of some 46% was in Merseyside, followed by the North West (up 27%) and London (up 16.5%). Apart from these regions, and Wales and the South West, who saw dwellings increase modestly, all other regions experienced falls of between 1% to 5%. As dwellings started rose modestly over the period, the number of housing completions only rose slightly, yet to react to the strong rise in dwellings started during 1996. In 1997 Q2, **dwellings completed** in England rose by 1.6% on 1996 Q2. As with dwellings started, between 1996 Q2 and 1997 Q2, the number of completions grew most strongly in London and Merseyside, but the North West only saw a modest increase. There were large falls over the period in Yorkshire and the Humber and Wales. Despite the modest increase in supply of new housing, increased demand for all housing (new and second-hand) has driven up house prices over the year. The Department of the Environment's all dwellings **house prices** index for the UK rose by 9.4% between 1996 Q2 and 1997 Q2. As chart 4 shows, all regions experienced rises over this period, with the largest rises mainly in the southern regions, and in particular London, but also in Merseyside and Eastern.

Chart 4

Dept. of Environment's house price index



1 Gross domestic product at factor cost: current prices
Government Office Regions

£ million and percentages

		Percentage of the UK[1]											
	United Kingdom[1] (£m)	North East	North West (GOR) & Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	England	Wales	Scotland	Northern Ireland
	DCIX	LRBU	LRBV	DCJD	DCJC	DCJB	LRBW	LRAD	LRBX	DCJA	LRES	DCJG	DCJH	DCJI
1985	289 444	*4.1*	*11.6*	*8.2*	*6.8*	*8.4*	*9.6*	*14.6*	*14.1*	*7.5*	*85.0*	*4.1*	*8.7*	*2.2*
1991	490 259	*3.8*	*10.8*	*7.9*	*6.8*	*8.4*	*9.7*	*14.8*	*14.8*	*7.8*	*84.9*	*4.3*	*8.6*	*2.3*
1992	511 737	*3.9*	*10.8*	*7.8*	*6.8*	*8.5*	*9.7*	*14.8*	*14.6*	*7.8*	*84.8*	*4.2*	*8.7*	*2.3*
1993	540 293	*3.9*	*10.8*	*7.8*	*6.8*	*8.4*	*9.6*	*15.0*	*14.7*	*7.8*	*84.9*	*4.1*	*8.7*	*2.3*
1994	569 995	*3.8*	*10.8*	*7.7*	*6.8*	*8.5*	*9.7*	*14.8*	*14.9*	*7.8*	*84.8*	*4.2*	*8.7*	*2.3*
1995	594 091	*3.8*	*10.7*	*7.8*	*6.9*	*8.6*	*9.7*	*14.7*	*14.8*	*7.9*	*85.0*	*4.1*	*8.5*	*2.3*

1 UK *less* continental shelf and statistical discrepancy.

Source: Office for National Statistics

2 Gross domestic product at factor cost: £ per head
Government Office Regions

£

	United Kingdom[1]	North East	North West (GOR) & Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	England	Wales	Scotland	Northern Ireland
	DCJJ	LRBY	LRBZ	DCJP	DCJO	DCJN	LRCA	LRAF	LRCB	DCJM	LRET	DCJS	DCJT	DCJU
1985	5 106	4 554	4 893	4 809	5 055	4 702	5 600	6 244	5 494	4 801	5 213	4 268	4 907	4 047
1991	8 481	7 225	7 725	7 765	8 294	7 865	9 257	10 519	9 428	8 058	8 632	7 228	8 242	6 955
1992	8 822	7 619	8 033	8 002	8 583	8 242	9 623	10 973	9 708	8 426	8 972	7 394	8 715	7 243
1993	9 285	7 967	8 474	8 360	9 000	8 623	10 013	11 712	10 296	8 838	9 449	7 686	9 163	7 637
1994	9 761	8 314	8 923	8 772	9 460	9 104	10 628	12 068	10 922	9 247	9 924	8 197	9 654	8 050
1995	10 134	8 689	9 255	9 166	9 926	9 649	10 991	12 503	11 231	9 663	10 324	8 440	9 873	8 410

1 UK *less* continental shelf and statistical discrepancy.

Source: Office for National Statistics

3 Total personal disposable income: £ per head
Government Office Regions

£

	United Kingdom	North East	North West (GOR) & Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	England	Wales	Scotland	Northern Ireland
	DCSD	LRCC	LRCD	DCSK	DCSJ	DCSI	LRCE	DCSF	LRCF	DCSH	LREU	DCSN	DCSO	DCSP
1985	4 294	3 858	4 101	4 074	4 158	3 982	4 285	5 194	4 683	4 313	4 365	3 736	4 132	3 691
1991	7 028	6 276	6 616	6 617	6 705	6 718	6 978	8 408	7 607	6 830	7 090	6 316	7 041	6 389
1992	7 504	6 713	7 046	7 020	7 005	7 182	7 373	8 920	8 157	7 384	7 549	6 690	7 740	6 847
1993	7 873	6 997	7 339	7 357	7 443	7 447	7 651	9 622	8 638	7 635	7 939	6 851	8 020	7 285
1994	8 143	7 092	7 576	7 626	7 718	7 738	8 003	9 873	9 088	7 785	8 222	7 184	8 101	7 639
1995	8 573	7 420	7 971	7 978	8 206	8 217	8 376	10 513	9 589	8 192	8 678	7 400	8 415	8 027

Source: Office for National Statistics

4 Household disposable income: £ per head
Government Office Regions

£

	United Kingdom	North East	North West (GOR) & Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	England	Wales	Scotland	Northern Ireland
	DEPZ	LRCG	LRCH	DEQB	DEQC	DEQH	LRCI	DEQE	LRCJ	DEQG	LREV	DEQJ	DEQK	DEQL
1985	4 050	3 705	3 845	3 838	3 874	3 688	4 190	4 775	4 357	4 221	4 108	3 607	3 920	3 497
1991	7 075	6 452	6 638	6 635	6 765	6 638	7 517	8 146	7 564	7 187	7 149	6 438	7 015	6 214
1992	7 524	6 879	7 093	7 086	7 124	7 030	7 943	8 583	7 991	7 671	7 580	6 878	7 685	6 518
1993	7 808	7 118	7 287	7 270	7 438	7 273	8 175	9 129	8 402	7 842	7 878	6 983	7 912	6 871
1994	8 027	7 136	7 427	7 490	7 574	7 545	8 529	9 378	8 774	8 060	8 118	7 303	7 885	7 046
1995	8 417	7 466	7 882	7 867	8 146	8 061	8 875	9 703	9 035	8 473	8 511	7 559	8 296	7 532

Source: Office for National Statistics

5 Consumers' expenditure: £ per head

Standard Statistical Regions

£

	United Kingdom	North	Yorks & Humber	East Midlands	East Anglia	Greater London	Rest of South East	South West	West Midlands	North West	England	Wales	Scotland	Northern Ireland
	DCVD	DCVM	DCVK	DCVJ	DCVG	DCVE	DCWD	DCVH	DCVI	DCVL	LREW	DCVN	DCVO	DCVP
1985	3 837	3 386	3 427	3 529	3 803	4 656	4 392	3 802	3 484	3 555	3 898	3 519	3 654	3 143
1991	6 322	5 621	5 676	6 058	6 197	7 579	6 965	6 415	5 887	6 021	6 427	5 835	5 843	5 560
1992	6 611	5 976	6 125	6 236	6 479	7 934	7 343	6 572	5 998	6 256	6 717	6 088	6 161	5 792
1993	6 984	6 392	6 636	6 612	6 640	8 385	7 737	6 783	6 320	6 641	7 095	6 263	6 651	6 008
1994	7 317	6 606	6 961	7 036	6 859	8 680	8 090	6 956	6 876	7 041	7 440	6 370	6 988	6 381
1995	7 631	6 821	7 220	7 470	7 132	9 026	8 415	7 184	7 230	7 401	7 760	6 678	7 210	6 806

Source: Office for National Statistics

6 Average weekly household disposable income and expenditure[1]

Government Office Regions

£

	United Kingdom	North East	North West (GOR) & Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	Wales	Scotland	Northern Ireland[2]
Average weekly disposable household income													
1995/96	307	280	291	277	317	286	311	350	347	318	296	275	268
Average weekly household expenditure													
1995/96	290	261	282	271	306	276	305	327	314	281	266	268	287

1 FES data are shown without adjustment for non-response, outliers or non-sampling errors. They are also subject to sampling error.
2 Northern Ireland data are obtained from an enhanced sample, but the United Kingdom figures are obtained from the main Family Expenditure Survey sample

Sources: Family Expenditure Survey, Office for National Statistics; Northern Ireland Statistics and Research Agency

7 Total average gross weekly pay[1]

Government Office Regions

£

	United Kingdom	North East	North West (GOR)	Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	Wales	Scotland	Northern Ireland
	DEOG	LRCO	LRCP	LREX	DCQI	DCQH	DCQG	LRCQ	DCPI	LRCR	DCQF	DCQL	DCQM	DCQN
1992 Apr	303.80	281.25	286.51	282.41	277.22	276.08	279.92	303.92	385.88	316.05	283.07	270.90	286.57	269.60
1993 Apr	316.00	286.21	299.46	297.71	287.63	285.50	292.65	312.19	408.84	328.91	298.84	281.48	297.64	282.40
1994 Apr	324.70	294.55	308.66	303.24	297.04	292.55	300.13	322.85	420.62	339.39	306.92	290.52	301.90	286.50
1995 Apr	335.30	299.23	317.42	319.01	306.02	306.40	311.26	331.50	441.53	348.13	313.89	302.05	313.45	300.20
1996 Apr	350.20	314.05	330.53	325.36	316.40	317.85	324.27	345.69	454.25	367.38	326.52	313.08	324.91	306.20

1 Average gross weekly earnings of full-time employees on adult rates whose pay for the survey pay-period was not affected by absence.

Sources: New Earnings Survey, Office for National Statistics; Department of Economic Development, Northern Ireland

8 JSA[1] claimant count rates as a percentage of total workforce

Government Office Regions

Seasonally adjusted

	United Kingdom	North East	North West (GOR)	Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	Wales	Scotland	Northern Ireland
	DCKH	LRCS	LRCT	LREK	DCKN	DCKM	DCKL	LRCU	DCRA	LRCV	DCKK	DCKQ	DCKR	DCPL
1993	*10.3*	*12.9*	*9.5*	*15.1*	*10.2*	*9.5*	*10.8*	*9.4*	*11.6*	*8.6*	*9.5*	*10.3*	*9.7*	*13.7*
1994	*9.3*	*12.4*	*8.7*	*14.9*	*9.6*	*8.7*	*9.9*	*8.1*	*10.7*	*7.3*	*8.1*	*9.3*	*9.3*	*12.6*
1995	*8.2*	*11.6*	*7.6*	*13.7*	*8.7*	*7.6*	*8.3*	*6.9*	*9.7*	*6.2*	*7.0*	*8.7*	*8.1*	*11.4*
1996	*7.5*	*10.6*	*6.9*	*13.1*	*8.0*	*6.8*	*7.4*	*6.1*	*8.9*	*5.4*	*6.2*	*8.2*	*7.9*	*10.9*
1996 Sep	*7.4*	*10.3*	*6.7*	*12.9*	*7.8*	*6.7*	*7.2*	*6.0*	*8.7*	*5.2*	*6.1*	*8.1*	*7.8*	*11.2*
Oct	*7.2*	*10.1*	*6.6*	*12.7*	*7.7*	*6.5*	*7.1*	*5.8*	*8.5*	*5.1*	*5.9*	*8.0*	*7.7*	*10.7*
Nov	*6.9*	*9.6*	*6.3*	*12.3*	*7.4*	*6.2*	*6.7*	*5.4*	*8.2*	*4.8*	*5.6*	*7.6*	*7.4*	*9.9*
Dec	*6.7*	*9.5*	*6.2*	*12.1*	*7.2*	*6.0*	*6.5*	*5.3*	*8.0*	*4.7*	*5.5*	*7.4*	*7.3*	*9.7*
1997 Jan	*6.5*	*9.1*	*5.9*	*11.8*	*7.0*	*5.8*	*6.3*	*5.1*	*7.7*	*4.4*	*5.3*	*7.2*	*7.1*	*9.2*
Feb	*6.2*	*8.8*	*5.7*	*11.6*	*6.8*	*5.5*	*6.1*	*4.8*	*7.5*	*4.2*	*5.0*	*7.0*	*6.9*	*8.9*
Mar	*6.1*	*8.7*	*5.5*	*11.4*	*6.6*	*5.4*	*6.0*	*4.7*	*7.3*	*4.1*	*4.9*	*6.8*	*6.9*	*8.7*
Apr	*5.9*	*8.5*	*5.4*	*11.1*	*6.4*	*5.3*	*5.8*	*4.5*	*7.0*	*3.9*	*4.7*	*6.6*	*6.6*	*8.4*
May	*5.8*	*8.5*	*5.3*	*10.9*	*6.4*	*5.2*	*5.7*	*4.4*	*6.9*	*3.8*	*4.6*	*6.6*	*6.6*	*8.4*
Jun	*5.7*	*8.4*	*5.1*	*10.7*	*6.3*	*5.1*	*5.6*	*4.3*	*6.7*	*3.7*	*4.5*	*6.5*	*6.5*	*8.1*
Jul	*5.5*	*8.3*	*5.0*	*10.4*	*6.2*	*4.9*	*5.4*	*4.2*	*6.5*	*3.5*	*4.3*	*6.3*	*6.2*	*7.9*
Aug[2]	*5.3*	*8.1*	*4.8*	*10.2*	*6.1*	*4.7*	*5.3*	*4.0*	*6.3*	*3.4*	*4.1*	*6.0*	*6.1*	*7.8*

1 Jobseeker's Allowance.
2 Provisional.

Source: Office for National Statistics

9 Long-term JSA[1] claimant count as a percentage of total workforce (those out of work for 12 months or more)

Government Office Regions

Percentages

	United Kingdom	North East	North West (GOR)	Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	Wales	Scotland	Northern Ireland
	DCKS	LRCW	LRCX	LREL	DCKY	DCKX	DCKW	LREF	DCRB	LRCY	DCKV	DCLB	DCLC	DCLD
1996 Oct	*2.6*	*3.9*	*2.0*	*5.4*	*2.7*	*2.2*	*2.7*	*1.9*	*3.7*	*1.7*	*1.9*	*2.6*	*2.4*	*5.7*
1997 Jan	*2.5*	*3.7*	*1.8*	*5.2*	*2.5*	*2.1*	*2.5*	*1.8*	*3.4*	*1.6*	*1.8*	*2.5*	*2.3*	*5.0*
Apr	*2.2*	*3.4*	*1.7*	*4.8*	*2.2*	*1.9*	*2.2*	*1.6*	*3.0*	*1.4*	*1.6*	*2.3*	*2.1*	*4.5*
Jul	*1.9*	*3.0*	*1.4*	*4.3*	*2.0*	*1.6*	*1.9*	*1.3*	*2.6*	*1.1*	*1.3*	*2.0*	*1.9*	*4.1*

1 Jobseeker's Allowance.

Source: Office for National Statistics

10 ILO unemployed as a percentage of the economically active, not seasonally adjusted

Government Office Regions

Percentages

	United Kingdom[1]	North East	North West (GOR)	Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	Wales	Scotland	Northern Ireland
	LRAH	LRCZ	LRDA	LREQ	LRAJ	LRAK	LRAP	LRDB	LRAM	LRDC	LRAO	LRAR	LRAS	LRAT
Spring 1993	*10.3*	*12.0*	*9.8*	*15.4*	*10.0*	*9.1*	*11.8*	*9.2*	*13.2*	*8.0*	*9.2*	*9.6*	*10.2*	*12.5*
Summer 1993	*10.5*	*14.0*	*9.5*	*14.8*	*11.1*	*8.9*	*11.6*	*9.4*	*13.8*	*8.4*	*8.4*	*9.9*	*10.4*	..
Autumn 1993	*10.2*	*13.0*	*9.2*	*15.1*	*10.0*	*8.3*	*11.4*	*9.0*	*14.4*	*8.0*	*8.6*	*9.8*	*9.7*	..
Winter 1993	*10.1*	*12.4*	*9.2*	*15.1*	*10.0*	*8.0*	*10.9*	*8.8*	*13.8*	*7.7*	*8.3*	*10.3*	*10.3*	..
Spring 1994	*9.6*	*12.5*	*9.5*	*13.6*	*9.9*	*8.3*	*10.0*	*8.2*	*13.1*	*7.1*	*7.5*	*9.3*	*10.0*	*11.7*
Summer 1994	*9.8*	*12.3*	*9.5*	*15.9*	*10.4*	*9.1*	*9.8*	*8.3*	*12.9*	*7.2*	*8.1*	*9.9*	*9.9*	..
Autumn 1994	*9.1*	*12.1*	*8.4*	*14.1*	*9.0*	*8.1*	*9.1*	*7.6*	*12.1*	*6.9*	*7.9*	*9.8*	*8.9*	..
Winter 1994	*8.9*	*12.3*	*8.3*	*13.0*	*8.8*	*7.5*	*8.6*	*7.6*	*11.7*	*7.2*	*7.7*	*9.6*	*8.5*	*11.4*
Spring 1995	*8.6*	*11.4*	*8.3*	*11.7*	*8.7*	*7.5*	*9.0*	*7.5*	*11.5*	*6.4*	*7.8*	*8.8*	*8.3*	*11.0*
Summer 1995	*8.9*	*11.7*	*8.4*	*13.5*	*9.1*	*7.1*	*8.9*	*7.8*	*12.3*	*6.6*	*7.3*	*8.4*	*9.2*	*11.2*
Autumn 1995	*8.6*	*11.4*	*7.9*	*13.7*	*8.2*	*6.9*	*8.7*	*7.4*	*11.8*	*6.4*	*7.5*	*8.3*	*9.1*	*10.7*
Winter 1995	*8.3*	*11.2*	*7.6*	*11.6*	*7.9*	*7.4*	*8.5*	*6.7*	*11.0*	*6.5*	*7.2*	*8.9*	*8.9*	*9.7*
Spring 1996	*8.2*	*10.8*	*7.3*	*13.3*	*8.1*	*7.4*	*9.2*	*6.2*	*11.3*	*6.0*	*6.3*	*8.3*	*8.7*	*9.7*
Summer 1996	*8.3*	*10.7*	*7.5*	*12.4*	*8.5*	*7.1*	*9.0*	*7.2*	*11.5*	*6.1*	*6.4*	*8.5*	*8.6*	*10.3*
Autumn 1996	*8.0*	*9.6*	*6.9*	*10.7*	*8.7*	*6.8*	*7.8*	*6.6*	*11.4*	*5.8*	*6.6*	*8.2*	*8.8*	*9.9*
Winter 1996	*7.4*	*9.8*	*6.7*	*10.0*	*8.2*	*6.1*	*7.1*	*6.3*	*10.1*	*5.1*	*6.0*	*8.5*	*8.7*	*9.3*
Spring 1997	*7.1*	*9.8*	*6.3*	*9.6*	*8.1*	*6.3*	*6.8*	*5.9*	*9.1*	*5.2*	*5.2*	*8.4*	*8.5*	*7.5*

1 Prior to Winter 1994, data for Northern Ireland were only collected annually, in the Spring quarters. Figures shown for non-Spring quarters prior to Winter 1994 therefore include the Spring estimates for Northern Ireland.

Source: Labour Force Survey, Office for National Statistics

11 Total in employment[1], not seasonally adjusted

Government Office Regions

Thousands

	United Kingdom[2]	North East	North West (GOR)	Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	Wales	Scotland	Northern Ireland
	LRAU	LRDD	LRDE	LRER	LRAW	LRAX	LRBC	LRDF	LRAZ	LRDG	LRBB	LRBE	LRBF	LRBG
Spring 1993	25 511	1 056	2 368	534	2 203	1 865	2 274	2 419	3 052	3 625	2 126	1 155	2 229	604
Summer 1993	25 689	1 046	2 414	538	2 205	1 882	2 307	2 418	3 027	3 655	2 174	1 172	2 247	..
Autumn 1993	25 679	1 054	2 409	534	2 208	1 877	2 318	2 441	3 000	3 655	2 142	1 183	2 254	..
Winter 1993	25 532	1 045	2 378	525	2 194	1 856	2 319	2 435	2 990	3 645	2 137	1 151	2 252	..
Spring 1994	25 697	1 036	2 387	522	2 180	1 858	2 343	2 455	3 013	3 677	2 181	1 177	2 266	604
Summer 1994	25 945	1 045	2 408	536	2 191	1 858	2 378	2 478	3 047	3 707	2 199	1 200	2 293	..
Autumn 1994	25 963	1 042	2 411	530	2 215	1 874	2 358	2 511	3 076	3 675	2 199	1 191	2 277	..
Winter 1994	25 830	1 027	2 391	523	2 202	1 890	2 362	2 484	3 074	3 645	2 174	1 176	2 272	609
Spring 1995	25 973	1 032	2 377	527	2 224	1 896	2 347	2 503	3 076	3 707	2 188	1 189	2 285	623
Summer 1995	26 272	1 052	2 402	532	2 240	1 930	2 373	2 511	3 100	3 765	2 229	1 203	2 307	628
Autumn 1995	26 265	1 058	2 386	523	2 247	1 935	2 385	2 510	3 112	3 772	2 222	1 192	2 282	641
Winter 1995	26 179	1 057	2 383	546	2 239	1 926	2 383	2 485	3 111	3 760	2 209	1 179	2 252	649
Spring 1996	26 219	1 058	2 420	532	2 223	1 926	2 348	2 527	3 110	3 772	2 216	1 195	2 252	641
Summer 1996	26 507	1 080	2 417	546	2 230	1 961	2 388	2 544	3 122	3 799	2 252	1 225	2 289	654
Autumn 1996	26 568	1 083	2 456	551	2 224	1 967	2 398	2 543	3 133	3 825	2 253	1 216	2 262	656
Winter 1996	26 556	1 074	2 442	549	2 210	1 961	2 403	2 524	3 157	3 808	2 281	1 216	2 266	665
Spring 1997	26 682	1 070	2 443	546	2 211	1 966	2 410	2 536	3 217	3 816	2 300	1 216	2 278	673

1 Includes employees, the self-employed, participants on Government-supported employment and training schemes and unpaid family-workers.

2 Prior to Winter 1994, data for Northern Ireland were only collected annually, in the Spring quarters. Figures shown for non-Spring quarters prior to Winter 1994 therefore include the Spring estimate for Northern Ireland.

