

Economic & Labour Market Review

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page 65.

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In brief

Local area labour markets

The latest local area labour market data show that the area with the highest employment rate was South Northamptonshire (90.1 per cent) while the lowest rate was in Tower Hamlets (52.9 per cent). There is a considerable variation within each region. For example, in the region with the highest average, the South East, employment varies between 88.7 per cent in West Oxfordshire and 68.3 per cent in Thanet.

The area with the highest unemployment rate in October 1995 to September 2006 was Tower Hamlets (13.7 per cent), while the lowest rate was in Eden, Cumbria (1.8 per cent). Again, there were considerable variations within regions. In the region with the lowest average rate, the South West, unemployment varied between Purbeck (2.3 per cent) and Plymouth (6.5 per cent). London had the highest average rate (7.9 per cent), but individual boroughs varied between Tower Hamlets (13.7 per cent) and Richmond upon Thames (4.8 per cent).

The latest estimates of jobs density (2005) show there were 0.84 jobs per working-age resident in the UK. London had the highest jobs density at 0.93 compared with 0.74 in the lowest region, the North East. The local area with the highest jobs density was the City of London, with almost 50 jobs per working-age resident, while the lowest was in Chester-le-Street, North East, and Carrickfergus, Northern Ireland, both with 0.39 jobs per resident.

People who work in the City of London had the highest earnings, with median full-time gross pay of £883 a week as at April 2006. The lowest pay was for people who work in Torridge, South West, at £306 a week.

The report, 'Local area labour markets: Statistical indicators April 2007', was published on the National Statistics website on 30 April 2007. It also contains sections looking at economic inactivity, ethnicity and the labour market, claimants of Jobseeker's Allowance (the claimant count), and earnings by place of residence. It brings together data from a number of different sources – the Annual Population Survey, Annual Business Inquiry, Annual Survey of Hours and Earnings, and administrative data on benefits from the Department for Work and Pensions – to give an overall

picture of the labour market looking at both labour supply and demand in each area.

Also available are spreadsheets giving data for key indicators such as employment, unemployment, economic inactivity, claimant count and jobs for both local authorities and parliamentary constituencies.

More information

www.statistics.gov.uk/StatBase/Product.asp?vlnk=14160

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Pension statistics in the Annual Survey of Hours and Earnings

One of the recommendations of the Review of ONS Pension Contributions Statistics (2002) was to use the New Earnings Survey (NES) to collect pension contributions data.

At around the same time, the Review of Statistics on the Distribution of Earnings (2002) made several recommendations for improving NES that resulted in the new Annual Survey of Hours and Earnings (ASHE) being introduced in 2004.

A new questionnaire was introduced in 2005 for ASHE, which gave the opportunity to improve existing questions as well as to add new questions on pension contributions. The questionnaire allowed improved information to be collected regarding the type of pension provision that employees had in place with their employer, as well as the level of contribution being made by the employer and employee into this pension scheme.

As is normal practice with ONS surveys, individual responses are validated against a set of criteria to identify large errors that may impact on results. In addition, the aggregate results from the survey have been compared with other data sources such as the Occupational Pension Scheme Survey and HM Revenue and Customs data.

The questionnaire collects data on amounts contributed to pensions but it was decided to publish information on contribution rates. Employee and employer contribution rates are derived by dividing

pensionable pay by employee and employer contribution amounts, respectively.

The tables published give breakdowns of employees by pension type and contribution rate bands for employee and employer contributions. Within these breakdowns, separate tables further break down the data by age group and earnings, industry and earnings, occupation and earnings, and size of employer and earnings.

The first set of 2005 results were published in summer 2006. These results were then revised alongside the release of the 2006 results in April 2007. Part of the revision to the 2005 results included improvements to the individual responses based on information from the 2006 returns.

The ASHE pensions tables, along with other ASHE analyses, are available from the National Statistics website, details of which are given below.

More information

www.statistics.gov.uk/StatBase/Product.asp?vlnk=13101

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Intangible investment and UK productivity

Work by researchers at Queen Mary, University of London, supported by HM Treasury and ONS, to test implications for economic measurement of a wide range of intangible investment by firms, was published in December 2006.¹ This work, drawing in part on ONS research, covered business investment in software, research and development, non-technical innovation, branding, training and organisational change, and suggested that these elements of intangible capital could roughly double UK business investment in 2004. Estimates for the US, for an earlier period, are of similar magnitude.

The analysis has now been extended to estimate a time series of UK intangible investment over the period since 1990, on similar assumptions to work in the US. This has been used to carry out growth accounting analysis for the UK market sector. In a new working paper 'What Happened to the Knowledge

Economy? ICT, Intangible Investment and Britain's Productivity Record Revisited',² the researchers show that intangible investment has risen sharply during the 1980s and 1990s, especially in the areas of computerised information, non-scientific research and development, workplace training and business process reorganisation.

The result of capitalising these activities in National Accounts would be to raise reported output, income and expenditure, increasing GDP and labour productivity, with all the returns from this additional output going to capital. This treatment of the UK economy shows a different profile of productivity growth over the period, and could help to explain the UK productivity slowdown in the late 1990s as measured by the internationally agreed System of National Accounts.

This new work does not supersede official economic measures, but it does help to explain how a change in the nature of output and investment affects measurement. The assumptions on which some of the work is based are still speculative, and further study and consultation, and new data, will be required to draw firm conclusions.

- 1 Giorgio Marrano M and Haskel J (2006), 'How much does the UK invest in intangible assets?', Queen Mary, University of London, Department of Economics, working paper 578
- 2 Giorgio Marrano M, Haskel J and Wallis G (2007) 'What Happened to the Knowledge Economy? ICT, Intangible Investment and Britain's Productivity Record Revisited', Queen Mary, University of London, Department of Economics, working paper forthcoming.

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Effects of taxes and benefits on household income

ONS published its annual analysis of the effects of taxes and benefits on household income on 17 May. It showed that there has been a rise in inequality of disposable household income. This has been driven by a rise in inequality of earnings, rather than the effects of taxes and benefits which were similar to the previous year. Income inequality had previously fallen between 2001/02 and 2004/05.

In 2005/06, original income (before taxes and benefits) of the top fifth of households in the UK was sixteen times greater than that for the bottom fifth (£68,700 per household per year compared with £4,200). After redistribution through taxes and benefits, the ratio between the top and bottom fifths is reduced to four-to-one (average final income of £49,300 compared with £13,500). These ratios are unchanged from last year.

Cash benefits such as income support, pension credit, child benefit, incapacity benefit, and the state retirement pension play the largest part in reducing income inequality. They go predominantly to households with lower incomes. Cash benefits make up 61 per cent of gross income for the poorest fifth of households, 39 per cent for the next group, falling to 2 per cent for the top fifth of households.

Final incomes include an adjustment for the receipt of benefits in kind from the state, such as health and education services. Households with lower incomes tend to receive more benefits in kind from the state (£6,700 for the bottom fifth compared with £3,900 for the top fifth). Retired households and households with children, which are more likely to be in lower income groups, are the biggest users of state health and education services.

The *Effects of Taxes and Benefits on Household Income* includes detailed estimates of the benefits received and taxes paid (direct and indirect) for each fifth or tenth of the household population ranked by equivalised disposable income. It shows where different types of households and individuals are in the income distribution and looks at the changing levels of income inequality over time.

More information

www.statistics.gov.uk/downloads/theme_social/Taxes_Benefits_2005-2006/Taxes_Benefits_2005_06.pdf

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Blue Book 2007

The next Quarterly National Accounts are published on 29 June 2007. This set of accounts will underpin the *United Kingdom National Accounts, The Blue Book* for 2007. The *Blue Book* itself will be published on the National Statistics website in electronic format on 20 July, and the

paper edition will be published on 17 August.

As explained in the recent article 'Modernising the UK's National Accounts',¹ *Blue Book* 2007 is a 'transition' publication. The scope is reduced through the postponing to 2008 of some annual processes, including balancing the accounts in current prices for 2005 using the Input-Output Supply and Use framework and benchmarking to annual surveys. Also there will only be one methodological change affecting historical data before 2005, which is the inclusion of estimates for own account software.²

As a result, some tables and analysis will not be available in this year's edition of the *Blue Book*. This will primarily be reflected in areas where data are reliant on the Input-Output Supply and Use balancing system, in particular in Chapter 2, 'Industrial Analysis'. These data will be reinstated with *Blue Book* 2008.

- 1 Beadle J (2007) 'Modernising the UK's National Accounts', *Economic & Labour Market Review* 1(4) (first published electronically on 22 February 2007)
- 2 Chamberlin G (2007) 'New measures of UK private sector software investment', *Economic & Labour Market Review* 1(5)

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UPDATES

Updates to statistics on www.statistics.gov.uk

10 May

Index of production

Manufacturing: 0.3% quarterly fall in Q1
www.statistics.gov.uk/cci/nugget.asp?id=198

11 May

Pensions contributions

£75 billion in 2005
www.statistics.gov.uk/cci/nugget.asp?id=1278

UK trade

Deficit widened to £4.5 billion in March 2007
www.statistics.gov.uk/cci/nugget.asp?id=199

14 May

Producer prices

Factory gate inflation falls to 2.5% in April
www.statistics.gov.uk/cci/nugget.asp?id=248

15 May

Inflation

April: CPI down to 2.8%; RPI at 4.5%
www.statistics.gov.uk/cci/nugget.asp?id=19

16 May

Average earnings

Bonuses increase pay growth in the year to March
www.statistics.gov.uk/cci/nugget.asp?id=10

Employment

Rate falls to 74.3% in three months to March 2007
www.statistics.gov.uk/cci/nugget.asp?id=12

18 May

Retail sales

Robust growth continues
www.statistics.gov.uk/cci/nugget.asp?id=256

21 May

Public sector

April: £0.2 billion current budget surplus
www.statistics.gov.uk/cci/nugget.asp?id=206

23 May

Service prices

SPPI inflation at 2.7% in Q1 2007
www.statistics.gov.uk/cci/nugget.asp?id=253

24 May

Business investment

1.3% fall in Q1 2007
www.statistics.gov.uk/cci/nugget.asp?id=258

Motor vehicles

Car production rises in the three months to April
www.statistics.gov.uk/cci/nugget.asp?id=376

25 May

GDP growth

Economy rose by 0.7% in Q1 2007
www.statistics.gov.uk/cci/nugget.asp?id=192

Index of services

0.8% quarterly rise into March
www.statistics.gov.uk/cci/nugget.asp?id=558

1 June

Industry consumption of energy and output

Energy use increases
www.statistics.gov.uk/cci/nugget.asp?id=151

FORTHCOMING RELEASES

Future statistical releases on www.statistics.gov.uk

8 June

Index of production – April 2007

11 June

Producer prices – May 2007

12 June

**Consumer price indices – May 2007
UK trade – April 2007**

13 June

**Labour market statistics – June 2007
MM19: Aerospace and electronic cost indices – March 2007
Public sector employment – Q1 2007**

14 June

**Public and private sector breakdown of labour disputes
Retail sales – May 2007
SDM28: Retail sales – May 2007**

15 June

**MM24: Monthly review of external trade statistics – April 2007
MQ10: UK trade in goods analysed in terms of industries – Q1 2007**

18 June

Focus on consumer price indices – May 2007

19 June

MM22: Producer prices – May 2007

20 June

**Average weekly earnings – April 2007
Public sector finances – May 2007**

21 June

Motor vehicle production – May 2007

25 June

Public sector finances: supplementary (quarterly) data

26 June

Monthly digest of statistics – June 2007

28 June

Investment by insurance companies, pension funds and trusts – Q1 2007

29 June

**Balance of payments – Q1 2007
Business investment revised results – Q1 2007
Consumer trends – Q1 2007
Experimental market sector gross value added (GVA) – Q1 2007 update
PM 34.10: Motor vehicle production business monitor – May 2007
Quarterly national accounts – Q1 2007**

30 June

Labour disputes – 2006

2 July

**Index of services – April 2007
Productivity – Q1 2007**

3 July

**Financial intermediation services indirectly measured – Q1 2007
Profitability of UK companies – Q1 2007**

Economic review

June 2007

Anis Chowdhury

Office for National Statistics

SUMMARY

GDP continued to grow robustly in 2007 quarter one, driven mainly by the services sector, with little contribution from manufacturing output. On the expenditure side, business investment and household spending weakened. As a reflection of the UK's dynamic domestic demand profile and unfavourable exchange rate position, the trade deficit widened through the quarter. The current account deficit widened in 2006 quarter four. The labour market remains buoyant despite showing tentative signs of weakening; average earnings remain subdued. The public sector finances improved in April 2007. Consumer and producer output price inflation fell in April 2007.

GROSS DOMESTIC PRODUCT

First quarter growth of 0.7 per cent

GDP growth for the first quarter of 2007 is estimated to have grown fairly strongly, by 0.7 per cent, continuing the similar rate of growth of the previous two quarters. The annual rate of growth rose by 2.9 per cent, down marginally from the 3.0 per cent growth in the previous quarter (Figure 1). The

latest M2 GDP release for 2007 quarter one contains more information than that contained in the preliminary estimate. It gives first estimates for the main expenditure categories and more complete information on the output side. It is still, however, based on as yet incomplete information.

The growth rate in the UK economy in 2007 quarter one continues to be led by strong growth in services sector output. Total industrial production growth in contrast was flat but reversed the fall in

the previous quarter. The acceleration in production was due to a bounce back in mining and quarrying and energy supply output. This was offset by a weakening in manufacturing output. Construction output sustained the strong rate of growth from the previous quarter.

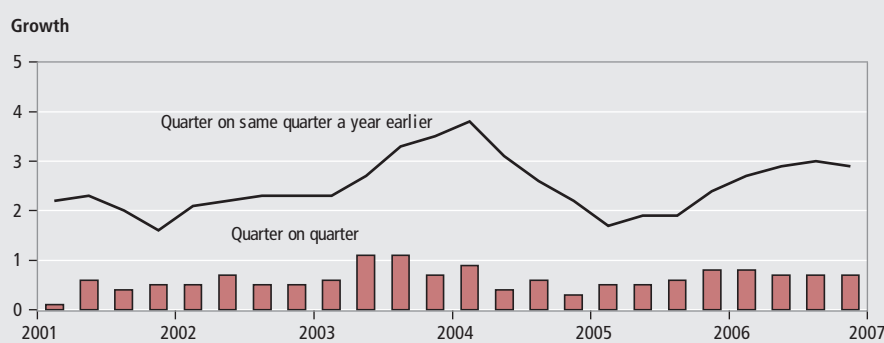
OTHER MAJOR ECONOMIES

Global growth moderates

Preliminary data for 2007 quarter one are now available for the other major OECD countries and these show a slowing picture of the world economy. US GDP data for the first quarter of 2007 showed a weakening. Growth was a subdued 0.3 per cent compared to 0.6 per cent in 2006 quarter four. The lower rate of growth continued to be led by robust household consumption expenditure, which was underpinned by a fairly buoyant labour market together with a fall in energy prices. Government spending growth also made a positive contribution to GDP growth. However, this was offset by a decline in residential investment, continuing the trend from the previous quarter and in line with the weak housing market. Net trade to a lesser extent contributed to the slowdown with exports falling and imports rising. Japan's GDP growth also moderated. GDP growth in 2007 quarter one was 0.6 per cent, down from 1.2 per cent in the previous quarter. The slowdown was mainly due to a contraction in private and non-private residential investment as well as business investment. This was partially offset by buoyant household consumption expenditure and partly due to a positive net trade picture with exports rising strongly on the quarter and exceeding imports.

Growth in the three biggest mainland EU economies – Germany, France and Italy – also exhibited signs of weakening. According to Eurostat, euro area GDP grew by 0.6 per cent in 2007 quarter one. This is a deceleration compared to growth of 0.9 per cent growth in the previous quarter. German GDP growth according to the initial estimate was a modest 0.5 per cent. This follows fairly strong growth of 1.0 per cent in 2006 quarter four. A weaker net trade position together with a slowdown in household spending contributed towards the modest GDP growth. This was offset by fairly strong growth in industrial output

Figure 1
Gross Domestic Product



and investment growth. French GDP growth also grew moderately, at 0.5 per cent, similar to the rate in the previous quarter. This reflected a slowdown in manufacturing investment together with household consumption. This was offset by a pick up in household investment and a stronger net trade position. The Italian economy showed a marked deceleration in growth. GDP growth according to the preliminary estimate was just 0.2 per cent in 2007 quarter one, compared to growth of 1.1 per cent in the previous quarter. Early indications suggest that this may mainly have been driven by a fall in industrial production.

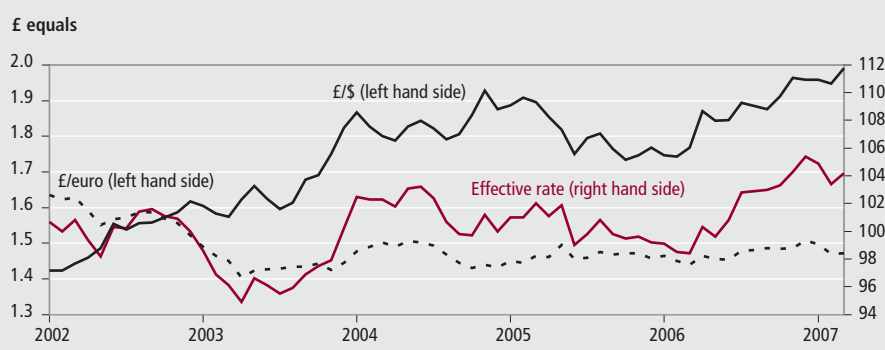
FINANCIAL MARKETS

Share prices rise and pound appreciates

Equity performance showed a strong bounce-back in 2007 quarter one, following a weak performance in 2006 quarter four. The FTSE All-Share index rose by around 11.0 per cent in 2007 quarter one after falling by 2.0 per cent in 2006 quarter four; this despite some turbulence towards the end of February 2007 where there was a sharp fall in share prices, partly led by rumours of capital gains taxes on shares in China. The rebound in share prices may be due to a number of factors. Firstly, the rise may have been due to recent speculation about merger activity concerning major companies; secondly, business profitability has been relatively high in recent months, which could have induced share purchases and thirdly, share prices may have risen due to the positive outlook on global growth held by investors. In April 2007 share prices rose by a further 2.0 per cent.

As for currency markets, 2007 quarter one saw sterling's average value appreciating and broadly grow in line with 2006 quarter four. The pound appreciated against the dollar by around 2.0 per cent in 2007 quarter one, similar to the rate in the previous quarter. Against the euro, sterling's values appreciated by around 0.5 per cent compared to growth of 1.0 per cent in the previous quarter. Overall, the quarterly effective exchange rate appreciated by 1.1 per cent in 2007 quarter one, down from 1.3 per cent growth in 2006 quarter four (**Figure 2**). In April 2007, sterling appreciated by around 2.0 per cent against the dollar. Against the euro, sterling was flat. Overall, the effective exchange rate appreciated by around 1.0 per cent.

Figure 2
Exchange rates



The recent movements in the exchange rate might be linked to a number of factors. Firstly, exchange rate movements can be related to the perceptions of the relative strengths of the US, the Euro and UK economy. The appreciation of the pound against the both the dollar and euro in 2007 quarter one may be partly linked to perceptions of stronger UK economic growth, leading to greater inflationary pressures and therefore the prospects of higher interest rates in the UK. Indeed in April, the pound breached the \$2 mark for the first time since 1992, in response to a rise in inflation and therefore inducing the prospect of higher interest rates. The potential for future rate rises may have been a factor in sterling's recent appreciation. In fact, interest rates were increased by a further 0.25 percentage point in May 2007, this follows the 0.25 percentage point interest increase in January 2007 and leaves interest rates currently standing at 5.50 per cent.

In contrast, there have been particular concerns in recent months regarding the relative weakness of US GDP growth. Furthermore, inflationary pressures have been relatively subdued in the US. This may have lessened the likelihood of further interest rate rises in the US, which currently stand at 5.25 per cent. In the euro-area, the lower rate of appreciation of the pound against the euro in the first quarter of 2007 may have come in response to further monetary tightening, with the European Central Bank (ECB) raising interest rates rising by a further 0.25 percentage points in March 2007, following the 0.25 percentage points rise in December 2006 to leave rates currently standing at 3.75 per cent. The rise in the euro has been further underpinned by robust growth in the euro-zone. However, compared to US and UK rates, euro-zone interest rates still remain fairly moderate and accommodative.

Secondly, another factor for the US depreciation relative to the pound may be due to the current account deficit which is generally seen as a weakness for the US economy. The dollar may have fallen recently in response to a readjustment process, with the intended consequence of making exports cheaper and imports dearer – thus in theory leading to switch in expenditure to home produced goods and ultimately leading to a narrowing in the deficit.

Thirdly, another factor may be due to a lack of international appetite for dollar denominated assets, particularly from central banks, whom are choosing to mix up their currency assets on their balance sheets (for portfolio and risk management purposes) thereby further undermining the value of the dollar.

OUTPUT

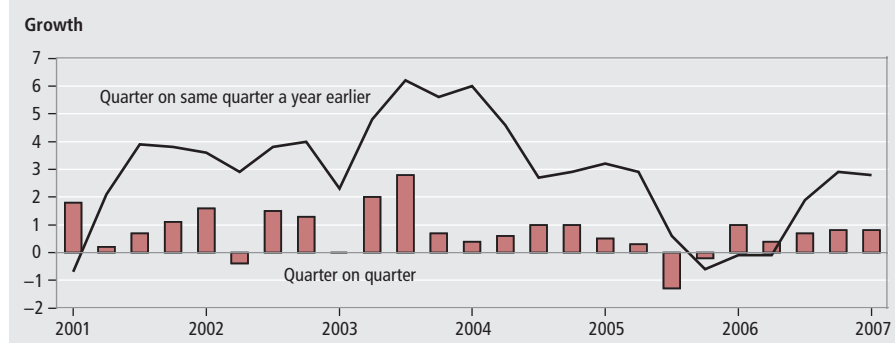
Services sector drives economic growth

GDP growth in 2007 quarter one was estimated at 0.7 per cent, unchanged from the previous quarter. On an annual basis it was 2.9 per cent, down from 3.0 per cent in 2006 quarter four.

Construction activity is estimated to have grown strongly in the first quarter of 2007. Construction output grew by 0.8 per cent in 2007 quarter one, unchanged from the previous quarter. Comparing the quarter on the quarter a year ago, construction output rose by 2.7 per cent following growth of 2.9 per cent in the previous quarter (**Figure 3**).

As for external surveys of construction, the CIPS survey signalled strengthening activity in 2007 quarter one with the average headline index at 58.0, up from 56.8 in the previous quarter. Stronger activity was driven by a rise in commercial activity. In April 2007, the headline index edged up

Figure 3
Construction output



further to 59.8. The RICS in its 2007 quarter one construction survey report that growth in construction workloads accelerated further in the first quarter of 2007 and at the fastest pace since 2004 quarter two. The net survey balance was at 28 per cent, up from 26 per cent in 2006 quarter four.

Total output from the production industries was flat in 2007 quarter one after falling by 0.2 per cent in the previous quarter. On an annual basis it grew by just 0.2 per cent compared to growth of 1.0 per cent in the previous quarter. The main contributions to the pick up in the latest quarter came from a turnaround in mining & quarrying output (including oil & gas production) which rose by 1.3 per cent in 2007 quarter one after decreasing by 0.6 per cent in the previous quarter. This was mainly due to oil extraction from the starting up of the Buzzard oil-field. Electricity, gas and water supply output also grew, by 1.3 per cent reversing a fall of 1.6 per cent in the previous quarter. This mainly reflected the resumption of power from two nuclear power stations. Manufacturing output in contrast fell by 0.3 per cent, a weakening from flat growth in the previous quarter. On an annual basis, manufacturing output also weakened but still showed a fairly robust rate of growth. Growth was 1.4 per cent compared to 2.7 per cent in 2006 quarter four (Figure 4). Production growth has generally been weak since the second quarter of 2006 due to weakness in mining and quarrying and utilities output, offset through most of this period by relatively strong manufacturing output. In the latest quarter, the picture has somewhat reversed with manufacturing output weakening. This may be due to the appreciation of sterling which makes British goods more expensive to sell overseas; and possibly due to slower US economic growth. The output of the agriculture, forestry

and fishing industries rose by 0.5 per cent following a decrease of 0.5 per cent in the previous quarter.

External surveys of manufacturing for 2007 quarter one show a relatively strong picture (Figure 5). It is not unusual for the path of business indicators and official data to diverge over the short term. These differences happen partly because the series are not measuring exactly the same thing. External surveys measure the direction rather than the magnitude of a change in output and often inquire into expectations rather than actual activity.