Source: Labour Force Survey, Office for National Statistics

12 Redundancies
Government Office Regions

Rates[1]

	Great Britain	North East	North West (GOR) & Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	Wales	Scotland
	DCXD	LRDH	LRDI	DCXF	DCXG	DCXL	LRDJ	DCXI	LRDK	DCXK	DCXN	DCXO
Spring 1993	12	..	..	13	14	14	..	11	..	13	11	11
Summer 1993	11	..	..	12	12	11	..	13	..	11	16	9
Autumn 1993	10	..	..	9	8	10	..	11	..	7	12	11
Winter 1993	11	..	..	11	11	11	..	10	..	12	12	11
Spring 1994	10	..	..	11	10	11	..	9	..	9	11	9
Summer 1994	9	..	..	10	10	8	..	8	..	8	–[2]	9
Autumn 1994	9	..	..	9	13	8	..	8	..	8	–[2]	9
Winter 1994	6	..	..	6	7	–[2]	..	5	..	–[2]	–[2]	–[2]
Spring 1995	10	..	..	10	12	11	..	10	..	10	15	9
Summer 1995	10	16	10	9	12	10	8	12	8	8	10	8
Autumn 1995	10	12	10	8	11	10	8	10	11	8	11	10
Winter 1995	10	14	10	10	10	8	12	11	9	9	10	13
Spring 1996	9	–[2]	11	8	8	11	11	8	8	10	11	11
Summer 1996	9	12	10	10	10	9	10	6	8	9	13	11
Autumn 1996	8	–[2]	8	11	9	7	6	8	9	8	–[2]	11
Winter 1996	8	–[2]	10	7	10	9	10	6	8	6	–[2]	11

1 Redundancies per 1,000 employees.
2 Sample size too small to provide a reliable estimate.

Source: Labour Force Survey, Office for National Statistics

13 Employees in employment (all industries)
Standard Statistical Regions

June 1990 = 100

	United Kingdom	North	Yorks & Humber	East Midlands	East Anglia	Greater London	Rest of South East	South West	West Midlands	North West	Wales	Scotland	Northern Ireland
	DCLE	DCLM	DCLK	DCLJ	DCLG	DCRC	DCLF	DCLH	DCLI	DCLL	DCLN	DCLO	DCLP
1995	98.4	94.3	97.4	98.8	98.2	91.7	95.2	97.8	95.9	95.3	95.5	99.9	106.8
1996	100.1	95.0	96.6	100.8	99.9	93.2	99.2	99.0	98.2	96.9	97.4	99.6	107.5
1996 Jun	99.9	95.1	97.1	100.4	99.8	92.8	98.7	99.3	97.9	96.2	97.7	99.6	106.8
Sep	100.7	95.0	96.3	101.6	100.4	93.7	100.3	99.7	98.5	96.9	98.6	100.5	107.2
Dec	101.3	96.1	96.5	101.5	100.9	94.3	101.1	99.9	99.7	98.6	97.9	99.8	109.0
1997 Mar	100.8	94.8	96.1	101.3	100.9	93.8	100.3	101.2	99.3	97.8	97.6	99.1	108.1
Jun	101.9	96.9	95.9	103.2	102.4	94.7	101.7	103.0	100.0	99.2	98.1	99.3	108.8

Source: Office for National Statistics

14 Index of industrial production

Seasonally adjusted 1990 = 100

	United Kingdom	Wales	Scotland	Northern Ireland
	DVZI	DEOL	DEOM	DEPY
1986	90.1	93.5	90.2	86.1
1987	93.7	99.3	89.9	86.5
1988	98.2	103.5	95.4	91.8
1989	100.3	101.6	97.6	97.5
1990	100.0	100.0	100.0	100.0
1991	96.6	97.9	98.6	98.8
1992	97.0	98.0	99.1	99.5
1993	99.1	98.3	102.0	102.4
1994	104.4	101.8	106.8	109.2
1995	106.7	108.3	110.0	113.6
1996	107.9	108.5	115.6	115.2
1996 Q2	107.5	107.7	114.4	114.1
Q3	108.2	111.0	116.7	115.8
Q4	108.6	107.4	119.4	116.1
1997 Q1	108.6	103.7	120.2	117.7
Q2	109.2	..	..	..

Sources: Office for National Statistics; Welsh Office; The Scottish Office; Department of Economic Development, Northern Ireland

15 Manufacturing industry: optimism about business situation
Standard Statistical Regions

Balance[1]

	United Kingdom	North	Yorks & Humber	East Midlands	East Anglia	South East	South West	West Midlands	North West	Wales	Scotland	Northern Ireland
	DCMO	DCMW	DCMU	DCMT	DCMQ	DCMP	DCMR	DCMS	DCMV	DCMX	DCMY	DCMZ
1996 Oct	8	–9	4	–	29	5	17	4	3	5	23	–4
1997 Jan	9	–	–1	3	2	8	20	6	8	17	5	–6
Apr	4	–3	–3	–3	17	–1	–2	–5	–12	13	14	–
Jul	–6	14	5	–10	–36	5	–15	–17	–11	–39	16	23

1 Balance in percentage of firms reporting rises *less* those reporting falls.

Source: CBI/BSL Regional Trends Survey ISSN:0960 7781

16 Manufacturing industry: volume of output
Standard Statistical Regions

Balance[1]

	United Kingdom	North	Yorks & Humber	East Midlands	East Anglia	South East	South West	West Midlands	North West	Wales	Scotland	Northern Ireland
Past 4 months												
	DCLQ	DCLY	DCLW	DCLV	DCLS	DCLR	DCLT	DCLU	DCLX	DCLZ	DCMA	DCMB
1996 Oct	12	–8	–10	8	–2	17	3	4	14	17	13	27
1997 Jan	11	–1	11	17	3	7	24	10	–2	26	6	–5
Apr	9	6	6	10	–12	4	2	9	–5	27	5	–21
Jul	7	–6	4	–6	16	–1	–6	2	3	–13	8	15
Next 4 months												
	DCMC	DCMK	DCMI	DCMH	DCME	DCMD	DCMF	DCMG	DCMJ	DCML	DCMM	DCMN
1997 Jul	21	7	7	–21	9	22	10	9	24	–30	27	58

1 Balance in percentage of firms reporting rises *less* those reporting falls.

Source: CBI/BSL Regional Trends Survey ISSN:0960 7781

17 Manufacturing industry: volume of new orders
Standard Statistical Regions

Balance[1]

	United Kingdom	North	Yorks & Humber	East Midlands	East Anglia	South East	South West	West Midlands	North West	Wales	Scotland	Northern Ireland
Past 4 months												
	DCNA	DCNI	DCNG	DCNF	DCNC	DCNB	DCND	DCNE	DCNH	DCNJ	DCNK	DCNL
1996 Oct	15	5	–3	–3	12	6	–1	8	9	35	11	34
1997 Jan	8	–17	2	–1	4	4	34	14	3	15	–3	7
Apr	12	18	1	3	17	5	5	9	–15	9	12	–30
Jul	10	17	–1	9	12	14	–8	–9	–1	–18	12	17
Next 4 months												
	DCNM	DCNU	DCNS	DCNR	DCNO	DCNN	DCNP	DCNQ	DCNT	DCNV	DCNW	DCNX
1997 Jul	17	33	–1	5	11	26	6	6	12	–26	24	37

1 Balance in percentage of firms reporting rises *less* those reporting falls.

Source: CBI/BSL Regional Trends Survey ISSN:0960 7781

18 Manufacturing industry: volume of new export orders
Standard Statistical Regions

Balance[1]

	United Kingdom	North	Yorks & Humber	East Midlands	East Anglia	South East	South West	West Midlands	North West	Wales	Scotland	Northern Ireland
Past 4 months												
	DCNY	DCOG	DCOE	DCOD	DCOA	DCNZ	DCOB	DCOC	DCOF	DCOH	DCOI	DCOJ
1996 Oct	3	–8	4	3	–23	3	19	–6	10	6	5	32
1997 Jan	–1	–30	6	–14	–8	5	15	–2	6	–19	–6	–3
Apr	–7	–7	–12	–14	–31	–3	–20	–14	–19	2	6	–38
Jul	–20	–14	–19	–10	–38	–6	–21	–18	–17	–30	–6	–5
Next 4 months												
	DCOK	DCOS	DCOQ	DCOP	DCOM	DCOL	DCON	DCOO	DCOR	DCOT	DCOU	DCOV
1997 Jul	–8	7	1	–17	–37	2	–10	–16	–14	–41	25	14

1 Balance in percentage of firms reporting rises *less* those reporting falls.

Source: CBI/BSL Regional Trends Survey ISSN:0960 7781

19 Manufacturing industry: firms working below capacity
Standard Statistical Regions

Percentages

	United Kingdom	North	Yorks & Humber	East Midlands	East Anglia	South East	South West	West Midlands	North West	Wales	Scotland	Northern Ireland
	DCOW	DCPE	DCPC	DCPB	DCOY	DCOX	DCOZ	DCPA	DCPD	DCPF	DCPG	DCPH
1996 Oct	*51*	*58*	*54*	*36*	*52*	*54*	*45*	*59*	*48*	*55*	*50*	*58*
1997 Jan	*52*	*52*	*37*	*61*	*84*	*47*	*38*	*61*	*47*	*43*	*47*	*65*
Apr	*51*	*47*	*54*	*49*	*57*	*59*	*57*	*63*	*54*	*43*	*39*	*55*
Jul	*54*	*78*	*55*	*61*	*80*	*49*	*59*	*63*	*53*	*49*	*29*	*45*

Source: CBI/BSL Regional Trends Survey ISSN:0960 7781

20 Permanent dwellings started
Government Office Regions

Numbers

	United Kingdom	North East	North West (GOR)	Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	Wales	Scotland	Northern Ireland
	DEOI	LRDP	LRDQ	LREO	DCRX	DCRW	DCRV	LRDR	DCRR	LRDS	DCRU	BLIA	BLFA	BLGA
1995	178 127	6 185	15 962	3 562	13 798	13 298	13 157	20 499	11 653	23 207	14 806	9 222	22 999	9 779
1996	174 862	4 952	14 308	3 955	10 595	15 252	14 118	20 731	12 099	25 469	14 032	8 837	20 416	10 098
1996 Q1	43 633	1 715	3 300	1 039	3 462	3 492	3 189	4 407	2 370	5 521	3 522	1 871	7 381	2 364
Q2	45 309	1 205	3 657	921	2 518	3 926	3 890	5 911	3 174	7 110	3 208	2 456	4 572	2 761
Q3	45 538	1 095	3 827	992	2 692	4 268	3 846	5 571	3 163	6 541	4 029	2 562	4 071	2 881
Q4	40 382	937	3 524	1 003	1 923	3 566	3 193	4 842	3 392	6 297	3 273	1 948	4 392	2 092
1997 Q1	..	1 638	4 052	1 148	2 844	4 151	4 209	5 913	3 107	6 330	3 545	2 316	..	2 838
Q2	..	1 150	4 636	1 344	2 460	3 826	3 700	5 836	3 699	6 874	3 402	2 629[1]	..	..

1 Provisional.

Sources: Department of the Environment, Transport and the Regions; Welsh Office; The Scottish Office Development Department; Department of the Environment, Northern Ireland

21 Permanent dwellings completed
Government Office Regions

Numbers

	United Kingdom	North East	North West (GOR)	Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	Wales	Scotland	Northern Ireland
	DEOJ	LRDT	LRDU	LREP	DCVX	DCVW	DCVV	LRDV	DCVR	LRDW	DCVU	BLII	BLFI	BLGI
1995	198 420	7 249	16 337	4 234	15 219	16 517	15 554	21 571	16 348	27 159	16 337	8 952	24 505	8 438
1996	182 227	5 352	16 103	4 008	11 363	15 160	14 754	21 582	13 616	25 136	16 103	9 996	20 498	8 556
1996 Q1	46 710	1 493	4 216	831	3 323	4 021	3 599	5 111	3 643	6 533	4 216	2 201	5 127	2 396
Q2	43 290	1 231	3 900	1 023	2 815	3 633	3 170	5 340	2 761	5 722	3 900	2 685	5 092	2 018
Q3	45 237	1 425	4 055	1 130	2 467	3 637	3 678	5 174	3 826	6 059	4 055	2 518	5 382	1 831
Q4	46 990	1 203	3 932	1 024	2 758	3 869	4 307	5 957	3 386	6 822	3 932	2 592	4 897	2 311
1997 Q1	..	991	3 719	909	2 581	3 063	3 140	4 780	2 613	5 762	3 719	2 224	..	2 723
Q2	..	1 117	4 032	1 152	2 065	3 661	3 476	5 566	3 205	5 733	4 032	2 100[1]	..	..

1 Provisional.

Sources: Department of the Environment, Transport and the Regions; Welsh Office; The Scottish Office Development Department; Department of the Environment, Northern Ireland

22 House prices[1]
Government Office Regions

1993 = 100

	United Kingdom	North East	North West (GOR)	Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	Wales	Scotland	Northern Ireland
	LRBH	LRDX	LRDY	LREN	LRBJ	LRBK	LRBP	LRDZ	LRBM	LREA	LRBO	LRBR	LRBS	LRBT
1995	103.2	98.7	102.1	95.0	98.6	102.4	103.2	102.8	106.2	104.6	104.1	99.4	102.2	116.0
1996	106.9	102.0	101.7	104.2	101.6	108.0	106.1	106.6	109.2	110.1	108.4	103.8	105.3	126.0
1996 Q2	104.4	100.3	99.3	97.9	103.1	106.2	106.8	103.0	103.5	107.5	105.2	102.9	101.6	126.3
Q3	108.5	102.8	103.6	107.7	104.2	111.6	105.5	109.0	110.2	111.3	109.7	102.0	105.8	126.1
Q4	110.4	103.1	106.1	104.4	102.0	109.8	108.5	110.9	122.4	112.9	110.5	107.6	106.5	135.9
1997 Q1	111.9	105.0	106.3	109.9	105.3	109.2	106.4	110.3	120.9	116.7	110.5	108.7	104.5	141.3
Q2	114.2	107.7	107.9	113.4	104.3	110.5	111.4	118.2	120.5	117.2	115.1	109.0	110.6	133.7

1 These indices adjust for the mix of dwellings (by size and type, whether new or second-hand) and exclude those bought at non-market prices and are based on a sample of mortgage completions by all lenders.

Source: Department of the Environment, Transport and the Regions

23 VAT registrations and deregistrations[1]: net change[2]
Government Office Regions

Thousands

	United Kingdom	North East	North West (GOR)	Mersey-side	York-shire and the Humber	East Midlands	West Midlands	Eastern	London	South East (GOR)	South West	Wales	Scotland	Northern Ireland
	DCYQ	LREB	LREC	LREM	DCYT	DCYU	DCYY	LRED	DEON	LREE	DCYX	DCZA	DCZB	DCZC
1994	–19.9	–0.7	–2.7	–0.3	–2.0	–1.0	–1.6	–2.0	–0.7	–2.3	–2.8	–2.3	–1.2	–0.3
1995	–9.3	–1.0	–2.0	–0.5	–2.1	–0.7	–1.3	–0.5	3.5	–0.6	–2.6	–1.2	–0.8	0.5
1996	11.2	–0.2	..	0.3	–0.2	–0.3	..	1.1	7.4	2.3	0.1	–0.4	0.3	0.8

1 Registrations and deregistrations of VAT-based enterprises. Not wholly comparable with figures for earlier years which counted VAT reporting units.
2 Registrations *less* deregistrations.

Source: Department of Trade and Industry

Final Expenditure Prices Index (Experimental) - August 1997

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Note that further development work, including the adjustment of the Index of Government Prices for productivity change, is ongoing and the FEPI will be available only as an experimental index until this work has been completed.

Summary

The Final Expenditure Prices Index (FEPI) for August shows an annual rate of 2.2 per cent, compared to an annual rate of 2.0 per cent in July. The increase in the annual rate of the FEPI reflects increases in the annual rates of all three component indices: the Index of Consumer Prices (ICP), the Index of Investment Prices (IIP) and the Index of Government Prices (IGP).

The FEPI annual percentage change

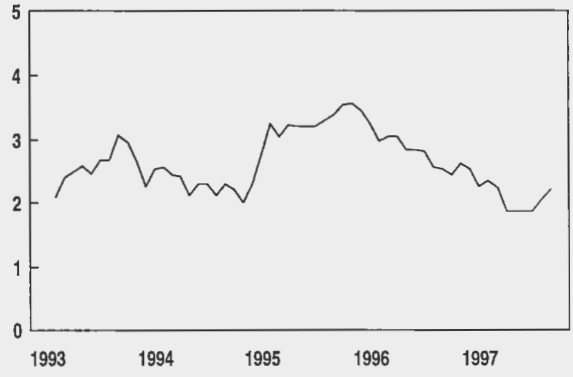


Table A

Final Expenditure Prices Index and components (January 1992=100 and annual percentage change)

		Final Expenditure Prices Index (FEPI)		Index of Consumer Prices (ICP)		Index of Investment Prices (IIP)		Index of Government Prices (IGP)	
		Index	Annual percentage change	Index	Annual percentage change	Index	Annual percentage change	Index	Annual percentage change
1997	Mar	114.4	1.9	116.0	2.3	110.6	0.9	113.9	1.5
	Apr	114.8	1.9	116.6	2.2	110.7	0.4	114.1	1.9
	May	115.1	1.9	117.0	2.3	110.8	0.6	114.6	2.0
	Jun	115.3	1.9	117.2	2.3	110.8	0.6	114.6	1.6
	Jul	115.0	2.0	116.7	2.5	111.2	1.0	114.3	1.8
	Aug	115.7	2.2	117.5	2.6	111.8	1.1	115.1	2.2

The Index of Consumer Prices (ICP)

Consumer price inflation, as measured by the ICP, was 2.6 per cent over the 12 months to August, up from 2.5 per cent in July.

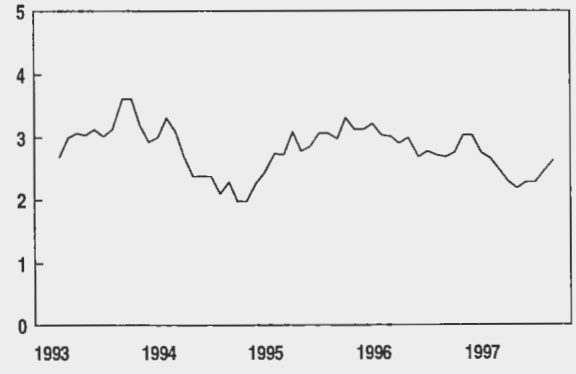
Upward pressure on the 12-month rate came mainly from prices for:

- Food, for which the 12-month rate rose from 0.5 per cent in July to 0.7 per cent in August;
- Alcoholic drink, for which the 12-month rate rose from 2.3 per cent to 2.5 per cent;
- Tobacco, for which the 12-month rate rose from 6.9 per cent to 8.2 per cent;
- Clothing and footwear, for which the 12-month rate rose from 1.1 per cent to 1.8 per cent.

Downward pressure came mainly from prices for:

- Transport and communication, whose 12-month rate fell from 4.5 per cent in July to 4.3 per cent in August;
- Recreation, entertainment and education, for which the 12-month rate fell from 1.3 per cent to 0.9 per cent.

The ICP annual percentage change



The Index of Investment Prices (IIP)

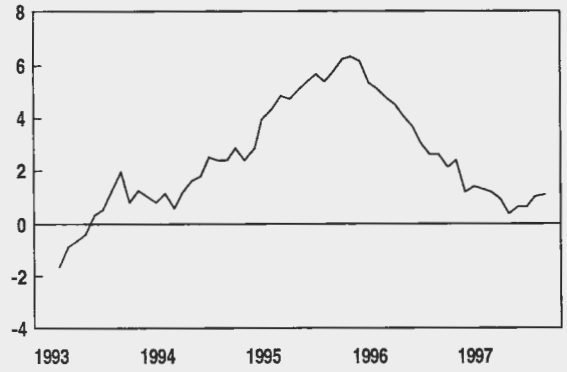
Investment price inflation, as measured by the IIP, was 1.1 per cent over the 12 months to August, up from 1.0 per cent in July.

Upward pressure on the 12-month rate came from:

- New buildings and works, whose 12-month rate rose from 3.7 per cent in July to 4.0 per cent in August;
- Plant and machinery whose 12-month rate rose from -4.7 per cent in July to -4.5 per cent in August. Note, the annual rate has been negative since June 1996, reflecting the impact of Sterling's strength on import prices;
- Vehicles, ships and aircraft whose 12-month rate rose from -0.8 per cent to -0.3 per cent.

Downward pressure on the 12-month rate came mainly from: New dwellings, whose 12-month rate fell to 7.1 per cent in August from 7.8 per cent in July.

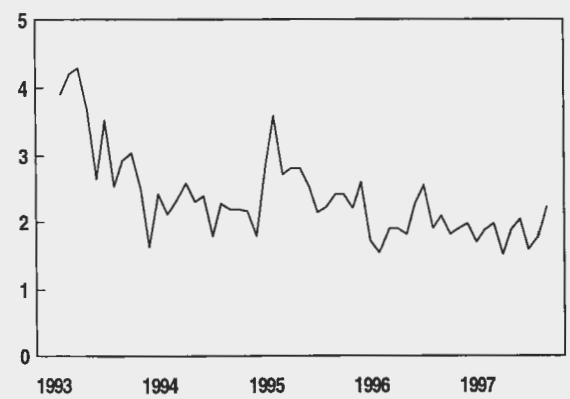
The IIP annual percentage change



The Index of Government Prices (IGP)

Inflation affecting Government expenditure, as measured by the IGP, was 2.2 per cent over the 12 months to August, up from 1.8 per cent in July. This should not be interpreted as being of particular significance - see note 7

The IGP annual percentage change



Comparison between the FEPI and other inflation measures

Table B

Measures of Inflation (annual percentage changes)

		FEPI	RPIX	PPI
1997	Mar	1.9	2.7	1.0
	Apr	1.9	2.5	0.8
	May	1.9	2.5	1.0
	Jun	1.9	2.7	1.1
	Jul	2.0	3.0	1.4
	Aug	2.2	2.8	1.4

NOTES

1. The headline measure of inflation is the Retail Prices Index (RPI). The RPI should be used as the main indicator of inflation affecting average households.

2. The Final Expenditure Prices Index (FEPI) is a measure of the change in the prices paid by UK consumers, business and Government for final purchases of goods and services. Intermediate purchases by business are excluded. The FEPI is made up of three components:

The Index of Consumer Prices (ICP)
The Index of Investment Prices (IIP)
The Index of Government Prices (IGP).

3. The Index of Consumer Prices (ICP) measures inflation affecting all consumers in the UK. The price indicators used in the ICP are taken mainly from the Retail Prices Index (RPI).

4. The Index of Investment Prices is a measure of the change in the prices paid for capital goods by business and by Government. It also covers new construction projects and dwellings built for consumers, business and government. The price indicators used are mainly Producer Price Indices (PPIs), Construction Output Price Indices and an average house price indicator.

6. The Index of Government Prices measures inflation affecting Government. It covers expenditure by Central and Local Government on pay and on procurement. The price indicators used are mainly Average Earnings Indices (to reflect labour costs), PPIs and RPIs (to reflect the cost of goods consumed by Government).

7. Care should be taken when trying to interpret monthly movements in the IGP. This index is particularly volatile on a month-to-month basis, so that a fall one month is often offset by a rise the next and vice-versa. The data are of greatest value if trends rather than individual monthly movements are observed.

8. An article describing the development and composition of the FEPI is included in *Economic Trends*, No 526, September 1997.

9. Longer runs of the FEPI back to January 1992, are available in computer readable form from the ONS Sales Office (telephone 0171 533 5670) or on paper from David Wall.

1 Final Expenditure Prices Index (Experimental)

	Index of Consumer Prices ICP	Index of Investment Prices IIP	Index of Government Prices IGP	Final Expenditure Prices Index FEPI	Annual percentage changes ICP	IIP	IGP	FEPI
January 1992=100								
Weights								
1995	601	162	237	1000				
1996	604	164	232	1000				
1997	605	165	230	1000				
	CUSE	CUSK	CUSO	CUSP				
1995 Aug	111.5	107.8	110.3	110.4	*3.0*	*5.8*	*2.4*	*3.4*
Sep	112.1	108.1	110.3	110.8	*3.3*	*6.2*	*2.4*	*3.6*
Oct	111.8	108.0	110.6	110.7	*3.1*	*6.3*	*2.2*	*3.6*
Nov	111.9	108.4	110.9	110.8	*3.1*	*6.2*	*2.6*	*3.5*
Dec	112.5	108.6	111.4	111.4	*3.2*	*5.3*	*1.7*	*3.2*
1996 Jan	112.3	109.0	111.6	111.3	*3.0*	*5.1*	*1.5*	*3.0*
Feb	112.9	109.3	111.6	111.7	*3.0*	*4.8*	*1.9*	*3.0*
Mar	113.4	109.6	112.2	112.3	*2.9*	*4.5*	*1.9*	*3.0*
Apr	114.1	110.3	112.0	112.7	*3.0*	*4.1*	*1.8*	*2.8*
May	114.4	110.1	112.3	113.0	*2.7*	*3.7*	*2.3*	*2.8*
Jun	114.6	110.1	112.8	113.2	*2.8*	*3.0*	*2.5*	*2.8*
Jul	113.9	110.1	112.3	112.7	*2.7*	*2.6*	*1.9*	*2.5*
Aug	114.5	110.6	112.6	113.2	*2.7*	*2.6*	*2.1*	*2.5*
Sep	115.2	110.4	112.3	113.5	*2.8*	*2.1*	*1.8*	*2.4*
Oct	115.2	110.6	112.7	113.6	*3.0*	*2.4*	*1.9*	*2.6*
Nov	115.3	109.7	113.1	113.6	*3.0*	*1.2*	*2.0*	*2.5*
Dec	115.6	110.1	113.3	113.9	*2.8*	*1.4*	*1.7*	*2.2*
1997 Jan	115.3	110.4	113.7	113.9	*2.7*	*1.3*	*1.9*	*2.3*
Feb	115.7	110.6	113.8	114.2	*2.5*	*1.2*	*2.0*	*2.2*
Mar	116.0	110.6	113.9	114.4	*2.3*	*0.9*	*1.5*	*1.9*
Apr	116.6	110.7	114.1	114.8	*2.2*	*0.4*	*1.9*	*1.9*
May	117.0	110.8	114.6	115.1	*2.3*	*0.6*	*2.0*	*1.9*
Jun	117.2	110.8	114.6	115.3	*2.3*	*0.6*	*1.6*	*1.9*
Jul	116.7	111.2	114.3	115.0	*2.5*	*1.0*	*1.8*	*2.0*
Aug	117.5	111.8	115.1	115.7	*2.6*	*1.1*	*2.2*	*2.2*

2 FEPI - Index of Consumer Prices (Experimental)

	Food	Alcoholic Drink	Tobacco	Clothing and Footwear	Housing	Fuel and Power	Household Goods and Services	Transport and Communi-cation	Recreation, Entertain-ment and Education	Other Goods and Services	Index of Consumer Prices ICP
January 1992=100											
Weights											
1995	132	69	31	66	84	42	73	185	111	207	1000
1996	128	70	30	67	85	40	72	190	113	205	1000
1997	126	68	30	67	90	39	71	189	119	201	1000
	CURU	CURV	CURW	CURX	CURY	CURZ	CUSA	CUSB	CUSC	CUSD	CUSE
1995 Aug	108.3	115.1	131.1	101.8	118.0	105.3	107.5	111.7	107.2	115.3	111.5
Sep	108.5	115.4	131.0	105.9	118.1	105.5	108.8	111.6	107.9	115.8	112.1
Oct	107.3	116.0	131.0	105.7	118.0	105.4	108.3	110.9	107.9	115.9	111.8
Nov	107.5	115.3	131.0	106.3	118.1	105.4	109.3	110.3	107.9	116.1	111.9
Dec	108.4	114.2	134.2	106.4	118.1	105.5	110.4	111.8	108.3	116.6	112.5
1996 Jan	109.0	115.2	136.8	100.3	118.5	105.6	107.1	112.8	108.2	116.7	112.3
Feb	110.1	116.0	137.4	101.3	118.6	105.6	108.8	113.0	108.6	117.3	112.9
Mar	111.1	116.3	137.5	102.7	118.7	105.7	110.3	113.2	108.8	117.7	113.4
Apr	111.2	116.8	138.7	104.2	120.8	105.7	109.7	113.9	109.3	118.4	114.1
May	112.1	117.2	139.6	104.4	121.0	105.6	110.5	114.3	109.3	118.7	114.4
Jun	112.1	117.8	139.8	104.3	121.3	105.8	110.6	114.4	109.3	118.9	114.6
Jul	110.7	118.4	139.6	99.2	121.9	105.9	108.8	114.3	108.9	118.9	113.9
Aug	111.8	118.3	139.8	100.5	122.0	105.7	110.1	115.1	109.2	119.4	114.5
Sep	110.8	118.5	140.1	105.4	122.1	105.8	110.8	116.3	109.6	119.9	115.2
Oct	110.1	118.8	140.2	105.5	122.2	105.6	110.4	116.4	109.8	120.3	115.2
Nov	109.7	118.6	140.0	106.6	122.4	105.0	111.4	116.0	110.1	120.4	115.3
Dec	109.7	118.0	142.8	106.6	122.5	104.8	112.3	116.7	110.1	120.7	115.6
1997 Jan	110.6	118.6	145.6	100.5	123.4	104.2	108.8	117.5	109.9	120.7	115.3
Feb	110.3	119.3	146.2	102.0	123.6	104.3	109.7	118.1	110.1	121.2	115.7
Mar	109.8	119.2	146.6	104.0	123.9	104.4	111.7	118.0	109.9	121.6	116.0
Apr	110.2	119.7	148.3	105.5	125.8	104.2	111.1	118.0	110.3	122.4	116.6
May	110.9	120.4	148.9	106.0	126.0	103.7	111.6	118.1	110.5	123.0	117.0
Jun	111.8	120.6	149.2	105.4	126.2	103.3	111.4	118.5	110.5	123.3	117.2
Jul	111.3	121.1	149.3	100.3	126.2	102.8	109.6	119.4	110.3	123.4	116.7
Aug	112.6	121.3	151.2	102.3	126.4	102.8	110.8	120.0	110.2	124.0	117.5

Annual Percentage Changes

	Food	Alcoholic Drink	Tobacco	Clothing and Footwear	Housing	Fuel and Power	Household Goods and Services	Transport and Communi-cation	Recreation Entertain-ment and Education	Other Goods and Services	Index of Consumer Prices ICP
1995 Aug	*4.4*	*3.9*	*6.8*	*−0.6*	*4.1*	*0.2*	*2.7*	*2.0*	*2.0*	*3.8*	*3.0*
Sep	*5.6*	*4.0*	*6.8*	*0.3*	*4.0*	*0.4*	*3.4*	*2.0*	*2.1*	*4.1*	*3.3*
Oct	*4.7*	*4.4*	*6.9*	*0.2*	*3.8*	*0.5*	*3.1*	*2.0*	*2.0*	*4.3*	*3.1*
Nov	*4.5*	*4.1*	*7.1*	*0.3*	*3.7*	*0.6*	*3.2*	*1.8*	*1.9*	*4.2*	*3.1*
Dec	*4.5*	*3.4*	*7.9*	*0.3*	*3.4*	*0.7*	*3.7*	*2.3*	*2.2*	*4.1*	*3.2*
1996 Jan	*4.1*	*2.8*	*7.0*	*−0.7*	*3.8*	*0.5*	*2.8*	*2.6*	*2.0*	*4.1*	*3.0*
Feb	*4.6*	*2.7*	*6.5*	*−1.0*	*3.7*	*0.4*	*2.9*	*2.4*	*2.2*	*4.3*	*3.0*
Mar	*4.9*	*2.6*	*6.5*	*−1.0*	*3.6*	*0.4*	*3.2*	*2.0*	*2.3*	*4.1*	*2.9*
Apr	*5.0*	*2.9*	*6.4*	*−1.0*	*2.7*	*0.2*	*2.7*	*2.2*	*2.4*	*4.0*	*3.0*
May	*4.2*	*2.7*	*6.6*	*−1.0*	*2.8*	*0.4*	*2.4*	*2.3*	*2.2*	*3.7*	*2.7*
Jun	*4.7*	*2.8*	*6.6*	*−0.9*	*2.9*	*0.6*	*2.7*	*2.0*	*2.1*	*3.8*	*2.8*
Jul	*3.9*	*2.9*	*6.5*	*−1.1*	*3.7*	*0.6*	*2.4*	*2.2*	*1.8*	*3.6*	*2.7*
Aug	*3.2*	*2.8*	*6.6*	*−1.3*	*3.4*	*0.4*	*2.4*	*3.0*	*1.9*	*3.6*	*2.7*
Sep	*2.1*	*2.7*	*6.9*	*−0.5*	*3.4*	*0.3*	*1.8*	*4.2*	*1.6*	*3.5*	*2.8*
Oct	*2.6*	*2.4*	*7.0*	*−0.2*	*3.6*	*0.2*	*1.9*	*5.0*	*1.8*	*3.8*	*3.0*
Nov	*2.0*	*2.9*	*6.9*	*0.3*	*3.6*	*−0.4*	*1.9*	*5.2*	*2.0*	*3.7*	*3.0*
Dec	*1.2*	*3.3*	*6.4*	*0.2*	*3.7*	*−0.7*	*1.7*	*4.4*	*1.7*	*3.5*	*2.8*
1997 Jan	*1.5*	*3.0*	*6.4*	*0.2*	*4.1*	*−1.3*	*1.6*	*4.2*	*1.6*	*3.4*	*2.7*
Feb	*0.2*	*2.8*	*6.4*	*0.7*	*4.2*	*−1.2*	*0.8*	*4.5*	*1.4*	*3.3*	*2.5*
Mar	*−1.2*	*2.5*	*6.6*	*1.3*	*4.4*	*−1.2*	*1.3*	*4.2*	*1.0*	*3.3*	*2.3*
Apr	*−0.9*	*2.5*	*6.9*	*1.2*	*4.1*	*−1.4*	*1.3*	*3.6*	*0.9*	*3.4*	*2.2*
May	*−1.1*	*2.7*	*6.7*	*1.5*	*4.1*	*−1.8*	*1.0*	*3.3*	*1.1*	*3.6*	*2.3*
Jun	*−0.3*	*2.4*	*6.7*	*1.1*	*4.0*	*−2.4*	*0.7*	*3.6*	*1.1*	*3.7*	*2.3*
Jul	*0.5*	*2.3*	*6.9*	*1.1*	*3.5*	*−2.9*	*0.7*	*4.5*	*1.3*	*3.8*	*2.5*
Aug	*0.7*	*2.5*	*8.2*	*1.8*	*3.6*	*−2.7*	*0.6*	*4.3*	*0.9*	*3.9*	*2.6*

3 FEPI - Index of Investment Prices (Experimental)

	New Buildings and Works	Plant and Machinery	Vehicles, etc	Transfer Costs of Land and Buildings	New Dwellings	Index of Investment Prices IIP
January 1992=100						
Weights						
1995	276	376	106	37	206	1000
1996	266	378	108	38	209	1000
1997	267	390	103	33	207	1000
	CUSF	CUSG	CUSH	CUSI	CUSJ	CUSK
1995 Aug	99.8	116.3	117.0	130.0	98.4	107.8
Sep	100.8	116.5	117.1	130.3	98.1	108.1
Oct	101.6	115.7	117.1	129.7	97.9	108.0
Nov	102.4	116.2	117.3	130.0	97.6	108.4
Dec	103.2	116.2	117.8	128.6	97.4	108.6
1996 Jan	103.7	116.7	118.5	127.1	97.5	109.0
Feb	104.2	116.3	118.7	129.8	98.2	109.3
Mar	104.8	116.0	118.8	130.5	99.3	109.6
Apr	105.2	116.7	119.2	135.7	100.1	110.3
May	105.7	115.4	119.1	135.8	100.5	110.1
Jun	106.1	114.7	118.9	135.5	101.1	110.1
Jul	106.5	113.5	119.0	138.1	102.0	110.1
Aug	106.9	114.0	119.6	139.2	102.7	110.6
Sep	107.3	113.1	119.7	139.3	102.7	110.4
Oct	107.7	113.0	119.2	140.9	102.8	110.6
Nov	108.1	110.6	117.6	140.9	103.0	109.7
Dec	108.5	111.0	117.5	141.0	103.8	110.1
1997 Jan	108.8	111.1	118.2	139.3	104.3	110.4
Feb	109.1	111.2	118.7	141.8	104.4	110.6
Mar	109.4	110.1	118.9	142.2	105.6	110.6
Apr	109.5	109.8	118.5	142.8	106.9	110.7
May	109.5	109.5	118.6	144.8	107.5	110.8
Jun	109.5	108.9	118.4	144.9	108.5	110.8
Jul	110.4	108.2	118.1	148.9	110.0	111.2
Aug	111.2	108.9	119.2	149.7	110.0	111.8

Annual Percentage Changes

	New Buildings and Works	Plant and Machinery	Vehicles, etc	Transfer Costs of Land and Buildings	New Dwellings	Index of Investment Prices IIP
1995 Aug	*12.8*	*4.3*	*5.1*	*0.9*	*0.0*	*5.8*
Sep	*13.3*	*5.0*	*5.0*	*0.2*	*0.3*	*6.2*
Oct	*13.0*	*5.1*	*5.4*	*2.9*	*0.5*	*6.3*
Nov	*12.9*	*5.1*	*5.2*	*3.6*	*0.1*	*6.2*
Dec	*12.8*	*3.4*	*4.8*	*1.7*	*−0.1*	*5.3*
1996 Jan	*12.2*	*2.6*	*4.3*	*1.6*	*0.7*	*5.1*
Feb	*11.8*	*1.5*	*4.0*	*3.7*	*1.9*	*4.8*
Mar	*11.4*	*1.0*	*4.2*	*4.9*	*1.7*	*4.5*
Apr	*10.3*	*0.9*	*3.8*	*5.5*	*1.5*	*4.1*
May	*9.5*	*0.0*	*3.3*	*6.3*	*2.3*	*3.7*
Jun	*8.6*	*−1.2*	*2.9*	*5.1*	*2.8*	*3.0*
Jul	*7.9*	*−2.2*	*2.8*	*6.3*	*3.6*	*2.6*
Aug	*7.1*	*−2.0*	*2.2*	*7.1*	*4.4*	*2.6*
Sep	*6.4*	*−2.9*	*2.2*	*6.9*	*4.7*	*2.1*
Oct	*6.0*	*−2.3*	*1.8*	*8.6*	*5.0*	*2.4*
Nov	*5.6*	*−4.8*	*0.3*	*8.4*	*5.5*	*1.2*
Dec	*5.1*	*−4.5*	*−0.3*	*9.6*	*6.6*	*1.4*
1997 Jan	*4.9*	*−4.8*	*−0.3*	*9.6*	*7.0*	*1.3*
Feb	*4.7*	*−4.4*	*0.0*	*9.2*	*6.3*	*1.2*
Mar	*4.4*	*−5.1*	*0.1*	*9.0*	*6.3*	*0.9*
Apr	*4.1*	*−5.9*	*−0.6*	*5.2*	*6.8*	*0.4*
May	*3.6*	*−5.1*	*−0.4*	*6.6*	*7.0*	*0.6*
Jun	*3.2*	*−5.1*	*−0.4*	*6.9*	*7.3*	*0.6*
Jul	*3.7*	*−4.7*	*−0.8*	*7.8*	*7.8*	*1.0*
Aug	*4.0*	*−4.5*	*−0.3*	*7.5*	*7.1*	*1.1*

4 FEPI - Index of Government Prices (Experimental)

	Local Government Total	Central Government Total	Education Grants	Index of Government Prices IGP	Annual percentage changes: Local Government Total	Central Government Total	Education Grants	Index of Government Prices IGP
January 1992=100								
Weights								
1995	347	588	65	1000				
1996	344	597	59	1000				
1997	347	589	64	1000				
	CUSL	CUSM	CUSN	CUSO				
1995 Aug	112.1	109.0	112.6	110.3	*2.6*	*2.3*	*2.9*	*2.4*
Sep	111.8	109.1	112.6	110.3	*2.6*	*2.2*	*2.9*	*2.4*
Oct	112.1	109.6	112.6	110.6	*1.9*	*2.4*	*2.9*	*2.2*
Nov	112.5	109.7	112.6	110.9	*2.3*	*2.6*	*2.9*	*2.6*
Dec	112.7	110.5	112.7	111.4	*0.5*	*2.5*	*3.0*	*1.7*
1996 Jan	112.7	110.8	113.4	111.6	*1.7*	*1.4*	*3.0*	*1.5*
Feb	112.8	110.8	113.3	111.6	*1.8*	*2.0*	*2.9*	*1.9*
Mar	113.0	111.6	113.3	112.2	*1.2*	*2.3*	*2.9*	*1.9*
Apr	112.8	111.4	113.3	112.0	*1.7*	*1.8*	*2.9*	*1.8*
May	114.3	111.0	114.3	112.3	*2.5*	*2.2*	*3.1*	*2.3*
Jun	114.8	111.5	114.3	112.8	*2.7*	*2.4*	*3.1*	*2.5*
Jul	114.3	110.9	114.5	112.3	*2.0*	*1.9*	*1.7*	*1.9*
Aug	114.1	111.5	114.6	112.6	*1.8*	*2.3*	*1.8*	*2.1*
Sep	114.1	110.9	114.6	112.3	*2.1*	*1.6*	*1.8*	*1.8*
Oct	114.5	111.5	114.6	112.7	*2.1*	*1.7*	*1.8*	*1.9*
Nov	115.2	111.6	114.8	113.1	*2.4*	*1.7*	*2.0*	*2.0*
Dec	114.9	112.3	114.9	113.3	*2.0*	*1.6*	*2.0*	*1.7*
1997 Jan	115.4	112.6	115.5	113.7	*2.4*	*1.6*	*1.9*	*1.9*
Feb	115.5	112.7	115.5	113.8	*2.4*	*1.7*	*1.9*	*2.0*
Mar	116.0	112.6	115.5	113.9	*2.7*	*0.9*	*1.9*	*1.5*
Apr	115.7	112.9	115.5	114.1	*2.6*	*1.3*	*1.9*	*1.9*
May	116.5	113.2	116.5	114.6	*1.9*	*2.0*	*1.9*	*2.0*
Jun	117.0	112.9	116.5	114.6	*1.9*	*1.3*	*1.9*	*1.6*
Jul	116.5	112.7	116.5	114.3	*1.9*	*1.6*	*1.7*	*1.8*
Aug	118.8	112.8	116.5	115.1	*4.1*	*1.2*	*1.7*	*2.2*

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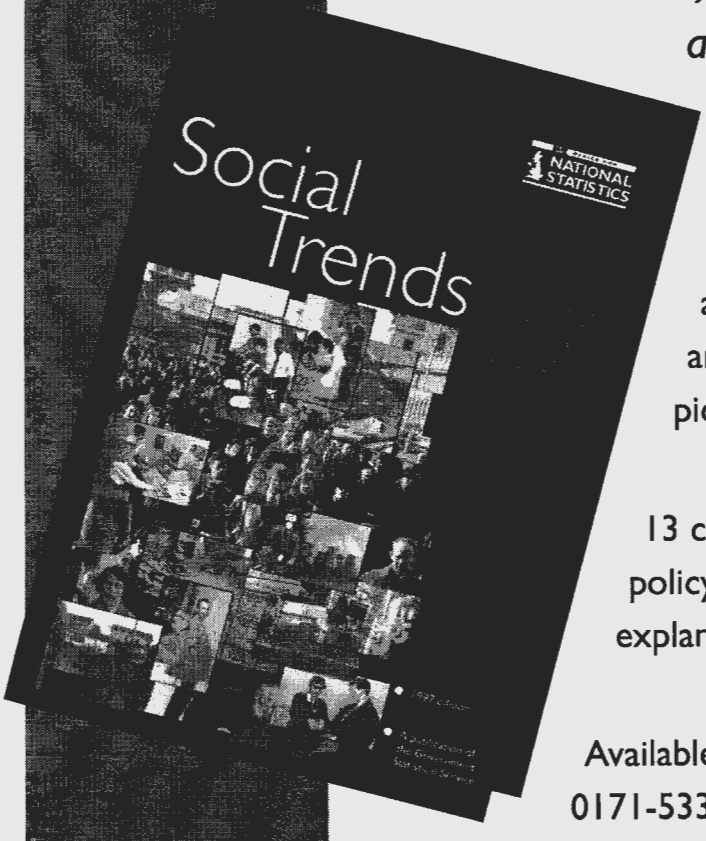

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Environmental input-output tables for the United Kingdom

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Summary

The UK environmental accounts are potentially a useful tool to understand and model interactions between the economy and the environment. One means of realising this potential it to integrate the accounts with input-output tables. This report calculates official environmental input-output tables for the UK.

The first table is an input-output matrix in basic prices. By manipulating this matrix analysts can ask questions such as *what would happen if industries substituted plastic for steel in their production processes.* The second table is a Leontief inverse matrix. This is used to calculate the 'knock-on' effects throughout the economy caused by a change in demand for goods. The next two matrices, the *direct emissions* intensity matrix and the *direct and indirect emissions intensity* matrix, are peculiar to environmental input-output. Both discuss emissions of atmospheric pollutants with regards two themes 'greenhouse gases' and 'acid rain precursors' or 11 pollutants. The *direct emissions intensity matrix* describes the physical quantity of emission directly caused by the production of goods as a ratio of the value of domestic consumption, in basic prices. Products are seen to vary greatly in their relative pollution intensities. The *direct and indirect emissions intensity matrix* uses the information from the Leontief inverse matrix to calculate all the emissions arising during the production and transport of different goods, not only in the industry producing the finished good, but in the production of all other products used by the supply chain.

Within this article tables have been presented aggregated to 11 products. They were however initially calculated at a 91 product breakdown using Standard Industrial Classification (1992). This more highly disaggregated format will shortly be available on the environmental accounts homepage - http://www.emap.com/ons/enviro/ea1.htm. The UK Environmental Accounts (UKENA) calculates emissions arising from the production of goods separately from emissions occurring from the road transport of goods. This distinction is maintained in the environmental input-output tables. Analysts can use the tables to assess the effects of changes in road vehicle emissions, even though these are distributed through out the economy.

The last section gives a practical demonstration of how environmental input-output tables can be used to help assess policy options. Two simulations are run: the first reporting on the effects of a fall in demand for energy products by final output with an offsetting rise in demand for all other goods; the second testing the consequence of a large scale substitution of electrical vehicles for conventional petrol and diesel vehicles. In themselves the environmental input-output tables are not capable of assessing the impact of environmental taxes necessary to bring about these changes in final output. An econometric model is necessary to estimate the impact of economic instruments. Please note these practical demonstrations were carried out for didactic purposes only and are not policies that ONS believe to be under active consideration.