The CIPS average headline index for manufacturing indicated a strengthening picture in 2007 quarter one. The headline

index was 54.4, up from 52.9 in 2006 quarter four, indicative of fairly robust growth. Growth was led by both increases in output and new orders. In April 2007, the index had edged down slightly to 53.9. The CBI in its 2007 quarter one Industrial Trends survey reported growth in manufacturers' level of total orders being the strongest than at any time in the last decade, with the balance at plus 2. The latest monthly Industrial Trends survey in April also recorded a balance of plus 2. The BCC survey reported a weakening, but overall, still a fairly buoyant picture in 2007 quarter one. The net balance for home sales fell to plus 27 from plus 31 in 2006 quarter four.

Overall the service sector, by far the largest part of the UK economy, continues to be the main driver of UK growth. Growth was 0.8 per cent in 2007 quarter one, down from 0.9 per cent growth in the previous quarter (Figure 6). On an annual basis, growth was 3.5 per cent, unchanged from the previous quarter. The main contribution to the growth rate continues to be driven by business services and finance output which grew by 1.0 per cent in the latest quarter, the same as in the previous quarter. Transport, storage and communication also grew strongly at 1.4 per cent, up slightly from 1.3 per cent growth in the previous quarter. This was offset by a slowdown in the output

Figure 4
Manufacturing output

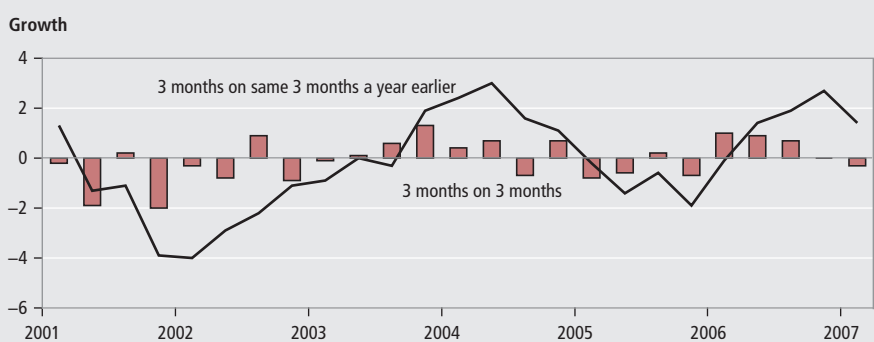


Figure 5
External manufacturing indicators

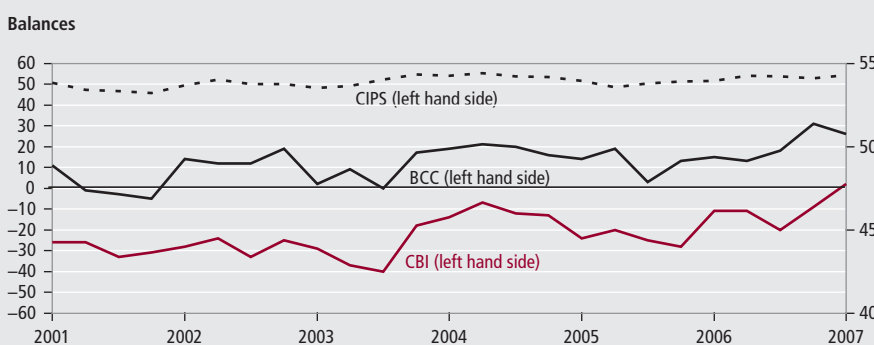
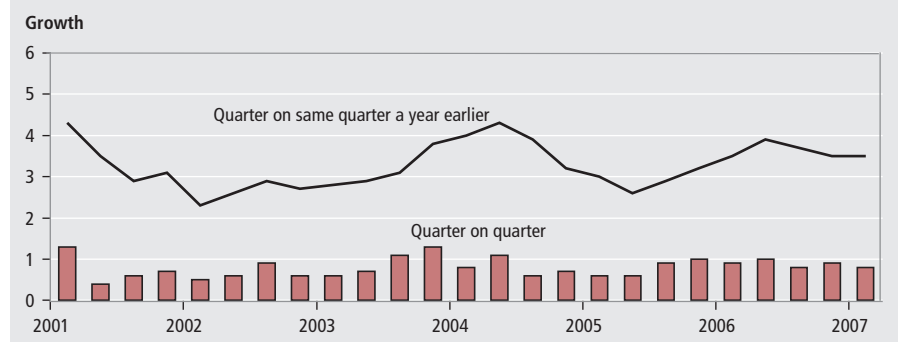


Figure 6
Services output



of the distribution, hotels and catering sector, but still registered a fairly robust rate of growth. Growth was 0.9 per cent compared to 1.2 per cent in the previous quarter. The output of government and other services grew by a modest 0.4 per cent, similar to the rate in the previous quarter.

The external surveys on services showed a somewhat weakening picture in 2007 quarter one but overall continued to show a fairly robust picture in line with the official picture. The CIPS average headline index in 2007 quarter one was 58.1, down from 59.9 in the previous quarter and continued to be led by new orders. In April 2007, the index had nudged down to 57.2. It should be noted that the CIPS survey has a narrow coverage of the distribution and government sectors.

The CBI and BCC also report a fairly buoyant picture (Figure 7). The CBI in its latest services sector survey in February reported strong growth in business volumes for both consumer and business & professional services firms over the last three months. The consumer services volume balance was at plus 13 and for business & professional services, the balance was at plus 27. The BCC in its 2007 quarter one survey reported a weakening in domestic balances but overall the balances remain relatively strong. The net balance for home sales fell 7 points to plus 27. The net balance for home orders fell 2 points to plus 28 in 2007 quarter one.

EXPENDITURE

Consumers' spending weakens

Household consumption expenditure growth decelerated in 2007 quarter one. Growth was a fairly modest 0.6 per cent. This follows relatively strong growth of 1.0 per cent in the previous quarter. Growth compared with the same

quarter a year ago also accelerated to 3.1 per cent, up from 2.5 per cent in the previous quarter (Figure 8). In terms of expenditure breakdown, the slowdown was led by a contraction in semi-durable goods expenditure, compared to strong positive growth in the previous quarter. There was also a weakening in non-durable goods and services expenditure. This was offset by buoyant growth in expenditure on durable goods.

Household expenditure in 2007 quarter one could have weakened for a number of economic reasons. Firstly, one key indicator of household expenditure is retail sales. Retail sales appear to have slowed in 2007

quarter one from the previous quarter. Retail sales grew by 0.4 per cent in the latest quarter, a marked deceleration from growth of 1.4 per cent in the previous quarter. The drop in retail sales occurred despite heavy discounting in the shops with the price deflator (that is, shop prices) falling on average by 0.4 per cent in the latest quarter. This may suggest a change in underlying fundamentals, particularly in regards to household disposable income and/or, it could be interpreted as a sign of caution on the part of consumers, wishing to retrench given the strong spending undertaken in the previous quarter.

Retail sales figures are published on a monthly basis and the latest available figures for April showed resurgent growth compared to the previous month (Figure 9). According to the latest figures, the volume of retail sales in the three months to April 2007 was 1.2 per cent higher than the previous three months. This followed growth of 0.5 per cent in the three months to March. On an annual basis however, retail sales continued to grow strongly. Retail sales on the latest three month on the same three months a year ago rose by 4.8 per cent, compared to 4.6 per cent in the three months to March compared to the same period a year ago.

Figure 7
External services

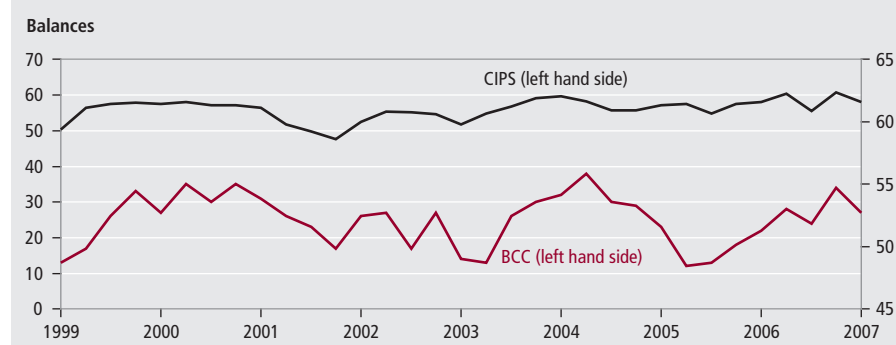


Figure 8
Household demand

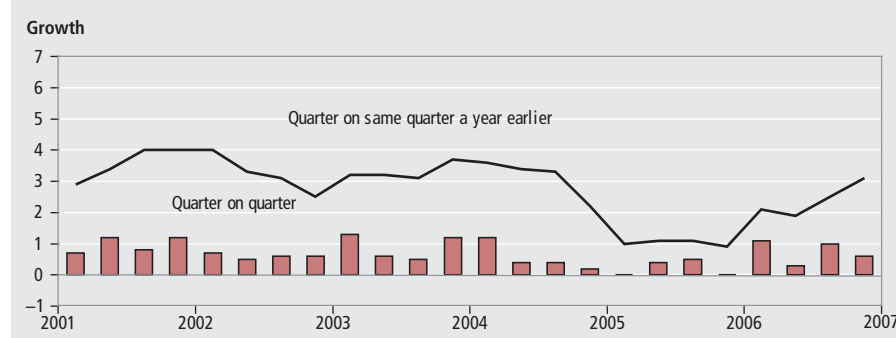
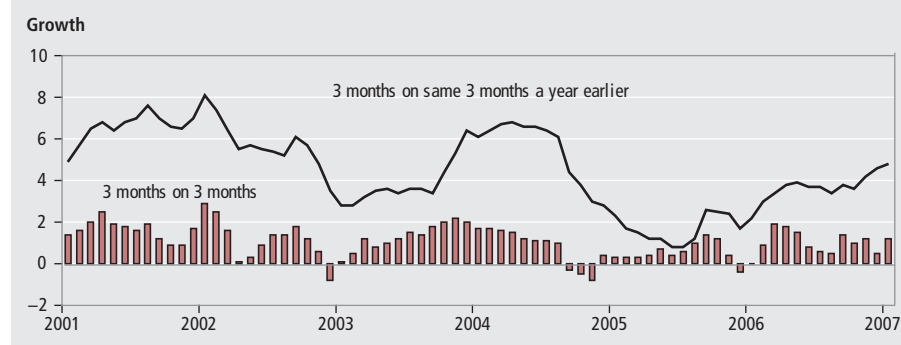


Figure 9
Retail sales



At a disaggregated level, retail sales growth during the three months to the end of April was driven by a sharp acceleration in growth in the 'Predominantly non-food stores' sector which grew by 1.6 per cent, up from 0.2 per cent growth in the previous month. Within this sector in the three months to April, growth was led by the 'Non-store retailing and repair' sector (which includes mail order and internet sales) and the 'Other stores' sector, each growing by 3.3 per cent respectively. Textile, clothing and footwear stores also registered strong growth at 3.1 per cent. Household goods store sales in contrast fell by 0.9 per cent following growth of 0.4 per cent in March. Retail sales growth in the 'Predominantly food stores' sector recorded modest growth of 0.4 per cent, the same as in the previous month.

External surveys for retail show a robust picture. The CBI in its monthly Distributive Trades survey report that retail sales volumes grew for the fifth consecutive month with the balance at plus 44 in April. The BRC report that retail sales increased by 2.4 per cent on a like-for-like basis in April, down from 3.9 per cent in the previous month. Both attribute some of the increase to the effects of discounting (Figure 10).

Secondly, another factor relating to the slowdown in retail sales in 2007 quarter one were the three interest rate rises seen since August 2006 and the potential for future rate rises, and its impact on household borrowing and spending. Interest rate rises don't seem to have had much discernible impact on borrowing and spending in 2006 quarter four but appears to be having some effect in the latest quarter.

Household consumption has risen faster than disposable income in recent years as the household sector has become a considerable net borrower and therefore accumulated high debt levels. There are two channels of borrowing available to households; i) secured lending, usually on homes; and ii) unsecured lending (that is, on credit cards). On a general level, increases in interest rates increases debt servicing costs and in the process may have displaced consumer expenditure on certain goods.

Thirdly, another factor for the slowdown could be attributed to house prices, which although still growing fairly buoyantly, are beginning to show an underlying picture of slowdown, suggesting the lagged effect of the three interest rate rises may be starting to feed through to housing demand.

Nationwide report that annual house price growth was 9.3 per cent in March, down from 10.2 per cent from February. Halifax report that overall, house prices grew by 2.8 per cent in 2007 quarter one, well below the 4.2 per cent rise in 2006 quarter four. The slowdown in house prices may have affected household consumption in a number of ways. Firstly, by reducing the feel-good factor; secondly, lower housing demand may have lead to lower expenditure on household items; thirdly, one source of expenditure has come through equity release, a lower rate of house price growth could have lead to a lower level of borrowing to finance further consumption.

Fourthly, the slowdown in household expenditure may be reflected by Bank of England lending figures. These showed that total net lending and therefore financing for expenditure, slowed in 2007 quarter one from the previous quarter. Total net lending in 2007 quarter one was around £32 billion, down from around £33 billion in the previous quarter. Of the total, lending secured on dwellings has remained roughly stable at around £30 billion. However, unsecured lending showed a marked fall in 2007 quarter one with lending at around £2.7 billion compared to around £3.3 billion in the previous quarter.

Another factor for lower consumer expenditure may be attributed to a higher share of taxation being generated on income. Higher inflation could be another possible factor. Finally, although the labour market appears relatively healthy, wage growth has been weak in real terms recently and this may act to a certain extent as a constraint on expenditure.

BUSINESS DEMAND

Business investment weakens

Total investment slowed down in 2007 quarter one from the previous quarter but continues to show a fairly robust rate of growth. Growth was 1.7 per cent compared to 2.6 per cent in 2006 quarter four. On an annual basis it grew by 7.7 per cent compared to 8.2 per cent in the previous quarter. The weakening in total investment was primarily driven by a contraction in business investment.

Business investment grew relatively strongly throughout 2006. However, in the latest quarter, this previously benign position has somewhat turned around. Business investment in 2007 quarter one

Figure 10
External retailing indicators

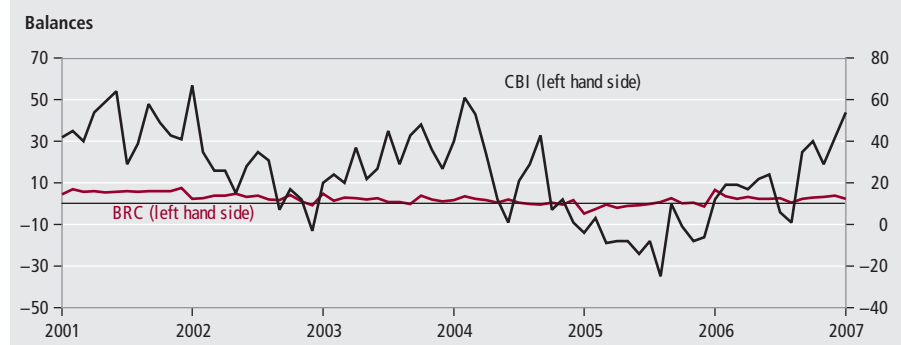
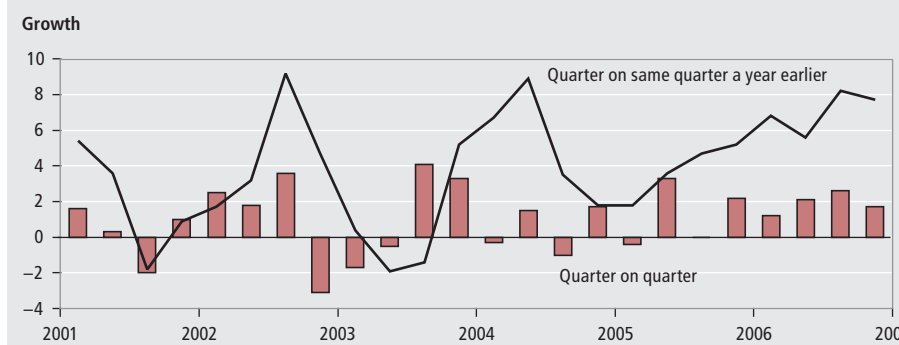


Figure 11
Total fixed investment



fell by 1.3 per cent, reversing the relatively strong growth of 4.5 per cent in the previous quarter. Business investment on an annual basis slowed but still continues to grow fairly robustly. Growth was 9.6 per cent, down from 13.5 per cent annual growth in the previous quarter (**Figure 11**). There could be a number of economic reasons explaining this downturn in business investment. Firstly, the continued strength of the pound and its further recent appreciation, particularly against the dollar may, aligned with a slowdown in the US economy have been a factor. The high pound may have made it difficult to sell UK goods to the US which is a major export market. Secondly, high real interest rates may have made investment in financial assets a much more favourable investment proposition than physical assets which may have been reflected in increased share buying and merger activity recently. Thirdly, firms may have been reluctant to investment due to an attempt to build up their profit base.

Evidence on investment intentions from the latest BCC and CBI surveys showed a mixed picture. According to the quarterly BCC survey, the balance of manufacturing firms planning to increase investment in plant and machinery fell 5 points to plus 18 and in services firms rose by 2 points to plus 20 in 2007 quarter one. The CBI in its 2007 quarter one Industrial Survey reported a subdued investment picture, with the investment balance at minus seven.

GOVERNMENT DEMAND

Government expenditure weakens

Government final consumption expenditure slowed in 2007 quarter one. Growth was 0.4 per cent compared to growth of 0.7 per cent in 2006 quarter four. Growth quarter on quarter a year ago was 2.4 per cent, unchanged from the previous quarter (**Figure 12**).

Public sector finances improve

The latest figures on the public sector finances report in the current financial year to April 2007 and illustrated a positive picture. It showed a current budget surplus together with a lower level of net borrowing. Overall however, the government continued to operate a financial deficit, with government expenditure continuing to exceed revenues, partly to fund capital spending. In April 2007, the current budget was in surplus by £0.2 billion; this compares with a deficit of £0.9 billion in April of 2006. In the financial

year 2006/07, the deficit was £7.6 billion. Net borrowing was £1.1 billion in April 2007; this compares with £2.8 billion in April 2006. In the financial year 2006/07, net borrowing was £33.8 billion. The positive picture mainly reflected strong growth in corporation and petroleum revenue together with higher VAT receipts, together with lower public corporations net borrowing.

Since net borrowing became positive in 2002, following the current budget moving from surplus into deficit, net debt as a proportion of annual GDP has risen steadily. Public sector net debt in April 2007 was 37.0 per cent of GDP. This compares with 36.2 per cent of GDP in April 2006. In the financial year 2006/07, net debt as a percentage of GDP was 37.4 per cent.

TRADE AND THE BALANCE OF PAYMENTS

Goods deficit widens

The publication of the latest quarterly Balance of Payments shows that the current account deficit widened in 2006 quarter four to £12.7 billion (the highest deficit on record), from a deficit of £10.5 billion in the previous quarter (**Figure 13**). As a proportion of GDP, the deficit rose to 3.8 per cent of GDP (the highest since

Figure 12
Government spending

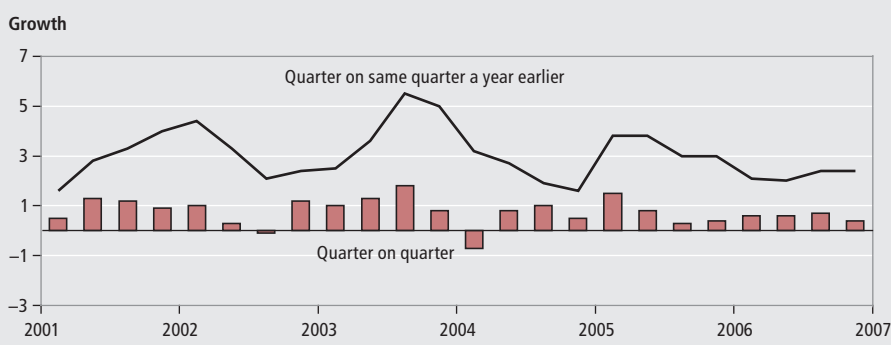
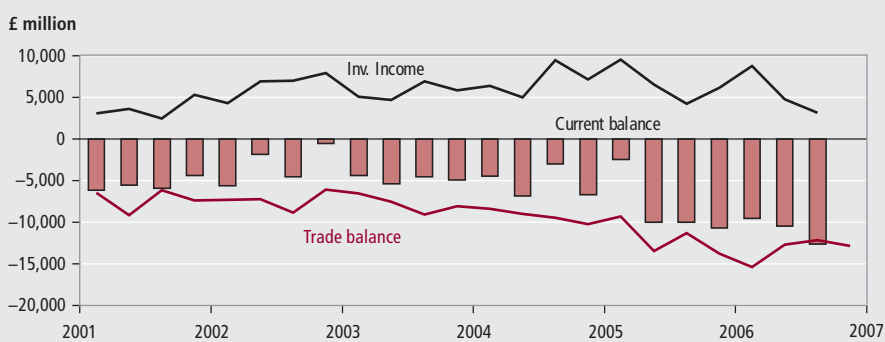


Figure 13
Balance of payments



1990 quarter two) from 3.2 per cent in 2006 quarter three. The widening current account deficit in 2006 quarter four was due to a lower surplus on investment income and higher deficits on trade in goods and current transfers, partially offset by a higher surplus on trade in services.

The run of current account deficits since 1998 reflects the sustained deterioration in the trade balance. The UK has traditionally run a surplus on the trade in services, complemented by a surplus in investment income, but this has been more than offset by the growing deficit in trade in goods partly due to the UK's appetite for cheaper imports.

Data for 2007 quarter one showed the UK continuing to have a large trade deficit in goods with levels of imports rising faster than exports. This has provided a negative contribution towards GDP growth in the first quarter. The deficit on trade in goods in 2007 quarter one was £12.9 billion, compared with a deficit of £12.2 billion in the previous quarter. In terms of growth, exports of goods fell by 1.9 per cent in 2007 quarter one whilst imports of goods fell by 1.1 per cent. The appreciation of the pound recently may have been a factor for the relatively high trade deficit, as a higher pound makes imports cheaper and exports more expensive.

However, these figures are distorted by volatility in VAT Missing Trader Intra-Community (MTIC) Fraud and therefore need to be treated with caution. According to the latest figures, the level of trade in goods excluding trade associated with MTIC fraud is estimated to have fallen to £0.3 billion in the first quarter of 2007.

External surveys on exports show a mixed picture. The BCC reported that the export sales net balance rose by 1 point to plus 21 and the export orders balance fell 1 point to plus 20 in 2007 quarter one. The CBI in its 2007 quarter one Industrial Trends Survey reported that both export sales and orders were flat at zero balances. According to the latest CBI monthly Industrial Trends survey, the export balance was at minus 6 in April.

LABOUR MARKET

Labour market activity still fairly buoyant

The Labour market in the latest reference period showed a mixed picture. There appears to be some signs of weakening in the Labour market. This somewhat reverses the recent trend

of fairly strong growth in labour market activity; as a result of a feeding through of fairly strong demand conditions from the beginning of 2006 into a strengthened labour market picture. Overall however, the labour market can still be considered as remaining rather buoyant, with employment and unemployment at fairly stable levels compared to the beginning of the year. Taking all the indicators together, the picture remains inconclusive as to suggest the labour market was entering a looser period.

The latest figure from the Labour Force Survey (LFS) pertains to the three-month period up to March 2007 and mostly showed a mixed picture. The number of people in employment fell as did the employment rate. The number of unemployed people increased. On the upside, the unemployment rate was unchanged. The claimant count fell. Job vacancies increased. Average earnings, excluding bonuses was up, while average earnings including bonuses fell; but overall, average earnings remain subdued with weak real wage growth.

Looking at a detailed level, the fall in the employment level appears to be mainly driven by a fall in employees, particularly part time employees, offset by an increase in the number of people in self-employment.

The current working age employment rate was 74.3 per cent, in the three months to March 2007, down 0.2 percentage points from the three months to December 2006 and down 0.3 percentage points from a year earlier. The number of people in employment fell by 55,000 over the quarter, but was up 93,000 over the year, to leave the employment level standing at 28.98 million in the three months to March 2007. The unemployment rate was 5.5 per cent, in the three months to March 2007, unchanged from the three months to December 2006 and up 0.3 percentage points from

a year earlier (Figure 14). The number of unemployed people rose by 13,000, from the three months to December, and increased by 101,000 from a year earlier, leaving the unemployment level standing at 1.70 million.

According to the LFS, in the period January to March 2007, the number of people in employment fell by 55,000. The decrease was led by a fall in employees of 100,000 offset by an increase in self-employment of 45,000. From another perspective, the number of people in full-time employment rose by 3,000, whilst people in part-time employment fell by 58,000.

Workforce jobs rises

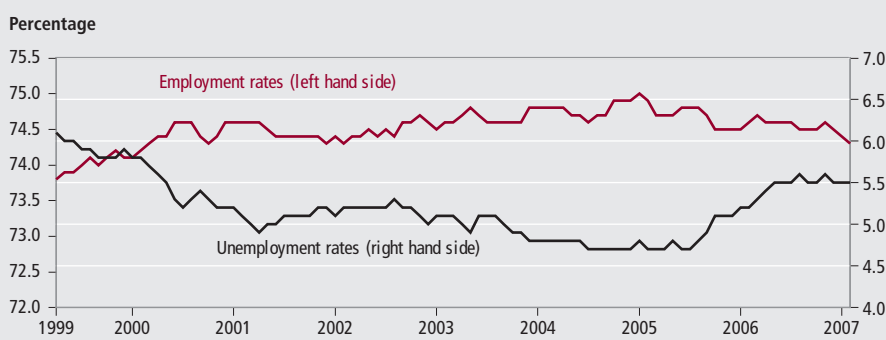
According to employer surveys, there was an increase of 88,000 jobs in the three months to December 2006.

Most sectors showed increases in jobs over the quarter and year. The largest quarterly contribution came from an increase in finance & business services jobs (up 51,000) followed by construction (up 21,000) and distribution, hotels & restaurants (up 19,000). Two sectors recorded a fall in jobs. Manufacturing continues to shed jobs, with a decrease of 23,000 in the latest period followed by other services (down 4,000). Over the year, education, health and public administration saw the largest increase in jobs at 96,000 followed by finance & business services (up 95,000). The manufacturing sector in contrast lost over 53,000 jobs on the year, followed by distribution hotels & restaurants (down 8,000).

Claimant count falls

The claimant count measures the number of people claiming the Jobseekers Allowance. The latest figures for April showed the claimant count level at 890,000, down 15,700 on the month and down 57,100 on a year earlier.

Figure 14
Employment and unemployment



The claimant count rate in April 2007 was 2.8 per cent, virtually unchanged from the previous month and down 0.2 percentage points from a year earlier. The discrepancy between the rise in unemployment and the fall in the claimant count can partly reflect reluctance by people losing jobs to claim Jobseekers Allowance and/or people not being eligible.

Vacancies rise

The number of vacancies created in the UK continued to show a healthy demand position for the economy, and appears to belie the weakness of the labour market in respects to other indicators, namely employment and unemployment. It may simply be the case that there is a mismatch between skills and vacancies and/or it could be an indication of the time lag in filling vacancies. There were 638,600 job vacancies on average in the three months to April 2007, up 32,100 from the previous three months and up 50,900 from the same period a year earlier.

Inactivity level rises

The working age inactivity rate was 21.2 per cent in the three months to March 2007, up 0.2 percentage points from the three months to December and up 0.1 percentage points from a year earlier. In level terms, the number of economically inactive people of working age was up 85,000 over the quarter to leave the level standing at 7.94 million in the three months to March 2007. There were inactivity increases amongst most categories over the quarter. The largest increase in inactivity level occurred amongst those categorised as 'student' which increased by 53,000, followed by those categorised as 'looking after family/home' (up 29,000) and the 'long-term sick' category (up 14,000). On an annual basis, inactivity rose by 78,000, with the largest rise being amongst those categorised as 'student' (up 27,000), followed by the 'retired' category (up 22,000). This was partially offset by inactivity falling amongst those categorised as 'long-term sick' (down 7,000).

Average earnings remain subdued

Average earnings growth showed a mixed picture in March 2007, but the underlying picture is still that of relative weakness. Average earnings

(including bonuses) decreased in the latest reference period. It fell by 0.1 percentage points to 4.5 per cent. Average earnings growth (excluding bonuses) in contrast increased from the previous month by 0.1 percentage point to 3.7 per cent in March. In terms of the public and private sector split, the gap in wages widened. Average earnings (excluding bonuses) grew by 3.1 in the public sector, unchanged from the previous months and grew by 3.8 per cent in the private sector, up 0.1 percentage points from the previous month.

Despite the weakening in labour market activity in the latest period, overall, the numbers still point to a fairly buoyant labour market, although it is still loose compared to previous years, with employment levels at relatively high levels and unemployment at a fairly stable level. This is consistent with higher workforce participation rates, underpinned by robust GDP growth. Average earnings show stable but fairly modest growth, consistent with increased supply in the labour force.

PRICES

Producer output and input prices fall

Industrial input and output prices are an indication of inflationary pressures in the economy. In 2007 quarter one, output prices exhibited signs of further acceleration of growth from 2006 quarter four and therefore signs of greater inflationary pressures. However, input prices fell on average in the first quarter of 2007 in contrast to an increase in the previous quarter. This may suggest that firms to some extent have attempted to rebuild their profit margins by passing on the higher price of their products to customers, after facing profit squeeze of previous quarters.

Input prices on average fell by 0.9 per cent in 2007 quarter one, on the back of lower oil prices. This contrasts with 2006 quarter four where prices on average increased by 3.5 per cent. The core input price index, excluding food, beverages, tobacco and petroleum rose by 1.7 per cent in 2007 quarter one compared to growth of 4.9 per cent in 2006 quarter four. The slower growth in input prices was to some extent helped by the appreciation of the pound relative to the dollar and euro, which had the effect of making exports dearer but imports cheaper. The fall in input prices may have had little impact on output prices in the latest quarter. According to the latest

figures, input prices fell by 0.2 per cent in the year to April 2007, reversing the increase of 0.6 per cent in February. The main contribution to the fall in April came from lower gas and crude oil prices which fell by around 26.0 per cent and 13.0 per cent respectively. In April, core prices rose marginally quicker, by 2.3 per cent compared to 2.2 per cent in March.

Output prices grew on average by 2.4 per cent in 2007 quarter one, a significant strengthening from growth of 1.9 per cent in the previous quarter, and as mentioned earlier may be an attempt by firms to re-build their profit margins. The underlying picture also suggested greater inflationary pressures. On the core measure which excludes food, beverages, tobacco and petroleum, producer output prices rose by 2.7 per cent in 2007 quarter one, up from 2.5 per cent in the previous quarter. According to the latest figures, the growth of the output price index was 2.5 per cent in the year to April and still indicative of inflationary pressures, despite slowing down from growth of 2.7 per cent in the year to March. Lower growth was partially due to slower growth in output prices of secondary raw materials compared to March. On the core measure, output prices also slowed. The core output price index rose by 2.3 per cent in the year to April, down from growth of 2.8 per cent in the year to March.

Consumer prices fall

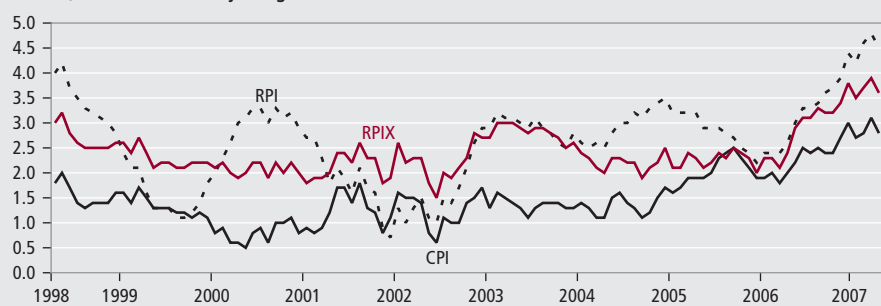
Growth in the consumer price index (CPI) – the Government's target measure of inflation – was 2.8 per cent in April, down from last months peak of 3.1 per cent and the first fall in six months; but still continuing to exceed the Government's 2.0 per cent inflation target. The Retail Price Index (RPI) a broader measure of inflation also fell, to 4.5 per cent from 4.8 per cent in March. The Retail Price Index, excluding mortgage interest payments (RPIX) was 3.6 per cent, down from 3.9 per cent (**Figure 15**).

The main downward pressure came from average gas and electricity bills which fell this year but rose a year ago. There was also a large downward effect from financial services. This year, foreign exchange commission rates fell following the abolition of a charge from one major bank; last year, by contrast, average commission rates rose. In addition, fees for overdrafts fell this year but rose a year ago.

Figure 15

Inflation

Growth, month on month a year ago



There were also small downward effects from furniture and household goods, mainly due to steeper cuts in the price of furniture this year, particularly bedroom furniture. This follows a record month-on-month increase in furniture prices in March 2007; and air travel, particularly long haul routes, with fares rising by less than a year ago when the price collection period coincided with the Easter holiday period. A large partially offsetting upward effect came from bus travel where prices rose this year but fell a year ago following the introduction of free off-peak local bus travel in England for disabled people and those aged over 60.

The largest upward effect on the inflation rate came from men's and women's clothing, with prices rising this year following the introduction of higher priced replacement stock. Last year, by contrast, there was a mixture of special offers and higher prices. There were also large upward effects from restaurants and cafes, with prices rising by more than a year ago, particularly for on-sales of alcohol; and from food and non-alcoholic beverages. The latter was mainly due to prices of vegetables rising this year, in large part reflecting limited supplies of some produce, but falling a year ago.

Independent forecasts

May 2007

UK forecasts

The tables below supplement the Economic Review by providing a forward-looking view of the UK economy. The tables show the average and range of independent forecasts for 2007 and 2008 and are extracted from HM Treasury's Forecasts for the UK Economy.

2007

	Average	Lowest	Highest
GDP growth (per cent)	2.7	1.9	3.0
Inflation rate (Q4, per cent)			
CPI	2.0	1.4	2.9
RPI	3.5	2.5	4.3
Claimant unemployment (Q4, million)	0.93	0.81	1.10
Current account (£ billion)	-39.6	-56.1	-7.2
Public Sector Net Borrowing (2007-08, £ billion)	35.8	27.1	44.0

2008

	Average	Lowest	Highest
GDP growth (per cent)	2.4	-0.3	3.0
Inflation rate (Q4, per cent)			
CPI	2.0	1.5	3.0
RPI	2.7	1.9	3.9
Claimant unemployment (Q4, million)	0.95	0.71	1.25
Current account (£ billion)	-41.7	-73.0	-11.4
Public Sector Net Borrowing (2008-09, £ billion)	34.0	19.5	43.0

Notes

Forecast for the UK economy gives more detailed forecasts, covering 29 variables, and is published monthly by HM Treasury. It is available on the Treasury's website at: www.hm-treasury.gov.uk/economic_data_and_tools/data_index.cfm

Selected world forecasts

The tables below supplement the Economic Review by providing a forward-looking view of the world economy. The tables show forecasts for a range of economic indicators taken from Economic Outlook (preliminary edition), published by OECD (Organisation for Economic Co-operation and Development).

2007

	US	Japan	Euro area	Total OECD
Real GDP growth (per cent)	2.1	2.0	2.5	2.6
Consumer price (percentage change from previous year)	2.6	-0.3	2.0	2.3
Unemployment rate (per cent of the labour force)	4.7	3.7	6.9	5.6
Current account (as a percentage of GDP)	-6.1	4.8	0.4	-1.5
Fiscal balance (as a percentage of GDP)	-2.8	-2.7	-0.8	-1.8

2008

	US	Japan	Euro area	Total OECD
Real GDP growth (per cent)	2.6	2.2	2.2	2.7
Consumer price (percentage change from previous year)	2.2	0.4	2.1	2.0
Unemployment rate (per cent of the labour force)	4.9	3.6	6.6	5.4
Current account (as a percentage of GDP)	-6.2	5.4	0.4	-1.5
Fiscal balance (as a percentage of GDP)	-2.8	-3.2	-0.7	-1.8

Notes

The OECD *Economic Outlook* is published bi-annually. Further information about this publication can be found at www.oecd.org/eco/Economic_Outlook

Key indicators

The data in this table support the Economic review by providing some of the latest estimates of Key indicators.

Seasonally adjusted unless otherwise stated									
	Source CDID	2005	2006	2006 Q3	2006 Q4	2007 Q1	2007 Feb	2007 Mar	2007 Apr
GDP growth – chained volume measures (CVM)									
Gross domestic product at market prices	ABMI	1.9	2.8	0.7	0.7	0.7	..	..	..
Output growth – chained volume measures (CVM)									
Gross value added (GVA) at basic prices	ABMM	2.0	2.7	0.7	0.7	0.7	..	..	..
Industrial production	CKYW	-1.9	0.1	0.2	-0.2	0.1	-0.3	0.2	..
Manufacturing	CKYY	-1.0	1.5	0.7	0.1	-0.3	-0.8	0.6	..
Construction	GDQB	1.5	1.1	0.7	0.8	0.7	..	..	..
Services	GDQS	2.9	3.6	0.7	0.9	0.9	..	..	..
Oil and gas extraction	CKYO	-10.8	-8.8	-3.2	-0.7	1.1	2.9	-1.6	..
Electricity, gas and water supply	CKYZ	-0.2	-2.8	-0.2	-1.6	1.2	0.1	-0.6	..
Business services and finance	GDQN	4.2	5.4	1.4	1.0	0.9	..	..	..
Household demand									
Retail sales volume growth	EAPS	2.0	3.3	0.8	1.4	0.5	1.6	0.5	-0.1
Household final consumption expenditure growth (CVM)	ABJR	1.4	1.9	0.3	1.0	0.6	..	..	..
GB new registrations of cars (thousands) ¹	BCGT	2,444	2,340	662	446	..	72	..	..
Labour market^{2,3}									
Employment: 16 and over (thousands)	MGRZ	28,674	28,895	28,986	29,036	28,981	28,981	..	..
Employment rate: working age (%)	MGSU	74.7	74.6	74.5	74.5	74.3	74.3	..	..
Workforce jobs (thousands)	DYDC	31,042	31,409	31,494	31,583	..	..	..	..
Total actual weekly hours of work: all workers (millions)	YBUS	918.6	923.7	925.4	925.8	927.1	927.1	..	..
Unemployment: 16 and over (thousands)	MGSC	1,426	1,657	1,711	1,687	1,700	1,700	..	..
Unemployment rate: 16 and over (%)	MGSX	4.7	5.4	5.6	5.5	5.5	5.5	..	..
Claimant count (thousands)	BCJD	861.7	944.7	955.0	947.1	916.3	920.0	905.7	890.0
Economically active: 16 and over (thousands)	MGSF	30,100	30,552	30,696	30,723	30,681	30,681	..	..
Economic activity rate: working age (%)	MGSO	78.5	78.9	79.0	79.0	78.8	78.8	..	..
Economically inactive: working age (thousands)	YBSN	7,933	7,843	7,835	7,854	7,939	7,939	..	..
Economic inactivity rate: working age (%)	YBTL	21.5	21.1	21.0	21.0	21.2	21.2	..	..
Vacancies (thousands)	AP2Y	616.8	594.9	598.9	602.0	636.4	618.6	636.4	638.6
Redundancies (thousands)	BEAO	126	145	141	130	145	145	..	..
Productivity and earnings annual growth									
GB average earnings (including bonuses) ³	LNNC	..	..	3.9	4.0	4.5	4.6	4.5	..
GB average earnings (excluding bonuses) ³	JQDY	..	..	3.5	3.7	3.7	3.6	3.7	..
Whole economy productivity (output per worker)	A4YN	..	..	2.3	1.9	..	..	..	..
Manufacturing productivity (output per job)	LOUV	..	..	..	..	..	4.1	3.6	..
Unit wage costs: whole economy	LOJE	..	..	2.0	1.9	..	..	..	..
Unit wage costs: manufacturing	LOJF	..	..	..	..	..	-0.4	-0.2	..
Business demand									
Business investment growth (CVM)	NPEL	17.2	-4.7	3.1	4.5	-1.3	..	..	..
Government demand									
Government final consumption expenditure growth	NMRY	3.0	2.4	0.6	0.7	0.4	..	..	..
Prices (12-monthly percentage change – except oil prices)									
Consumer prices index ¹	D7G7	2.1	2.3	2.4	2.7	2.9	2.8	3.1	2.8
Retail prices index ¹	CZBH	2.8	3.2	3.5	4.0	4.5	4.6	4.8	4.5
Retail prices index (excluding mortgage interest payments)	CDKQ	2.3	2.9	3.2	3.5	3.7	3.7	3.9	3.6
Producer output prices (excluding FBTP) ⁴	EUAA	2.1	2.3	2.3	2.6	2.6	2.6	2.7	2.4
Producer input prices	EUAB	11.7	9.5	7.9	3.4	-0.8	-0.9	0.7	-0.3
Oil price: sterling (£ per barrel)	ETXR	30.358	35.929	37.748	31.637	29.946	29.829	32.065	34.019
Oil price: dollars (\$ per barrel)	ETXQ	55.046	66.107	70.675	60.633	58.527	58.411	62.455	67.646

	Source CDID	2005	2006	2006 Q3	2006 Q4	2007 Q1	2007 Jan	2007 Feb	2007 Mar
Financial markets									
Sterling ERI (January 2005=100)	BK67	100.5	101.0	102.2	103.5	104.6	104.9	103.4	104.2
Average exchange rate /US\$	AUSS	1.820	1.843	1.875	1.917	1.955	1.958	1.947	1.991
Average exchange rate /Euro	THAP	1.463	1.467	1.471	1.485	1.492	1.497	1.470	1.471
3-month inter-bank rate	HSAJ	4.57	5.26	5.02	5.26	5.56	5.48	5.56	5.66
Selected retail banks: base rate	ZCMG						5.25	5.25	5.25
3-month interest rate on US Treasury bills	LUST	3.92	4.89	4.77	4.89	4.91	5.01	4.91	4.81

Trade and the balance of payments

UK balance on trade in goods (£m)	BOKI	-68,783	-83,691	-19,818	-20,191	-20,735	-6,948	-7,048	..
Exports of services (£m)	IKBB	114,330	125,561	31,214	31,742	32,234	10,653	10,543	..
Non-EU balance on trade in goods (£m)	LGDT	-31,912	-46,105	-12,415	-12,724	-11,796	-4,101	-3,963	..
Non-EU exports of goods (excl oil & erratics) ⁵	SHDJ	119.8	117.8	111.7	112.6	116.3	113.3	119.7	..
Non-EU imports of goods (excl oil & erratics) ⁵	SHED	116.8	124.5	123.0	127.4	127.9	128.0	133.1	..
Non-EU import and price index (excl oil) ⁵	LKWQ	101.2	103.9	103.4	103.1	104.2	103.7	105.4	..
Non-EU export and price index (excl oil) ⁵	LKVX	100.6	102.0	101.7	100.7	101.9	101.9	102.5	..

Monetary conditions/government finances

M0 (year on year percentage growth)	VQMX	5.1	..	..	..	..	..	..	..
M4 (year on year percentage growth)	VQJW	11.3	13.3	14.4	12.8	12.8	12.7	12.8	..
Public sector net borrowing (£m)	-ANNX	41,091	33,556	6,283	13,131	-2,301	437	8,350	1,141
Net lending to consumers (£m)	RLMH	19,756	13,137	3,029	3,318	2,652	1,041	885	..

External indicators – non-ONS statistics

		2006 Sep	2006 Oct	2006 Nov	2006 Dec	2007 Jan	2007 Feb	2007 Mar	2007 Apr
Activity and expectations									
CBI output expectations balance	ETCU	14	9	5	11	12	28	21	18
CBI optimism balance	ETBV		-10			-7			16
CBI price expectations balance	ETDQ	12	11	23	8	11	16	20	14

Notes:

1 Not seasonally adjusted.

2 Annual data are for April except for workforce jobs (June), claimant count (average of the twelve months) and vacancies (average of the four quarters).

3 Monthly data for vacancies and average earnings are averages of the three months ending in the month shown. Monthly data for all other series except claimant count are averages of the three months centred on the month shown.

4 FBTP: food, beverages, tobacco and petroleum.

5 Volumes, 2003 = 100.

For further explanatory notes, see Notes to tables on page 61.

FEATURE

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100 years of the Census of Production in the UK¹

SUMMARY

The Census of Production Act 1906 paved the way for the first Census to be taken about economic activity in 1907. To celebrate the centenary of the Census of Production, this article traces its history, focusing on the pressures which have caused it to develop in particular ways. In the first part of its existence, it had a major impact on developments in statistical legislation and methods. The common themes running through the evolution of the Census of Production are examined, how these are driving current developments and what the future is likely to hold.

The Census of Production in the UK started in respect of 1907, under the authority of the 1906 Census of Production Act. This article celebrates the centenary of the Census, and charts some of the interesting and notable developments in its history.

The Census has always been the most important source of business statistics, covering mainly the manufacturing industries. It was originally motivated by a specific policy need on trade tariffs, but soon became the definitive source of statistics on the structure of industry and its contribution to the economy. With the publication of annual National Accounts after the war, it eventually took on the role of providing the definitive benchmark estimates for the output measure of gross domestic product (GDP), and, through supply-use tables, contributed to a greater understanding of supply and demand. It has also been widely used for economic analysis, as a benchmark for smaller, more frequent surveys, and to provide the weights for use in various indices (for example the producer price indices).

More recently, its importance has been underlined by a European Union (EU) Regulation on structural business statistics which ensures that comparable surveys are conducted across the EU. Its current form, the Annual Business Inquiry (ABI), is the centrepiece of UK thinking about the future direction of business surveys.

The beginnings

The early years

The Board of Trade (the equivalent of the modern Department of Trade and Industry) was formed in 1786. An early role was to gather statistics, although they were not regularly published. After 1832 when statistics-gathering work was organised as a separate Department (the first such within the Board of Trade), a statistical yearbook was instituted, which included some information on commercial activities, although the main focus was very much on trade (imports and exports) rather than domestic production.

A resolution was adopted by the House of Commons on 2 March 1886 that 'full and accurate labour statistics should forthwith be collected and published', and this led to the first Census of Wages in 1886, run by the Board of Trade.

There was also a considerable amount of uncoordinated data collection from specific industries and for specific purposes by different departments and ministries. Much of this information has been brought together in Mitchell (1988). The Census of Population also included information on people employed, and additionally on occupation.

The first Census of Production

The first economic census was in 1907, carried out under the 1906 Census of Production Act by the Board of Trade. The impetus for it came from tariff policy – to

enable production levels to be compared with imports. The UK was a latecomer to a census of production – a hundred years later than the USA – and there was deep suspicion from manufacturers. Although the Census Bill was proposed by David Lloyd George and had opposition support from Joseph Chamberlain, there was a concern from individual MPs about manufacturers losing trade secrets. ‘A great invasion of public liberty’; concern that government ‘had got into [its] hands the possibility of prying into the secrets of ... trade and commerce’; ‘sacrificing their liberty to a gang of clerks in Downing Street’; ‘a most important bill of a very far reaching and revolutionary character’ are some of the comments in the parliamentary debates.

The initial Census of Production Bill included wide powers for data collection, but after concessions in its passage through Parliament, the Act severely limited the amount of data that could be statutorily collected. The first censuses focused on statistics of output and employment. Special Advisory Committees were set up to devise a suitable questionnaire for each industrial classification, and these added further, voluntary questions on a range of topics.

The final report of the 1907 Census includes some reconciliation of various different figures, and describes income, output and expenditure together with capital formation, and therefore forms a rudimentary set of National Accounts based on the Census of Production. A more complete estimate of the National Income (a forerunner of GDP), the first to be produced using the output measure, was produced by the then Director of the Census Office, Alfred Flux, also in the final report of the Census. It was only the Census of Production information which allowed this approach to be used.

The quinquennial censuses 1912 to 1935 and the Import Duties Act inquiries

A Parliamentary Order set the next Census for 1912 and determined a quinquennial pattern. The processing of the 1912 Census was, however, still in progress when the First World War intervened, and processing was halted.

There were two aborted attempts to take post-war censuses. Preparations were made for a Census in 1920, but the need for

financial economy led to its cancellation, and an announcement of a Census of Production for 1922 was made, but the preparations were abandoned at an early stage. The next Census of Production to be successfully undertaken was for 1924. The publication of the results also included partial information from the 1912 Census, finally worked up for industries where the lack of follow-up with respondents was not too serious, although the quality of the 1912 estimates remained poor.

The Balfour Committee of 1929 recommended a resumption of quinquennial censuses. The next were held for 1930 and 1935, and the Board of Trade, after initially setting up only a temporary staff, soon gained Treasury approval for a permanent staff. The series was again interrupted by war. Each census was designed afresh from its predecessor, making comparability difficult – for example, exemptions were mostly provided for the smallest businesses, but the size of businesses granted an exemption was different in each census. For 1930, when only businesses employing more than ten people were included, the smaller workload resulted in much quicker production of results, with the first preliminary data appearing in December 1931 and the final reports in 1933 to 1935.

The Import Duties Act 1932, mainly concerned with imposing a 10 per cent tax on imports, also included powers for the Board of Trade to collect information on domestic production of goods which, had they been imported, would have been subject to the tax. The principal differences in the powers in this Act were that:

- breakdowns of production by commodity were no longer restricted to breakdowns in the import and export list
- breakdowns of the cost and quantity of materials and fuel could be collected

The first such census was taken for 1933, on a reduced set of production industries, covering 62 per cent of output and 69 per cent of employment according to the 1930 Census, and again for 1934.

The 1935 Census used a combined approach, with some industries approached under the Import Duties Act and some under the Census of Production Act. There was a further Import Duties Act inquiry

in 1937 (mostly) and 1938 (six additional industries only). Preliminary results for 1937 appeared in the Board of Trade journal, but no final report was produced as processing was interrupted by the Second World War.