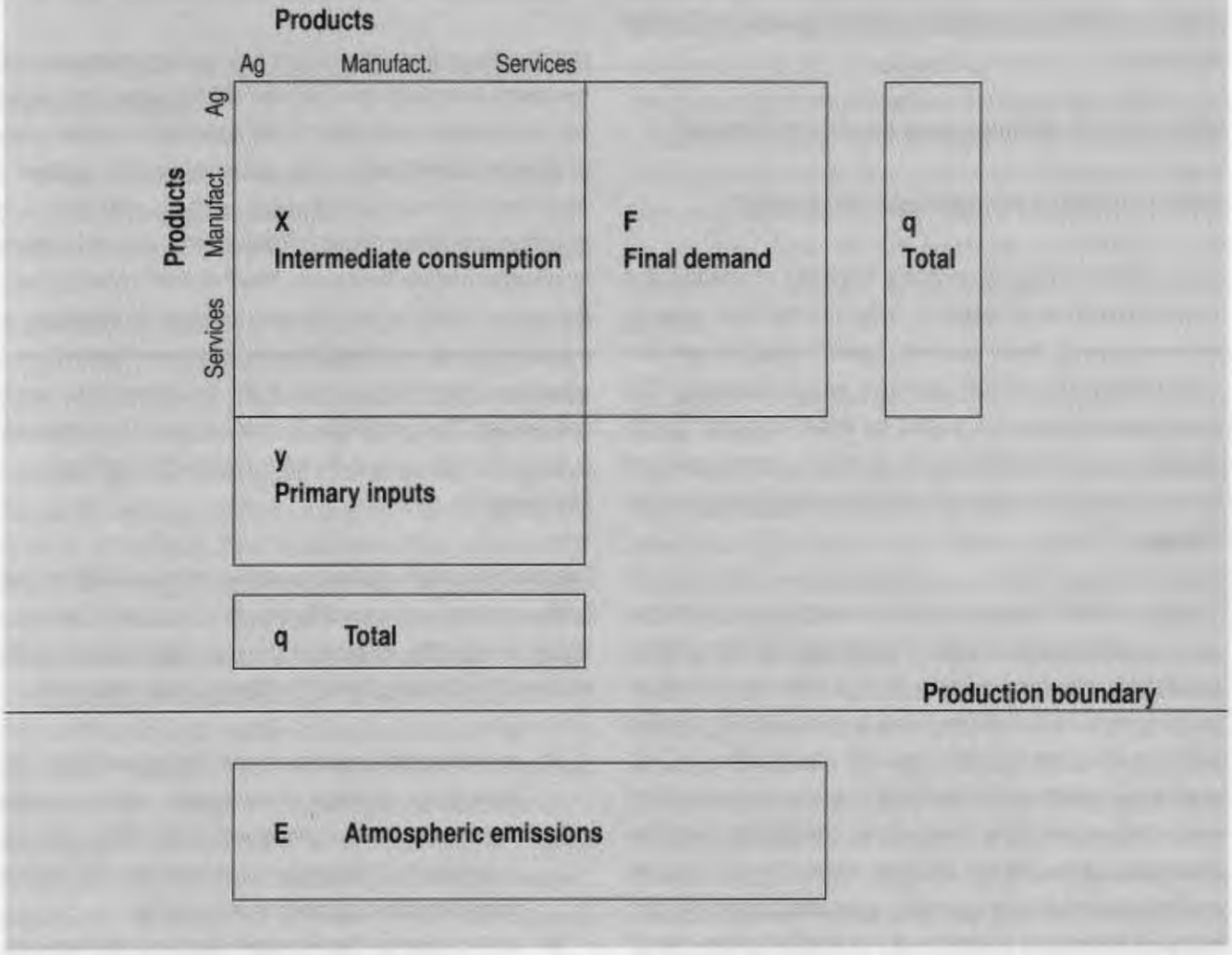
Introduction

This report present the first official UK environmental input-output tables and explains the methodology used to compute them. These tables are an important modelling resource for policy makers and academics. Since input-output tables are not regularly used for environmental analysis within the UK there is some discussion about the strengths and weaknesses of input-output analysis and two mock simulations are performed to illustrate how the tables might be used to construct scenarios for analysis.

ONS is grateful to Directorate B of Eurostat for helping to finance this project.

Figure 1: Schema for environmental input-output tables

Input output table in basic price



What are environmental input-output tables

Environmental input-output tables are an integration of traditional input-output tables with environmental accounts data. The input-output tables provide insights into how industries interact through their purchases of one another's output. The environmental accounts give details on how much natural resources depletion and emissions of pollutants arise during industrial activity. Both the input-output tables and the environmental accounts have been calculated at the same level of product disaggregation (91 products).

Figure 1 gives a graphical representation of how these two building blocks fit together. The upper part of the diagram, containing matrices X - "intermediate output", F - "final output" and y - "value added", make up the traditional input-output matrices. Box 1 gives an explanation of the economic terms used in this article for those unfamiliar with the terminology. The top row of the matrices X and F contain data on the value of the first product (agriculture) that is purchased to make other products (in matrix X) and is bought by final output (in matrix F). X is referred to as a square matrix because it has the same number of rows and columns and because corresponding rows and columns depict the same products. The area below the thick line (outside the production boundary) contains the environmental accounts data. These are in the natural units of the pollutant. For instance, greenhouse gases are quoted in millions of tonnes of carbon dioxide equivalent. Data on emissions and natural resources are traditionally excluded from national accounts and appear in satellite accounts. The pilot UK environmental accounts (UKENA) describe how different branches of industry and households contribute to atmospheric emissions (Vaze and Balchin, 1996).

A number of other countries have carried out work on the development of environmental input-output tables along the lines of the ones presented here, readers interested might wish to read Kuhn (1996), Pederson (1993), Smith (1993) or McNicoll and Blackmore (1993) for the German, Danish, Canadian and Scottish experiences.

Why calculate environmental input-output tables?

Potential uses of environmental input-output

Environmental pressures, meaning emissions of pollution and consumption of natural resources, arise from decisions made by economic agents. These economic agents include industry and Government, our trading partners and households. The environmental pressures exerted by these economic agents change because of technological developments, demographic and economic evolution and because of environmental and economic policies.

The pilot UKENA contains industrially disaggregated emissions of 11 gaseous pollutants, fully consistent with the UK's national atmospheric emissions inventory. Work is underway to enhance the accounts to incorporate emissions to water. UKENA classifies industries using the Standard Industrial Classification, SIC 92, which is fully consistent with NACE Rev. 1, an internationally agreed nomenclature permitting international comparison. Because standard industrial classes are used environmental pressures exerted by an industry can be readily compared to economic data sets such as numbers of employees, value added, gross output / turnover, investment and trade.

UKENA can also be used as the basis for modelling. In order to understand how the environmental impact of economic activity changes it is helpful to recognise three mechanisms:

- changes in the demand for goods and services by final output categories;
- changes in inputs purchased by one industry from another (changes in this mix influence environmental pressures elsewhere in the economy); and
- technological changes in the production process.

When households or any other category of final demand buy a good there is an increase in the gross output of the firms producing the good. This gives rise to emissions from the firms supplying the good. There are also changes in *all firms that provide goods and services to this firm.* The change in output of these other firms gives rise to second round changes elsewhere in the economy and so on. These 'knock-on' indirect emissions may be greater than the direct emissions. The resultant increase in emissions can be related back, or attributed, to the final purchase of goods and services by the household etc.

In order to capture these direct and indirect emissions it is necessary to explicitly consider how different industries interact with one another. Input-output tables make use of a wide variety of data on inter-industry sales and purchases to produce a reconciled picture of both the supply of goods and services by industries and the purchases of these same goods and services by industries and final consumers. They therefore contain precisely the type of detail on inter-industry interactions necessary to estimate the knock-on effects of one industry on another and hence emissions arising from changes in the final demand for goods and services. The Leontief inverse matrix is derived from the input-output tables and captures the full multiplier effects of changes in final demand.

The environmental input-output tables provide a tool to help analyse the consequences of these type of changes in behaviour taking on board the interactions between different parts of the economy. The following types of analysis can be undertaken:

- **environmental impact analysis:** the assessment of the impacts of changes in economic activity on the environment; for example, growth in the entire economy or demand for particular products. Normally this requires integration with a macro-economic model.
- **environmental technology studies:** for example, estimating the impact of new products or industrial processes on the economy or the environment.
- **environmental policy assessment:** the estimation of the overall effects on the economy and the environment of policies with either a specific or general 'environmental orientation'. Note however that the impact of taxes and changes in income have to be estimated outside the input-output framework.
- **testing the economic impact of an environmental constraint:** use of linear programming techniques to calculate the structure of the economy that would be consistent with one or more environmental constraints being imposed upon it.

Caveats on the use of environmental input-output tables

There are some important features and assumptions implicit in input-output analysis that should be borne in mind when assessing whether and how they should be used. These assumptions are:

- industries have constant returns to scale;
- industry output can be expressed as a linear combination of its inputs and;
- input-output industries and products are homogenous.

Further assumptions are needed to operationalise environmental input-output analysis:

- the environmental pressures exerted by an industry is proportional to its gross output; and
- emissions from firms within an industry are homogenous.

Coefficients are calculated to associate an industry's pollution to its gross output. These coefficients represent *averages for each industry for the year in question.* This implicitly takes a static view of technology. If expansion in demand is met by investment in new plants the new technology's coefficients may diverge from the industry average and the use of environmental input-output becomes questionable. Thus environmental input-output is most reliable when changes in gross output arising from scenario studies are small (met within existing plant capacity) and the projected scenario is expected to occur in the short and medium term (next 5 to 10 years). The importance of the *homogeneity* assumption is less extreme when industries are disaggregated to the extent they have been in the tables published electronically on the internet. ONS has made a special effort to disaggregate industries where the environmental impacts are not homogenous, for instance sanitary services (NACE 90) includes the waste water treatment and the solid waste disposal industries, these industries clearly have very different environmental repercussions.

Input-output tables cannot by themselves be used to assess the effects of changes in relative prices or growth of GDP. To do this input-output tables have to be integrated with econometric models to analyse taxation policies. Symons et al (1994) use the Institute of Fiscal Studies' (IFS) SPIT model in conjunction with input-output tables to compute the impact of a carbon tax. The input-output tables are first used to trace the effect of carbon taxes on prices of household goods (how much fossil fuel is embodied in them), and the IFS model is used to compute the change in demand. Leontief inverse tables are then used to calculate the gross output of industries in response to this new final demand. McNicoll and Blackmore (1993) also provides a useful overview of how environmental input-output has been applied to Scottish data sets.

Calculation of the environmental input-output tables

Supply and use balances are calculated every year by the UK Office for National Statistics. These balances are used to reconcile estimates of GDP calculated from the *expenditure approach, the income approach and the output approach.* These balances consist of two tables: a **supply table** and a **use table.** The former describes how much each industry produces of each product. Extra columns detail imports of goods and services, distributors' trading margins and taxes on products. The **use table** describes how much is spent by firms and final demand groups purchasing goods and services. Extra rows provide information on wages, profits, production taxes (such as business rates) less subsidies, and purchases of second hand goods. Additional columns, in the final demand domain of the use table, detail value of purchases by households and Government, investment, stocks and exports of goods and services.

The supply and use balances differ from input-output tables in several respects. Firstly, both the supply and use tables have industries as their column headings and product as their row titles. Input-output tables are 'square', meaning both axes have to be either product or industry but not a mixture. Secondly, the body of the use matrix is valued at purchaser prices (the price of the good paid by the buyer) the body of the supply matrix is valued at producer prices. Input-output tables are valued at basic prices. Thirdly, the body of the use table does not discriminate between domestically produced and imported purchases. However the emissions recorded in the environmental accounts arise from domestic industrial activity. So if imports are not separated out in the use table they will be treated as domestic production and emissions will be wrongly assigned to them. ***Some countries have calculated environmental accounts and assumed overseas production generates the same quantity of emissions per unit output as domestic production. This might be a sensible working assumption but ought not be incorporated into the analysis by default.***

The supply and use balances are not designed to be used for analytic purposes, such as environmental accounts. For further information on the annual input-output balances read the UK Input-output Balances Methodological Guide (Mahajan, 1997). The UK produces full input-output tables every five years, the last such tables published in 1995 (Millard, 1995) contain data for 1990. These were unsuitable for the environmental accounts for two main reasons. The tables were calculated on the old industrial classification system SIC80 rather than SIC92 so could not be linked to the environmental accounts. Secondly, the environmental accounts report emissions to a different industrial disaggregation to the UK's standard input-output tables. The disaggregation system used by the UK environmental accounts is described in Annex 2.

Box 1: Glossary of input-output terms

Basic prices This price excludes all taxes and distributors' trading margins.

Combined Use matrix (I-O balances) Each column in this matrix analyses by product group the inputs of a particular industry group or sector of final demand, whether from domestic production or imported. It shows the inputs used by each industry to produce their total output separating intermediate purchases of goods and services from its primary inputs. The purchases estimates in this matrix are valued at purchaser prices.

Distributors' trading margins These form part of the extra costs associated with the valuation of a product leaving "the factory gate" to the point where the product is purchased either for final consumption or intermediate consumption. These margins are typically earned by motor trades, wholesalers, retailers and catering and represent, for example, the difference between the price paid by the wholesaler for the good and the price paid by the purchaser. The distributors' trading margins column sums to zero because it simply reallocates the supply of the distribution services to the products being distributed. Because of the difficulties inherent in measuring trade and transport margins separately, these are shown as a single item.

Domestic Use matrix (I-O tables) This matrix is compiled for the I-O theoretical work. Each column in the matrix analyses by product group the purchases of domestically produced goods and services used up in the production process. This matrix separates the purchases of imported goods and services from all intermediate purchases as shown in the Combined Use matrix, and shows these imports on a separate row.

Final buyers Expenditure by final buyers comprises of consumers' expenditure, general government final consumption, gross domestic fixed capital formation, the value of physical increases in stocks and work in progress and exports of goods and services. Total demand by final buyers is the same as total final expenditure.

Final output This is that part of gross output of each industry sold for final consumption by persons and general government, and which is used for investment (including additions to stocks and work in progress) and for export. In short, final output is output sold to final buyers. For the whole economy, total final output is equal to the value of goods and services (both domestically produced and imported) available for consumption, investment and export. Total final output is equal to total final expenditure, which is the same as total demand by final buyers.

Gross domestic product (GDP) This is a measure of the value of goods and services produced in the UK before providing for capital consumption. It is equal to gross value added (including capital consumption) of each industry. In the "Combined Use" matrix it is equal to the sum of the factor incomes of all industries.

Gross output The gross output of an industry is the aggregate value of the goods and services, together with the work-in-progress, produced by the industry. It is equal to the value of the industry's sales plus any increase (and less any decrease) in the value of its physical stocks of finished products and work in progress. Output is thus measured after deducting stock appreciation. The outputs of the distribution and service trades industries are measured on a 'gross margin' basis.

Industry group The term 'industry' is used in a very wide sense to denote any subset of economic activity including agriculture, distribution, transport and other services, public administration and defence as well as the production industries.

I-O Balances These show a balanced and complete picture of the flows of goods and services in the economy for a specific year. These balances are composed of the Supply and "Combined Use" matrices produced each year as part of the annual national accounts compilation round. The supply and demand for goods and services are valued at purchaser's prices.

Intermediate output That is that part of the gross output of each industry sold to other industries for use in the production process.

Make matrix (I-O balances and tables) This is one of the basic I-O matrices. Each column in the matrix analyses the sales by a particular industry of a product group. Each row analyses the sales of a particular product group by different industries. The data relate to domestic output only, and are valued at basic prices in the I-O tables but at producer prices in the I-O balances. In both cases, the values are shown after deducting stock appreciation on stocks of finished goods and work in progress held by the industries concerned. The matrix is largely diagonal, and the off-diagonal entries are known as secondary products.

Off-diagonals See Secondary products and MAKE matrix.

Principal product The principal product of an industry is the main product produced by the relevant industry. This product is commonly associated in production and is usually similar in nature or manner of production in terms of the industry defined.

Producer prices This valuation reflects the cost of the product as it leaves "the factory gate". This price will include taxes on production but excludes taxes on products, for example value added tax (VAT), and distributors' trading margins.

Product group A product group covers all those goods or services produced as a principal product of the industry group to which it corresponds. The classification of products followed in the I-O balances based on the SIC(92) is the same as that used for industries.

Purchaser's prices These represent the prices which a purchaser actually pays for the product purchased. This price will include distributors' trading margins and any taxes on products excluding any deductible VAT.

Secondary products The secondary products (also known as off-diagonals) of an industry are those products which are the principal products of other industries.

Supply matrix (I-O balances) The MAKE matrix together with additional columns for imports of goods and services, distributors' trading margins and taxes on products form the Supply matrix. The values of the supply of goods and services are at purchaser's prices.

Taxes on expenditure (I-O tables) These include all 'indirect' taxes paid to the central government which are related to the volume of production of, or trade in, particular goods and services as distinct from taxes related to income or capital. They also include business rates paid to local authorities.

Taxes on production (I-O balances) These taxes are shown as a row in the Combined Use matrix and are considered a component of primary inputs. They are taxes which are paid by producers or paid by final buyers, for example business rates. These taxes are levied according to production, for example on the amount of alcohol sales, and does not depend on the profitability or otherwise of a company, and does not include corporation tax and capital gains taxes etc.

Taxes on products (I-O balances) These taxes are defined as product specific taxes, for example value added tax and import duties. These are an integral part of purchaser prices as they are paid by either intermediate industries or final consumers. They are shown as a separate column in the Supply matrix.

Total final expenditure This is the sum total of consumers' expenditure on goods and services, general government final consumption, the value of the physical increase in stocks and work in progress and exports of goods and services. Total final expenditure is the same as total demand by final buyers and is equal to total final output.

Total input The total input of each industry is the total cost of production. This is equal to the industry's total purchases of the outputs of other industries as well as purchases of imports of goods and services for use in its production process plus primary inputs.

Value added The gross value added by an industry is the difference between the its sales and intermediate costs, imports, taxes on production (such as rates) and net sales of second hand goods. It includes wages paid to employees and retained and distributed profits.

The environmental input-output tables

This section describes the environmental input-output tables calculated in this study.

Full input-output tables have been calculated to accompany the UKENA. The data relate to 1993 and the figures are consistent with the UK National Accounts 1996 ("Blue Book 1996"). The following tables are attached:

- input-output matrix- "product x product" valued at basic prices
- Leontief inverse matrix
- direct emissions intensities matrix
- direct and indirect emissions intensities matrix
- emissions allocated back to final demand

Readers interested in the details of the methodology should contact the author. The tables were calculated in SAS - IML (Interactive Matrix Language). The tables will be made available electronically on the Internet from the environmental accounts home page. Annex 1 briefly describes how the derived tables were calculated and mentions some of the assumptions that had to be made.

Table 1 : Input-output matrix, "product x product" matrix valued at basic prices

This matrix shows the value of domestically produced inputs going into the production of each commodity. For instance the first column of the commodity x commodity matrix shows UK agricultural requires £2.1 bn of agricultural produce and £4.4 bn of manufacturing product to produce £19.4 bn of agricultural product. Unlike the conventional use table the columns refer to products and not industries.

The final output columns of the matrix relate the value of purchases by final output categories. Additional rows detail the purchases of imports, second hand sales and of course value added for each product group.

Table 1 Input-output- "product x product" matrix

£million current basic prices

1993	PURCHASES BY PRODUCT GROUP											FINAL DEMAND						TOTAL
	Agriculture	Mining and quarrying	Manufact-uring	Electricity, gas and water supply	Construct-ion	Wholesale and retail trade	Transport and communi-cation	Financial intermed-iation	Public adminis-tration	Education, health and social work	Other services	Total for industry	Consumers' expenditure	General government final consumption	GDFCF	Change in stocks	Exports of goods & services	Total FD	
SALES BY PRODUCT GROUP																			
Agriculture	2,133	11	9,805	0	1	767	32	31	14	103	33	12,929	5,291	0	0	85	1,094	6,470	19,400
Mining and quarrying	12	1,813	5,897	4,552	371	81	57	72	19	53	25	12,952	248	0	0	-110	5,651	5,789	18,741
Manufacturing	4,431	1,311	75,219	2,453	9,980	13,842	6,166	10,096	7,459	8,974	3,100	143,030	58,877	0	26,365	539	62,261	148,041	291,071
Electricity, gas and water supply	326	213	5,879	9,538	539	1,805	927	1,625	575	1,208	460	23,095	15,169	0	0	-59	57	15,167	38,263
Construction	136	94	352	308	17,536	669	110	4,983	3,107	450	350	28,096	4,116	0	42,193	-349	31	45,990	74,086
Wholesale and retail trade	1,271	514	13,968	973	3,100	4,252	2,090	2,694	108	298	434	29,701	101,766	1,853	2,740	0	16,993	123,351	153,052
Transport and communication	256	1,262	7,101	211	859	14,124	11,503	13,519	2,020	1,652	1,287	53,793	18,643	0	810	0	8,716	28,169	81,961
Financial intermediation	1,255	640	24,757	1,356	9,462	20,236	10,053	52,114	6,590	4,809	7,198	138,471	84,625	0	7,603	0	14,969	107,197	245,668
Public administration	0	0	0	0	0	0	0	0	410	0	0	410	0	72,419	0	0	0	72,419	72,829
Education, health and social work	212	19	942	56	124	434	451	2,064	6,795	19,791	452	31,338	13,729	66,121	0	0	1,222	81,072	112,410
Other services	73	23	2,370	85	67	454	408	1,292	375	1,126	3,974	10,249	21,767	5,158	0	0	2,151	29,076	39,324
Total industry	10,105	5,900	146,289	19,532	42,039	56,663	31,797	88,490	27,473	38,465	17,311	484,065	324,229	145,550	79,710	106	113,145	662,740	1,146,805
Imports	1,533	1,402	41,100	2,930	3,452	5,863	3,576	5,627	4,349	4,196	1,880	75,909	33,984	1,144	14,695	270	42,273	92,366	168,275
Sales by final buyers	-4	7	453	-2	26	-6	42	1,615	0	2	5	2,139	4,752	-6,882	-4,708	0	4,699	-2,139	0
Taxes on expenditure *less* subsidies	-1,981	-502	1,440	2,586	352	8,583	1,724	6,584	4,075	3,854	1,266	27,982	49,263	130	4,417	-47	1,392	55,155	83,137
Value added	9,747	11,933	101,787	13,217	28,216	81,949	44,822	143,352	36,932	65,894	18,863	556,500	0	0	0	0	0	0	556,500
Total	19,400	18,741	291,071	38,263	74,086	153,052	81,961	245,668	72,829	112,410	39,324	1,146,595	412,228	139,941	94,114	329	161,509	808,122	1,954,717

This matrix is needed to carry out scenario studies of the type *What would happen if an industry replaced plastics for iron in one of their products.* One would have to make the appropriate adjustment to this matrix and then recalculate the Leontief inverse to assess the impacts on plastic and metal production. This sort of simulation has been carried out in SIM2 which is presented later in the paper.

Table 2: Leontief inverse

The Leontief inverse matrix shows the direct and indirect demand for products in response to changes in final demand. The first entry shows that £1 spent by households etc. on domestically grown agricultural commodities causes a £1.14 rise in agricultural production and a £0.39 rise in demand for manufactured products. The total for the column, shows that £1 spent on UK agricultural products causes a £1.96 rise in demand for UK produced goods and services.

Rows of the matrix shows the change in demand for a product arising from changes in final demand for all other products. Column 3 of the first row shows that if households spent an extra £1 purchases of manufactured goods there would be a rise in demand for agricultural product by £0.05. The row total for agriculture implies there would be a £1.96 increase in demand for agricultural products if there was a £1 rise in demand for each of the other products.

Environmental impacts in the UKENA are associated to the *industry* rather than *product.* However the derived tables have been calculated on a product, rather than industry basis. Product by product tables are considered easier to link to econometric equations which tend to phrase forecasts in terms of quantity of product being demanded rather than industrial output. Consideration was given to supplying a further matrix to transform product output to industry output (gross output) so the expansion in demand for product could be converted into an expansion in industrial activity. The author did not consider the slight intellectual improvement in emissions forecast justified calculation of this further matrix.

Table 3a & 3b : Direct emissions intensity matrices

The direct emissions intensity matrices express the environmental pressure (produced during manufacture of goods and services and the operations of vehicles owned by the industry) produced per £1 million of product output, valued in basic prices. The value of product sales are adjusted to exclude the effect of distorting taxes (specifically hydrocarbon taxes, VAT, import duties, alcohol taxes and tobacco taxes). These emissions intensities are a useful way of projecting how emissions change as the demand for goods and services change.

These matrices were calculated by a detailed scrutiny of the fuel usage by households and industries. Emissions were calculated by multiplying these fuel uses by emissions factors and adding on non-combustion related emissions. The UKENA computes emissions using a 28 fuel breakdown. Emissions from fuel usage by road vehicles are handled separately.