The Second World War

During the war, there was a confusion of statistical information, which led the Prime Minister, Winston Churchill, to develop his statistical section into the Central Statistical Office (CSO). The need to make very large changes to the economy for the war very quickly required a great deal of statistical information, which continued to be collected by the various departments of government, but was mediated through the CSO. There were no census publications during this period, but there were initially two digests of statistical information, and later many more, including annual supplements which might be considered the wartime counterparts of the censuses. The increase in statistical requests to businesses which resulted from this caused resentment in many parts of industry, and this continued after the war in a general distrust of proposals for new statistical collections. The first National Accounts were produced in 1941, and their annual publication added to pressure for good statistics after the war.

The annual censuses 1946 to 1969

A new Act – the Statistics of Trade Act (1947)

In June 1945, two committees were commissioned by the Board of Trade, one to review the requirements for the Census of Production, and the other to review the case for a Census of Distribution. The recommendations of these committees were translated into the Statistics of Trade Act (1947), which is the Act under which most statutory surveys of businesses are undertaken in Great Britain (there is separate legislation for Northern Ireland). The Act stipulates that a Census of Production shall be run each year (the only survey required to be undertaken under British law), but also provides powers for the statutory collection of other business statistics.

The committees also suggested a number of changes to the questions which were being asked, including changing from production to sales – which was designed to

make the questionnaires easier to complete. The Statistics of Trade Act contained a schedule of topics which could be included, with much wider topic coverage than the Census of Production Act. The wider scope for questions meant that wages and salaries information was also asked in the Census of Production for the first time in 1946.

Getting restarted 1948 to 1951

The next Census, for 1948, began the line of modern, annual censuses of production, with expanded topic coverage, and classification according to the first Standard Industrial Classification (SIC48) – a classification designed to be used consistently across government departments, many of which had used their own versions until then. Questions on commodity breakdowns of sales and purchases – goods (and later services) bought from other businesses – were asked in 1948, and this enabled the tabulation of results on both an industry and a product basis. Collecting and analysing the commodity breakdowns was burdensome for both businesses and the office processing the survey, so in 1949 and 1950 the Census collected only an aggregate figure, except in a few industries. The one major exception was in Northern Ireland, where the 1949 Census was the first full post-war collection.

The 1951 Census covered an expanded range of topics, and there were quite detailed questions on power equipment, included in the census for the first and only time since 1930, and also new questions on shift working. There was a breakdown of sales by commodity (in value and quantity), and also a breakdown of specified materials purchased.

Sampling

Sampling was already acknowledged as an issue to be considered in 1946, but it was several years before the consideration was serious enough to give rise to action. In planning the 1952 Census ‘it was decided that sufficiently accurate estimates of the main aggregates required could probably be made ... from a sample of establishments’, and this made the cost (both the cost to businesses and the cost to government) substantially smaller than a full census. The sample design essentially set a pattern which was unchanged in 2006. The very largest businesses (measured by employment) are completely enumerated,

with stratification by employment and decreasing sampling fractions with decreasing employment in these size strata. If there were few establishments in an industry, all were included.

It is interesting to quote the paragraph summarising the impact of sampling, which says:

The use of sampling methods inevitably means that precise figures cannot be obtained. The results for industry as a whole are accurate within very close limits, but a rather wider margin of uncertainty attaches to those for individual industries. In spite of this, it was considered that they should be published for these industries – principally the larger ones – where the margin of uncertainty is not too great; but that the results are based on sampling, and are not precisely accurate, should be borne in mind in any use that is made of them.

Once sampling was used, the frame from which the sample was drawn became more important. The frame was based on the responses to the census two years earlier.

Once the sampled businesses have responded, it is then necessary to use the responses to make an estimate for the whole population. In 1952 this was done using expansion estimation, but in 1953 an additional correction factor was introduced, to give the classical ratio estimator, which has been the mainstay of business survey estimation in the UK ever since.

In 1954, for the first time, a table was shown which estimated the activity of smaller businesses which had not been required to complete a detailed questionnaire, by industrial classification. From 1955 onwards, the tables were all adjusted so that they included estimates for businesses below the size threshold, and there were no separate tables for different-sized businesses in general (although size breakdowns of some variables continued to be produced).

Another review

There continued to be adverse reactions to the impositions and costs of the Census, so a further review of the Censuses of Production and Distribution was commissioned and published in 1954. It confirmed the need for the Census (although pointing out that many

businesses did not themselves find the results useful), and made a number of recommendations for reducing the compliance cost, which were largely implemented in the 1958 Census.

There was a general move to make the Census easier for businesses to complete. This was done firstly by including ancillary activities, particularly merchanting (for all industries) and also additional activities in specific industries, such as tree felling in businesses in the sawmilling industry. This meant that businesses were no longer required to divide their accounts. It was also tied up with a further development, which was the production of results by enterprise (one or more firms under common ownership or control, as defined in the Companies Act 1948) as well as on the traditional establishment basis, and this involved changes to the structure of the frame.

Secondly, the exemption limit for the detailed information was raised from employment of 11 or less to under 25, but the unit on which it was calculated was changed to the ‘firm’, which could be several establishments (approximately but not exactly equivalent to local units), but could also be only a part of an enterprise. Nevertheless, fewer businesses were required to respond overall.

Thirdly, the making of combined returns for local units (business sites) in the same industry and in England, Scotland or Wales was facilitated in 1958. This meant that figures needed to be apportioned by the Census Office for any detailed geographical analysis.

Fourthly, only an aggregate question on purchases of materials and fuel was asked in 1958 – not the product breakdown of earlier full Censuses, which it was now planned to collect decennially. Additionally, less product detail of output was collected where detailed monthly or quarterly statistics were available.

A return to a quinquennial pattern

The 1958 Census also started a quinquennial pattern of detailed censuses (covering all units above a threshold without sampling) in 1958, 1963 and 1968, with intervening smaller, sample-based surveys. The main difference in 1963 was in the detail collected, which included a detailed breakdown of purchases into around 2,000 headings (needed as the basis for input-output tables and for weights for the producer price index) and also a range of additional topics.

Since information on capital expenditure and inventories was collected in voluntary monthly and quarterly surveys, any businesses which supplied this information were given a simpler questionnaire asking only for output, or in some cases where there were also sales surveys, not sent a questionnaire at all.

Supplementary surveys were run in 1963 for capital expenditure of 'not yet in production' units (new units which are not yet producing output, but may have substantial capital expenditure in buildings and plant in preparation for beginning production), and for stocks and capital expenditure by parts of businesses excluded from census responses. This allowed stocks and capital expenditure for 1963 to be reworked onto a reporting unit (establishments under common control) basis, and used as the basis of sampling and estimation for the subsequent censuses.

The primary purpose of the smaller surveys between full censuses was as an input to the National Accounts, and also to provide more broadly-based figures which could be used to revise those made using short-period surveys. With these much simplified surveys, the unit was changed to something which would now be called a reporting unit – usually a firm or company, but sometimes a part of such a firm or company if it was engaged in a number of main activities corresponding to different industry groups. These units included all the parts of a firm, whether or not they were classified in the area the survey covered. This change had several statistical advantages, as well as being cheaper – it improved the coverage since, for example, capital expenditure at head offices was automatically included, and it improved the comparability with the annual inquiry into the Distributive and Services Trades, which was already taken on this basis. There was, however, a big disadvantage in that figures for output showed a discontinuity from the main censuses of 1958, 1963 and 1968 (as sales between establishments within a business unit were eliminated, and wholesaling and similar activities were added), and it was not considered possible to make an adjustment to a consistent basis or to provide a link.

In 1964 to 1967 and 1969, very simple censuses were run, asking only for information on inventories and capital expenditure (except in construction and

water supply industries where there were, respectively, one additional and one fewer questions). The threshold for inclusion in the census was effectively raised to employment of 500, although in industries where businesses employing fewer than 500 people made a substantial contribution, businesses below this threshold were sampled.

The annual censuses 1970 to 1997

Further development of industrial statistics

The Estimates Committee was appointed in the mid-1960s to review the whole structure of statistics. Following its fourth report, which contained much of the evidence and recommendations for action, the system of economic statistics in the UK was overhauled, to increase the frequency of the basic information collected in the Census of Production to annual, to speed up the production of the results, to provide more detailed commodity information and to harmonise the concepts used. The new annual census (formally renamed the Annual Census of Production and universally known as ACOP) returned to enumerating all businesses larger than a fixed size threshold each year. The Business Statistics Office (BSO) – a precursor of part of the Office for National Statistics – was formed in part to facilitate running the new system of surveys.

One of the central planks of the new system was a 'Central Register' – a database of all the businesses in the UK with information which could be used for sampling. There was also some reduction in the detail collected through ACOP, since commodity breakdowns of sales were collected through a new quarterly survey, and the commodity breakdown of purchases questions moved to a new quinquennial Purchases Inquiry, first undertaken in 1974. Otherwise, the topic coverage of ACOP was little different from earlier surveys. For the first years of the new survey (1970 to 1972), in fact, a conscious decision was taken by the Census of Production Advisory Committee to keep the content of the Census fixed.

The European Economic Community

International comparison had been noted as a key requirement for Census of Production statistics as early as 1945, although this had initially looked more towards the USA and

the dominions. When the UK joined the European Economic Community (EEC – 'Common Market') on 1 January 1973, however, comparability with European nations became important.

The first effects were felt on the Census of Production for 1973, which was modified to conform with a directive aimed at coordinating the annual structural surveys in EEC member states. The main changes to the 1973 survey were:

- calculation of estimates of gross value added (which are closer to the definition of output required for the National Accounts)
- the introduction of a uniform cut-off of 20 employees (formerly 25) above which all businesses were included. This created a rather odd sequence of employment bands of unequal length – 0 to 10, 11 to 19, 20 and over, and a difference from the quarterly inquiries, which continued with a threshold of 25 employees, occasionally causing difficulties of reconciliation between the two surveys
- introduction of a standard questionnaire (the 'long form') for businesses with employment of 100 or more, and a questionnaire collecting less detail (the 'short form') for businesses with employment of up to 99
- some additional detailed questions were included on the long form relating to labour costs, purchases of services, merchanting, capital expenditure, and taxes (VAT, rates and motor vehicle licences)

Mass imputation (1973 onwards)

As well as changes to the scope and questions in 1973 in line with EEC requirements, there was also a change to the way the estimation system operated. Ratio estimation continued to be employed, but it was made operational through the directly equivalent practice of mass imputation using ratio imputation models. A ratio of the collected variable to the number of employees was calculated, and then applied to the register employment of any non-responding or exempt business to generate estimated values. Estimates for any domain could be easily produced by summing the appropriate combination of real values and estimates for any business in the domain. What was less clear was the

quality of such estimates, which led to its eventual discontinuation in 1995 (when estimates were made by weighting the sample responses with weights derived by ratio estimation).

The results from the 1974 and 1975 ACOPs were published together 'to improve timeliness', and the results of the first Purchases Inquiry were also included. Construction was reintroduced as a full part of the Census in 1974, after operating as a limited survey collecting capital expenditure and stocks from a sample of large undertakings from 1969 to 1973.

Sampling makes a comeback

In 1978 there was a move to use sampling more widely in ACOP. One in two establishments with 20 to 49 employees were sampled in 68 manufacturing industries. At the same time, around 10 per cent of units with 11 to 19 employees were also sampled, to meet a European requirement for a limited range of data from smaller units every five years. This sample of smaller businesses was not repeated in 1979, but the description of the size range changed from 11 to 19 to 10 to 19 as the size ranges were rationalised to be in line with Europe. The sampling of 20 to 49s was, however, repeated, and in 1980 it was extended so that only one in four 20 to 49s and one in two 50 to 99s were selected. Sampling also evolved in the construction industries, with the one in two sample of 20 to 49s extended to these industries from 1979. Further savings were made when the sample of construction businesses with fewer than 20 employees was discontinued in 1980.

In 1979 the first steps in another harmonisation with Europe were taken, as a supplementary volume was produced classified by the new SIC80 classification (although the Census was actually designed and run using SIC68). The new classification was the first to be aligned with the European classification NACE. The Purchases Inquiry, undertaken as a supplement to the Census of Production, was, however, designed using SIC80 classifications. Both the 1979 Census and Purchases Inquiry were vital in reclassifying (as well as rebasing) the National Accounts as they provided the weights for the Index of Production and producer price index, respectively. The 1980 ACOP was run fully on SIC80, but only summary results were produced for 4-digit activity headings (industries), with the detail produced mostly on 3-digit groups of the new SIC.

The Rayner review (Rayner 1981) articulated the view that statistics should be produced primarily for the purposes of

government and, from the 1980 publication onwards, the text prominently mentions the government first in the list of purposes for undertaking a Census of Production. This was, however, altered to give Europe as the first driver in 1983 – probably as a defence against pressure for surveys to be stopped or reduced, since the Census of Production outputs were a requirement under European regulations (which have the force of law). The statutory obligation to undertake a Census (from the Statistics of Trade Act) is also mentioned explicitly for the first time in many years.

A new register was introduced in 1984, based on value-added tax (VAT) information. This improved coverage especially of new 'births', new businesses beginning trading, which were properly identified through the VAT system more quickly than they had been noted before. 1984 also saw a 'benchmark Census' with an increased sample size, returning to the sampling scheme last used in 1979. This was designed to provide better quality information to benchmark the Purchases Inquiry run in the same year, and to provide weights for the Index of Production for rebasing onto 1985=100.

Occasional extra questions were included in ACOP to gather information on topics of interest or policy importance. The 1986 and 1988 Censuses saw three additional questions designed to obtain information on computer employees and the costs of buying or leasing computer equipment. 1991 and 1992 included questions on the cost of pollution control and waste management.

In 1993 a further revision of the classification system was made (to SIC92), to harmonise classifications within the European Union which were moving to the first revision of NACE. This was undertaken at the same time as moving to a new register, the Inter-Departmental Business Register (IDBR) (Perry 1995), which was based on the integration of the two primary administrative sources – VAT and pay-as-you-earn (PAYE) employment information. Apart from the change of classification, this had little direct impact on the running of ACOP, although it did pave the way for later changes.

The 1994 ACOP would have been a 'benchmark' one, with an increased sample size, if the series of more detailed surveys every five years had been continued, but instead it was 'slimline', as part of a general pressure on costs. The way in which ACOP was processed also changed for 1994. The mass imputation approach introduced in 1973 was dropped, and a survey-weighting approach was introduced for the first time,

in keeping with the treatment of ACOP as a sample survey. This made some of the processing more difficult, but meant that the quality of some of the lowest-level aggregates was much more easily seen. The ratio estimation approach was maintained.

Maximum information at minimum cost

The 1990s also saw renewed pressure to keep the costs to business of filling in government forms as low as possible. Although surveys are a very small proportion of the total administrative burden, they did not escape scrutiny, and ACOP was affected through a gradual reduction in sample size (aided by the declining number of businesses classified to manufacturing), and by reductions in the number of questions on the questionnaire.

The 1994 ACOP dropped the collection of information on capital expenditure and employment in local units. This made a substantial saving in compliance costs for businesses. The responses from businesses were then apportioned between the local units according to information from the IDBR on local unit employment, which was updated by the Census of Employment. The quality of the apportionment relied on the completeness of the register, and also on the relationship between employment on the IDBR and the variable collected in the survey (although this approach was not used in construction, mining and energy industries where regional data were not produced). The relationship was mostly good for (survey) employment, with deviations only where there had been changes in local unit structures, but the relationship between capital expenditure and employment has always been acknowledged to be weak except in the largest units.

Integration - the Annual Business Inquiry (1998 onwards)

The ABI was a major development which replaced and integrated quite a number of surveys – the Annual Censuses of Production and Construction, the Purchases Inquiry, the Annual Employment Survey (AES), and the set of six surveys covering the distribution and services sector – retail, wholesale, motor trades, catering, property and (other) services. Putting all these together in a single framework had big benefits for measuring consistently across the economy, for improved coverage by reduced duplication and fewer areas with poor coverage, and also allowed efficiencies from using the same survey structure.

The employment and turnover statistics from the Employment Department and CSO, respectively, were brought together in 1995 and formed part of the new Office for National Statistics; part of the reasoning for this was that a single survey collecting both sorts of information together would be more efficient and produce more consistent estimates. This was the main impetus for the integration of ACOP with the AES. At the same time, the successful introduction of the IDBR, which merged information from the two administrative sources PAYE and VAT, also made it practical to merge the services sector (which had formerly been based on a register derived only from VAT) and the production sector (where the register had been based on employment information). The final driver was from Europe, which extended the structural business statistics regulation (Council regulation 58/97) to cover the service industries. The UK met its obligations under this regulation through the new ABI.

In 1997 the way employment was measured was changed as part of the transition to the ABI – instead of the average employment over the year (defined for convenience as the average of the last week in each month), the employment on a specific date was required. The Census of Employment had had a date in September but, to correspond with the despatch date of the ABI, this was moved to 12 December, with the results adjusted based on information from the Monthly Production Inquiry. The adjustment process was soon dropped, however, leading to a lot of dissatisfaction with the effects of seasonality around Christmas on the employment figures, so the reference date was moved back to the old Census of Employment date of September in 2006.

Another way in which the merger of the surveys was implemented was to institute a two-part questionnaire, one part requesting employment information which could be returned relatively quickly, and one part requesting more detailed financial variables which could typically only be completed when a business had finalised its annual accounts.

A companion survey, the Annual Register Inquiry (ARI) replaced the collection of local unit information undertaken by the AES and formerly ACOP (until 1993), from 1999. The AES itself was run alongside the

ABI in 1998. The local unit information from the ARI is now used to update the business structures on the IDBR, and this information is then used to apportion data to form regional estimates.

The most important changes to the methods employed in the ABI were:

- a move to stratification by country, with oversampling in Scotland and Wales. This gave additional accuracy for estimates in Scotland and Wales, and fulfilled the original requirements from the Statistics of Trade Act
- a change from sampling independently each year to having 50 per cent overlap between samples outside completely enumerated strata (except for businesses with fewer than 10 employees, where there was no overlap, to keep the response burden as low as possible). This improved the quality estimates of yearly change
- a change in the apportionment between regions
- a new outlier adjustment procedure

More details of the transition to the ABI and the survey methods employed are available in Jones (2000). The detail of the methods used for the employment information from the ABI and the transition from the AES are given in Partington (2000, 2001).

Some common themes

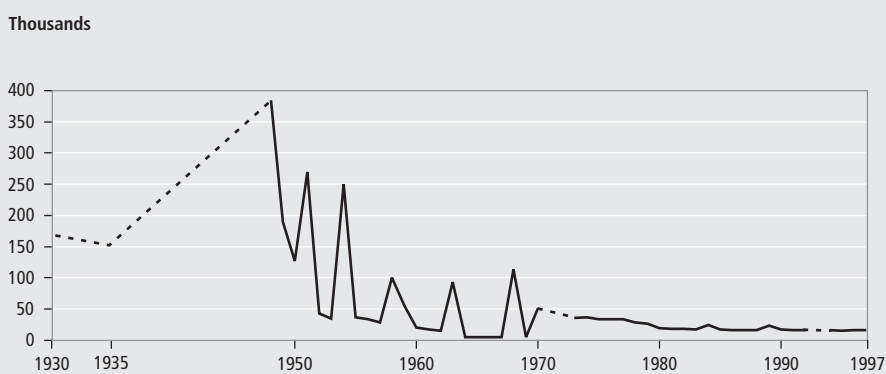
Over the 100 years of development of economic censuses and surveys in the UK, some common themes have emerged:

- increasing concern about compliance costs
- greater use of sampling
- more comprehensive coverage of services
- improved timeliness
- greater integration

The cost to businesses of completing questionnaires has always been a strong consideration in the development of the Census of Production (and indeed in all business surveys). Many of the advances in the procedures and methods have been led by this, including the introduction of sampling; the detailed consultation on questions to be asked; the evolution of the statistical unit to something which corresponds as closely as possible to actual business structures; and the use of models to derive regional data instead of needing to collect it.

The sample size (**Figure 1**) has shown an asymptotic reduction, initially from gradually raising the threshold for inclusion in the census, later from the introduction of sampling, and towards the end from other methodological improvements. This is also slightly confounded with changes to the definition of the unit. What is clear, however, is that there is an asymptote, and that the range of estimates which can be produced cannot be maintained if there are large cuts in sample sizes. Further methodological developments may in time allow small reductions in the sample without adverse impacts on quality, continuing the asymptotic development.

Figure 1
Despatch of questionnaires in the Census of Production¹



Note:

- 1 1997 was the last year when the Census of Production had an independent existence – thereafter it became part of the Annual Business Inquiry.

Improved timeliness has been associated with the reduction in the number of questionnaires despatched, as this reduced the follow-up requirements. Later, technology made significant changes to the speed with which processing could be undertaken, and full advantage was taken in increasing the frequency of the Census of Production to annually, and then in improving the speed with which results were produced. The long-term effect has been to move from requiring five years to produce the final census results (with provisional results published piecemeal up to that date), to the ABI for 2004 where final results appeared 18 months after the reference date (with provisional results after 12 months). Much of this time is used in obtaining responses from businesses, since questionnaires cannot be completed until the year has finished.

There has also been a gradual improvement in the coverage of service industries, leading to the ABI which integrates the production and services collections. Integration is a growing theme, especially the need for more consistent definitions, methods and practices. The driver is not only the users' need for greater clarity and consistency in outputs, but also a producer requirement to achieve efficiencies through common practices. The difficulty has always been the need for investment to implement the changes needed. Most recently the drive for consistency has been underpinned by organisational change: the introduction of the IDBR in 1995 as a common register for all business surveys; the formal separation of data collection as a functional unit in 1999 (although data collection had been separated from results processing a few years earlier); and the setting up of the Sources Directorate in 2003.

From the foregoing, it is clear that the current directions in the development of UK economic surveys are based on themes that have developed during 100 years of operation. An understanding of the historical context helps us to see where pressures are likely to lead in the future, and

what has already worked well without the need to test all the approaches. The gradual evolution of surveys will continue, and it will be interesting to see what will be the main developments as the second century of the Census of Production is entered.

Note

- 1 This article is extracted from a detailed paper on the history of the Census of Production, which is available from the authors on request.

ACKNOWLEDGEMENTS

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REFERENCES

- Jones G (2000) 'The development of the Annual Business Inquiry', *Economic Trends* 564, pp 49–57.
- Mitchell B (1988) *British historical statistics*. Cambridge: Cambridge University Press.
- Partington J (2000) 'The Annual Business Inquiry: an improved way of measuring employee jobs', *Labour Market Trends* 108(9), pp 405–8.
- Partington J (2001) 'The launch of the Annual Business Inquiry', *Labour Market Trends* 109(5), pp 259–68.
- Perry J (1995) 'The Inter-Departmental Business Register', *Economic Trends* 505, pp 27–30.
- Rayner D (1981) Review of Government Statistical Services. Report to the Prime Minister. (Publisher not given).

FEATURE

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Labour disputes in 2006

SUMMARY

In 2006, 754,500 working days were lost in the UK from 158 stoppages of work arising from labour disputes.

This article analyses the three main measures of labour disputes – working days lost, stoppages and workers involved – by industry, region, cause, size and duration. The statistics are put into context by considering estimates of working days lost per 1,000 employees and working time lost through strikes as a proportion of time actually worked.

Data are taken from a number of sources, including regular centralised returns from some industries and public bodies, as well as directly from the employer or trade union involved after the Office for National Statistics has been notified of a dispute from press reports.

In 2006, 754,500 working days were lost in the UK from 158 stoppages of work arising from labour disputes. This article analyses the disputes by industry, region, cause, size and duration, and also compares the 2006 figures with previous years.

The article presents final figures on labour disputes for 2006 and analyses the figures in more depth than in the monthly tables, which are published on the National Statistics website as part of ELMR's monthly release. Provisional estimates are published in the monthly Labour Market Statistics First Release.

Annual changes

A comparison of statistics on labour disputes in 2005 and 2006 is shown in **Table 1**. There are three core components to the figures: the number of working days lost through stoppages; the number of workers involved in those stoppages; and the number of stoppages.

The 2006 total of 754,500 working days lost through labour disputes is significantly higher than the 2005 (157,400) total. The 2006 total is also higher than the average number of working days lost per year in the 1990s (660,000) but lower than the average for both the 1980s (7.2 million) and the 1970s (12.9 million).

The 158 stoppages total in 2006 is higher than the 2005 and 2004 totals of 116 and 130, respectively. There were three stoppages beginning in 2005 which continued into 2006. The number of stoppages has fallen sharply since the 1980s,

Table 1

Number of stoppages, workers involved and working days lost

United Kingdom		
Working days lost through stoppages	2005	2006
In progress in year ¹	157,400	754,500
Beginning in year	157,400	747,800
Workers involved in stoppages in progress in year²	92,600	713,300
Of which: directly involved	92,400	690,200
indirectly involved	200	23,100
Beginning in year	91,900	710,800
Of which: directly involved	91,700	687,800
indirectly involved	200	23,000
Stoppages		
In progress in year	116	158
Beginning in year	116	155

Notes:

- 1 Stoppages that began in 2005 and continued into 2006 accounted for 6,700 days lost in 2006.
- 2 Workers in progress figures also include workers who did not strike initially, but who joined at a later date.

when the average annual number was 1,129. The average number in the 1990s was 273.

There were 713,300 workers involved in labour disputes during 2006; this compares with 92,600 in 2005. The number of workers involved is higher than average number involved in the 1990s (201,600) but below the average in the 1980s (1,040,300).

Table 2
Number of stoppages and working days lost

United Kingdom

	Working days lost (000s)	Working days lost per 1,000 employees ¹	Workers involved (000s)	Stoppages ²	Stoppages involving the loss of 100,000 working days or more
1987	3,546	155	887	1,016	3
1988	3,702	157	790	781	8
1989	4,128	172	727	701	6
1990	1,903	78	298	630	3
1991	761	32	176	369	1
1992	528	23	148	253	-
1993	649	28	385	211	2
1994	278	12	107	205	-
1995	415	18	174	235	-
1996	1,303	55	364	244	2
1997	235	10	130	216	-
1998	282	11	93	166	-
1999	242	10	141	205	-
2000	499	20	183	212	1
2001	525	20	180	194	1
2002	1,323	51	943	146	2
2003	499	19	151	133	-
2004	905	34	293	130	3
2005	157	6	93	116	-
2006	755	28	713	158	1

Notes:

- 1 Based on the (September 2006) estimates of employee jobs.
- 2 Stoppages in progress during year.

Figure 1
Working days lost

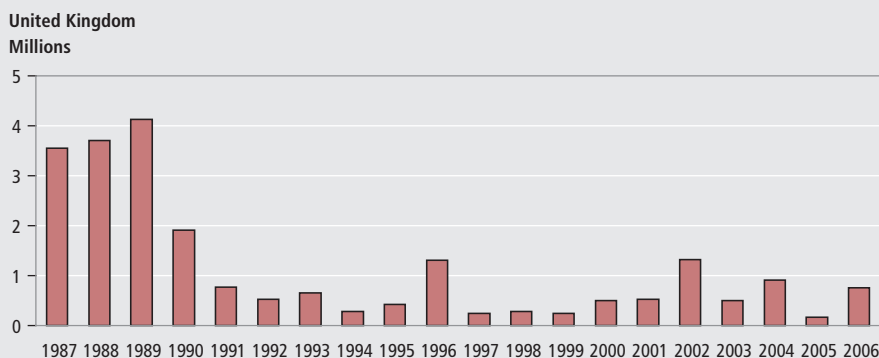
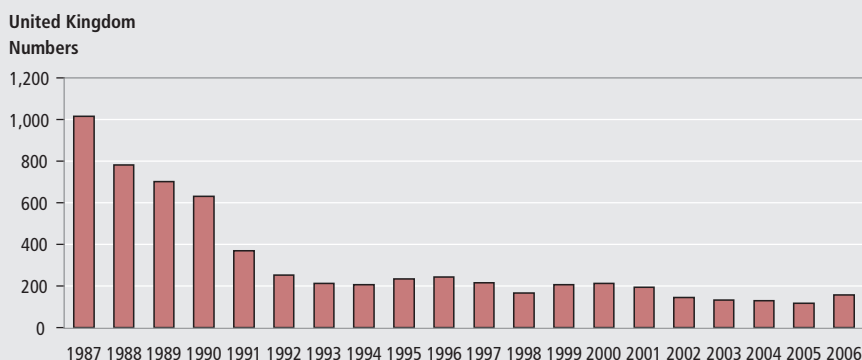


Figure 2
Stoppages in progress



Review of 1987 to 2006

Table 2 presents labour dispute figures for the period 1987 to 2006, and Figure 1 and Figure 2 illustrate working days lost and the number of stoppages. The high number of days lost in 1996 was due to one very large stoppage in the transport, storage and communication group, and shows the impact that large disputes can have on the statistics. This was also evident in 2002, when two disputes in public administration accounted for 60 per cent of the total days lost over the year.

Both Figures 1 and 2 show a substantial decline in strike activity in the 1990s. Figure 2 in particular shows that the number of strikes has been on a downward trend over the last 20 years.

The second column of Table 2 shows working days lost per 1,000 employees for each year from 1987 to 2006. This is the standard method that has been used to convert working days lost into a strike rate that takes account of the size of the labour force. This also enables comparisons to be made across industries and regions that differ in size. Since the number of employee jobs has not changed dramatically over the last 20 years, the rates for the UK as a whole show the same pattern of general decline, with occasional peaks that can be seen on the working days lost series. The 754,500 working days lost in 2006 is equivalent to 28 working days lost per 1,000 employees.

An alternative way of putting strike statistics into a wider context is to consider working time lost through strikes as a proportion of time actually worked. In 2006, an estimated 42.2 billion hours were worked in the UK. Comparing this with 5.9 million hours lost through strikes shows that approximately one in every 7,200 potential working days was lost through strikes in 2006. The equivalent figure for 2005 was one in every 33,800.

Industrial analyses

Historically, certain industries have been more prone to strike than others, and breaking the strike statistics down into separate industries can reveal some interesting patterns and shifts over time. However, it should be noted that comparisons between industries can also be affected by the methodology that is used for compiling the figures. For example, because small stoppages are excluded from the figures, it is more likely that industry groups with large firms will have disputes included in the statistics.

Table 3
Number of stoppages and working days lost: by industry, 2006

United Kingdom

Industry group (SIC 2003)	SIC class	Working days lost (000s) ¹	Workers involved (000s) ¹	Stoppages ²
All industries and services³		754.5	713.3	158
Mining, energy and water	10–14, 40, 41	11.9	1.1	2
Manufacturing	15–37	17.9	10.7	25
Services	50–99	709.6	699.7	126
Agriculture, hunting, forestry and fishing	01, 02, 05	-	-	-
Mining and quarrying	10, 14	10.5	1.1	1
Manufacturing of:				
Food products, beverages and tobacco	15, 16	2.5	1.3	6
Textiles and textile products	17, 18	1.9	0.1	1
Leather and leather products	19	-	-	-
Wood and wood products	20	-	-	-
Pulp, paper and paper products; printing and publishing	21, 22	2.1	0.4	4
Coke, refined petroleum products and nuclear fuels	23	-	-	-
Chemicals, chemical products and man-made fibres	24	-	-	-
Rubber and plastic products	25	3.2	0.2	2
Other non-metallic mineral products	26	0.5	0.2	1
Basic metals and fabricated metal products	27, 28	2.4	0.5	2
Machinery and equipment not elsewhere specified	29	0.7	0.2	1
Electrical and optical equipment	30–33	-	-	-
Transport equipment	34, 35	4.6	7.8	8
Manufacturing not elsewhere specified	36, 37	-	-	-
Electricity, gas and water supply	40, 41	1.4	-	1
Construction	45	15.1	1.8	5
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	50–52	0.6	0.5	4
Hotels, restaurants, canteens and catering	55	-	-	-
Transport, storage and communication	60–64	40.5	14.4	30
Financial intermediation	65–67	-	-	-
Real estate, renting and business activities	70–74	3.9	1.3	9
Public administration and defence; compulsory social security	75	626.6	653.5	18
Education	80	31.4	27.7	53
Health and social work	85	4.8	1.6	4
Other community, social and personal service activities, private households with employed persons, extra-territorial organisations and bodies	90–93, 95, 99	1.7	0.6	8

Notes:

- 1 The figures for working days lost and workers have been rounded and consequently the sums of constituent items may not agree precisely with the totals.
 - 2 Some stoppages involved workers in more than one of the above industry groups, but have each been counted as only one stoppage in the totals for all industries and services.
 - 3 Stoppages in progress during year.
- Nil or negligible

Table 3 shows labour dispute statistics for 2006 broken down into 27 industrial groups (classified according to the Standard Industrial Classification 2003) and **Table 4** shows working days lost per 1,000 employees in 2005 and 2006 for the same industries.

Some 83 per cent of the working days lost in 2006 were as a result of 18 stoppages in public administration; 4 per cent were from 53 stoppages in education; and a further 5 per cent were from 30 stoppages in transport. There were also 25 stoppages in manufacturing which resulted in 18,000 working days lost. Of these 18,000 days lost, 25 per cent were from eight stoppages in the manufacturing of transport equipment. There were also two stoppages in the rubber and plastic products sector, which resulted in 3,200 working days lost.

Table 4 presents the strike rates for 2005 and 2006. The rate for services has significantly increased, from six in 2005 to 32 in 2006. The main reason for the increase is public administration, which has increased from 15 in 2005 to 412 in 2006. The strike rate for manufacturing increased slightly from five in 2005 to six in 2006. Within the manufacturing sector there was a significant fall in the rate for manufacturing of coke, refined petroleum products and nuclear fuels, but a sharp rise for both textiles and textile products and rubber and plastic products. The mining and quarrying sector also showed a significant rise in their strike rate, from three in 2005 to 476 in 2006.

Table 5 shows strike rates over time for the mining, energy and water supply industries, manufacturing and services sectors. In recent years, the services sector strike rate has tended to be higher than the rate in the manufacturing sector, particularly in 2002 and 2004. The mining, energy and water rate has tended to be erratic. It is worth noting that in 1999, the mining, energy and water supply industries group had a nil strike rate for the first time on record, although the number of employee jobs in these industries was also at a record low. **Figure 3** shows the strike rates for the manufacturing and services sectors separately for the period between 1997 and 2006. This shows the large increase in the services sector in 2002 and 2004, which was predominantly due to a small number of large disputes in public administration.

Table 4
Working days lost per 1,000 employees: by industry

United Kingdom

Industry group (SIC 2003)	SIC class	2005	2006
All industries and services		6	28
Mining, energy and water	10–14, 40, 41	34	74
Manufacturing	15–37	5	6
Services	50–99	6	32
Agriculture, hunting, forestry and fishing	01, 02, 05	-	-
Mining and quarrying	10, 14	3	476
Manufacturing of:			
Food products, beverages and tobacco	15, 16	3	6
Textiles and textile products	17, 18	-	17
Leather and leather products	19	-	-
Wood and wood products	20	-	-
Pulp, paper and paper products; printing and publishing	21, 22	4	6
Coke, refined petroleum products and nuclear fuels	23	208	-
Chemicals, chemical products and man-made fibres	24	1	-
Rubber and plastic products	25	-	17
Other non-metallic mineral products	26	-	4
Basic metals and fabricated metal products	27, 28	2	6
Machinery and equipment not elsewhere classified	29	6	3
Electrical and optical equipment	30–33	-	-
Transport equipment	34, 35	18	14
Manufacturing not elsewhere classified	36, 37	-	-
Electricity, gas and water supply	40, 41	53	-
Construction	45	1	11
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	50–52	-	-
Hotels, restaurants, canteens and catering	55	12	-
Transport, storage and communication	60–64	20	25
Financial intermediation	65–67	3	-
Real estate, renting and business activities	70–74	1	1
Public administration and defence; compulsory social security	75	15	412
Education	80	19	13
Health and social work	85	-	1
Other community, social and personal service activities, private households with employed persons, extra-territorial organisations and bodies	90–93, 95, 99	4	1

Notes:

- 1 Based on the latest (Sept 2006) estimates of employee jobs.
- Nil or negligible

Table 5
Working days lost per 1,000 employees: by industry group¹

United Kingdom

	Mining, energy and water	Manufacturing	Services	All industries and services
1997	9	21	7	10
1998	1	8	12	11
1999	-	14	7	10
2000	17	13	20	20
2001	141	11	22	20
2002	1	6	62	51
2003	2	18	20	19
2004	29	6	41	34
2005	34	5	6	6
2006	74	6	32	28

Notes:

- 1 Based on the latest available (Sept 2006) estimates of employee jobs.
- Nil or negligible

Regional analyses

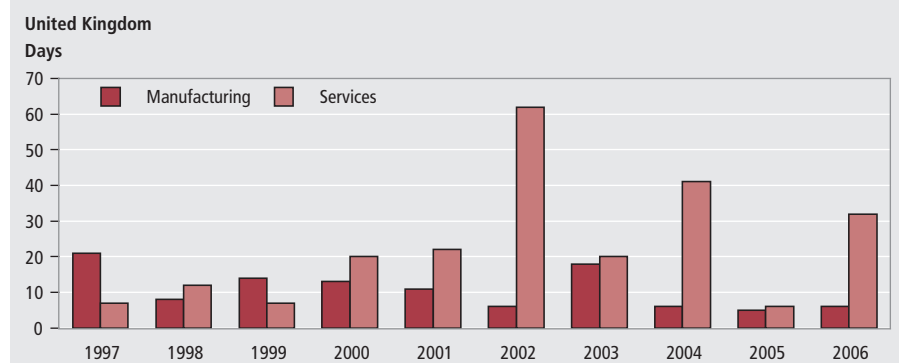
Table 6 shows regional strike rates for Government Office Regions (GORs) between 2002 and 2006, with a further breakdown of the figures for 2006 by industry. The rates for 2006 are also illustrated on **Map 1**. When interpreting these figures, it is important to bear in mind that the industrial composition of employment in a region is a major influencing factor on the scale of labour disputes it experiences. Having noted this point, the region with the highest number of working days lost per thousand employee jobs in 2006 was the North West with 53. Significantly, all regions apart from London saw an increase in their strike rates. Wales showed the sharpest rise, from two in 2005 to 51 in 2006. Scotland, the North East and North West also showed significant increases in 2006.

Causes of disputes

Table 7 shows stoppages in 2006 by principal cause and industry group and **Table 8** provides a time series of working days lost by cause. **Figure 4** illustrates the number of working days lost in 2006 by principal cause of dispute. In 2006, 73 per cent of working days lost were due to disputes over pay and accounted for 68 per cent of all stoppages. In comparison, redundancy questions accounted for 22 per cent of days lost and 13 per cent of all stoppages. Working conditions and supervision accounted for 2 per cent of days lost and 3 per cent of all stoppages. Dismissal and disciplinary measures accounted for 1 per cent of days lost and 3 per cent of all stoppages; manning and working allocation accounted for 1 per cent of days lost and 3 per cent of all stoppages.

Figure 5 shows the distribution of working days lost by cause in each year from 1997 to 2006 for four causes: pay, redundancy, staffing and work allocation, and other. This shows the percentage of days lost due to disputes over pay increased in 2006 compared with 2005, with redundancy increasing most significantly. It should be noted that disputes over pay also include stoppages over feared or alleged reductions in earnings as well as disputes over pay increases. The figures are often dominated by one or two very large strikes which will, in turn, dominate all of the detailed analyses and can make comparisons over time difficult. Indeed, the increase in working days lost due to disputes over redundancies has resulted from one stoppage in the public administration sector.

Figure 3

Working days lost per 1,000 employees: by sector**Disputes by duration**

The statistics cover the number of days that strike action took place, not the number of days the parties involved in the dispute were actually in disagreement.

Table 9 shows the duration of the stoppages in progress in 2006 and this information is displayed in **Figure 6**. Some 55 per cent of stoppages lasted just one day, involved 603,400 workers and accounted for 67 per cent of the total working days lost. At the other extreme, two stoppages lasted between 31 and 50 days, involved 700 workers and accounted for 0.1 per cent of

Table 6

Stoppages in progress: by GOR and industry group,^{1,2,3} 2006

	North East	North West	Yorkshire and The Humber	East Midlands	West Midlands	South West	East of England	London	South East	Wales	Scotland	Northern Ireland	United Kingdom
Days lost per 1,000 employees⁴ – all industries and services													
2002	119	76	44	50	41	32	26	60	36	74	54	34	51
2003	2	10	8	6	8	7	4	51	6	9	39	101	19
2004	33	19	37	20	23	13	11	18	16	28	160	99	34
2005	7	7	4	3	11	1	4	11	1	2	7	15	6
2006	51	53	23	18	15	8	8	10	5	51	49	30	28
2006 by industry group (SIC 2003)													
Working days lost (thousands)													
Agriculture, hunting, forestry and fishing	-	-	-	-	-	-	-	-	-	-	-	-	-
Mining, quarrying, electricity, gas and water	-	-	-	1.4	-	-	-	-	-	-	10.5	-	11.9
Manufacturing	0.5	5.7	-	0.4	3.4	-	0.2	0.1	0.3	1.5	5.1	0.8	17.9
Construction	-	-	4.9	-	-	-	-	4.0	-	5.7	0.5	-	15.1
Transport, storage and communication	2.8	2.1	3.1	2.4	7.5	2.6	0.1	8.6	1.6	-	0.7	9.1	40.5
Public administration and defence	49.8	115.7	41.9	28.2	23.1	15.2	17.9	24.5	15.2	54.3	101.1	2.0	626.6
Education	0.2	1.2	0.3	0.8	0.1	0.2	0.2	0.5	0.1	0.4	-	9.0	31.4
All other services	1.1	2.3	1.6	0.5	0.2	-	0.7	3.4	0.9	0.3	-	-	11.0
All industries and services	54.4	127	51.9	33.7	34.3	18.0	19.1	41.0	18.2	62.2	117.9	20.8	754.5
Workers involved (thousands)													
Agriculture, hunting, forestry and fishing	-	-	-	-	-	-	-	-	-	-	-	-	-
Mining, quarrying, electricity, gas and water	-	-	-	-	-	-	-	-	-	-	1.1	-	1.1
Manufacturing	0.2	4.5	-	3	0.6	-	0.1	-	0.3	0.6	1.1	0.2	10.7
Construction	-	-	0.7	-	-	-	-	0.8	-	0.3	-	-	1.8
Transport, storage and communication	1.3	0.5	1.4	0.8	3.1	0.8	0.1	4.7	0.4	-	0.2	1.0	14.4
Public administration and defence	60.4	121.0	51.4	34.4	29.1	18.1	19.3	29.2	18.1	64.8	120.7	2.2	653.5
Education	0.2	1	0.3	0.4	0.1	0.2	0.2	0.4	0.1	0.3	-	4.2	27.7
All other services	0.4	0.6	0.4	0.3	0.1	-	0.4	0.6	1.0	0.3	-	-	4.0
All industries and services	62.6	127.5	54.2	38.9	33.0	19.0	20.2	35.8	19.9	66.2	123.1	7.6	713.3
Stoppages													
Agriculture, hunting, forestry and fishing	-	-	-	-	-	-	-	-	-	-	-	-	-
Mining, quarrying, electricity, gas and water	-	-	-	1	-	-	-	-	-	-	1	-	2
Manufacturing	1	4	-	1	4	-	2	1	3	2	5	2	25
Construction	-	-	1	-	-	-	-	2	-	1	1	-	5
Transport, storage and communication	3	3	4	1	5	4	1	7	6	-	4	2	30
Public administration and defence	3	6	2	2	2	2	5	3	3	3	6	2	18
Education	3	10	9	6	2	2	5	10	1	8	-	2	53
All other services	4	3	4	2	1	1	3	6	3	2	-	-	25
All industries and services	14	26	20	13	14	9	16	29	16	16	17	8	158

Notes:

- The figures for working days lost and workers involved have been rounded and consequently the sum of the constituent items may not agree precisely with the totals.
 - Figures for widespread stoppages which cannot be disaggregated down to Government Office Region level are included in the UK total but excluded from the regional figures in the table above. This accounts for 156,000 days lost in 2006.
 - When a stoppage has been identified as covering more than one broad industry group, the actual number of working days lost and workers involved will be allocated to the specific broad industry group; however, the stoppage will be included in each industry category.
 - Based on the latest (September 2006) estimate of employee jobs.
- Nil or negligible

Map 1

Working days lost per 1,000 employees, all industries and services, 2006

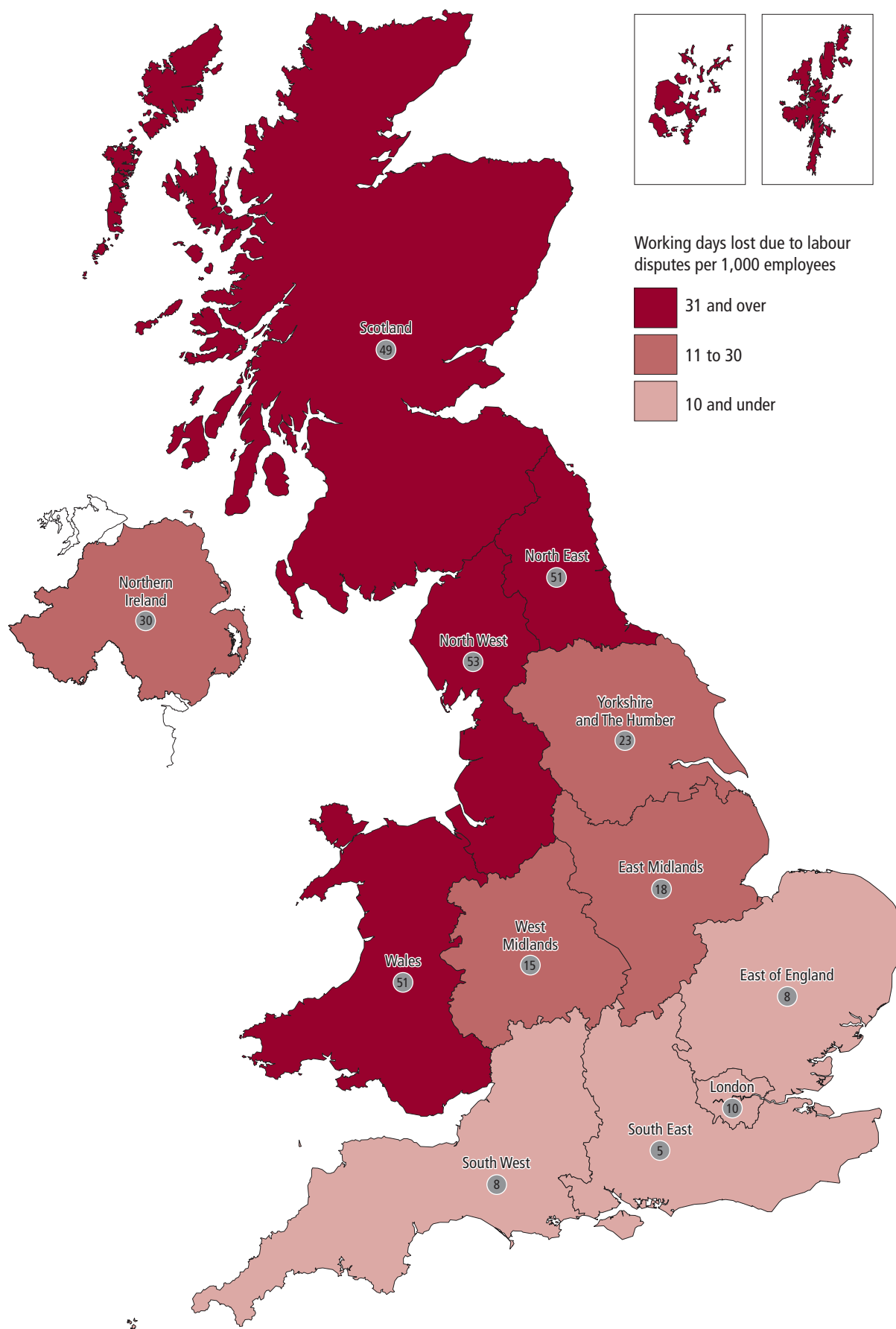


Table 7

Working days lost, workers involved and stoppages in progress: by main cause and broad industry group, 2006

United Kingdom

Thousands

Industry group (SIC 2003)	Wage disputes			Other causes						All causes
	Wage rates and earnings levels	Extra wage and fringe benefits	Total wage disputes	Duration and pattern of hours worked	Redundancy questions	Trade union matters	Working conditions and supervision	Staffing and work allocation	Dismissal and other disciplinary measures	
Working days lost (thousands) ¹										
Agriculture, hunting, forestry and fishing	-	-	-	-	-	-	-	-	-	-
Mining, quarrying, electricity, gas and water	11.9	-	11.9	-	-	-	-	-	-	11.9
Manufacturing	11.1	-	11.1	1.8	2.3	-	-	-	2.7	17.9
Construction	0.5	3.9	4.4	-	-	0.1	5.7	-	4.9	15.1
Transport, storage and communication	12.8	10.1	22.9	2.1	2.7	2.0	9.8	-	0.9	40.5
Public administration and defence	5.3	460.7	466.0	-	156.3	-	-	4.2	-	626.6
Education	28.6	-	28.6	-	2.6	-	-	0.3	-	31.4
Other services	6.9	0.4	7.3	0.2	2.8	0.1	0.1	0.5	-	11.0
All industries and services	77.1	475.1	552.2	4.1	166.7	2.3	15.7	5.0	8.5	754.5
Workers involved (thousands) ¹										
Agriculture, hunting, forestry and fishing	-	-	-	-	-	-	-	-	-	-
Mining, quarrying, electricity, gas and water	1.1	-	1.1	-	-	-	-	-	-	1.1
Manufacturing	6.1	-	6.1	0.1	4.0	0.1	-	-	0.4	10.7
Construction	-	0.8	0.8	-	-	0.1	0.3	-	0.7	1.8
Transport, storage and communication	5.9	3.8	9.7	1.0	1.4	1.0	1.1	-	0.2	14.4
Public administration and defence	4.8	557.8	562.6	-	86.2	0.1	-	4.6	-	653.5
Education	24.8	-	24.8	-	2.8	-	-	-	-	27.7
Other services	1.8	0.1	1.9	0.1	1.6	0.1	0.1	-	-	4.0
All industries and services	44.6	562.5	607.1	1.2	96.1	1.3	1.5	4.7	1.4	713.3
Stoppages ²										
Agriculture, hunting, forestry and fishing	-	-	-	-	-	-	-	-	-	-
Mining, quarrying, electricity, gas and water	2	-	2	-	-	-	-	-	-	2
Manufacturing	17	-	17	2	3	1	-	-	2	25
Construction	1	1	2	-	-	1	1	-	1	5
Transport, storage and communication	12	3	15	5	2	3	3	-	2	30
Public administration and defence	8	2	10	-	5	1	-	2	-	18
Education	47	-	47	-	5	-	-	1	-	53
Other services	14	1	15	2	5	1	1	1	-	25
All industries and services	101	7	108	9	20	7	5	4	5	158

Notes:

- The figures for working days lost and workers involved have been rounded and consequently the sum of the constituent items may not agree with the totals.
 - The number of stoppages for the industry groups shown may not sum to the total for all industries and services as some stoppages which affect more than one broad industry group have been counted once only in the total for all industries and services.
- Nil or negligible

Table 8

Working days lost:¹ by main cause in all industries and services

United Kingdom

Thousands

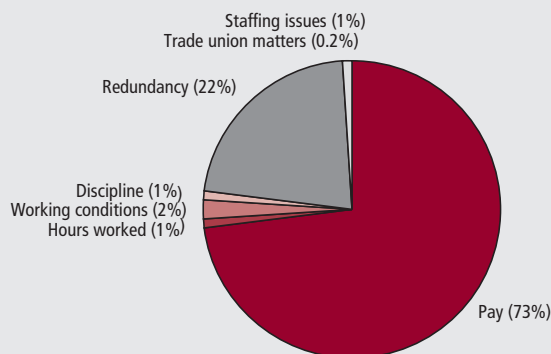
	Wage disputes			Other causes						All causes
	Wage rates and earnings levels	Extra wage and fringe benefits	Total wage disputes	Duration and pattern of hours worked	Redundancy questions	Trade union matters	Working conditions and supervision	Staffing and work allocation	Dismissal and other disciplinary measures	
1996	1,028	34	1,063	52	39	6	91	35	18	1,303
1997	103	26	128	7	69	2	8	18	4	235
1998	147	19	166	2	54	2	14	16	28	282
1999	159	8	166	5	35	2	15	6	14	242
2000	376	8	383	6	56	0	11	23	18	499
2001	141	3	143	13	88	6	173	79	23	525
2002	1,039	137	1,176	3	14	5	110	10	7	1,323
2003	280	140	420	63	5	0	2	7	2	499
2004	759	3	762	19	107	11	0	5	1	905
2005	87	8	94	7	17	6	9	22	2	157
2006	77	475	552	4	167	2	16	5	9	755

Note:

- The figures for working days lost have been rounded and consequently the sum of the constituent items may not agree with the totals.