The UKENA associates emissions either to households or the industry group immediately responsible for the generation of the pollution, meaning the household or industry group that burns the

Table 2 Leontief inverse - commodity output per unit of domestically met final demand 1993

	PURCHASES BY PRODUCT GROUP											
	Agriculture	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Wholesale and retail trade	Transport and communication	Financial intermediation	Public administration	Education, health and social work	Other services	TOTAL
SALES BY PRODUCT												
Agriculture	1.14	0.01	0.05	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	1.26
Mining and quarrying	0.02	1.11	0.04	0.18	0.02	0.01	0.01	0.01	0.01	0.01	0.01	1.41
Manufacturing	0.39	0.13	1.40	0.16	0.28	0.16	0.15	0.10	0.19	0.15	0.16	3.26
Electricity, gas and water supply	0.04	0.02	0.04	1.34	0.03	0.03	0.03	0.02	0.02	0.02	0.03	1.61
Construction	0.02	0.01	0.01	0.02	1.32	0.01	0.01	0.04	0.06	0.01	0.02	1.53
Wholesale and retail trade	0.10	0.04	0.08	0.05	0.08	1.04	0.04	0.02	0.02	0.01	0.03	1.53
Transport and communication	0.05	0.10	0.07	0.04	0.05	0.13	1.19	0.09	0.05	0.03	0.07	1.88
Financial intermediation	0.17	0.09	0.19	0.11	0.27	0.22	0.21	1.31	0.17	0.10	0.30	3.13
Public administration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.01	0.00	0.00	1.01
Education, health & social work	0.02	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.12	1.22	0.02	1.43
Other services	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	1.12	1.21
TOTAL	1.96	1.53	1.91	1.91	2.06	1.64	1.66	1.61	1.66	1.58	1.76	19.26

Table 3a Emissions intensities for different products

tonnes of pollutant emitted per £million of spending on domestic production 1993

Direct emissions per £million domestic gross output of product

	Agriculture	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Wholesale and retail trade	Transport and communication	Financial intermediation	Public administration	Education, health and social work	Other services
Greenhouse gases (1)	1,706	2,018	471	4,683	61	128	724	34	133	106	1,095
Acid rain precursors (2)	31.2	9.1	3.1	65.5	0.5	0.6	7.8	0.2	0.9	0.6	1.0
CO_2 (3)	334	1300	404	4417	56	127	718	33	132	105	99
CH_4 (4)	57.3	33.7	0.0	9.9	0.0	0.0	0.0	0.0	0.0	0.0	47.2
N_2O (5)	0.5	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_x (6)	0.7	3.8	2.4	54.8	0.1	0.1	1.9	0.0	0.4	0.4	0.3
NO_x (7)	2.9	7.6	1.0	15.4	0.7	0.7	8.5	0.2	0.7	0.2	0.5
NH_3 (8)	15.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Black smoke (9)	0.7	0.6	0.1	0.6	0.2	0.2	1.6	0.0	0.0	0.0	1.2
NMVOC (10)	5.1	9.4	2.8	0.7	1.2	0.6	3.1	0.3	0.1	0.1	1.3
Benzene	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO (11)	5.0	4.1	0.5	7.3	9.2	1.8	5.0	0.9	0.2	0.3	0.9
Lead (kg)	1.7	0.4	1.0	1.4	0.0	0.7	1.0	0.4	0.1	0.2	4.1

Direct and indirect emissions from £1 million expenditure on a product

	Agriculture	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Wholesale and retail trade	Transport and communication	Financial intermediation	Public administration	Education, health and social work	Other services
Greenhouse gases (1)	2420	2519	1115	6780	448	480	1097	268	423	385	1518
Acid rain precursors (2)	40.1	13.1	9.8	90.6	4.2	4.3	11.7	2.5	3.7	3.3	4.2
CO_2 (3)	799	1691	895	6268	382	431	1049	238	377	337	372
CH_4 (4)	66.6	38.3	5.5	20.0	1.8	1.6	1.4	1.0	1.4	1.6	53.7
N_2O (5)	0.7	0.1	0.3	0.3	0.1	0.1	0.1	0.0	0.1	0.0	0.1
SO_x (6)	4.1	6.0	6.0	74.7	2.3	2.2	4.0	1.4	2.2	2.3	2.4
NO_x (7)	5.0	10.0	3.2	22.6	2.3	2.6	10.8	1.5	1.9	1.1	1.9
NH_3 (8)	17.3	0.1	0.8	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.3
Black smoke (9)	1.0	0.8	0.4	1.0	0.5	0.4	1.9	0.2	0.2	0.1	1.5
NMVOC (10)	7.4	11.3	4.9	3.3	2.9	1.7	4.3	1.1	1.1	0.9	2.4
Benzene	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
CO (11)	7.1	5.6	2.2	11.2	13.2	3.2	6.6	2.2	1.6	1.1	2.3
Lead (kg)	2.6	0.8	1.9	2.2	0.6	1.2	1.5	0.8	0.5	0.6	5.0

Direct emissions as a ratio of direct and indirect emissions

	Agriculture	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Wholesale and retail trade	Transport and communication	Financial intermediation	Public administration	Education, health and social work	Other services
Greenhouse gases (1)	0.71	0.80	0.42	0.69	0.14	0.27	0.66	0.13	0.31	0.28	0.72
Acid rain precursors (2)	0.78	0.69	0.31	0.72	0.12	0.14	0.67	0.06	0.23	0.17	0.23
CO_2 (3)	0.42	0.77	0.45	0.70	0.15	0.30	0.68	0.14	0.35	0.31	0.27
CH_4 (4)	0.86	0.88	0.00	0.49	0.01	0.01	0.03	0.01	0.00	0.00	0.88
N_2O (5)	0.76	0.46	0.63	0.63	0.16	0.05	0.28	0.03	0.06	0.03	0.21
SO_x (6)	0.17	0.63	0.39	0.73	0.02	0.05	0.47	0.02	0.17	0.19	0.14
NO_x (7)	0.58	0.77	0.32	0.68	0.29	0.27	0.79	0.13	0.37	0.15	0.27
NH_3 (8)	0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54
Black smoke (9)	0.70	0.67	0.29	0.58	0.48	0.37	0.81	0.13	0.19	0.16	0.80
NMVOC (10)	0.69	0.83	0.57	0.20	0.41	0.34	0.72	0.28	0.10	0.17	0.55
Benzene	0.70	0.56	0.49	0.35	0.49	0.70	0.72	0.53	0.17	0.37	0.54
CO (11)	0.71	0.73	0.24	0.65	0.69	0.55	0.76	0.40	0.15	0.31	0.41
Lead (kg)	0.64	0.50	0.55	0.61	0.07	0.59	0.64	0.49	0.15	0.31	0.82

(1) Greenhouse gases emissions are calculated by summing emissions of CO_2, CH_4, and N_2O weighted by their Global Warming Potentials at 100 years
(2) Acid rain precursors aggregated by summing SO_x, NO_x and ammonia according to potential hydrogen ions production
(3) Carbon dioxide; Emissions of CO_2 expressed as mass of CO_2, to convert to mass of Carbon multiply by 12/44.
(4) Methane
(5) Nitrous oxide
(6) Sulphur dioxide
(7) Oxides of nitrogen
(8) Ammonia; Includes data from personal communication from M.A.Sutton, and from Sutton et al (1995)
(9) Suspended solid matter arising from combustion of fossil fuels
(10) Non-methane volatile organic compounds
(11) Carbon monoxide

Table 3b Emissions intensities for different products - transport vehicles only

tonnes of pollutant emitted per £million of spending on domestic production 1993

Direct emissions per £ million domestic gross output of product

	Agriculture	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Wholesale and retail trade	Transport and communication	Financial intermediation	Public administration	Education, health and social work	Other services
Greenhouse gases (1)	115	33	17	15	10	66	331	23	4	8	34
Acid rain precursors (2)	0.7	0.2	0.1	0.1	0.1	0.5	3.2	0.1	0.0	0.0	0.3
CO_2 (3)	113	33	17	15	10	65	327	23	4	8	34
CH_4 (4)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N_2O (5)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_x (6)	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
NO_x (7)	0.9	0.3	0.2	0.1	0.1	0.6	4.1	0.2	0.0	0.1	0.3
NH_3 (8)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Black smoke (9)	0.2	0.1	0.1	0.0	0.0	0.2	1.4	0.0	0.0	0.0	0.1
NMVOC (10)	0.7	0.2	0.1	0.1	0.0	0.3	1.1	0.2	0.0	0.1	0.2
Benzene	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO (11)	4.0	0.9	0.3	0.5	0.1	1.8	3.9	0.9	0.1	0.3	0.8
Lead (kg)	1.7	0.4	0.1	0.2	0.0	0.7	1.0	0.4	0.1	0.1	0.3

Direct and indirect emissions from £1 million expenditure on a product

	Agriculture	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Wholesale and retail trade	Transport and communication	Financial intermediation	Public administration	Education, health and social work	Other services
Greenhouse gases (1)	168	80	64	49	49	123	405	65	34	29	75
Acid rain precursors (2)	1.1	0.7	0.5	0.4	0.4	1.0	3.9	0.5	0.3	0.2	0.6
CO_2 (3)	165	79	63	49	48	122	400	65	34	29	74
CH_4 (4)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N_2O (5)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_x (6)	0.1	0.1	0.1	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.1
NO_x (7)	1.5	0.8	0.7	0.5	0.5	1.3	5.0	0.7	0.4	0.3	0.8
NH_3 (8)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Black smoke (9)	0.3	0.2	0.2	0.1	0.2	0.4	1.7	0.2	0.1	0.1	0.2
NMVOC (10)	1.0	0.4	0.3	0.2	0.2	0.6	1.4	0.3	0.1	0.1	0.3
Benzene	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
CO (11)	5.2	1.7	1.3	1.3	0.9	2.7	5.0	1.6	0.7	0.7	1.6
Lead (kg)	2.2	0.6	0.5	0.5	0.3	1.0	1.3	0.6	0.3	0.3	0.6

Direct emissions as a ratio of direct and indirect emissions

	Agriculture	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Wholesale and retail trade	Transport and communication	Financial intermediation	Public administration	Education, health and social work	Other services
Greenhouse gases (1)	0.69	0.42	0.26	0.31	0.20	0.54	0.82	0.36	0.13	0.28	0.46
Acid rain precursors (2)	0.64	0.36	0.27	0.27	0.21	0.49	0.82	0.26	0.10	0.20	0.43
CO_2 (3)	0.69	0.42	0.26	0.31	0.20	0.54	0.82	0.36	0.13	0.28	0.46
CH_4 (4)	0.74	0.51	0.25	0.37	0.15	0.62	0.80	0.49	0.18	0.39	0.49
N_2O (5)	0.70	0.43	0.25	0.31	0.17	0.54	0.82	0.38	0.13	0.30	0.45
SO_x (6)	0.59	0.33	0.27	0.23	0.22	0.45	0.83	0.20	0.08	0.14	0.41
NO_x (7)	0.64	0.37	0.27	0.27	0.21	0.49	0.82	0.27	0.10	0.21	0.43
NH_3 (8)	.	.	.	.	.	.	.	.	.	.	.
Black smoke (9)	0.56	0.31	0.27	0.21	0.23	0.43	0.83	0.16	0.07	0.11	0.40
NMVOC (10)	0.74	0.50	0.24	0.36	0.14	0.60	0.80	0.48	0.18	0.38	0.48
Benzene	0.77	0.61	0.25	0.41	0.13	0.70	0.75	0.59	0.24	0.46	0.54
CO (11)	0.76	0.56	0.24	0.39	0.13	0.66	0.78	0.54	0.21	0.43	0.51
Lead (kg)	0.77	0.62	0.25	0.42	0.13	0.71	0.74	0.60	0.25	0.47	0.54

(1) Greenhouse gases emissions are calculated by summing emissions of CO_2, CH_4, and N_2O weighted by their Global Warming Potentials at 100 years
(2) Acid rain precursors aggregated by summing SO_x, NO_x and ammonia according to potential hydrogen ions production
(3) Carbon dioxide; Emissions of CO_2 expressed as mass of CO_2, to convert to mass of Carbon multiply by 12/44.
(4) Methane
(5) Nitrous oxide
(6) Sulphur dioxide
(7) Oxides of nitrogen
(8) Ammonia; Includes data from personal communication from M.A.Sutton, and from Sutton et al (1995)
(9) Suspended solid matter arising from combustion of fossil fuels
(10) Non-methane volatile organic compounds
(11) Carbon monoxide

fossil fuel or releases the non-fuel emission. Emissions from households consist of gases released from heating fuels (gas, wood, burning oil) and exhaust fumes from cars used for non-business purposes.

The direct emissions intensity matrix gives the ratio of the quantity of emissions created during the manufacture of a product to the gross output of the product (valued in basic prices). For instance, agriculture produces 1,706 tonnes of greenhouse gases (in CO_2 equivalents) for every £1 million of product output. Unlike most other products agricultural emissions of greenhouse gases consist largely of methane rather than CO_2. Products vary markedly in their direct emissions intensities. At one extreme, financial intermediation generates only 34 tonnes of CO_2 per £1m transacted. At the other extreme electricity, gas and water distribution generates 4,683 tonnes of CO_2 per £1m transacted. Minerals extraction, several manufactured goods and fossil fuel fired electricity have high emissions intensities for carbon dioxide. The same is true though to a lesser extent for transport goods such as bus, taxi and air transport.

As well as t*otal emissions* further tables describe the quantities of emissions arising solely from road vehicles owned and operated by an industry. Emissions from road transport are reported separately because it is likely that some policies will apply only to road vehicles irrespective of which industry owns them (for instance various vehicle emissions standards). Since vehicle ownership is widely distributed through-out the economy it will be difficult to analyse this type of policy without the separate handling of road transport.

The environmental input-output framework assumes constant coefficients in describing inter-industry purchases. This 'linearity' assumption is extended to the generation of pollution. Simply put, if there is a 10% rise in the demand for a product then if all other things remain the same there is a 10% rise in the characteristic emissions for that product. For some simulation exercises this assumption can be relaxed. In SIM 2 it is assumed that the direct emissions intensities of all road vehicles is halved relative the base scenario.

Table 3a & 3b : Direct and indirect emissions intensity matrices

Direct emissions production of goods and services gives rise to emissions embodied in their purchases from other firms. For instance the production of an aluminium can causes emissions in the electricity industry as a result of the aluminium industry's purchases of electricity. Such emissions are the *indirect* consequence of production.

The *direct and indirect emissions intensity* matrices express the full environmental pressure, produced per £1 million of product output, valued at basic prices. This includes emissions arising in the industry producing the goods and services and also emissions arising through the entire supply chain. This is a little like the 'cradle to grave' environmental burden discussed in life cycle analyses. These matrices make use of the Leontief inverse matrix in their computation.

Emissions in the 'Direct and indirect' tables are necessarily higher than those from the 'Direct' tables. In some cases the differences are small. For instance, the *direct* emissions of mining and quarrying is 80% of the *direct* and *indirect emissions* implying that greenhouse gas emissions are nearly all direct. In financial intermediation the *direct* greenhouse gas emissions account for only 13% of the total *direct and indirect* emissions. The proportion of 'direct' to 'direct and indirect' emissions varies markedly between products. Many businesses that use little fossil fuel themselves are major purchasers of electricity so have low ratios of direct to indirect emissions.

Table 4 : Emissions allocated back to final demand

It could be said that ultimately all emissions arise because of consumption by final output categories, be they households, government or the rest of the world. Emissions have been allocated back to final demand categories in the table **Emissions allocated back to final demand**. Consumers' expenditure is the only final demand category that gives rise to direct emissions, occurring through the use of private motor vehicles and domestic fuel use. Emissions from Government's activities arise within the body of the intermediate output matrices mainly in public administration, education and health.

All categories of final demand give rise to indirect emissions through their purchases. By far the largest cause of emissions is consumer expenditure which accounts for over half of *direct and indirect emissions*. The production of UK exports is also a major cause of emissions accounting for between half (for nitrous oxide) and a twentieth (carbon monoxide) of emissions. These proportions vary across pollutants because of the different mix of products bought by the different components of final output.

Simulations to demonstrate the use of environmental input-output tables

The environmental input-output tables are intended to be used in conjunction with economic models for policy analysis. The purpose of this section is show the mechanics of how this might be done.

Table 4 Emissions allocated back to final demand categories

000s of tonnes of pollutants emitted by different categories of final demand unless otherwise specified

Direct emissions by final demand

	Consumers' expenditure	General government final consumption	GDFCF	Change in stocks	Exports	Total
Expenditure (£mil)	406,399	138,081	94,293	329	159,997	799,099
Greenhouse gases (1)	148,028	0	0	0	0	148,028
Acid rain precursors (2)	645	0	0	0	0	645
CO_2 (3)	145,372	0	0	0	0	145,372
CH_4 (4)	71	0	0	0	0	71
N_2O (5)	4	0	0	0	0	4
SO_x (6)	125	0	0	0	0	125
NO_x (7)	691	0	0	0	0	691
NH_3 (8)	21	0	0	0	0	21
Black smoke (9)	149	0	0	0	0	149
NMVOC (10)	798	0	0	0	0	798
Benzene	48	0	0	0	0	48
CO (11)	4,173	0	0	0	0	4,173
Lead (tonnes)	1,152	0	0	0	0	1,152

Direct emissions from vehicles owned and operated by final demand

Greenhouse gases (1)	57,710	0	0	0	0	57,710
Acid rain precursors (2)	443	0	0	0	0	443
CO_2 (3)	56,356	0	0	0	0	56,356
CH_4 (4)	20	0	0	0	0	20
N_2O (5)	3	0	0	0	0	3
SO_x (6)	13	0	0	0	0	13
NO_x (7)	618	0	0	0	0	618
NH_3 (8)	0	0	0	0	0	0
Black smoke (9)	22	0	0	0	0	22
NMVOC (10)	601	0	0	0	0	601
Benzene	45	0	0	0	0	45
CO (11)	3,728	0	0	0	0	3,728
Lead (tonnes)	1,135	0	0	0	0	1,135

Direct and indirect emissions from final demand

Greenhouse gases (1)	425,955	80,805	51,699	-610	133,827	691,677
Acid rain precursors (2)	3,693	485	437	4	1,168	5,787
CO_2 (3)	374,502	50,587	47,063	98	106,801	579,052
CH_4 (4)	2,024	1,358	153	-24	558	4,069
N_2O (5)	29	5	5	-1	49	88
SO_x (6)	1,990	315	275	-2	682	3,261
NO_x (7)	1,753	212	225	1	571	2,763
NH_3 (8)	257	12	3	2	47	321
Black smoke (9)	298	55	41	0	62	457
NMVOC (10)	1,556	174	238	-10	535	2,494
Benzene	60	2	3	0	5	70
CO (11)	5,248	208	653	-4	344	6,450
Lead (tonnes)	1,514	169	103	3	225	2,015

Direct and indirect emissions from vehicles operated throughout economy

Greenhouse gases (1)	89,565	5,379	6,389	43	10,975	112,351
Acid rain precursors (2)	706	43	56	0	93	900
CO_2 (3)	87,775	5,303	6,303	42	10,824	110,248
CH_4 (4)	24	1	1	0	1	27
N_2O (5)	4	0	0	0	0	5
SO_x (6)	39	4	6	0	9	59
NO_x (7)	959	56	73	0	120	1,209
NH_3 (8)	0	0	0	0	0	0
Black smoke (9)	124	16	23	0	37	200
NMVOC (10)	742	24	24	0	46	836
Benzene	54	2	1	0	3	60
CO (11)	4,402	116	105	1	206	4,830
Lead (tonnes)	1,376	45	37	0	76	1,534

GDFCF - Gross domestic fixed capital formation

(1) Greenhouse gases emissions are calculated by summing emissions of CO_2, CH_4, and N_2O weighted by their Global Warming Potentials at 100 years

(2) Acid rain precursors aggregated by summing SO_x, NO_x and ammonia according to potential hydrogen ions production

(3) Carbon dioxide; Emissions of CO_2 expressed as mass of CO_2, to convert to mass of Carbon multiply by 12/44.

(4) Methane

(5) Nitrous oxide

(6) Sulphur dioxide

(7) Oxides of nitrogen

(8) Ammonia; Includes data from personal communication from M.A.Sutton, and from Sutton et al (1995)

(9) Suspended solid matter arising from combustion of fossil fuels

(10) Non-methane volatile organic compounds

(11) Carbon monoxide

Table 5a Simulations to demonstrate use of environmental input-output tables

Base : 1993 final demand and industry structure
SIM1 : final demand for fuels10% greater, final demand for other products lower to offset
SIM2 : 50% of road vehicles use electricity in place of petrol and diesel

Economic data : £ million
Environmental data : 000s tonnes

			PRODUCT Agriculture	Mining and quarrying	Manufact-uring	Electricity, gas and water supply	Construct-ion	Wholesale and retail trade	Transport and communication	Financial intermed-iation	Public adminis-tration	Education, health and social work	Other services	Total	Consumers' expenditure	TOTAL
Economic data	Final demand	*Base*	6,470	5,789	148,041	15,167	45,990	123,351	28,169	107,197	72,419	81,072	29,076	662,740	0	662,740
		SIM1	6,505	5,373	148,430	13,841	46,240	122,501	28,321	107,778	72,811	81,512	29,233	662,545	0	662,545
		SIM2	6,470	5,789	147,094	19,113	45,990	123,351	28,169	107,197	72,419	81,072	29,076	665,739	0	665,739
	Gross outputs	*Base*	19,422	18,747	291,134	38,271	74,092	153,066	81,979	245,708	72,829	112,412	39,327	1,146,987	0	1,146,987
		SIM1	19,520	17,790	291,693	36,542	74,452	152,171	82,060	246,459	73,224	113,003	39,516	1,146,430	0	1,146,430
		SIM2	19,400	17,258	289,106	45,879	74,119	153,147	81,960	245,712	72,829	112,410	39,327	1,151,147	0	1,151,147
Environment data	Greenhouse gases	*Base*	33,134	37,838	136,975	179,243	4,497	19,635	59,346	8,306	9,693	11,923	43,057	543,649	148,028	691,677
		SIM1	33,302	36,005	136,622	171,247	4,519	19,361	59,451	8,328	9,746	11,986	43,217	533,784	133,225	667,009
		SIM2	31,981	37,799	130,080	227,564	4,141	14,578	45,733	5,443	9,534	11,470	42,407	560,728	119,173	679,901
	Acid rain precursores	*Base*	607	171	891	2,508	38	90	637	37	62	62	38	5,142	645	5,787
		SIM1	610	163	884	2,398	39	89	638	38	63	62	39	5,021	580	5,601
		SIM2	599	170	813	3,221	35	52	506	21	61	59	33	5,572	423	5,996
	Particulates	*Base*	13	11	32	22	17	25	128	7	3	3	48	307	149	457
		SIM1	13	10	32	21	17	25	128	7	3	3	48	307	134	441
		SIM2	11	10	23	27	15	13	70	4	3	2	46	224	138	362

Table 5b Simulations to demonstrate use of environmental input-output tables - % change from base

Base : 1993 final demand and industry structure
SIM1 : final demand for fuels10% greater, final demand for other products lower to offset"
SIM2 : 50% of road vehicles use electricity in place of petrol and diesel

Economic data : £ million
Environmental data : 000s tonnes

			PRODUCT Agriculture	Mining and quarrying	Manufact-uring	Electricity, gas and water supply	Construct-ion	Wholesale and retail trade	Transport and communi-cation	Financial intermed-iation	Public adminis-tration	Education, health and social work	Other services	Total	Consumers' expenditure	TOTAL
Economic data	Final demand	*Base*	6,470	5,789	148,041	15,167	45,990	123,351	28,169	107,197	72,419	81,072	29,076	662,740		662,740
		SIM1	1%	-7%	0%	-9%	1%	-1%	1%	1%	1%	1%	1%	0%		0%
		SIM2	0%	0%	-1%	26%	0%	0%	0%	0%	0%	0%	0%	0%		0%
	Gross outputs	*Base*	19,422	18,747	291,134	38,271	74,092	153,066	81,979	245,708	72,829	112,412	39,327	1,146,987		1,146,987
		SIM1	1%	-5%	0%	-5%	0%	-1%	0%	0%	1%	1%	0%	0%		0%
		SIM2	0%	-8%	-1%	20%	0%	0%	0%	0%	0%	0%	0%	0%		0%
Environment data	Greenhouse gases	*Base*	33,134	37,838	136,975	179,243	4,497	19,635	59,346	8,306	9,693	11,923	43,057	543,649	148,028	691,677
		SIM1	1%	-5%	0%	-4%	0%	-1%	0%	0%	1%	1%	0%	-2%	-10%	-4%
		SIM2	-3%	0%	-5%	27%	-8%	-26%	-23%	-34%	-2%	-4%	-2%	3%	-19%	-2%
	Acid rain precursores	*Base*	607	171	891	2,508	38	90	637	37	62	62	38	5,142	645	5,787
		SIM1	1%	-5%	-1%	-4%	0%	-1%	0%	0%	1%	1%	0%	-2%	-10%	-3%
		SIM2	-1%	0%	-9%	28%	-9%	-41%	-21%	-43%	-2%	-4%	-13%	8%	-34%	4%
	Particulates	*Base*	13	11	32	22	17	25	128	7	3	3	48	307	149	457
		SIM1	1%	-1%	0%	-4%	0%	0%	0%	0%	1%	0%	0%	0%	-10%	-3%
		SIM2	-14%	-3%	-28%	25%	-8%	-49%	-45%	-49%	-9%	-18%	-4%	-27%	-7%	-21%

The results from this section **are not** an endorsement for any particular policies.

A change in emissions can be modelled through three types of adjustment to the environmental input-output system:

- change in final demand;
- an end-of-pipe change in technology; and
- new pattern of intermediate purchases by an industry

The economic or technological driver that causes the change in final demand is not discussed in this paper. Many econometric models exist which purport to show how households will change their mix of purchases in response to changes in relative prices. The output of these models can serve as inputs to the environmental input-output tables. Subsequently, there are three advantages to using environmental input-output tables. Firstly, they track the full consequences of this shift in tastes right through the supply chain. Secondly, they handle all pollutants simultaneously and consistently. Thirdly, the path of interactions through the supply chain is not based on a single 'case study' but on the input-output tables which represent the totality of all interactions between industries.

Two simulations were carried out to show how the tables might be used for policy analysis:

- SIM 1 - 10% fall in energy purchases by final demand categories off-set by a rise in purchases of all other commodities such that aggregate final demand is unchanged; and
- SIM 2 - a 50% switch to electric vehicles, 50% reduction petrol and diesel consumption by road transport, off-set by a rise in electricity consumption.

Neither of these simulations ought to be considered to be policies under active consideration.

Software

Both simulations were carried out in SAS-IML on a standard PC. This package was well suited to handling and manipulating the matrices. Simulation 1 was also carried out on a standard spreadsheet package. Simulation 2 has to be carried out on a package capable of inverting a 91 x 91 matrix. Both simulations were carried out at the 91 industry breakdown. Results were subsequently shrunk to the 11 product breakdown to include in this paper.

Mechanics of running the simulations

SIM1 : 10% fall in energy purchases by final demand, offsetting rise in other goods

This simulation demonstrates the mechanics of how to simulate the effects of any change in final demand. In essence the following three steps have to carried out:

- a new final demand is calculated;
- implications of this new final demand on gross supply is calculated; and
- implications of this new supply on emissions is calculated, taking into account any changes in direct emissions from the new final demand

The following sequence of operation was carried out. In the formulae below '*' signifies matrix multiplication and '#' signifies element by element multiplication of tables;

- energy products (transport fuels, heating fuels, electricity) were separately identified and expenditure was decreased by 10%;
- the fall in final expenditure was calculated and the expenditure on all other goods was proportionally scaled to calculate final demand for SIM1 : F_1;
- baseline commodity supply (S_b) was calculated by multiplying Leontief inverse (L_b) with the baseline final demand (F_b):

  $$S_b = L_b * F_b$$
- baseline emissions were calculated by multiplying the emissions per unit gross output, direct emissions from final demand were added:

  $$E_b = (P_b \# S_b) + E_{f,b}$$
- process repeated for the final demand computed for scenario 1; and
- direct emissions from final demand for scenario 1 is only 90% of that of the baseline due to 10% fall in energy purchases:

  $$E_{f,1} = E_{f,b} \# .9$$

SIM2 : replacement of 50% of fossil fuel purchases by road transport with electricity

A study carried out by ETSU (Gover et al 1996) was used to calibrate the extra demand for electricity arising from this switch to electrically powered vehicles. The approach taken was to calculate a notional figure of the distance travelled by a medium sized car implied by the total UK consumption of road fuels. In

SIM2 it was assumed 50% of this distance was powered by electricity. The extra demands on the electricity industry (expressed in KWh) were calculated using the average efficiencies of medium sized cars as reported in Gover et al. It should be noted that the conversion of diesel and petrol cars for electric vehicles is not a "like for like" conversion in terms of performance of the two types of vehicles. Most notably the electrical vehicles have lower ranges than the fossil fuelled vehicles. ONS has made no attempt to verify results from the ETSU study and this simulation ought not be regarded as endorsement or support for electrically powered vehicles.

A large scale shift from petrol to electricity implies that throughout the economy, less petrol and diesel and more electricity would be purchased. This would have knock on effects on the electricity industry, the coal industry (in 1993 still the largest fuel source for electricity), and on the oil industry.

The following steps were taken to run the simulation:

- expenditure on petrol and diesel in basic prices (net of hydrocarbon tax and VAT) was calculated
- row 59 (purchases from garages - used to proxy for vehicle usage by different products) of the input-output matrix was used to apportion 50% of this sum across industries
- subtract this from row 17 (refined petroleum products) of the input-output matrix
- calculate the energy content of the fuel that has thus been saved
- calculate the extra demand for electricity using data on the relative energy efficiencies of petrol and electric vehicles
- calculate the implied rise in electricity consumption relative to the baseline (using the simplifying assumption that average fuel mix for electricity generation is used to recharge vehicle batteries)
- increase purchases across the electricity products in proportion to row 59
- purchases (columns) of the electricity and oil refinery industries were rescaled following their expansion and contraction respectively
- calculate a new coefficient form of the input-output matrix
- calculate a new Leontief inverse matrix
- all operations for SIM1 were then repeated for the new final demand F_2 except adjusting purchases of refined oil products and electricity of final demand categories

Results

The results of the simulations are shown in the Table 5a and 5b of the report at an 11 product breakdown. For the each base scenario, SIM1 and SIM2 details are given for the final demands, gross outputs and emissions of greenhouse gases, acid rain precursors and particulates. Table 5a gives the absolute values of the two simulations studies. Table 5b gives the proportional change in emissions as a ratio of the baseline position.

The results are consistent with expectations.

Final demand and gross output are virtually the same for SIM1 and the base scenario. Emissions by final demand categories are 10% lower, but over the whole economy emissions fell by about 5% reflecting the fact that demand for energy by industry was not directly cut in this scenario and that the offsetting rise in final demand for non-energy goods and services would have increased energy consumption and hence emissions by industry.

In SIM2 there was a 50% cut in emissions by 'consumers' expenditure - travel' reflecting the lower road transport emissions coefficients. Industrial emissions of greenhouses gases and acid rain precursors rose reflecting the higher power output by the electricity industry. Emission of particulates, of which road transport is a major source, fell by over 20%. Over the entire economy emissions of greenhouse gases and particulates were lower and acid rain precursors higher. The fact that green house gas emissions were lower reflects ETSU's findings that electric vehicles are more fuel efficient than conventional vehicles. The electrical vehicles which they surveyed had lower ranges than conventional vehicles.

Further work

The environmental input-output tables presented in this study can be used to simulate policy scenarios and can in principal be integrated with economic models that report changes in demands for goods disaggregated by standard industrial classification.

There are further developments that could be made in the future when this exercise is repeated. In general a higher level of industrial disaggregation is to be preferred over a limited disaggregation. This is particularly important for environmentally active industries such as sanitary services. Accurate environmental analysis using this method of modelling cannot be carried out satisfactorily at present due to little data is collected on purchases by service industries.

At present the tables exclude the knock-on effects of investment activities. Gross domestic fixed capital formation, which gives rise to demands for construction, vehicles and land lies do not appear within the core of the input-output matrix but instead as a separate column within final demand. Thus if a model predicts an increase in demand for a good gives rise to greater capital spending this is not directly reflected in the emissions from the industry producing the capital the capital good. Expenditure on investment could in principal be internalised but some care needs to be taken to ensure the assumption that emissions per unit gross output still hold with newer capital stocks.

A number of developments occurring within then ONS are likely to improve the quality of source data. ONS is moving towards the compilation of annual input-output tables in 1999. Deficiencies in our knowledge of purchases is being addressed in part by the move to an annual purchases' enquiry and the extension of the enquiry to the service industries.

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Annex 1: Methodology used to calculate the derived tables

This annex gives a technical description of how the derived tables and environmental input output tables were calculated.

Figure 2 SAM representation of environmental input-output source tables

	Industries	Commodities	Final demand	Total
Industries		**Supply (S')**		**g**
Commodities Primary inputs	**Use (X)** **Value added Industry taxes, (Y)**		**Final demand (F)**	**q**
Total	**g**	**q**		
Pollutants	E_i		E_f	

Figure 2 shows how the various matrices fit together in a simplified SAM framework. The following matrices and vectors are defined.

S' - transposed make matrix in basic prices
g - total industry output of the economy in basic prices
X - domestic use matrix in basic prices
F - final demand matrix
q - total product output of the economy in basic prices
E_i - total industrial emissions
E_f - total final output emissions

Construction of the basic price 'use' matrix

A 'combined use' table valued at purchaser prices is compiled and published annually by the ONS and revised subsequently as part of the balancing process. The ONS also calculates a supply table annually. The unpublished revised table was used as the basis for the derived tables.

The following sequence of adjustments were made to the 'use' table to bring it to basic prices:

- split environmentally active branches of industry
- reallocate 'margins' from product rows to distribution rows
- subtract VAT from the elements in the core of the table
- subtract other product taxes (principally import duty)
- strip out use taxes (hydrocarbon tax, alcohol duty and betting and gaming tax) from the body of the matrix
- reallocate use taxes within the tax less subsidy row of the use matrix

The 123 industry *supply and use* balances were disaggregated to 137 industries to introduce greater detail in certain environmentally active branches of the economy. This was done using a mixture of annual company reports and business survey data. The 'nuclear fuel', 'oil refining' and 'coke oven' information in the symmetrical use matrix has been adjusted to prevent disclosure of confidential material.

- removal of distributors' trading margins

The 'use' table is valued at purchaser prices. The mark-up on goods by wholesalers and retailers are not separately attributed to the retail and wholesale industries. However ONS does annually compile data on total margins for each product (column in the supply table). This was used as a control total. Detailed margins data from 1989 on SIC 80 basis were linearly manipulated to bring them on to SIC 92 and scaled so they conformed to the 1993 control totals.

- removal of product taxes

VAT paid on commodities is calculated annually and published within the taxes on product column in the supply balance. This had to be allocated across industries. VAT is paid by households, Government, and industries that cannot reclaim VAT paid on their purchases. Information on how to allocate VAT amongst was available internally. Import duty, and other taxes were scaled across industries in proportion to expenditure by the industry on the commodity in question.

-separation of imports

There is good detailed data on the value of imports by product into the UK. Unfortunately there was no information available to allocate imports between industries. Instead imports were pro-rated in line with total inputs.

- symmetrical commodity x commodity domestic use table valued in basic prices

The domestic use table calculated above is still asymmetric - columns refer to industries and rows to products. This is awkward because, as the Supply matrix reveals, products are made by a variety of different industries. Each industry has different characteristic purchases. For instance, hotelling is provided by the agriculture industry (bed and breakfast accommodation) as well as the hotelling industry. If the demand for accommodation increases should we assume the increase in purchases will be similar in fashion to purchases by the hotel industry or to the agriculture industry? In this instance the accommodation provided by the agriculture industry is likely to require the same type of purchases as the hotel industry (the commodity technology assumption). This is not always the case; the Supply matrix might reveal the glass industry produces substantial quantities of structural materials. Assuming these materials include toughened glass the inputs required to make these *structural materials* are more likely to be like those of the glass industry (sand, energy) rather than the structural material industry which we see from the disaggregated use table include metals, glass and rubber. This is the industry technology assumption.

To make the use table symmetrical the Supply table is used to split the use matrix into two. Decisions have to be made about whether off-diagonal production of goods and services (such as toy manufacture by the glass industry and accommodation by the agriculture industry) revealed in the Supply matrix has a purchase structure similar to the industry or the commodity. A new 'square' product by product use matrix is produced using data from the make and use matrices calculated above. Details are given in Millard (1995) and Bulmer-Thomas (1992).

The following formula was used:

$$A = B [C_1^{-1} (I - D_2' \hat{i}) + D_2]$$

where:
A is the square commodity x commodity matrix in coefficient form (divided by industry gross output)
B is the basic price domestic use matrix in coefficient form
C_1 is that part of the basic price make matrix in coefficient form (divided by industry gross output) for which the commodity technology assumption holds. This includes production of the industry's characteristic product
D_2 is that part of the basic price make matrix in coefficient form (divided by product output) for which the industry technology assumption holds
I is the identity matrix
i is the unit vector

- Leontief inverse matrix

This was calculated from the symmetrical commodity x commodity domestic input-output matrix in coefficient form valued in basic prices (A) using the well known formula. I is again the identity matrix.

$$L = [I - A]^{-1}$$

It was thought a commodity x commodity matrix would be more useful than an industry by industry matrix.

- Direct emissions intensities for branches of the economy P_D

- Pollution multiplier tables P_M

These were calculated by dividing total UK emissions for each branch of the economy by the product output for each commodity. It is assumed that pollution occurs as a result of production of the principal product only.

$$P_D = E q^{-1}$$

where E is the pollutant by industry matrix for emissions throughout the economy and q is the diagonalised commodity output vector. An E_t matrix was calculated solely for transport related emissions so these can be separately modelled.

The direct and indirect emissions intensities or polluter multiplier matrix P_M was calculated from.

$$P_M = P_D L$$

Each element of the pollution multiplier matrix gives the amount of direct and indirect emissions arising from a unit increase in final demand for a commodity.

Annex 2 The industrial disaggregation used in the UK environmental accounts

The UK environmental accounts largely uses a 2 digit NACE classification system. Within the manufacturing industries the accounts are more disaggregated in line with the UK's input-output tables. To enable international comparability Eurostat distributed a suggested list of industries for EU member states to calculate their accounts. The UK used this list as a minimum specification for its accounts. Several environmentally active branches were further disaggregated to provide modellers with a higher resolution of the economy. The table below shows these industries:

The data needed to split purchases by Electricity and Other land transport are not collected by official surveys and a mixture of statistical data, expert knowledge and assumption was used. Although care should be used when using these data, the author believes they are adequate for modelling purposes. Particular items of data within the input-output tables or in the balances **should not** be used as evidence of specific interaction between firms.

Eurostat industry	UKENA industry
Coke ovens, oil processing, nuclear fuel manufacture	Coke oven products Refined petroleum products Processing of nuclear fuel
Non-ferrous metals	Non-ferrous metals excluding aluminium Aluminium
Electricity production and distribution	Electricity prod. and distribution - gas Electricity prod. and distribution - coal Electricity prod. and distribution - nuclear Electricity prod. and distribution - oil Electricity prod. and distribution - other
Other land transport	Buses and coaches Tubes and trams Taxis Freight by road Transport via pipeline
Public administration	Public administration - excluding defence Public administration - defence
Sanitary services	Sewage Solid waste Other sanitary services

Disaggregation at which input-output tables have been calculated

EA Codes	*Industry*	*SIC(92)*
1	Agriculture, hunting and related service activities	1
2	Forestry, logging and related service activities	2
3	Fishing, operation of fish hatcheries and fish farms	5
4	Mining of coal and lignite; extraction of peat	10
5	Extraction of crude petroleum and natural gas	11
6	Mining of metal ores	13
7	Other mining and quarrying	14
8	Manufacture of food products and beverages	15
9	Tobacco products	16
10	Textiles	17
11	Wearing apparel; dressing and dying of fur	18
12	Leather tanning, luggage and footwear	19
13	Wood and wood products, except furniture	20
14	Pulp, paper and paperboard	21
15	Publishing, printing and production of recorded material	22
16	Coke oven products	23.1
17	Refined petroleum products	23.2
18	Processing of nuclear fuel	23.3
19	Industrial gases, dyes and pigments	24.11, 24.12
20	Other inorganic basic chemicals	24.13
21	Other organic basic chemicals	24.14
22	Fertilisers and nitrogen compounds	24.15
23	Plastics and synthetic rubber in primary forms	24.16, 24.17
24	Pesticides and other agro-chemical products	24.2
25	Paints, varnishes and similar coatings, printing ink and mastics	24.3
26	Pharmaceuticals, medicinal chemicals and botanical products	24.4
27	Soap and detergents, cleaning and toilet preparations	24.5
28	Other chemical products	24.6
29	Man-made fibres	24.7
30	Rubber products	25.1
31	Plastic products	25.2
32	Glass and glass products	26.1
33	Ceramic goods	26.2, 26.3
34	Bricks, tiles and construction products, in baked clay	26.4
35	Cement, lime and plaster	26.5
36	Articles of concrete,stone,other non-metallic metal products	26.6, 26.7, 26.8
37	Iron and steel	27.1, 27.2, 27.3
38	Non-ferrous metals excl. aluminium	27.41, 27.43, 27.44, 27.45
39	Aluminium	27.42
40	Casting of metals	27.5
41	Fabricated metal products, except machinery	28
42	Machinery and equipment	29
43	Office machinery and computers	30
44	Electrical machinery and apparatus	31
45	Radio, television & comms	32
46	Medical, precision and optical instruments, watches and clocks	33

EA Codes	Industry	SIC(92)
47	Motor vehicles, trailers and semi-trailers	34
48	Other transport equipment	35
49	Manufacture of furniture, toys, sports equipment, other products	36
50	Miscellaneous manufacturing not elsewhere classified; recycling	37
51	Electricity production-gas	40.1
52	Electricity production-coal	
53	Electricity production-nuclear	
54	Electricity production-oil	
55	Electricity production-other	
56	Gas: distribution of gaseous fuels through mains	40.2, 40.3
57	Water: collection, purification and distribution of	41
58	Construction	45
59	Garages, car showrooms	50
60	Wholesaler trade and commission trade, except of motor vehicles	51
61	Retail and repair trade, except of motor vehicles	52
62	Hotels and restaurants	55
63	Transport via railways	60.1
64	Buses and coaches	60.21/1, 60.23
65	Tubes and trams	60.21/2
66	Taxis	60.22
67	Freight by road	60.24
68	Transport via pipeline	60.3
69	Water transport	61.1, 61.2
70	Air Transport	62
71	Supporting and auxiliary transport activities; activities of travel agencies	63
72	Post and telecommunications	64
73	Financial intermediation, except insurance and pension funding	65
74	Insurance and pension funding, except compulsory social security	66
75	Activities auxiliary to financial intermediation	67
76	Real estate activities	70
77	Renting of machinery	71
78	Computer and related activities	72
79	Research and development	73
80	Other business activities	74
81	Public administration - not defence	75 not 75.22
82	Public administration - defence	75.22
83	Education	80
84	Health and veterinary services	85
85	Sewage	90
86	Solid waste	
87	Other sanitary services	
88	Activities of membership organisations not elsewhere classified	91
89	Recreational, cultural and sporting activities	92
90	Other service activities	93
91	Private households with employed persons	95
92	Total intermediate consumption	

Implications of the US Boskin report for the UK Retail Prices Index

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Summary

There has been much interest in recent years in the possibility of bias in the UK Retail Prices Index. Research into this possibility has been in progress for several years at the ONS as part of a continuing programme to improve the RPI methodology. The Bank of England and other bodies have also looked at this issue. Interest in the possibility of bias was recently stimulated further by the publication of the Boskin Report on the US prices index (Boskin *et al.*, 1996). This paper discusses the relevance of the Boskin Report to the UK and current research into RPI methodology by the Office for National Statistics.

Introduction

The Senate of the USA recently commissioned a study of possible biases in the US Consumer Price Index (CPI: their equivalent of the UK RPI). The commission, chaired by Prof. Michael Boskin of Stanford University, reported in December 1996 that the annual change in the US CPI is upward biased by about 1.1 percentage points per year with a range of 0.8 to 1.6 percentage points. Thus, if reported US inflation is 3% per year, this would imply that a best estimate of the true value is 3% minus 1.1% i.e. 1.9%.

The concept of bias in any statistic is only meaningful in so far as one defines what the true value would be given perfect information. As discussed below, any bias in the RPI depends on what the RPI is intended to measure, which in turn depends on the use to which it is being put. Thus the extent of any bias will be different for each possible use.

Causes of bias in price indices

Bias is usually classified under five headings (see for example Diewert, 1996):

Commodity substitution
Outlet substitution
Formula effects
Quality adjustment
New goods and services

Commodity substitution

If the prices of some products rise faster than others, people are likely to spend less on the former and more on the latter. This effect is known as *substitution of commodities.* This means that if the basket of goods used to construct a price index is not updated regularly, too much weight may be given to prices that are rising rapidly and not enough to prices that are rising more slowly or falling, causing an overstatement of price rises. Any bias due to substitution between products in different weighting groups is greatly reduced if the expenditure weights are updated frequently. However, any substitution bias between products in the same weighting groups is not affected by review of weights (see *Formula effects*).

(Commodity substitution is not the same as saying that people tend to buy the cheapest products. If there are dearer but better products and the price differential reduces, people may shift to buying the dearer product because they perceive the smaller extra cost to be worth while.)

Outlet substitution

This is similar to commodity substitution. If the prices in some outlets rise faster than others, people tend to spend less in the former and more in the latter. This effect is known as *substitution of outlets.* Unless the sample of outlets is continuously kept up to date, there is eventually an over-representation of outlets where prices have risen rapidly and an under-representation of those where prices have risen more slowly. This will again cause an overstatement of price rises. (As before, outlet substitution is not the same as saying that people tend to buy goods in the cheapest outlets.)

Formula effects

This refers to the way that individual price quotations are combined within weighting groups. Various formulae can be used, such as average of relatives (AR), geometric (G) and ratio of averages (RA) (see Appendix 2). The Boskin Report proposes moving from the AR method now used exclusively in the US CPI to the G

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method. The effect of such a move would be to reduce any rises and increase any falls in the CPI.

The use of G is regarded (Dalen, 1992) as compensating for substitution bias due to shifts in buying patterns at the lowest level. In the UK, prices are collected for a sample of items chosen within broad categories of consumers' expenditure. For most of these items, the outlets where prices are collected are stratified either by region or shop type (multiples and independents) or both. The exceptions are those items which often cannot be found in sampled outlets, so that too few prices are collected to make any stratification meaningful.In the UK context, shifts at the lowest level means shifts between brands or varieties within item and shifts between outlets within the same stratum.

As explained in Appendix 2, AR treats each price quote as equally important. However, if one price rises faster than the others, there is a tendency for consumers to switch away from the brand, variety or outlet represented by that price, so for a cost of living index (Appendix 3) it should be down-weighted to avoid upward bias. It can be shown (Dalen, 1992) that the use of G is equivalent to assuming that expenditure shares remain constant, so that if one price doubles while the others stay the same, the quantity purchased of the brand, variety or outlet represented by that price will halve.