Figure 4
Working days lost: by principal cause of dispute, 2006

United Kingdom
Percentages



the total working days lost. There were no stoppages lasting over 50 days' duration.

Disputes by size

Table 10 shows disputes in 2006 by size and **Figure 7** illustrates that a large proportion of days lost result from large stoppages but that very few stoppages are large. The chart shows that 79 per cent of working days lost in 2006 resulted from stoppages where more than 5,000 days were lost in total, but that only 2 per cent of stoppages were that large. There were no stoppages with more than 25,000 working days lost. In contrast, 55 per cent of stoppages involved the loss of less than 250 days, but only 1 per cent of all days lost came from stoppages of this size.

Disputes by public and private sectors

Figure 8 and **Figure 9** illustrate the breakdown of working days lost and the number of stoppages between the public and private sectors and this information is also shown in **Table 11**. The number of working days lost from the private sector rose from 58,900 in 2005 to 98,300 in 2006. However, the proportion of working days lost from the private sector has decreased from 37 per cent in 2005 to 13 per cent in 2006. This is still considerably lower than in 1999, where 71 per cent of days lost were from the private sector.

The number of stoppages in both 2005 and 2006 were divided almost equally between the public and private sectors, with 55 per cent of stoppages in the public sector and 45 per cent in the private sector. Generally, the breakdown of stoppages between the public and private sectors has been fairly constant, with 2002 and 2003 being the exceptions, when the private sector accounted for 58 per cent and 65 per cent of stoppages, respectively.

Trade union ballots

Annual data covering the period 2002 to 2006 has been provided by the Electoral Reform Service.

Annual trade union ballot data for the period 2002 to 2006 is presented in **Table 12** and **Table 13**. The number of ballots¹ calling for strike action increased steadily between 2002 and 2006, peaking

Figure 5
Working days lost: by principal cause of dispute

United Kingdom
Percentages

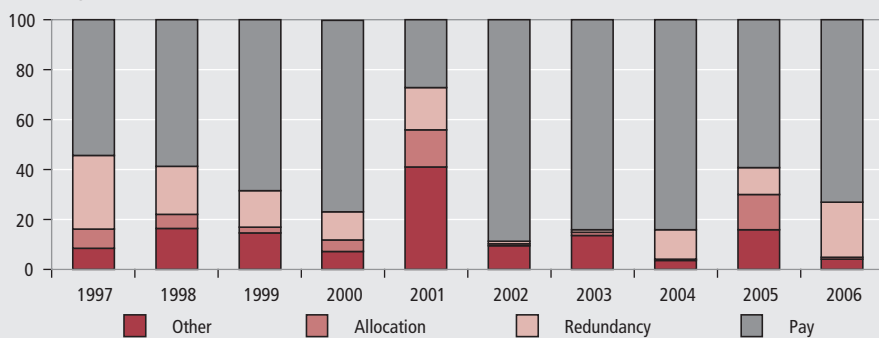


Figure 6
Proportions of stoppages in progress: by duration, 2006

United Kingdom
Percentages

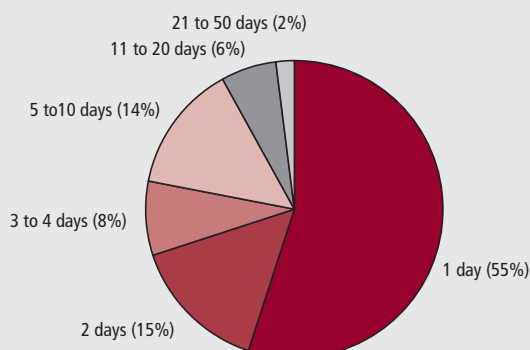


Table 9
Stoppages in progress: by duration¹ in working days, 2006

United Kingdom

	Working days lost (thousands) ^{2,3,4}	Proportion of all working days lost (per cent)	Workings involved (thousands) ³	Proportion of all workers (per cent)	Stoppages in progress	Proportion of all stoppages (per cent)
Days ¹						
1	506.9	67.2	603.4	84.6	87	55.1
2	155.6	20.6	94.4	13.2	24	15.2
3	15.3	2.0	5.6	0.8	8	5.1
4	5.0	0.7	1.7	0.2	4	2.5
5	1.4	0.2	0.3	0.0	3	1.9
6–10	34.1	4.5	5.1	0.7	19	12.0
11–15	7.2	1.0	1.1	0.2	5	3.2
16–20	11.6	1.5	0.7	0.1	5	3.2
21–30	16.7	2.2	0.9	0.1	1	0.6
31–50	0.7	0.1	0.1	0.0	2	1.3
Over 50	0.0	0.0	0.0	0.0	0	0.0
All stoppages	754.5	100.0	713.3	100.0	158	100.0

Notes:

- The statistics cover the number of days that strike action took place, not the number of days the parties involved in the dispute were actually in disagreement.
 - Classification by size is based on the full duration of stoppages, but the figure for days lost include only those days lost in 2006.
 - The figures for working days lost and workers involved have been rounded and consequently the sum of the constituent items may not agree precisely with the totals.
 - The working days lost figures are in general less than the product of the duration of each stoppage and the number of workers involved, because some workers would not have been involved throughout the dispute - see Technical note.
- Nil or negligible

at 1,290, or 96 per cent of the total. The proportion of those ballots calling for strike action resulting in a 'yes' is 85 per cent for 2006, a decrease of 1 percentage point on the 2005 figure of 86 per cent.

The number of ballots calling for action 'short of a strike' in 2006 decreased to 579 (43 per cent of total ballots). The proportion of those ballots resulting in a 'yes' vote has fallen steadily over the four-year period, dropping from 97 per cent in 2002 to 93 per cent in 2005 and 2006.

The five year time series for trade union ballots is illustrated in **Figure 10**. It can be seen that the trend for ballots voting for strike action closely follows the trends for the number of ballots calling for strike action and the total number of ballots. Nevertheless, there is still a notable difference in the number of ballots calling for strike action and those resulting in a 'yes' vote.

Notes

- As the majority of ballots include options for both 'strike action' and 'action short of strike action,' the total number of ballots does not equal the total of these options added together.

CONTACT

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Figure 7
Proportions of stoppages in progress and working days lost: by size of dispute, 2006

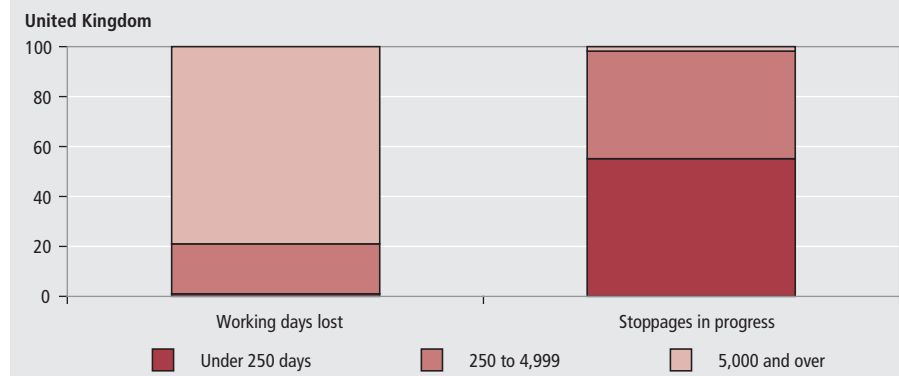


Figure 8
Working days lost: by public/private sector split

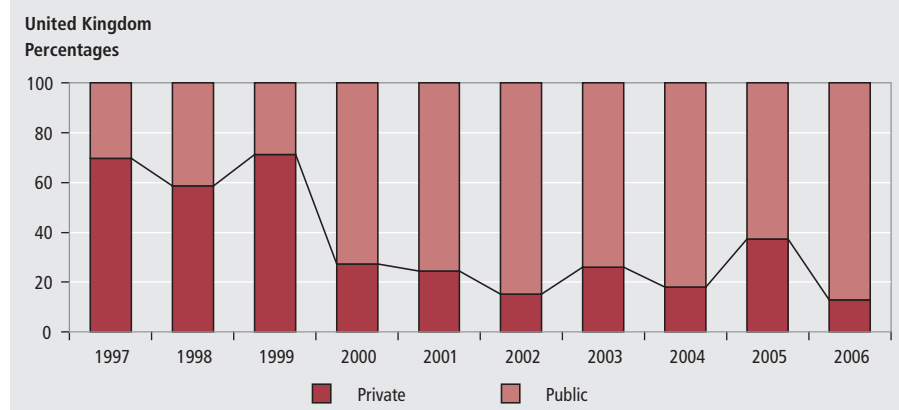


Figure 9
Stoppages: by public/private sector split

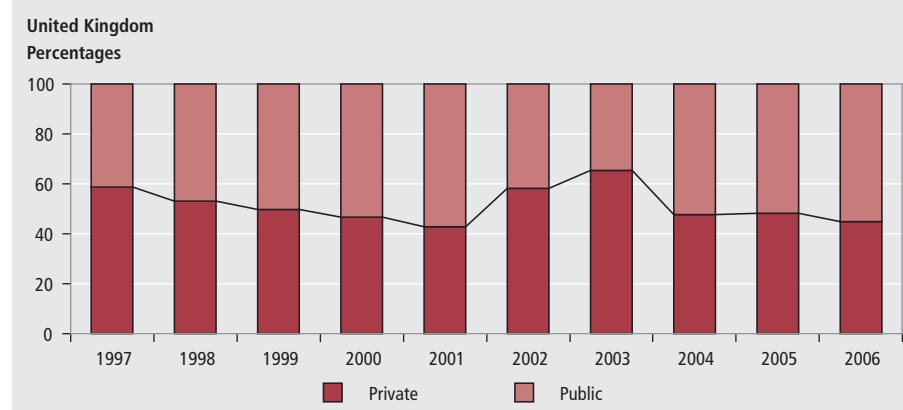


Table 10
Stoppages in progress: by size of dispute, 2006

United Kingdom

	Working days lost (thousands) ¹	Proportion of all working days lost (per cent)	Workers involved (thousands) ¹	Proportion of all workers (per cent)	Stoppages in progress	Proportion of all stoppages (per cent)
Working days lost in each dispute						
Under 250 days	7.1	0.9	5.5	0.8	87	55.1
250 and under 500	7.5	1.0	7.3	1.0	19	12.0
500 and under 1,000	8.2	1.1	5.2	0.7	12	7.6
1,000 and under 5,000	66.0	8.7	29.1	4.1	30	19.0
5,000 and under 25,000	68.6	9.1	24.7	3.5	7	4.4
25,000 and under 50,000	0.0	0.0	0.0	0.0	0	0.0
50,000 days and over	597.1	79.1	641.5	89.9	3	1.9
All stoppages	754.5	100.0	713.3	100.0	158	100.0

Note:

¹ The figures for working days lost and workers involved have been rounded and consequently the sum of the constituent items may not agree with the totals.

Table 11
Number of stoppages and working days lost: by public and private sector

United Kingdom

	Working days lost (thousands)		Stoppages ¹		Strike rate		Employee jobs (thousands)		
	Private	Public	Private	Public	Private	Public	Private	Public	Total
1997	163	71	127	89	8	14	19,208	5,174	24,382
1998	165	117	88	78	8	23	19,568	5,163	24,731
1999	172	70	102	103	9	13	19,882	5,207	25,089
2000	136	363	99	113	7	69	20,370	5,288	25,658
2001	128	397	83	111	6	74	20,609	5,378	25,987
2002	200	1,123	85	61	10	205	20,600	5,485	26,085
2003	130	369	87	46	6	65	20,505	5,641	26,146
2004	163	742	62	68	8	129	20,587	5,756	26,343
2005	59	99	56	60	3	17	20,758	5,850	26,608
2006	98	656	71	87	5	111	20,916	5,899	26,815

Note:

¹ Stoppages in progress during year.

Table 12

Trade union ballots: strike action

United Kingdom					Numbers
	Total ballots	Ballots calling for strike action	Ballots voting for strike action	Ballots voting against strike action	Split result
2002	806	738	613	113	12
2003	899	825	684	125	16
2004	952	919	762	144	13
2005	815	775	663	109	9
2006	1,341	1,290	1,094	140	57

Source: Electoral Reform Services

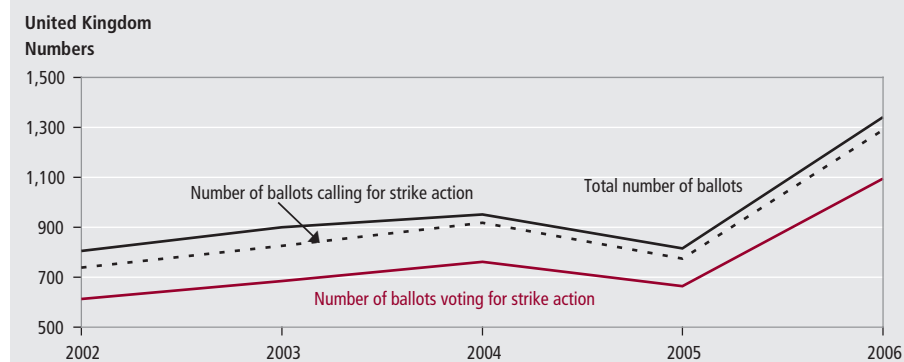
Table 13

Trade union ballots: action short of a strike

United Kingdom					Numbers
	Total number of ballots	Ballots calling for action short of a strike	Ballots voting for action short of a strike	Ballots voting against action short of strike	Split result
2002	806	537	519	16	2
2003	899	637	601	31	6
2004	952	756	708	41	9
2005	815	606	562	35	7
2006	1,341	579	541	27	9

Source: Electoral Reform Services

Figure 10

Ballots resulting in strike action**TECHNICAL NOTE****Coverage**

Information about labour disputes in the UK is collected by ONS from a number of sources. Certain major industries and public bodies provide regular centralised returns, but more often the information is collected directly from the employer or trade union involved after ONS has been notified of a dispute from press reports. Up until September 1996, this information was collected by the Employment Service local office network on behalf of ONS. ONS publishes figures on labour disputes each month. They appear in the Labour Market Statistics First Release and are published in Tables 6.29 and 6.30 of the online tables section of *Economic & Labour Market Review*.

Definition of stoppages

The statistics cover stoppages of work in progress in the UK during a year caused by labour disputes between employers and workers, or between workers and other workers, connected with terms and conditions of employment. A distinction can be drawn between stoppages that started in the current year and those that started in earlier years.

The statistics exclude disputes that do not result in a stoppage of work, for example work-to-rules and go-slows; this is because their effects are not quantifiable to any degree of certainty. Stoppages involving fewer than ten workers or lasting less than one day are also excluded unless the total number of working days lost in the dispute is 100 or more.

Stoppages over issues not directly linked to terms and conditions between workers and employers are omitted, although in most years this is not significant. For example, in 1986, one stoppage was considered to be political (a protest in the coal industry against the visit of an MP) and it was excluded from the figures. The total working days lost amounted to less than 1,000. The next known dispute to be excluded was in 1991. This involved a boycott by self-employed market traders who, after increased rent and changes to the market rules, kept their stalls closed for about 20 weeks.

The statistics include 'lock-outs', where an employer prevents their employees from working by refusing entry to the place of work, and 'unlawful', that is, unlawfully organised strikes. However, no distinction is made between a 'strike' and a 'lock-out' or between 'lawful' and 'unlawful' stoppages. This is principally because of the practical difficulty in deciding which category a particular stoppage falls into. It was for similar reasons that a distinction between 'official' and 'unofficial' disputes was no longer made after 1981.

Working days lost

Working days lost are defined as the number of days not worked by people involved in a dispute at their place of work. In measuring the number of working days lost, account is taken only of the time lost in the basic working week. Overtime work is excluded, as is weekend working where it is not a regular practice. Where an establishment is open every day, and runs two or more shifts, the statistics will record the number of working days lost for each shift. In recording the number of days lost, allowance is made for public and known annual holidays, such as factory fortnights, occurring within the strike's duration. No allowance is made for absence from work for such reasons as sickness and unauthorised leave.

Where strikes last less than the basic working day, the hours lost are converted to full-day equivalents. Similarly, days lost by part-time workers are converted to full-day equivalents. The number of working days lost in a stoppage reflects the actual number of workers involved at each point in the stoppage. This is generally less than the total derived by multiplying the duration of the stoppage by the total number of workers involved at any time during the stoppage, because some workers would not have been involved throughout.

In disputes where employers dismiss their employees and subsequently reinstate them, the working days lost figure includes those days lost by workers during the period of dismissal.

For disputes where employers dismiss their employees and replace them with another workforce, the statistics cannot assume that working days lost by the sacked workers continue indefinitely. In such cases, the statistics measure the number of days lost in terms of the size of the replacement workforce. For example, where an employer initially recruits 100 workers and wishes to build up to 300, the number of working days lost on day one will be 200 and will then progressively reduce on subsequent days, eventually to zero when the new workforce reaches the target of 300.

Number of stoppages

There are difficulties in ensuring complete recording of stoppages, in particular for short disputes lasting only a day or so, or involving only a few workers. Because of this recording difficulty and the cut-off applied, the number of working days lost is considered to be a better indicator of the impact of labour disputes than the number of recorded stoppages.

Workers involved

The figures for workers involved are for workers both directly and indirectly involved at the establishment where the dispute occurred. Workers indirectly involved are those who are not themselves parties to the dispute but are laid off because of the dispute. However, the statistics exclude workers at other sites who are indirectly affected (because of a shortage of material from a supplier who is in dispute, for example). This is partially because of the difficulty in deciding to what extent a particular firm's production problems are due to the effects of a strike elsewhere or some other cause. Workers involved in more than one stoppage during the year are counted in the statistics for each stoppage in which they take part. Part-time workers are counted as whole units.

The statistics try to record the number of workers that are involved at any time in the stoppage. For example, consider a three-day strike where there were 200 workers involved on the first day; 300 on the second day, of whom 100 were involved for the first time; and 200 on the third day, of whom 50 were involved for the first time. The total number of workers involved in the dispute is 350 – the sum of all those involved on the first day, and those joining for the first time on subsequent days. However, the number of workers taking strike action for the first time during a dispute cannot always be easily ascertained. In such cases, the statistics record the highest number involved at any one time (300 in the above example). Take another example, where there are 200 workers involved in a stoppage on each of days one, two and three. It may be necessary to assume that there were a total of 200 workers involved, although it is possible, but unlikely, that as many as 600 workers could have been involved. For this reason, the statistics may underestimate the number of workers involved in a dispute. However, the estimate of the number of working days lost is unaffected by this consideration.

FEATURE

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Issues in the measurement of low pay

SUMMARY

The UK uses two major surveys to produce low pay estimates; the official ASHE measure and supplementary LFS measure. The differences between these measures have been accepted as a consequence of the different survey methods and purposes.

This article describes three related investigations into these differences. The first shows how the timing of measurement is important and suggests evidence of non-compliance. The second examines the perceived inaccuracy of responses in household surveys and how this affects LFS low pay estimates. The third shows that the measure of hourly rate used can explain much of the difference between the estimates.

This work supports the current methods for generating low pay estimates and highlights the need for an awareness of these background issues when interpreting the estimates.

The National Minimum Wage (NMW) was introduced in the UK in 1999 by the Government as a direct response to the perceived growth in inequality in wages throughout the 1980s and 1990s. Subsequent analysis has led to many arguments about the impact of the NMW. These debates have largely relied upon official survey data produced by the Office for National Statistics (ONS). ONS produces National Statistics (aggregate statistics produced to a defined quality standard) on the number of low paid. These figures relate to those earning below the NMW, and are broken down by a variety of personal and employer characteristics.

The Low Pay Commission Reports (LPC, 2005 and 2007) give an idea of the range of work carried out on the NMW, mostly using this official data at aggregate and individual level. Changes in the ONS aggregates are seized upon as evidence that the NMW is or is not having an impact on jobs, wages, profits, and so on. Low pay figures are therefore highly visible statistics and small changes are often highlighted in the press.

The survey methodologies and collection practices are well-established, follow international best practice, and are produced with standard confidence intervals. Nevertheless, relatively little work has been carried out, either by ONS or by external researchers, on how robust some of these figures are when put under the spotlight that is possible by combining and contrasting the survey microdata at the most detailed level.

In studying changes over time, it is assumed that the NMW measures are affected by the same factors each year. It is also assumed that the period over which studies are carried out is not of major importance, that the wage itself is measured accurately and that errors in measurement lead to proportional impacts on statistics. Finally, it is often assumed that differences in official statistics are the result of irreconcilable differences in the data sources.

When working with most official statistics, these are reasonable assumptions. However, when dealing with low pay, these need to be treated more cautiously. Because the concept of low pay is an on-off measure, small deviations in methods or circumstances can lead to large changes in results. Given the policy importance of low pay, there is an important discussion to be had around the sensitivity of results.

This article describes how the official statistics on low pay are collected and published, and relates how the accuracy of low pay statistics is commonly perceived. This is then reviewed in light of several recent results (Griffith *et al.*, (2006), Ormerod and Ritchie (2006a), Ormerod and Ritchie (2006b)). These investigations compare the methodology for low pay estimates, look at the effect of rounding on employee responses to earnings questions and examine the effect of timing. Overall, the article supports the current methods for generating low pay estimates but suggests that the number of low paid can be a misleading construct without an awareness of these background issues.

Sources of low pay estimates

The Annual Survey of Hours and Earnings (ASHE) has been the main source of information on earnings in the UK since 2004 and comprises a 1 per cent sample of employees using information provided by employers. ASHE is used to generate the official estimates of the low paid, the percentage of jobs paid below the NMW; see Milton (2004) for a description of the ASHE estimate and its forerunners.