The sensitivity of consumers to price change will vary from item to item. For many food items, from baked beans to tomato ketchup, many people have strong preferences for particular brands and would not wish to switch to other brands; indeed, they might give up buying that item rather than switch to what they regard as an unacceptably inferior brand. Other people will not mind and will switch readily. If consumers are insensitive to price changes, G will be downward biased. Thus it would probably be wrong to adopt G for all items. Ideally, for each item one would estimate how much variety and outlet substitution is likely to occur and, in the light of this, decide whether AR, RA, G or some other formula would be most appropriate.

Since formula effects include a contribution from the effects of changing outlets, there is an overlap with outlet substitution. Thus it would be wrong, having produced estimates of outlet substitution effects and formula effects, just to add them together.

The Boskin Report calls the difference in the results between using AR for all items and using G for all items "bias associated with the fixed weight formula". It has been pointed out that this is not accurate, since G is not necessarily unbiased. Also, the two formulae are conceptually not measuring the same thing, so the numerical difference between the results of using the two formulae is not a meaningful quantity.

Quality adjustment

If a product improves in quality, purchasers get more for their money and hence the true price rises are less than the apparent ones. Thus a bias will arise if appropriate adjustments are not made for quality changes. This bias need not always be positive; it will be negative if a product deteriorates in quality so that purchasers get less for their money.

New goods and services

The emergence of these has the potential to cause two sorts of bias:

> **non-inclusion** when the price movements of a new product not in the index differ from other products in the same section; for example, mobile phone charges (which are not covered in the US CPI or the UK RPI) have generally fallen faster than those for ordinary phones.
>
> **delayed inclusion:** when new goods are initially high-priced then fall in price rapidly, there is an upward bias if the goods are not included until this fall slows or stops.

It is difficult to separate quality adjustment from new goods and services. For example, mobile phones are described as a new good, but they could equally be regarded as a quality improvement for ordinary phones.

Boskin's conclusion

The upward biases in the annual change in the US CPI due to the above five causes are estimated as:

commodity substitution	0.15 percentage points
formula	0.25 percentage points
outlet substitution	0.1 percentage points
quality change + new goods	0.6 percentage points

Criticisms of the Report

The Boskin Report represents just one point of view, and has not received universal acceptance from economists (eg Moulton, 1996; Madrick, 1997). The estimate of quality change has proved

particularly controversial. The report presents estimates of quality change and new goods biases for many components of the index. Critics argue that some of these estimates are very rough, and there is a tendency to dismiss cases where products may have deteriorated in quality. Further, some of the arguments used to justify quality adjustment are judged to be contrived. For example, the Boskin Report argues that flats are improving because more of them are being built in Florida where the climate is better, so part of any observed price or rent increase represents a quality improvement. For some items, such as medicines, the report quotes the bias in the Producer Price Index rather than in the CPI.

The Bureau of Labor Statistics (1997) has produced a detailed rebuttal. They argue that there is a lot of emphasis on areas where quality may have improved, but little mention of areas where quality may be declining, causing a negative bias. They criticise the report for assuming that the geometric mean is unbiased, when this requires several strong assumptions that are unlikely always to hold in practice. Boskin's estimate of formula effects may thus be too large. They note that their latest research on new outlet bias suggests a much lower figure than the one in the report. Thus any bias in the US CPI may be much less than Boskin claims.

Differences between the US CPI and the UK RPI

Due to the different methods of compilation, a number of the concerns highlighted in the Boskin Report do not apply to the RPI or are likely to be less important in this country. The most important difference in methodology between the US and the UK is that the RPI basket and weights are reviewed annually whereas the US CPI weights are reviewed every 10 years. During each year the RPI basket is of fixed composition, quantity and quality, but it is reviewed each January. This means that any substitution bias in the UK RPI is likely to be much less than in the US CPI.

In the US, new goods may not be introduced until the decennial re-weighting, causing substantial delays. There is thus much greater scope for new goods biases in the US CPI than in the RPI.

Bias and the use made of the RPI

The extent of bias in the RPI depends on what the RPI is intended to measure and the use to which it is being put; see Triplett (1983). The US CPI aims to be a cost of living index or COLI (see Appendix 3). Boskin's estimates refer to the difference between the CPI and a COLI. The RPI is not designed to be a COLI. It is intended to measure the change from month to month in the cost of a fixed basket of goods and services (Department of Employment, 1986). As explained in Appendix 3, a COLI will in general show smaller price rises than the RPI. Thus attempts to assess bias in the RPI in the framework of a COLI rather than an index of price change will yield a higher estimate of bias.

It is well recognised that no single inflation measure can meet all users' needs. The ONS therefore produces other inflation measures as well as the RPI. The RPI represents an average of consumer price inflation as it affects the majority of private households (Baxter, 1997b). Other price indicators prepared by the ONS, such as the Producer Prices Index and the GDP deflator, measure inflation as it affects various parts of, or the whole, economy. For some purposes these inflation measures may be more suitable than the RPI. Even in the context of consumers' expenditure, particular types of household, and indeed each individual person, may experience different rates of inflation. Other measures of consumers' inflation produced by the ONS include the Pensioner Prices Indices, the Tax and Prices Index (which allows for the effect of changes in direct taxes) and RPIY (which excludes the effect of indirect taxes). For specialist purposes, measures produced by other bodies, such as an index of commercial rents, may be appropriate. Also, the RPI is a combination of a large number of price indices for a wide variety of goods and services. For some purposes it is better to use just one component of the RPI, such as the price index for food.

RPIX (RPI excluding mortgage interest payments) is used to define the inflation target. This is because one tool to lower inflation is to raise interest rates, but doing so increases mortgage interest payments so in the short term increases the all items RPI.

The Rossi index, rather than the RPI, is used to uprate state income-related benefits. This index is the RPI excluding most of the housing items; it is used because recipients of these benefits are unlikely to be paying significant housing costs. (For uprating other state benefits, the RPI is used.)

For some purposes, it is arguable that any new goods bias should be ignored. For example, Diewert (1996) says "If a CPI were to be adjusted downward due to an adequate treatment of the new goods bias, the resulting index would probably not be appropriate for adjusting transfer payments to the poor. The problem is that an increasing selection of commodities may not be relevant to the poor who are forced to spend the bulk of their income on a few essentials." This argument applies to some extent to quality improvements as well. The poor are more likely to buy cheaper versions of an item. If these cheaper versions cease to be available

and they are forced to buy more expensive versions, they may regard this as a pure price increase even if the more expensive versions are of better quality or have more features.

Issues in the UK RPI

Research into the possibility of RPI bias has been in progress for several years at the ONS, the Bank of England and elsewhere. The issues raised by the Boskin Report which are relevant in the UK context are already being addressed in the context of a continuing ONS work programme, which is described below. The ONS will examine international best practices in reducing the scope for possible bias to see if any further improvements are possible. Results of this research will be published.

Commodity substitution

UK weights for 1997 reflect expenditure patterns from mid 1995 to mid 1996; the US weights refer to 1982-4. The Bureau of Labor Statistics in the US intend to use 1993-5 data for 1998, at which time data for mid 96 to mid 97 will be used in the UK. They have requested extra funds to allow the use of more up-to-date weights in future, but only aim to use weights that are on average two years old when first introduced compared with weights that are on average one year old in the UK.

If the UK RPI were to become a cost of living index, then in principle the RPI weights would need to be updated each month for changes in consumers' expenditure. This would be impracticable; given the time lags in data collection, expenditure weights can only be known some months afterwards so the bias associated with out of date weights cannot be wholly eliminated. However, it can be found retrospectively by calculating a superlative index (see Appendix 1) such as a Tornqvist index, which is free from this source of bias. A Tornqvist index was calculated for the UK for each year in the period 1990-1996. For recent years, when inflation has been low, the bias due to out of date section and item weights was about 0.06 to 0.07 percentage points per year. For 1990, when inflation was 9%, the bias was about 0.14 percentage points. Since a superlative index requires knowledge of the weights for the following year, it cannot be used for the regular, up-to-date monthly production of the RPI.

Outlet substitution

There are three reasons for believing that any outlet substitution bias in the UK is currently less than in the US:

- The locations in the UK where prices are collected are chosen to represent the whole country, whereas the US only covers large urban areas. The sample of locations and outlets used in the UK for price collection has been completely reviewed, and will in future be reviewed in a regular cycle, so that it is and will remain as representative of current shopping patterns as possible. In the UK, all major out of town shopping centres are included, whereas they are poorly covered in the US.

- For most items, separate price indices are calculated for independent and multiple shops; these are then combined using shop type weights and individual weights for major chains from which prices are collected centrally (Baxter, 1997b). These weights are reviewed each year and allow for shifts in shopping patterns between different shop types, so any defects in the outlet sample are less important than in the US.

- Discount warehouse clubs - a recent major development in the US - are of less significance in the UK.

Oulton (1995) notes that outlet bias is probably less important in the UK than the US since retailing patterns have changed less.

Any outlet bias will thus be due mainly to out of date shop type weights. To assess this, ONS will produce an experimental index on the same basis as the RPI but using revised shop type weights to see if it is significantly different from the RPI. Such an index requires knowledge of the shop type weights for the following year, so it cannot be used for the regular, up-to-date monthly production of the RPI. Also, average prices and index movements will be compared for locations where the outlets are mainly in the city centre and those where the outlets are mainly out of town. This will show whether any remaining imbalance in the sample between city centre and out of town shops could be a potential source of bias. As noted above, all large out of town shopping centres are included in the sample of locations.

Formula effects

The effect of moving to G (Appendix 2) is likely to be lower in the UK than in the US. This is because in the UK, but not the US, the RA formula is used for a substantial number of items. The price rise calculated from G is always less than that calculated from AR, but is not always less than that calculated from RA; as explained in Appendix 2, the difference may be in either direction. If the UK used only AR, it would increase the RPI slightly.

Research is under way to investigate the impact of using G rather than AR or RA on various product groups. Also, the effect on the RPI overall of using G will be evaluated by producing an experimental index on the same basis as the RPI but using G exclusively. G is used in the Harmonised Index of Consumer Prices (HICP) produced for the European Union.

Quality adjustment

The two largest causes of this bias identified in the Boskin Report will not have the same effect in the UK as in the US. The report identifies housing as the largest single cause of this bias. In the US, Boskin argues that newer houses tend to be larger than old ones, so that a part of house price or rent increases represents a quality improvement since occupants enjoy more space. Critics claim that new houses in the UK, by contrast, often have smaller rooms and gardens and are less substantial. Thus, the experience in the US may not be applicable to the UK. Medical care, which according to the report is the second largest cause of this bias, has a far lower weight in the RPI than in the US CPI as the majority of UK expenditure is financed via the NHS. Thus, even if this component is as biased in the UK as in the US it will have far less effect on the all items RPI.

The estimate of quality adjustment bias in consumer durables in the US CPI is based on the work of Gordon (1990). Oulton (1995) notes that Gordon's work "does not prove that UK indexes suffer from similar biases", that our methods "have no inherent bias, upwards or downwards" and that "in the US case, the failure was an administrative, not a methodological one".

Note also that quality bias may be negative in some areas. The evidence suggests that ladies' clothing has a negative quality adjustment bias in the UK RPI. It can be argued that the quality of some services, such as public transport, may have declined in recent years, so could also contribute to a negative bias.

However, there are some areas in the RPI where it is possible that quality adjustment would remove an upward bias. Personal computers are excluded from the RPI (and the US CPI), mainly due to problems with their quality adjustment. New cars are also excluded from the RPI (though they are in the US CPI). It is assumed that their price movements after quality adjustment are the same as for used cars, which are included. If this assumption is wrong, it could cause an upward or a downward bias. The US CPI also includes a quality adjusted clothing index, which the RPI does not, but this raises rather than lowers the CPI.

The issue of quality change and how to deal with it has been considered for many years (Department of Employment, 1986). Methods of producing quality adjusted price indices are being investigated for those sections thought to be most affected (clothing, new cars, computers, audio-visual goods). Any difference between these indices and those produced by existing methods will provide estimates of quality adjustment bias. Experimental quality adjusted price indices for new cars and computers have already been incorporated into the HICP. The possibility of including these indices into the RPI will be considered. Since the quality adjusted index for PCs is falling rapidly, including it in the RPI would reduce the RPI.

New goods

In the UK, the basket of goods is reviewed annually, so new goods can be brought in relatively quickly. In future, the chance of any new goods bias should decrease: the HICP should speed up the inclusion of new goods, since all member states will be notifying each other of new goods which they intend to include in the HICP. The ONS will consider this information, as well as its usual market information on new goods, when updating the RPI basket each year.

A guide to the possible effects of any new goods bias in the RPI for 1997 can be obtained by using data collected for goods included in the HICP but not the RPI, to see if including them in the RPI would have any significant effect.

Historical research will be conducted to see if it is possible to assess price movements in new items before they were included in the RPI, and if so whether including them earlier would have affected the RPI significantly.

Conclusion

The appropriateness of a price index depends on the uses to which it is being put, so there is not and cannot be a single best measure. The RPI is used for a wide variety of purposes in the UK, and no change in methodology could make it perfectly suitable for every application. In the light of the evidence in this paper, it would be unwarranted to presume that any bias in the UK RPI is as large as in the US CPI. The ONS continually seeks to make improvements in the methodology, and to that end has a continuing research programme. Its primary aim is to ensure that the best possible methods are used.

Appendix 1: Superlative indices

A superlative index (Diewert, 1976) is to a good approximation free from substitution bias at the level at which explicit weights are used, namely down to the elementary index level. This means that it is unaffected by substitution bias down to this level if a particular pattern of utility (Appendix 3) is assumed. The pattern is such that it approximates well to most patterns of utility found in practice, so substitution bias is almost eliminated. However, it does not remove bias at the lowest level; this is covered by formula bias (Appendix 2). The two commonest superlative indices are the Fisher Index

$$I_F = \sqrt{(I_0 \times I_1)}$$

where I_0 is the published index and I_1 is the index re-calculated using the same data but the following year's weights, and the Tornqvist Index

$$I_T = \prod_i \left(\frac{P_{i1}}{P_{i0}}\right)^{S_i}$$

where p_{i0} is the price index for section i in the base month, p_{i1} is the price index for section i in a later month and s_i is the average of this year's and the following year's weights for section i.

Appendix 2: Formula effects

An elementary index is an index for an item computed from data within a stratum of outlets (depending on the item, prices may be stratified by region, by multiple/independent or both.) The two methods currently used in the UK RPI to produce elementary indices are *average of relatives (AR)* and *ratio of averages (RA)*. The Boskin Report recommends use of the *geometric mean (G)*. If prices $p_{1,0}$ to $p_{n,0}$ are obtained in the base period (which, for the RPI, is January each year) and matching prices $p_{1,t}$ to $p_{n,t}$ are obtained for the same commodities in a subsequent month t, then we have:

$$AR: \quad I_t = \frac{1}{n}\sum_{i=1}^{n}\frac{P_{it}}{P_{i0}}$$

$$RA: \quad I_t = \frac{\sum_{j=1}^{n} P_{jt}/n}{\sum_{i=1}^{n} P_{i0}/n}$$

$$G: \quad I_t = \left(\prod_i \frac{P_{it}}{P_{i0}}\right)^{1/n} = \frac{\left(\prod_i P_{i1}\right)^{1/n}}{\left(\prod_i P_{i0}\right)^{1/n}}$$

RA is less affected than AR if there is a $p_{i,0}$ that is abnormally low, for example due to January sales, while the corresponding $p_{i,t}$ is not low. However, RA has the disadvantage that if one matched pair of prices (i.e. prices for exactly the same product available in both the base and the current month) relates to an object of much higher price than the other pairs, this pair dominates the calculation. AR is thus used when the prices within an elementary index are likely to vary a lot, such as for furniture. In the US, RA is not used.

AR shows a greater price rise (or smaller fall) than RA if the price relatives $p_{i,t}/p_{i,0}$ are negatively correlated with the base prices, which is often the case in practice. However, if the price relatives are positively correlated with the base prices, AR shows a smaller price rise or larger fall than RA.

Another way to describe the difference between AR and RA is to consider the expression

$$I_t = \sum_{i=1}^{n} W_i \frac{P_{it}}{P_{i0}}$$

Ideally, the w_i should reflect actual expenditure, but there are no data currently available to estimate the weights on this basis at this very low level of aggregation, so some assumption must be made. If it is assumed that all the w_i are equal, this formula becomes AR. Thus AR is appropriate if each price quote within the aggregate is considered to be as important as any other. However, if the weights are assumed to be proportional to the base price $p_{i,0}$ this formula becomes RA. Thus RA is appropriate if expenditure is proportional to price.

G is always lower than AR (unless the price relatives are all equal, when G = AR). If most price relatives are roughly equal but there are a few outliers, G is not raised so much as AR by large price relatives, but is lowered more by small ones. For example, suppose n = 10 and nine of the price relatives equal 1. If the other price relative is 2, AR is 1.1 and G is 1.072. However, if the other price relative is 0.1, AR is 0.91 and G is 0.794.

G may be higher or lower than RA. If the coefficient of variation of the prices (standard deviation divided by mean) is higher in month t than in the base month 0, then RA > G and vice versa.

Appendix 3: A Cost of Living Index (COLI)

In economic theory, a COLI is the answer to the question "What is the *minimum* cost, at this month's prices, of achieving the level of utility actually attained in the base period?" The level of utility is the total value, on some arbitrary scale, placed by the consumer on all of his or her purchases and everything else that contributes to the consumer's quality of life.

To compute such an index in practice is extremely difficult. One problem is how to assess the impact of factors other than purchases. However, if everything other than purchases is ignored, it is possible to produce a COLI given one assumption. This is the assumption of *market equilibrium*. If two similar products, or two shops selling the same product, are not changing their relative market shares rapidly, then it is assumed that differences in price approximately reflect differences in quality of product or outlet so substitution between them does not appreciably change a COLI. With this assumption, an index of pure price change becomes a COLI if the weights are continuously updated (Pollak, 1989). Thus the RPI is not a COLI because the weights are already out of date in the base month and become more out of date as the year progresses.

In practice, it is impossible to use completely up-to-date weights. However, retrospectively a good approximation to a COLI can be obtained by frequent reviews of weights, items and outlets and the use of a superlative index (Appendix 1).

The RPI was not designed to be a COLI. This point has been considered by the RPI Advisory Committee and they have in the past rejected the idea of attempting to produce a COLI. Due to the stress on *minimum*, a COLI calculated ignoring everything other than what consumers actually buy will give a lower rate of inflation than the RPI. (If other factors, such as a worsening environment, are allowed for, this may not be the case.) Thus attempts to assess bias in the RPI in the framework of a COLI rather than an index of price change will yield a higher estimate of bias.

These issues are discussed further in Gillingham (1974), Pollak (1989) and Baxter (1997a).

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A HOUSEHOLD SATELLITE ACCOUNT FOR THE UK

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INTRODUCTION -

From September 1998 the UK will produce national accounts in accord with the UN System of National Accounts 1993. The SNA 93, in common with previous systems does not include unpaid production of services in the household within the accounts. It does, however recommend the use of satellite accounts to deal with production which falls outside the conventional accounts. Not all production within the household is excluded from traditional accounts. Production of goods - such as agricultural products or housing repair, paid services such as nannies, and the services of owner occupied housing are included in theory, although practical problems make them difficult to measure. The vast bulk of production in households is the production of household services. This is excluded, along with unpaid work for voluntary organisations and barter exchange of services between households. The purpose of this article is to begin the process of compiling accounts of household production of services which would complement the traditional economic accounts

HOUSEHOLD PRODUCTION IN THE SYSTEM OF NATIONAL ACCOUNTS 1993

The SNA 93 manual [9] justifies the omission of household production from the core accounts in the following terms

"In most countries a considerable amount of labour is devoted to the production of these domestic and personal services while their consumption makes an important contribution to economic welfare. However, national accounts serve a variety of analytical and policy purposes and are not compiled simply to produce indicators of welfare. The reasons for not imputing values for unpaid domestic or personal services produced and consumed within households may be summarised as follows.

(a) The own-account production of services within households is a self-contained activity with limited repercussions on the rest of the economy. The decision to produce a household service entails a simultaneous decision to consume that service. This is not true for goods. For example, if a household engages in the production of agricultural goods, it does not follow that it intends to consume them all. Once the crop has been harvested, the producer has a choice about how much to consume, how much to store for future consumption or production, and how much to offer for sale or barter on the market. Indeed, although it is customary to refer to the own-account production of goods, it is not possible to determine at the time the production takes place, how much of it will eventually be consumed. For example, if an agricultural crop turns out to be better than expected, the household may dispose of some of it on the market even though it may have been originally intended all for own consumption. This kind of possibility is non-existent for services;

(b) As the vast majority of household domestic and personal services are not produced for the market, there are typically no suitable market prices that can be used to value such services. It is therefore extremely difficult to estimate values not only for the outputs of the services but also for the associated incomes and expenditures which can be meaningfully added to the values of the monetary transactions on which most of the entries in the accounts are based;

(c) Imputed values have a different economic significance from monetary values. The imputed incomes generated by the imputed production would be difficult to tax in practice. They would have to be shown as being all spent on the same services. However, if the incomes were to be available in cash, the resulting expenditures might be quite different. For example, if a household member were offered the choice between producing services for own consumption and producing the same services for another household in return for remuneration in cash, the paid employment would probably be preferred because of the greater range of consumption possibilities it affords. Thus, imputing values for the own-account production of services would not only be very difficult, but would yield values which would not be equivalent to monetary values for analytic or policy purposes."

This is a valuable distillation and summary of the arguments often deployed against measuring and valuing unpaid work. Many of these objections stand as practical objections to including unpaid housework within the core accounts. They do not argue, and were not offered as arguments, against satellite accounts. The SNA itself recommends the use of satellite accounts both for addressing problems of unpaid work , as well other areas beyond the production boundary such as the environment. Its arguments should only be seen in the context of the core accounts.

In making this case, however, it goes too far. It is wrong in suggesting that including household production is only needed to ensure welfare measurement. It is needed also for assessing the productive resources of the economy and their uses. Household production interacts in a wide variety of ways with activity in the market economy. The argument about simultaneous decisions to produce and consume apply equally to many commercially produced services. Indeed, while you cannot store a haircut, you can put away an ironed shirt. Arguments (b) and (c) suffice.

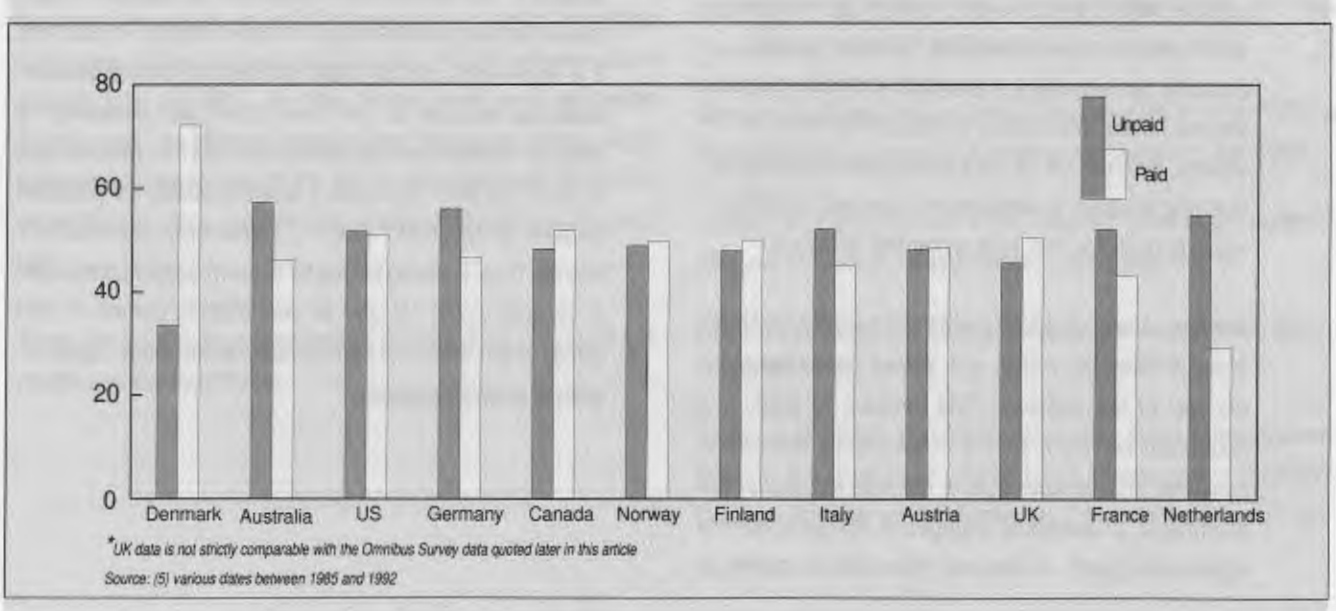
WHAT IS HOUSEHOLD PRODUCTION?

The measurement of production in the national accounts is widely recognised to be deficient in failing to measure production of household services. Many other countries have constructed separate accounts for household production; see, for example Ironmonger.[5] The aim of this article is to start the process of remedying this deficiency in the UK. Without the production which takes place in households, it is quite clear that much of the production measured in the core national accounts would be pointless or meaningless. There is little point in buying rice or salt except as an input to cooking, or buying washing powder unless it is to be used for washing. Much of what is presented in the national accounts as final consumption is in fact intermediate consumption by the household production industries.

Does this matter? The answer to this is clearly yes. If household production were a constant fraction of all the relevant magnitudes in the national accounts, then the case would be weaker. Even then, the exclusion of housework from the national accounts production boundary reduces its salience as a measure of economic activity. In practice, that argument is reinforced by the strong likelihood that the relationship between unpaid housework and paid labour in production is far from proportional. It is clear from time use studies, and from surveys of such activities as caring, that household productive activities and production in the formal economy are as often substitutes as complements. In different countries and, even more importantly in the same country at different times, activities have been undertaken either in the formal economy or in the household. Expectations of what can and should be undertaken by unpaid labour in the home varies. The measurement only of paid work can give a misleading impression of the scale of resources in use or the benefit derived from their use. Different household activities have both substitutes and complements within the formal economy. There has been rapid technical development in housework of a kind not very different from that in more traditional industries. This may itself have been a factor in the rapid expansion in the labour force in many countries, and may also have stimulated innovation in a circular process of causation. That expansion may represent a shift of employment from housework to formal

Chart 1

Comparisons of time spent on paid and unpaid work



*UK data is not strictly comparable with the Omnibus Survey data quoted later in this article

Source: (5) various dates between 1985 and 1992

employment. At the same time there are areas of housework which can be, and sometimes are, performed within the formal economy. Finally there are very different patterns of paid and unpaid work in the economies in different countries - as is illustrated in chart 1. All these observations strongly suggest that formal production measures are at best a poor proxy for total production. In this respect, the SNA 93 is in error in ascribing the desire to measure household production solely or mainly to the wish to measure welfare. The production and productive capacity aspect of national accounts is equally important.

Constructing household satellite accounts should be undertaken both for policy and analytical purposes. The main analytical purpose is that measuring only paid activity obscures some very important trends. If domestic work becomes more or less of a paid commodity then trends in both the scale of resource use and the value of output will be obscured. This applies both to the balance between the informal and the commercial sectors and the balance between the public and private commercial and informal sectors.
This may have significant policy implications in a number of areas. Household satellites will also enable a more effective analysis of policy issues wherever significant amounts of unpaid time are subscribed, or where policy changes might affect the balance between the formal and the informal economy.

WHY USE A SATELLITE ACCOUNT?

We have argued that excluding household production from measured output can mislead if formal output changes, not because the total output of society changes, but because the output shifts from the formal to the informal sector or vice versa. We have also argued that including it within the production boundary would require too rigid assumptions about the monetary value of household work.
The SNA 93 proposes the use of satellite accounts in a range of uses. In the ONS we distinguish between internal and external satellite accounts. Internal accounts are used to reorganise production and transaction which take place within the presently compiled accounts - within what is known as the production boundary. A common example is the construction of tourism accounts which collects a range of transactions together under the heading of tourism. External satellite accounts include at least some activity outside the production boundary. Hitherto the most important external satellite account produced by the ONS is for the environment. While internal satellites have to be accounted in monetary terms, external satellites provide the freedom to use non-monetary units. The use of an external satellite thus addresses two issues, the ability to account non-market transactions and the freedom not to attribute a particular monetary value to them.

The value of satellite accounts is thus to enable users to modify and colour the picture provided by formal production figures with reference to the production illustrated in the household accounts. Thus if it is found that household production levels tend to offset each other in comparisons over time or between countries, this would suggest that the formal GDP comparisons overstate differences and vice versa. For some purposes, possibly for the monitoring of resources available, a simple comparison of time spent in formal and informal activities may be adequate. In other contexts, monetary values, within the context of a satellite account may be useful. If monetary values are to be used, for example to assess the welfare arising from production, then they should reflect the concerns and objectives of the analyst.

The danger from excluding household production from the core accounts is that it receives less attention than complying with the new rules for compiling accounts of activity within the production boundary. As Duncan Ironmonger argues [53], the term satellite is an unfortunate analogy. By almost any measure the household industry is probably larger than that of any of the main single digit heading industries within the production boundary. The accounts could be seen more as twin planets rather than earth and moon. Nonetheless, difficulties in valuation outweigh these concerns, and justify the use of a satellite.

By setting household production within an external satellite account, we endorse the view that housework should be measured, but should not be assigned a single all-purpose value in monetary terms. It is possible to make comparisons based on time spent in formal and informal economic activity; and that is the main basis for our comparative statements. For those who wish to monetise housework a range of options for doing so are offered at the end of this article.

A further advantage of external satellite accounts is that they allow the recording of household production, even though these do enter into market transactions. Although we can impute a price to housework, there is no actual transaction. An economy in which houseworkers were paid a wage would be so radically different from the present as to invalidate almost all the measures we currently make. Incorporating it into the core accounts would therefore be painting a picture of a different society from ours, and would thus prove a poor monitoring tool. By providing measures of housework in the satellite accounts, we leave it open to the analyst and policy maker to choose a weighting which reflects the different needs and assumptions of their analysis. If, for example, the aim was to measure the productive resources of the economy, then a time based

measurement might prove useful. If on the other hand there were a desire to construct some kind of welfare measure, then some kind of value weighting would need to be given both to the output of household production, to the burdensomeness of the labour involved and the beneficiaries of the product.

ISSUES CONCERNING THE HOUSEHOLD SECTOR

Once we have recognised that the household sector represents a large part of economic activity, then some of the issues which are normally addressed only within the production sector have also to be addressed in this context.

In the next few paragraphs we analyse how, in the absence of monetary valuation we might address the issues of distribution, intermediate and final consumption and economies of scale in the household sector. It also looks at some of the particular problems of constructing the accounts.

Distributional analyses underline the difficulties of valuation. Attributing the same value to housework in all households irrespective of the earning potential of their members and level of household capital equipment, runs the risk of misleading. On the other hand attributing different values to different households risks either making highly speculative assumptions, or adding nothing to the analysis derived only from the formal economy. There is some comfort in the recent results of Jenkins and O'Leary [6] that the conclusions on distribution between households are relatively little affected by the assumptions made on the value of unpaid labour.

While we have warned of the difficulties of distributional analysis, there is still important scope for extending our understanding of income distribution by including informal production. A household satellite may also be a useful tool in analysing the distribution of income and resources within households. By identifying output and consumption separately, it provides the conceptual basis of identifying who produces the services and who consumes. This offers a possible route out for the otherwise apparently intractable problem of dependents such as children in the income distribution. Very few of them have any income, yet clearly they consume. By looking separately at the provision of work and the consumption of its fruits we shall be able - in principle - to place everyone. There remain, however, conceptual and measurement problems which will mean that practise will remain very difficult.

It is clear that what is normally treated as final consumption by households is partly just that, but also that much of it is intermediate consumption leading to a final product in the household. The reverse process is not so obvious but equally important. Driving to work is production in the household which is part of intermediate unpaid production supplied to the formal sector. The structure of household production, like much of the formal economy, involves multiple inputs and outputs. Much of the activity taking place within households while generally productive may not be attributed to any particular output. This can be seen not only as the well known problem of multiple activity such as cooking and child minding at the same time; it also applies to the overhead activities of a generally managerial and enabling character.

A complete output account would require not only time use, but a rental or capital consumption return to fixed capital. This could be based on capital stock estimates currently available for the household sector from the conventional national accounts. Many household assets, such as consumer durables are not measured as assets in the present system of accounts and would need to be added.

Finally there is a problem of economies of scale of production in households. For some time, analysts have used the concept of equivalisation. This is a statistical device which adjusts the income or expenditure of households for size and structure. They reflect the view that two can live almost as cheaply as one and that children may absorb more or less resources than adults. In a recent article Ringen [8] performed the calculation of relating equivalised to non-equivalised average income. The difference between the two reflects the extent to which living in family units makes more effective use of resources - both resources of unpaid work and of bought in goods and services. To some extent the ratio of equivalised to non-equivalised income is a measure of economies of scale in household production. These problems could be addressed if we could use an output rather than an input approach, and in the long run we should aim to have both, and some kind of production analysis relating the two. We illustrate below how we might start with catering.

The proposal for a household satellite account provides scope for two approaches - an input approach, and an output approach. The former would be based on time use data, and is likely to form the core of the published accounts. The alternative tried by Andrew Harvey approach requires the use of direct indicators of outputs, and is inevitably more eclectic. Some of these can also be based on time use - as for example the time use of children which illustrates the demand for childcare.

OUTPUT ACCOUNT

Table 1 illustrates a crude attempt to exemplify this approach to the

catering industry. What we display is a production account for different branches. Clearly not all the data has been filled in. The first column shows production in the unpaid domestic catering industry. The second column shows consumption by households of meals produced in the commercial sector. The problem here is that the catering industry also includes pubs and hotels. More detailed information suggests that about 50% of value added in this industry goes into creating meals. The third and fourth columns show meals consumed which are not treated as personal consumption.

Table 1 PARTIAL PRODUCTION ACCOUNT FOR CATERING
UK 1993

	Household	Commercial	Institutional	
			Education	Other
INPUTS				
1. Food materials purchased (£m)	70981	3831	584	1453
2. Other material purchased (£m)		4992		
3. Food preparation (hours billion pa)	17. 3	1.6		
4. Shopping etc (hours billion pa)	4.2			
5. income from employment (£m)		[9400]		
6. capital consumption				
7. value added (£m)		14979		
8. tax/subsidy (£m)		1339		
9. OUTPUT (£m)		25141		
10. No of meals billions pa	56	8.3	0.4	1.0

The cash expenditure figures shown in rows 1, 2, 7, 8 and 9 are drawn form UK input output tables. The figure in row 5, for income from employment is derived from I/O tables and the National Accounts Blue Book. The meals numbers in row 10 are based on the National Food Survey. Hours of unpaid work and paid work in rows 3 and 4 are assumed to be unchanged between 1993 and 1995 and estimated from the Omnibus Survey and from the Annual Census of Employment. (See Annex). One third of shopping time is attributed to the catering industry.

It is possible to impute a value to the output of the unpaid catering industry by assuming the same value for a meal as in the commercial catering industry. More detailed unpublished evidence suggests that the 8.3 billion meals represent turnover of £25 billion or about £3 each gross of VAT. Food input into commercial meals was £3831m or about 46p per meal. With domestically produced meals, even if we assume that 20% of food purchased does not go into meals, the food content appears to be about twice as great. This will reflect in part the greater market purchasing power of the catering industry, partly the VAT paid by households on some food items, and partly the fact that households are likely to buy more processed foods than the catering industry. If we assume the same value of home produced meals as commercial meals, then the gross output of the domestic catering industry is

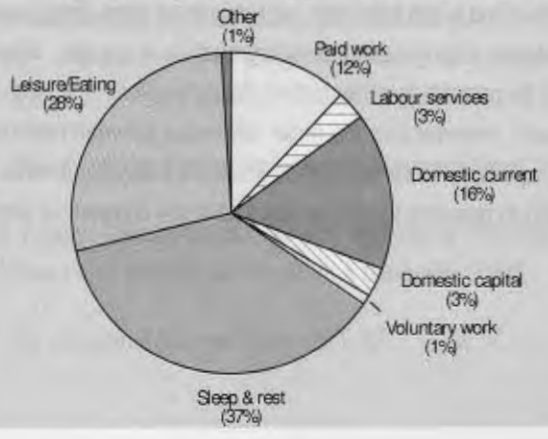
£3 x 56 billion

Adjusting for VAT we arrive at a figure of about £140 billion. If we further assume the same ratio of about 20% for the ratio of other materials - such as fuel - to gross output, then a net output of about £60 billion can be obtained by subtracting that and the food material purchased. If unpaid work in this industry were paid the same hourly rate as in the commercial catering sector the income form employment would also be about £60 billion. This is around 40% to 50% of the of total value added for all activities in the household sector measured on an input basis.

INPUT ACCOUNTS, BASED ON TIME

In this article we offer the core accounts in purely time terms. Chart 2 indicates that about 15% of the time of adults in Britain is spent on paid work and travel; 20% on unpaid work and the remainder on leisure and consumption, sleep and other personal needs. Table 2 gives this information in more detail, and illustrates gender differences; information comes from the results from the OPCS Omnibus survey of time use of all people over the age of sixteen conducted in May 1995. The Table in the Annex shows the assumption made to allocate time use to the categories shown in table 2 and these are explained a little more in the remainder of the Annex. The category labour services is applied to travel which is

Chart 2
Time use by adults in Great Britain,1995



assumed to be predominantly travel to work and is therefore an unpaid service supplied unpaid by the domestic sector to the production sectors. In future versions of these accounts, it may be possible to use the National Travel Survey to refine this assumption.

TABLE 2 TIME USE - TIME SPENT IN DIFFERENT ACTIVITIES (%)

	All	Male	Female
Paid work	12	15	9
Labour services	3	3	3
Unpaid work			
domestic- current	16	11	20
domestic-capital	3	4	2
Voluntary/other	1	1	1
Consumption/Leisure			
sleep and rest	37	37	37
leisure/meals	28	28	27
Other	1	1	1

Source: Omnibus Survey GB 1995

We feel that it would be useful to offer some illustration of the effect of making a range of assumptions about the shadow price of housework. By looking at possible extreme assumptions we show that housework is a significant element of the economy in value terms. Table 3 shows the assessed value in 1995 of unpaid labour valued under different assumptions. In each case paid labour is equated with total income from employment as identified in the National Accounts. In accounting terms we therefore assume that there is neither gross operating surplus nor depreciation in the unpaid sector.

The first line of table 3 shows the effect of taking the value of unpaid work as equal to the value of paid work. The ratio thus reflects simply the ratio f time spent in paid and unpaid work. The second line takes the ratio of paid work to unpaid work separately for men and women and applies the gender specific average pay rates to each. The third and fourth lines both apply pay rates more disaggregated by industry and maintain the disaggregation by gender. Clearly it would be possible to apply further disaggregation. It is clear from the table, however that the major difference between methods of applying wages arises from the fact that the industries in which the household operates tend to be low paid in the commercial sector.

TABLE 3 ALTERNATIVE ESTIMATES OF THE VALUE OF UNPAID WORK IN THE HOUSEHOLD 1995 UK

Base	Income from Employment		Wages and salaries		Net pay	
	£b	%of GDP	£b	%of GDP	£b	%of GDP
Unpaid work valued as paid	739	122	646	106	513	84
unpaid work valued as paid by gender	682	112	596	98	473	78
unpaid work valued pay rate for domestic work	421	69	368	60	292	48
Unpaid work valued at pay rate for industry	341	56	298	49	237	39

Table 3 shows the results of applying a range of assumptions not only for the rate of translation of unpaid work to money. It also shows a range of assumptions for the component of national income to which the ratio should be applied. The assumption made in the first column is that the ratio is applied to income from employment. This, therefore, ignores the role of factors of production other than labour in household production. In practice both land and capital in the form of housing and consumer durables contribute to domestic production. Ideally a separate calculation for the contribution of these could be made, but is not included in the current exercise. Such a calculation would need to remove the elements attributed to these in national accounts at present which include imputed rent on dwellings, and treat consumer durables as final consumption. Without adjustment there would be double counting.

Another issue is tax. Taking the whole of income from employment for comparison, values household unpaid labour in the same way as employers value the labour they pay for in the conventional production sector. The alternative would be to value the time net of all taxes, focusing only on the money actually received by the worker. This excludes both taxes and other expenditure by the employer and taxes compulsory contribution by the employee. This values the time spent rather than the production drawn from it. Some authors, like Himmelweit [4], go further and argue that the value is

even less, in that working under your own control is less onerous than working for others and therefore would require less compensation. The same argument is implied in the use of a value of leisure time in transport appraisal which values it at a fraction of net average pay.

The assumptions made for the various calculations are for the most part straightforward. For the valuation which assumes all time is of equal value, the value of household work is calculated by taking the ratio of time spent in paid and unpaid work and applying that ratio to income from employment or relevant national accounts magnitude. Where there is disaggregation by gender, the unpaid working time is reweighted using the weekly pay rates taken from the New Earnings Survey 1995. Valuation based on industries is slightly more complicated and uses the more detailed disaggregation shown in the Annex. Child care is valued at the average rate for paid child care, cooking valued at catering rates, repair work at construction rates etc. All rates are taken from the New Earnings Survey 1995 Occupation tables.[7]

It is reassuring to note that the calculations are within the range of international experience. Goldschmidt-Clermont and Pagnossin-Aligisakis [3] show a range on the basis of pay for equivalent industries, and income from employment of between 38% and 72%. Our equivalent figure of 56% is very close to the 54% for Germany.

It needs to be emphasised again that all these calculations are no more than illustrative. There is, by definition, no market in unpaid labour. All these calculations do not even show what could happen if these were. If a market existed all kinds of other changes would also follow. What these calculations do is use money values to make more vivid an illustration of different assumptions about the relative productivity of paid and unpaid labour. Different valuations and different bases will be appropriate for different purposes.
The larger figures will tend to be appropriate when the scale of total production and pressure on resources is to be calculated. The smaller figures may be thought of as representing the cost of effort of housework. The increase in welfare arising from household work would be different from either.

CONCLUSION

There can be no doubt that much value added takes place outside the formal economy. This article begins the process of trying to assess its scale. It suggests a wide range of estimates from around 40% to around 120% of GDP.

This article is no more than an illustration of the kind of analysis which can be done with time- use data. It is intended that future analysis will focus at looking at the evolution of this kind of output over time and look in more detail at the outputs which this production achieves, as well as addressing the wider issues associated with measuring the quality of time spent on different activities and refining analytical concepts further. These and other improvements depend on more robust measures of time use than are currently available in the UK. ONS proposes to host a seminar to discuss possible future developments in this field; expression of interest in attending this are invited.

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ANNEX Time use data for satellite accounts

Time use activities - minutes per day: ONS Omnibus Survey 1995
GB adults aged 16+

	All	Male	Female
Paid work			
Paid work	**168**	**212**	**127**
Labour services			
Travel	**46**	**50**	**43**
Unpaid work			
Food preparation	49	28	68
Care of Family/household	71	55	86
Clothing Care	14	3	25
Shopping etc.	36	26	46
Care of home	56	43	70
Total Domestic Current	**226**	**155**	**295**
Self improvement	27	33	21
Home improvement	14	22	6
Total domestic capital	**41**	**55**	**27**
Work for others unpaid			
Voluntary work outside household	**13**	**11**	**15**
Consumption/Leisure			
Sleep and rest	536	533	539
Leisure/Eating			
Leisure	226	226	226
Eating	141	146	135
Exercise and sports	29	38	20
Total Leisure/eating	396	410	381
Total Consumption / Leisure	**932**	**943**	**920**
Other			
other	7	7	6
missing	7	7	7
ALL TOTAL	**1440**	**1440**	**1440**

Time Use Activity Categories

As shown in the table, activities have been split as far as possible into the following categories

- current production for own use (household sector)
- capital production for own use (household sector)
- paid work outside the household
- unpaid work outside the household
- consumption/leisure
- other.

The categories of activities available from the 1995 Omnibus survey do not completely match to the satellite account analysis categories, largely because of the need for a simple precoded diary instrument.

Particular points worth noting on the allocation to categories used in this analysis are:

- Care of people (washing, dressing, care of others) has been included in current production for own use as has care of home (cleaning house, gardening)

- Travel is put in a separate category (labour services) ; we don't know how much of it was for leisure for work or to work.

Self improvement is education and study at home. It is possible that an element of some other categories (e.g. reading, work based training) could be self improvement, but as education was a choice it seems reasonable to assume that it is a fairly good approximation to the notion of investment in self.

Home improvement is likely to involve an element of current maintenance as well as investment, and arguably conversely for gardening which has been placed in the current production sector.

The voluntary work category includes religious and political meetings on the basis that these are unpaid activities outside the home. However the Omnibus did not include a category for caring for others outside the home separate from charities. This is one of the areas in which a more sophisticated methodology might provide better measures of informal voluntary work.

Helping extended family or neighbours may often be combined with other activities, or not described as such in the survey;

Eating here includes eating at home, eating out, work breaks and socialising. Arguably the latter two could be excluded or only partly included, the remainder going to leisure or other activities.

In preparing the estimates for this article no attempt has been made to exploit the further disaggregations available of time use by gender, age, day of the week etc. which might contribute to a more refined assignment of time use to different categories of activity. While the sample size of the Omnibus Survey provides reasonably robust estimates of axerage time spent on different activities, many of the apparent differences in patterns of time spent, by different groups are not statistically significant. More sophisticated research with a larger sample is necessary to provide information which can be classified to fit National Accounts concepts more closely and allow distributional analysis while still making sense to respondents.

Time use data for satellite accounts: Omnibus survey time use data:background notes

A time use module was included in the May 1995 Omnibus Survey, carried out by Social Survey Division of OPCS (now ONS), covering some 2000 adults in Great Britain.

Respondents were asked to complete a precoded diary, for the previous day with 30 activities in 15 minute blocks.

The aim was to test whether such a light survey instrument was feasible and provide some broad indicators of the amount of time spent on different activities. The diary instrument was designed by J Gershuny and R Smith, of Essex University commissioned by Social and Regional Division of CSO (now ONS).

The instrument worked well and produced results broadly in line with earlier surveys using different instruments. It is a cheap, quick method of data collection such a method could be used in future eg to estimate trends.

However, the data has limitations and the results are influenced by the method of data collection. Particular points to note are:

- small sample size (not possible to estimate reliably for small groups eg the unemployed or those with pre-school children, especially cross-classified with another variable eg gender)
- the sample of individuals, so data be analysed for families/ households together
- precoded categories not flexible for different kinds of analysis. Not based on recent detailed study of perceptions of activities, nor entirely consistent with categories needed for some important uses eg National Accounts.
- only one activity was recorded for any time interval; so estimates of total time spent on some activities are often carried out simultaneously others will be underestimations (eg TV/radio watching)
- No contextual information for activities (location, whether paid, who with) was sought unless included in the activity description eg in own Standard classificatory information on respondents is, however, available.

Further background information is available in Church, Koudra and Murgatroyd [1]and Gershuny and Smith [2].