However, ASHE is not the only source for official low pay statistics. The household-based Labour Force Survey (LFS) also includes information on hours and earnings, as well as much more personal data. As ASHE has very limited information on the individual, LFS estimates are required to support the ASHE estimates where breakdowns by personal characteristics are required, for example, ethnicity. An improved methodology for the LFS was developed by ONS in 2005 to use improved information on second jobs (Ormerod (2006)).

Until 2004, ONS placed equal weight on the low pay estimates of LFS and the New Earnings Survey (NES), ASHE's predecessor. This was an acknowledgement that neither survey gave a definite answer on the number of low paid. ASHE was developed to remedy this uncertainty, and is considered to be the most reliable estimate; hence, the National Statistic for the number of low paid is simply the ASHE figure. However, the nature of low pay analysis is to try to understand which groups of individuals are more affected by the NMW.

The LFS is vital to this analysis because ASHE has very limited personal data. ASHE and LFS estimates are therefore examined together by the Low Pay Commission (LPC) and others to assess the impact of the NMW on earnings and other related subjects.

The main difference between the two estimates has always been attributed to the different sources of the information. ASHE is collected from the employer and as such the earnings information is thought to be more reliable as it is mainly provided with reference to company records. The LFS is provided by the individual and it is subject to recall error which is compounded when the information is provided by proxy response. These differences are described in detail in Ormerod (2006).

The ASHE survey takes place in April so there is a six-month gap between the uprating of the NMW and the official ONS measurement of the low paid. The LFS collects information on a quarterly basis. This has recently moved from seasonal to calendar quarters to comply with European requirements. ONS has developed a partial back series for calendar quarters so that the effect of this change can be investigated (Madouros (2006)). In examining the impact of the move from seasonal to calendar quarters, ONS produced low pay estimates for both seasonal and calendar quarters throughout the year. This gave the opportunity to investigate the change in the estimates of the low paid throughout the year and to look at the affect of the October uprating on the level of the low paid.

Figure 1 summarises the various measures of low pay produced by ONS.

The pattern is generally consistent across all methods with an increase in the percentage of jobs paid below the NMW since 2003. The overall changes in the numbers of people below the minimum wage are related to the size of the change in the NMW (Lam *et al*, (2006)).

Effect of methodology on low pay estimates

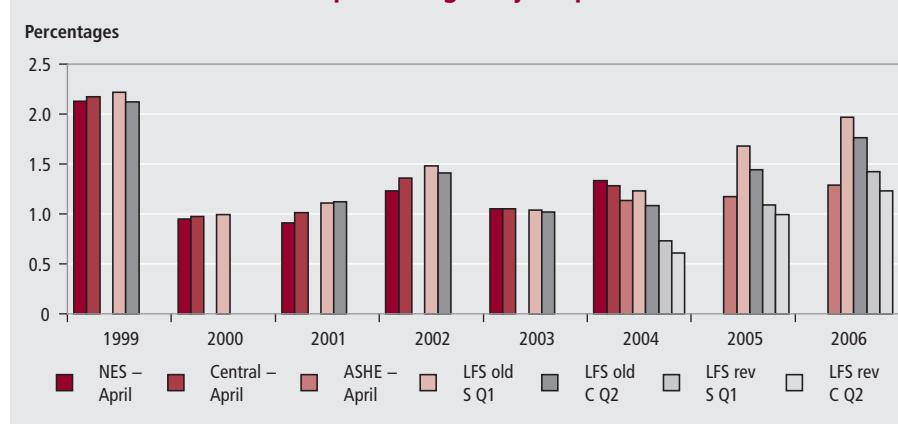
Which hourly rates are comparable?

Estimates of low pay are generated by comparing individuals' hourly earnings with the appropriate NMW rate. The National Statistics on low pay are therefore calculated from ASHE by comparing the NMW with the derived hourly rate: earnings for the period divided by hours worked. For employer surveys, the derived rate is believed to be the best measure of hourly pay because it is based on actual earnings and hours worked. The information provided by employers is extracted from pay records and therefore earnings and hours are likely to be more accurate than the same information provided from a household survey.

Basing estimates on the derived rate has the advantage of being able to include the desired components of pay as, for example, the LPC recommends that shift premium should be excluded. A stated rate is more likely to be based on basic pay only, but even then it is difficult to ensure that the respondent has included the desired components in the basic rate. Although validation against the derived rate can help, guidance is not clear in LFS and not explicit in ASHE.

For a household survey, a stated hourly rate is more likely to be an accurate measure for pay per hour than the derived hourly rate, as the derived rate is calculated by dividing weekly earnings by hours worked. Hourly rates are only applicable for certain types of jobs, while total earnings and hours are provided by most respondents. Individuals who provided stated rate information are generally low paid and, as estimates of the low paid focus on this part of the earnings distribution, this is not a big issue. For individuals providing both derived and hourly rate information in the LFS, it has been shown that the distribution of the derived rate is much wider than the stated rate and in some cases implausible. This is likely to be because respondents do not provide hours information that exactly matches the earnings information for the period and this results in an inaccuracy in

Figure 1
Annual estimates of the percentage of jobs paid below the NMW



Notes:

- NES NES estimates, applicable until 2003
- Central Central estimate derived using ASHE and LFS methodologies
- ASHE ASHE estimate, applicable from 2004
- LFS old LFS old methodology
- LFS rev LFS revised methodology, applicable from 2004 (see Ormerod (2005))
- S Q1 Seasonal quarter 1 (March, April, May)
- C Q2 Calendar quarter 2 (April, May, June)
- 2000 Calendar data set not available for LFS

the derived hourly rate. LFS estimates are therefore based on the hourly rate where this is provided. Where a respondent does not provide hourly rate information, this is imputed using a nearest neighbour model, where the derived rate has the most influence.

In summary then, the derived rate is thought to be the best measure of actual earnings and this is used in the ASHE estimate of low pay. For household surveys, the derived rate is thought to be inaccurate and the stated rate is therefore used in its place.

Comparable ASHE and LFS low pay estimates

There is therefore a basic difference between the methodologies used to create the ASHE and LFS low pay estimates; the ASHE estimate is based on the derived rate while the LFS estimate is based on the stated rate. Due to issues with the LFS derived rate, it is not possible to produce a credible LFS estimate on the ASHE basis (Ormerod (2005)). Since 2004, however, ASHE has also collected a stated rate of pay, for those workers who are paid an hourly rate. ONS

currently uses this hourly rate for the validation of the derived rate but it is not used in reporting. This investigation created low pay estimates from ASHE based on three additional hourly rate measures:

- stated hourly rate – this is simply the hourly rate stated by the respondent. As the stated rate is only applicable for certain individuals, only half the data set will have this variable
- basic-derived – this is a derived rate based on basic pay only. The derived rate used in the official methodology includes other and incentive payments. This derived rate is comparable to the stated rate, which is based on basic pay only, and
- combined – this is the stated rate if it is present; otherwise the derived rate is used. This is comparable to the LFS hourly rate measure used to estimate low pay. Since the derived rate is not an issue in ASHE, it is used alone and not imputed as for the LFS

Table 1

Annual estimates of the number of jobs paid below the NMW using various hourly pay measures

	16+			18+		
	Jobs below NMW		Jobs below NMW (per cent)	Jobs below NMW		Jobs below NMW (per cent)
	Jobs (thousands)	Jobs (thousands)		Jobs (thousands)	Jobs (thousands)	
2004						
ASHE derived	-	-	-	24,518	276	1.1
ASHE basic-derived	-	-	-	24,519	343	1.4
ASHE stated ¹	-	-	-	11,221	117	1.0
ASHE combined ¹	-	-	-	24,520	227	0.9
LFS ²	-	-	-	24,226	147	0.6
2005						
ASHE derived	25,246	308	1.2	24,753	289	1.2
ASHE basic-derived	25,246	376	1.5	24,753	355	1.4
ASHE stated ¹	10,982	136	1.2	10,579	129	1.2
ASHE combined ¹	25,247	256	1.0	24,752	239	1.0
LFS ²	25,124	250	1.0	24,527	244	1.0
2006						
ASHE derived	25,309	337	1.3	24,964	322	1.3
ASHE basic-derived	25,308	405	1.6	24,964	390	1.6
ASHE stated ¹	10,602	160	1.5	10,319	153	1.5
ASHE combined ¹	25,309	285	1.1	24,964	271	1.1
LFS ²	25,146	307	1.2	24,574	302	1.2

Notes:

- 1 Some basic validation carried out on stated rate where factor errors were obvious.
 - 2 Revised LFS methodology devised in 2005 based on calendar quarters.
- Not applicable as 16–17 year rate not introduced.

Table 1 shows these ASHE estimates for 2004 to 2006. The LFS estimates are included for comparison purposes. Figure 2 illustrates the pattern for individuals aged 18 and over.

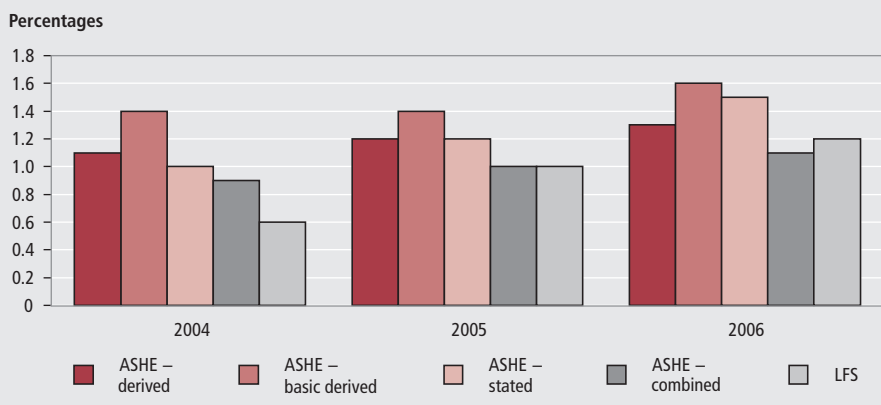
Estimates based on the basic-derived hourly rate of pay are higher than the estimates based on the derived rate. The basic derived rate is by definition lower than the derived rate as it excludes other and incentive payments. This therefore results in a higher estimate of the low paid. Estimates based on the stated rate are lower than estimates based on the derived rate for two possible reasons. Employers may be reluctant to write down a stated rate that is below the NMW. There may also be some employers who believe they are paying above the NMW when this is not actually the case. The situation can arise where the employer calculates an hourly rate by dividing an annual salary by 52 (weeks) and then by 7 (days). However, there are 52.2 weeks in a year and the hourly rate actually paid is therefore less than intended.

The ASHE combined measure is closer to the LFS measure, even in 2004, when the stated rate was subject to a number of problems. In 2005 the difference is negligible.

This work supports the use of the derived rate of pay in the ASHE low pay estimates. The derived hourly rate is the most accurate measure of pay per hour. However, when the information on total hours and total earnings comes from household surveys, the derived rate is inaccurate. In this case

Figure 2

Estimates of the percentage of jobs paid below the NMW using various hourly pay measures for individuals aged 18 and over



the stated rate should be used. It is therefore necessary for ASHE and LFS low pay estimates to be based on different measures of hourly pay. ASHE estimates produced on the same basis as the LFS estimates are very similar. In summary, the estimates can be partially reconciled on the basis of the methodology used, partly driven by the nature of the source data.

Effect of source on low pay estimates

This section focuses on the second reason for the differences; the source of the information. ASHE estimates should be provided by employers from actual pay records (and follow-up checks confirm that this is overwhelmingly the case). LFS responses are recalled by the respondents, often without reference to documentation. In around 30 per cent of cases, the respondent is not available when the survey is carried out, and a 'proxy response' is provided by another member of the household.

The potential for recall error in the LFS poses a particular problem for low pay estimates, as it changes the distribution of observed earnings. Because low pay estimates are concerned with numbers below a limit, then a different distribution will lead to a biased estimate of the number of low paid, even if the estimate of the earnings distribution remains unbiased.

It is difficult to assess the true extent of this problem because, by its nature, there has been no corroborating information available on individual responses. However, the level of the NMW does provide an insight into the issue of recall error, and the possible direction of any bias.

Focus points and rounding

Lam *et al* (2006) showed that employers like to pay employees on wage rates at 'round' values, such as £4.50, £5.00 and to a lesser extent £5.75, £6.25. It is likely that household members paid at these wage rates would accurately recall rates, total wages and total hours. However, the actual wages paid in survey weeks often do not correspond to round values, and the concern here is that LFS respondents who do not refer to pay records carry out the rounding themselves: £4.95 being reported as £5.00, and so on. Total hours and earnings may also be rounded. The LFS shows a large number of employees being paid £5.00 per hour prior to 2006. Whether this a true figure or rounded is impossible to determine. However, this is also observed in ASHE with employers preferring to pay at round numbers.

The April 2006 NMW of £5.05 provides a natural experiment to test rounding by comparing stated and derived rates surrounding the £5.05 mark. Individuals rounding wages are likely to round down to £5.00; rounding wages up to £5.10 does not seem a likely alternative to using the actual wage. Observing large numbers of employees paid at £5.00 rather than £5.05 would imply significant rounding. This conclusion can be tested by comparing the ASHE records, which are compiled from documentation and are less likely to be subject to rounding error.

As well as rounding on the wage rate, household respondents may be rounding on total hours and earnings too. This is also likely to lead to more observations at £5.00 on the derived wage. This then leads to a further source of supporting information. If the derived and stated wage rates differ, the two can be investigated for evidence of rounding.

Two years were studied in comparison with 2006. In 2004, the NMW was set at £4.50. This is one of the 'focal points' where employers tended to fix wages; it also a relatively straightforward number to use in calculations. In contrast, in 2005, the NMW was £4.85, which does not have any obvious round numbers in the vicinity. Hence, if rounding by household surveys is a significant issue, then in the LFS:

- 2004 should show little rounding effect, with derived and stated rates similar and a peak of employees paid at the NMW
- 2005 should demonstrate no particular peak around the NMW, and a distribution of values around the NMW
- 2006 should demonstrate a peak at £5.00, below the NMW

Earnings around the NMW

Figure 3 shows the distribution of earnings around the NMW in ASHE and LFS for individuals aged 22 and over, using the stated and derived hourly rate measures. ASHE estimates of low pay are based on the derived hourly rate of pay and this is shown in part (a). Peaks at the NMW can be seen clearly for 2004 at £4.50, at £4.85 in 2005 and at £5.05 in 2006. Peaks in the derived rate are also clearly visible at other focus points in the distribution, £5.00, £5.50 and £6.00.

In 2005 the peak at £5.00 is particularly high, suggesting that, when the minimum wage is close to a round number, many employees chose to pay the next round number up. This is not the case in 2006, with the minimum wage at £5.05. Rounding to the next focus point at £5.50 may be

too much of an increase from the NMW and there is therefore a higher peak at the NMW in 2006 than observed in previous years. The change in the percentage of jobs below the NMW is also related to the size of the uprating (see Lam *et al* (2006)), but the position relative to a focus point also appears to be significant.

Employers are aware that they cannot round down and are unlikely to round up by a large amount. It therefore appears that the NMW, depending on its position relative to a focus point, can encourage some employers to take their earnings higher than the NMW if this is set close to a focal point. This could suggest that many employers could use £5.50 as their lowest wage following the uprate in October 2006 to £5.35.

This contrasts with the picture for the derived rate of pay from the LFS, in part (b). Here, peaks are clearly visible at the focus points but only small peaks appear at the minimum wage values. Respondents on the LFS may not match the hours and earnings for a period; this will give an inaccurate derived hourly rate. Equally, respondents may round their hours or earnings resulting in a 'rounded' derived rate. As employers respond to ASHE, they will be eager to provide accurate hours and earnings information as they do not want wages to appear to be below the NMW (it is assumed that employers do not deliberately falsify data). LFS respondents do not have the same incentive.

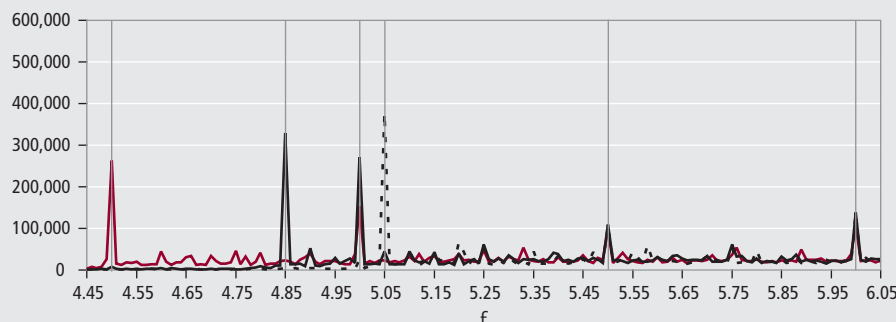
For the stated rate in ASHE (part (c)), peaks are clearly visible at the NMW and at focus points. For the LFS stated rate, earnings are all focused on 5p bands, with higher peaks at focus points (for example, no respondent reports £5.23, only £5.20 or £5.25 is observed). In 2006 the LFS stated rate (part (d)) shows a peak at £5.00 and at the NMW value of £5.05. The peak at £5.00 is much lower in 2006 than for previous years and seems to have shifted to the £5.05 point. Concern that individuals being paid at £5.05 are rounding to £5.00 is still justified, but not as problematic as anticipated. The stated rate is generally being reported accurately.

These charts therefore support the current methodologies for ASHE and LFS. The derived rate in ASHE shows peaks at the NMW, suggesting a derived rate based on actual earnings and hours measures hourly rates well. The stated rate shows almost no individuals being paid less than the NMW. There is the counter argument that employers are aware their information is being used to measure the low paid, and care is taken to ensure the calculation would

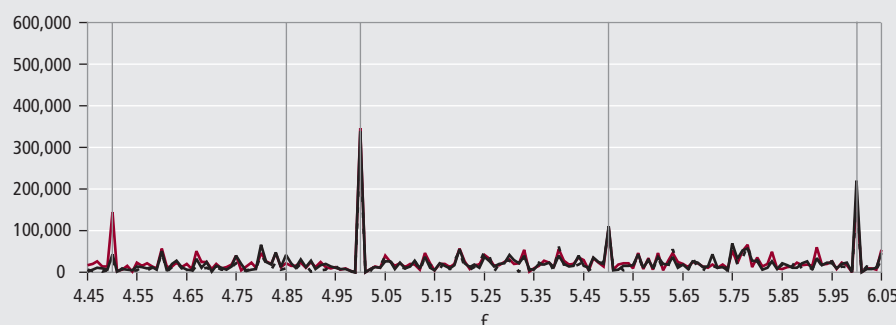
Figure 3
Earnings for individuals aged 22 and over

Numbers

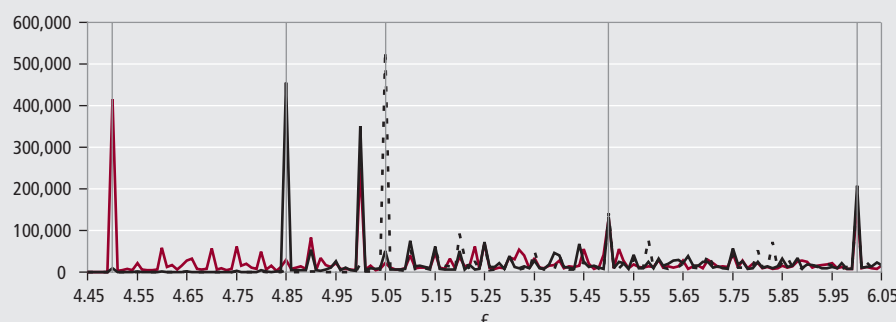
(a) ASHE derived rate of pay



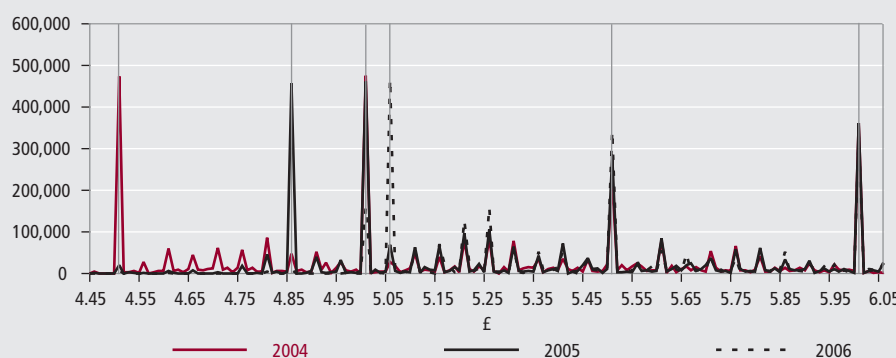
(b) LFS derived rate of pay



(c) ASHE stated rate of pay



(d) LFS stated rate of pay



Note:

LFS March-May quarter.

be correct at this level. This is, however, still more reliable than the stated rate in ASHE, as employers will be even more reluctant to write down a stated rate less than the minimum wage.

Rounding in the LFS

For the LFS, there is no concentration around the NMW values for the derived

rate, suggesting either rounding or a mismatch in earnings and hours makes the measure unreliable. The stated rate shows clearly peaks at the NMW values, suggesting that individuals are aware of their hourly rates and do not round these. The derived rate is used to inform the imputation of the stated rate when a stated rate is not provided (Ormerod, 2006).

Comparing responses to the derived and stated rate at this level therefore helps to understand the nature of the LFS low pay estimates.

Figure 4 shows the number of respondents with derived and hourly rate values around the NMW in 2006. The size of the point is related to the number of respondents. Most respondents have a derived rate of £5.00. Half of these also have a stated rate of £5.00, but the other half have a stated rate of £5.05. For all the respondents with a stated rate of £5.05, a variety of derived rates are provided. This suggests that for individuals having both a stated and derived rate, the stated rate is more accurate. This is based on the assumption that a reported hourly rate of £5.05 is correct; it is unlikely that an individual would report such a value when estimating or rounding.

This is intuitively sensible. Employees are likely to know their hourly rate, as this does not change from week to week. Weekly hours and earnings can, however, vary from week to week which makes recalling them more difficult. On examining the data closely, the majority of rounding appears to relate to total earnings causing a round hourly rate to be provided.

Bad memory, bad knowledge or bad records?

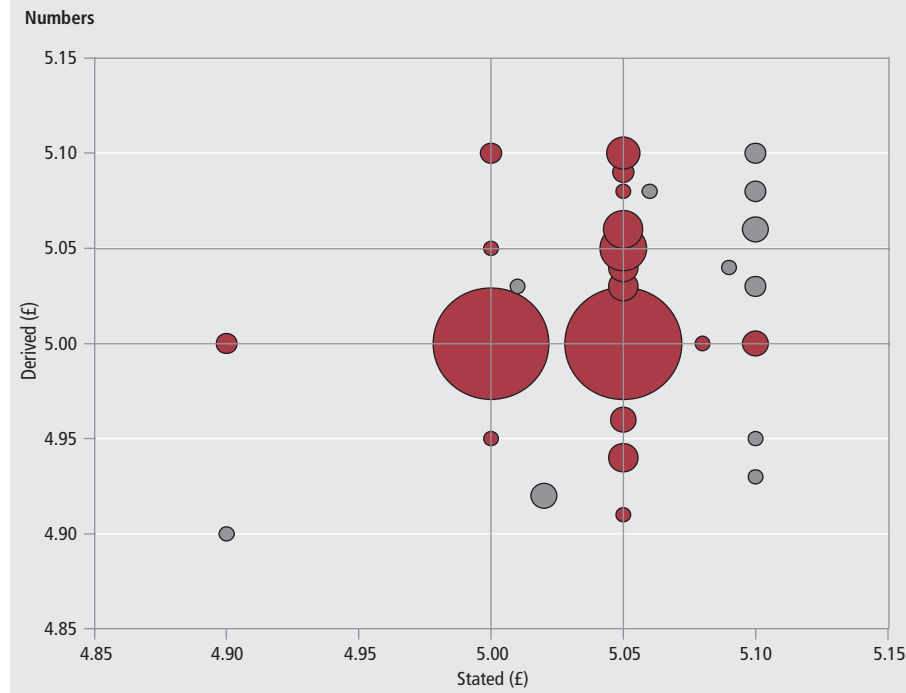
It was noted above that two of the concerns about the accuracy of the LFS relate to the use of proxy responses and the lack of supporting documentation. A natural question to ask is whether these contribute to the rounding effect. **Table 2** shows the types of responses and whether documentation was used for hourly rates quoting £5.00 or £5.05.

Where the stated and derived value are both £5.05, the respondents are more likely to have provided the response themselves and with reference to documentation. Although it is impossible to tell whether the rates have been provided accurately, it can be assumed that quoting such a number and obtaining a derived rate exactly equal to it suggests the information is accurate. This is borne out by the fact that 90 per cent of these individuals provided the information themselves.

Only a small number of cases have a stated rate of £5.00 and a derived of £5.05; hence the numbers are not shown here. Where the stated rate is 'accurate' at £5.05 and the derived rate is rounded to £5.00, this is more likely to be a personal response. In all cases proxy responses are more likely to round one or both rates.

Figure 4

Number of respondents aged 22 and over with stated and derived hourly rate values between £4.85 and £5.15, March to May 2006

**Note:**

Small numbers have been randomly adjusted to maintain confidentiality.

The table supports the idea that documentation is a source of error: correct answers are more likely to be supplied with documentation.

Effect of rounding on low pay estimates

Interpretation of the percentage of jobs paid below the NMW in LFS can be improved by understanding the way individuals respond to questions on hours and earnings. A margin of 1 per cent in a response does not appear to be important to respondents when

calculating earnings; however, when looking at specific cut off points in the distribution like the NMW, this can cause estimates to vary from year to year. It is therefore likely that the LFS estimate would be more accurate if the NMW were placed on a focus point; for example the £4.50 value in 2004. This explains the similarity between the ASHE and LFS estimates in Figure 1.

So, when the NMW is just above a 'round' number, for example the £5.05 rate in 2006, misreporting in the LFS can cause an overestimate in the estimate of the

percentage of jobs paid below the NMW. It is conceivable that an NMW of, for example, £5.95, would conversely cause the estimate to be lower than the true value, as respondents would report £6.00. Analysis of the NMW using the LFS therefore needs to be aware that the value of the NMW can directly affect both the number of low paid and the estimate of the low paid.

The importance of timing

Calendar versus seasonal quarters

The Government makes a change in the NMW (called an uprating) in October and employers are legally obliged to comply with the new NMW immediately. Uprates are advertised well in advance and employers are expected to prepare for the uprating. The ASHE survey takes place in April so there is a six-month gap between the uprating of the NMW and the official ONS measurement of the low paid. The LFS is collected on a quarterly basis and therefore estimates of low pay can be produced at four points during the year. The LFS has recently moved from collecting on a seasonal to calendar quarters basis and ONS has produced a back series on a calendar quarters basis for comparison. The process of examining the effect of the move from seasonal to calendar quarters involved examining all LFS low pay estimates for all quarters on both bases. **Figure 5** shows the LFS low pay estimates for all quarters from 2003 using the old and revised methodology on calendar and seasonal quarters bases.

This investigation showed that there is little effect between the estimates in corresponding calendar and seasonal quarters, except in the quarter containing October. The seasonal quarter estimate covers responses to the LFS taken in

Table 2

Percentage of respondents aged 22 and over with £5.00 and £5.05 hourly rate measures: by proxy response and whether documentation was used, March to May 2006

Type of response					Documentation used			
Stated (£)	Derived (£)	Personal (per cent)	Proxy (per cent)	Brought forward ¹ (per cent)	Payslip (per cent)	Statement ² (per cent)	Other (per cent)	None (per cent)
5.00	5.00	46	54	-	7	-	2	92
5.00	5.05	*	*	-	-	-	-	*
5.05	5.00	79	21	-	13	-	-	87
5.05	5.05	90	10	-	30	-	-	70
Other		72	27	1	20	-	2	78
Total		72	27	1	20	-	2	78

Notes:

¹ Information brought forward from previous quarter.

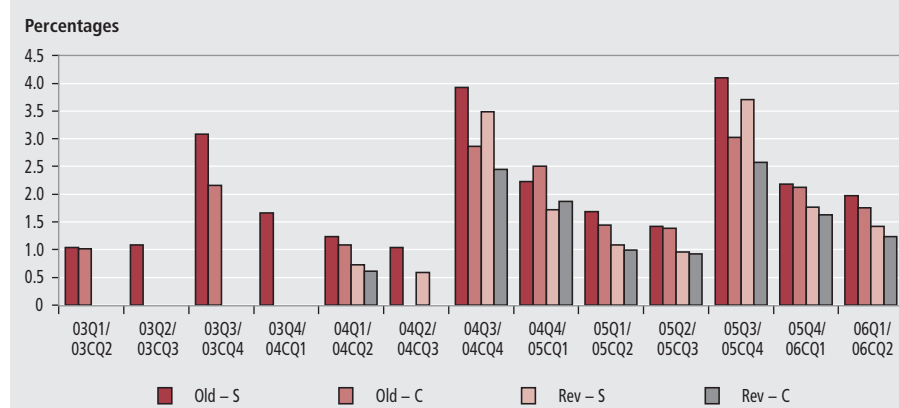
² Bank or building society statement.

* Frequency suppressed for confidentiality reasons.

- Zero or less than 0.5 per cent.

Figure 5

Quarterly estimates of the percentage of jobs paid below the NMW



Notes:

Old LFS old methodology

Rev LFS revised methodology, applicable from 2004

S Seasonal quarter (quarters 1 to 4 are DJF, MAM, JJA, SON)

C Calendar quarter (quarters 1 to 4 are JFM, AMJ, JAS, OND)

A full back series for calendar quarters is not available, therefore some estimates cannot be calculated

03Q1/03CQ2 'Q' refers to the seasonal quarter, 'CQ' to the calendar quarter, this is, March to May 2003 and April to June 2003

September, October and November; all these are measured against the October rate. This estimate is therefore expected to be higher than the true value as there will be a number of respondents from September who are being measured against an NMW rate which is not a legal requirement until October. The calendar quarter estimate is therefore a better measure over this period as it covers one NMW rate throughout the entire quarter.

Why do differences persist through the year?

On all measures, the estimate of the percentage of jobs paid below the NMW is highest in the quarter containing October and then decreases throughout the year until the next uprating is made. While low pay estimates attempt to measure the number of jobs that are paid below the NMW, the estimates cannot be used directly as a measure of non-compliance with the legislation. This is because it is not possible to discern from data sources on earnings whether an individual is eligible for the minimum wage; for example, apprentices and those undergoing training, who are exempt from the minimum wage or are entitled to lower rates. If employees receive free accommodation, employers are entitled to offset hourly rates to reflect this.

However, if the issues in recording discussed above were the only issues in the measurement, the estimate would be expected to drop from the quarter containing October and then remain steady throughout the year. This is not the case, and the estimates continue to drop

throughout the year. This suggests that companies are taking time to respond to the October rate, and the trend in the LFS figures can provide some evidence about compliance or patterns of compliance.

There are two obvious possibilities why compliance might be expected to change over time. First, large companies often have complex pay negotiations with workforces which may run into several months. The LFS is not updated retrospectively, so if an employee appears to be earning below the NMW in October but later receives back pay to cover this period, the October value will not be adjusted. Hence, for large companies, it might be expected that there is a delay in complying with pay legislation due to organisational inertia.

The second possibility is that large companies, even if involved in complex pay negotiations, would be more likely to implement NMW changes quickly than smaller companies. Larger companies:

- are more likely to be targeted by regulatory bodies checking on compliance
- will have a significant public presence and so be more promising targets for low pay campaigners
- have dedicated human resources departments, who should be aware of legislative changes and who can calculate complex wage changes accurately

Small companies may not have the information to set an acceptable wage level. They have a low probability of prosecution,

and penalties imposed have been relatively small. Small firms may therefore conclude that keeping up with the latest legislation is not a high priority.

These competing hypotheses can be examined. The LFS asks respondents how many employees are at the respondent's workplace. **Figure 6** shows the estimate of the percentage of jobs paid less than the NMW across all quarters from 2004, by company size. It can be seen that smaller companies have a higher percentage of jobs paid less than the NMW. The pattern in the high-level estimate (shown under 'Total') is apparent across all groups. This pattern is more pronounced in the smaller companies and is almost non-existent for companies with over 500 employees. This suggests that smaller companies are taking time to respond to the uprating in the NMW while large companies respond immediately.

To identify whether these apparent differences are statistically significant, a probit model was estimated:

$$p(\text{lowpaid}) = f(\text{industry, region, quarter, company size})$$

As well as identifying the size of the impacts, the aim was to ascertain whether this apparent difference between big and small companies was due to the characteristics of the companies or whether there is a pure size effect in line with the two hypotheses outlined above. **Table 3** shows the regression coefficients.

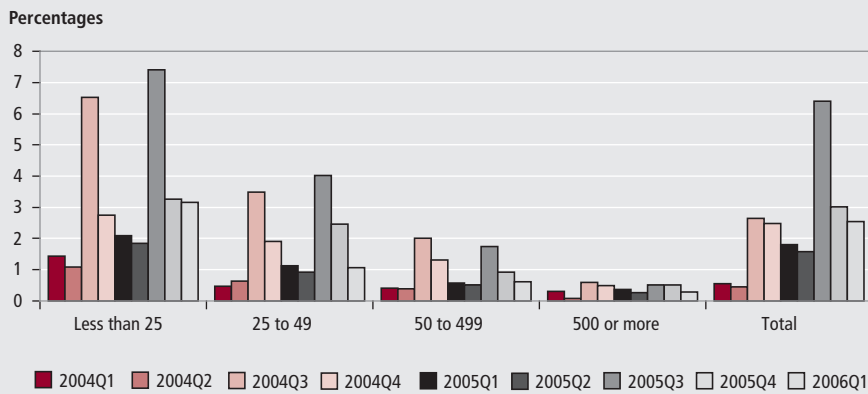
While there are some regional and industry effects, the interest here is on the timing and size variables. First, it is clear that, for all size classes, there is no significant difference between the last two quarters in the year. That is, the effect of the NMW appears to have settled down by the April to June quarter. This is important, as April is the reference date for the low pay National Statistic. There is, however, an adjustment period which lasts up to six months.

Second, the first column of results shows that there is a significantly higher probability of being paid below the NMW for those working for small companies. This is taking account of employment characteristics, and so it suggests there is a pure size effect. Hence this may be the first indirect evidence of non-compliance with the legislation, at least immediately after the uprating.

Implications of timing on official low pay estimates

It is not possible to carry out the same analysis using ASHE as it is an annual survey. There is no reason to believe that

Figure 6
Estimates of the percentage of jobs paid below the NMW:
by company size



Note:

LFS revised methodology used. Seasonal quarters shown, as full back series of calendar quarters not available.

the employers' surveys would produce a significantly different outcome from the household survey. Official low pay estimates are taken at a point in time, six months after the uprating, and should be interpreted as such and not as an annual average. The LFS figures do show that this is a relatively stable phenomenon so the ASHE figures can be compared from year to year. Moreover, the above analysis also demonstrates that the quarter containing April does not seem to be significantly different from the remainder of the NMW period, and so can be taken as a reasonable indicator of the impact of the NMW.

Conclusion

These linked investigations do support the current methods of estimating low pay using ASHE and the LFS. They also go some way to reconciling the differences between the two sources of low pay estimates: ASHE and

Table 3
Regression coefficients used to test timing and quarter, 2004 to 2005

	Significance level		Significance level		Significance level		Significance level	
	Coefficient		Coefficient		Coefficient		Coefficient	
	All companies		Big companies ¹		Medium-sized companies ²		Small companies ³	
Industry (default = manufacturing)								
Health and education	−0.02		−0.39	***	0.11		0.09	
Retail	0.30	***	0.10		0.42	***	0.38	***
Hotels	0.59	***	0.21		0.71	***	0.69	***
Public services – other	−0.25	***	−0.45	***	−0.27	**	−0.10	
Other	−0.26		-	-	−0.23		−0.07	
Region (default = London)								
North East	0.36	***	0.20		0.09		0.59	***
North West and Merseyside	0.22	***	0.26		0.12		0.31	**
Yorkshire and The Humber	0.09		0.16		−0.03		0.18	
East Midlands	0.12		0.13		0.04		0.20	
West Midlands	0.25	***	0.28		0.11		0.36	***
East	−0.06		−0.08		−0.16		0.05	
South East	−0.03		0.00		−0.37	**	0.17	
South West	0.12		0.34		−0.06		0.20	
Wales	0.17	*	0.14		0.03		0.30	**
Scotland	0.16	*	0.08		−0.04		0.33	***
Northern Ireland	0.44	***	0.57	**	0.12		0.60	***
Company size and quarter (default = medium, quarter 3)								
Small quarter 4 ⁴	0.68	***	0.25	*	0.44	***	0.43	***
Small quarter 1 ⁵	0.61	***	0.22	*	0.34	***	0.36	***
Small quarter 2 ⁶	0.34	***	0.13		−0.09		0.08	
Small quarter 3 ⁷	0.25	***						
Medium quarter 4 ⁴	0.44	***						
Medium quarter 1 ⁵	0.34	***						
Medium quarter 2 ⁶	−0.09							
Large quarter 4 ⁴	0.07							
Large quarter 1 ⁵	0.04							
Large quarter 2 ⁶	−0.06							
Large quarter 3 ⁷	−0.18							

Notes:

- 1 250 or more employees.
- 2 Between 25 and 249 employees.
- 3 Less than 25 employees.
- 4 October to December 2004.
- 5 January to March 2005.
- 6 April to June 2005.
- 7 July to September 2005.
- * Significant at the 10 per cent level.
- ** Significant at the 5 per cent level.
- *** Significant at the 1 per cent level.

the LFS. Nevertheless, they also suggest that 'the number of low paid' can be a misleading construct without an awareness of these background issues: timing, the choice of measure of hourly earnings, the way people respond to survey questions and so on.

These results also suggest that the level of the NMW has implications beyond simply setting a floor for wages. Lam *et al* (2006) showed that companies do use some flexibility in setting wages, and the level of the NMW affects this. The more detailed examination presented here supports this, in that companies do round up to 'memorable' focus points as long as these are not too far from the NMW. This raises the intriguing possibility that certain levels of the NMW could be used to influence firm behaviour more widely. For example, an NMW of £5.95 would almost certainly lead to a large number of employers rounding wages up to £6.00. But with the measurement issues involved in the LFS, it would not be possible to determine whether earnings reported at £6.00 were a true value or as a result of rounding. In contrast, the 2007 NMW has been set at £5.52, and similar levels of potential misclassification in the LFS are expected to be observed, as happened in 2006.

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REFERENCES

- Griffiths C, Ormerod C and Ritchie F (2006) 'Measuring low pay: Methods and precision' at www.statistics.gov.uk/ci/article.asp?id=1732
- Lam K, Ormerod C, Ritchie F and Vaze P (2006) 'Do company pay policies persist in the face of minimum wages?', *Labour Market Trends* 114(3), pp 69–81 and at www.statistics.gov.uk/downloads/theme_labour/lmt_mar06.pdf
- Low Pay Commission (2005), *National Minimum Wage Low Pay Commission Report 2005*, HMSO: Norwich
- Low Pay Commission (2007), *National Minimum Wage Low Pay Commission Report 2007*, HMSO: Norwich
- Madouros V (2006), 'Impact of the switch from seasonal to calendar quarters in the *Labour Force Survey*', *Labour Market Trends* 114(6), pp 191–202 and at www.statistics.gov.uk/downloads/theme_labour/lmt_jun06.pdf
- Milton J (2004), 'New methodology for low pay estimates' at www.statistics.gov.uk/ci/article.asp?id=992
- Ormerod C (2006) 'LFS low pay estimates: Method of dealing with second jobs', *Labour Market Trends*, 114(7), pp 233–9 and at www.statistics.gov.uk/downloads/theme_labour/lmt_july06.pdf
- Ormerod C and Ritchie F (2006a) 'Measuring low pay: Focus points and rounding' at www.statistics.gov.uk/ci/article.asp?id=1731
- Ormerod C and Ritchie F (2006b) 'Measuring low pay: The importance of timing' at www.statistics.gov.uk/ci/article.asp?id=1730

FEATURE

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The measurement of non-market output in education and health

SUMMARY

In recent years, considerable progress has been made in developing improved methodologies to measure non-market output in the National Accounts. Most EU Member States have supported the introduction of a legal framework to implement these methodologies, and have introduced current best practice methods to measure output of health and education services.

This article summarises contributions at a workshop held in October 2006 that focused on building on this foundation and further improving the measurement of non-market output in the National Accounts. The workshop supports a project intended to provide detailed international guidelines for the further development of volume measures of non-market outputs, in particular for education and health.

Most governments have an extensive role in the provision and financing of education and health services.

These account for a significant part of gross domestic product (GDP) so it is important that their output is measured accurately, not least so that governments can allocate expenditure on an informed basis. Governments also recognise the importance of demonstrating to taxpayers that government expenditure on these services represents value for money.

In October 2006, the Office for National Statistics (ONS) organised a workshop jointly with the Organisation for Economic Co-operation and Development (OECD) and the Norwegian Government to launch a project for improving the measurement of non-market output in the National Accounts. The project is intended to provide detailed international guidelines for the development of volume measures of non-market output, in particular for education and health.

The workshop had three main objectives:

- to improve temporal analysis, by moving from input to output or outcome measures in the health and education sectors and, thereby, improve the measurement of non-market output growth and productivity over time
- to improve international comparisons, by standardising international definitions and processes, and developing Purchasing Power Parities (PPPs), to allow for better cross-country comparisons both of the levels

and growth rates of final consumption in the health and education sectors, and

- to take account not only of the quantity of output but also the quality of that output (the notion of the volume of services embraces both concepts)

This article summarises the main issues arising from the workshop. It first outlines the key conceptual achievements and challenges involved in developing direct volume measures and accounting for quality that were reported at the workshop. It then summarises the specific issues arising from experience of measuring output in the health and education sectors. Finally, the article describes key themes emerging from the workshop and highlights what are considered to be the most important issues to be tackled in future work.

The intention of this article is to highlight achievements, interesting new departures, key challenges, and priorities for the future. It must be emphasised that the article represents only the views of the authors, and is not intended as an official report of the workshop. The article is an abridgement of the formal report of the workshop, which is available from the OECD website at www.oecd.org/dataoecd/61/9/37903961.pdf

Moving from output=input to direct volume measurement

The motivation for the workshop is the strong international drive towards replacing the traditional treatment of non-market output in the National Accounts. From the early 1960s to the mid-1990s, the output of

the public sector in all countries was valued simply by adding up expenditure on inputs, an approach termed the 'output=input' convention. The attraction of this approach is that it avoids the need both to measure and to place valuations on non-market outputs. But there are three main drawbacks to this convention:

- it is circular and self-justifying. The value of output is however much the government chooses to spend on producing or purchasing it. By definition, the higher the level of spending, the better. Taxpayers may disagree
- it implies no change in productivity over time, as outputs are not measured directly, and
- reductions in expenditure brought about by technological improvements appear to reduce output, when in reality only inputs might have been reduced

The inadequacy of the output=input approach led to recommendations from international bodies such as the United Nations and Eurostat for the development of measures of non-market output using methods that are independent of expenditure on inputs. Both the System of National Accounts (SNA93) and European System of Accounts (ESA95) include recommendations to move toward direct volume measurement (DVM) of non-market outputs for many services, including health and education. So, in education for instance, instead of reporting teachers' salaries, the accounts should measure how many pupils were taught. The output=input approach remains the recommended method for measuring collective services, such as defence and public order, which have classical public good characteristics. Even so, preliminary

attempts are being made to identify outputs for some collective services.

All Member States of the European Union (with the exception of Denmark, which has secured a postponement) are legally required to implement the DVM approach in time for the 2006 National Accounts. Considerable progress has been made by Member States in meeting these requirements, and these achievements are summarised in **Box 1**.

Beyond the EU, the recommendations to move to a DVM approach are not being applied universally. In particular, the US and Canada are likely to continue to use the output=input convention for the foreseeable future. Changing the accounting basis is likely to be politically sensitive, particularly in contexts where input-based measures suggest higher levels of output growth than alternative volume measures.

DVM avoids many of the deficiencies of the output=input convention and has already secured rapid improvement in the usefulness of the National Accounts. However, there are three fundamental challenges in applying the DVM approach:

- the output of the public sector is often difficult to describe or measure
- it is difficult to measure the quality of public sector output, and
- some means of weighting different goods and services is required in order to aggregate them into a single output index

For goods and services exchanged in the private sector, market prices provide an indication of their relative value to consumers. But such prices do not exist for non-market outputs, so some other means must be adopted to assess their relative value. The absence of prices that reflect

the true marginal social value is taken to be the fundamental defining feature of the non-market sector. Moreover, the role of government in the provision and financing of health and education services varies across countries and over time, so that in most contexts there is a blurred boundary between the public and private sectors. DVM measurement seeks to measure volumes of non-market outputs in the National Accounts in an analogous fashion to that employed for the traded sector. This implies the need to infer values for each of the services under scrutiny. These are required so that the different non-market services produced can be aggregated with each other and also aggregated with market services.

Progress in implementing DVM

Considerable progress has also been made in many countries across Europe seeking to implement the European Union National Accounts directive, particularly in healthcare and education. Key definitional terms for the health and education sectors are reproduced from the Eurostat handbook in **Box 2**. This reveals differences in applying the definitional concepts to the two sectors.

Measuring the quantity of educational output is less challenging than it is in the health sector, even though Eurostat's broad definitions of output are similar. In education, there is usually accurate information about the number of pupils taught at each stage of their education and, often, it is possible to track the educational attainment of individual pupils over time. Furthermore, pupils are a relatively homogenous set of service users.

In the health sector, there is much more heterogeneity among service users in terms of the nature of their contact with the health system and what this contact is designed

Box 1

Progress in implementing direct volume measurement

Progress has been achieved in the following areas:

- the publication by Eurostat of a methodological Manual on prices and volumes to provide guidance to Member States
- the support by most EU Member States for the introduction of a legal framework requiring each Member State to measure non-market outputs (as opposed to inputs) by 2006
- the introduction, by most EU countries who have reported, of output methods for much of health services; about half of these countries are using methods classified by Eurostat as best practice. There are examples of countries outside EU doing the same
- the introduction, by nearly all EU countries who have reported, of output methods for non-market education services; nearly all of these countries are using methods classified by Eurostat as best practice. There are examples of countries outside the EU doing the same
- many countries have been working seriously on developing new methodologies that go well beyond those formally reported to date, as evidenced by the workshop papers

Box 2

Key definitional terms

	Health	Education
Input	What the health system uses in order to provide its output	What the education sector uses in order to provide its output
Output	The quantity of healthcare received by patients, in terms of complete treatments, adjusted to allow for the qualities of the services provided	The quantity of teaching received by students, adjusted to allow for the qualities of the services provided
Activities	The individual actions carried out by the health sector in delivering a completed treatment	n/a
Outcome	The change in health status due to health sector interventions	Lack of consensus over what constitute educational outcomes

to achieve. It is often difficult to arrive at a precise definition of what constitutes a completed treatment, and to measure this accurately, particularly for the large volume of treatments for patients with chronic conditions. The fallback position in the health sector, therefore, is to count the number of activities undertaken by the various institutions that comprise the health sector. This is discussed at greater length in the next section of the article.

Conversely, there is greater consensus about how to define the desirable outcomes of healthcare than there is of education. The primary, although not exclusive, aim of healthcare is to improve health status. While it is a challenge to measure this improvement, it is becoming both technically and practically more feasible.

In contrast, participants at the workshop did not share a consensus about what constitutes the primary purpose of education. Education may be designed to ensure that pupils have more qualifications, are more rounded citizens, or are better able to command higher wages. The workshop featured presentations that assumed different conceptions of educational outcomes. The debate is summarised in more detail later in the article.

The SNA requires each country to measure output volume growth and most discussion was, not surprisingly, about this measure. Output volume growth in one or more countries can be measured in a comparable way without having to measure the actual volume levels in each country.

But inter-country comparisons are also important. Measures of volume levels indicate, in a comparable way, the output or consumption of different goods and services by each country in a particular time period. Such comparisons of the volume of

education or health services produced or consumed in different countries – perhaps expressed per pupil or per head of population – are likely to be of considerable policy interest. Although challenging, constructing this type of measure is, in principle, feasible for education and health services, as shown by the contributions made at the workshop. Some recent developments have helped make success more likely. Volume levels of different goods and services produced in different countries are now regularly estimated and compared with the help of PPPs (which remove the differences in national price levels from the money value of each country's production). An extension of the PPP methodology could result in the development of comparable measures of the volume levels of education and health services in different countries.

Health

Finding an adequate measure for output volume is not straightforward. This task involves the partitioning of total output into a set of individual products, quantifying their volume and finding weights in order to aggregate the volumes into a value representing total output volume (Chessa *et al* 2006). If the health system produced only a single output (x), the change in output from one year to the next can be expressed as:

$$I^1 = \frac{\text{output}_{yr2}}{\text{output}_{yr1}} = \frac{x_2}{x_1}$$

But this oversimplifies matters considerably, as encapsulated by the Eurostat definition of healthcare output.

The health output is the quantity of health care received by patients, adjusted to allow for the qualities of

services provided, for each type of health care. The quantity of health care received by patients should be measured in terms of complete treatments (Eurostat, 2001).

Putting this definition into practice is not straightforward because it is a challenge to measure complete treatments. The majority of patients receive a range of interventions from different providers, in different settings, and, in the case of patients with chronic conditions, over a long period of time. It is not always possible to define when the treatment is complete, and most countries lack the informational capability to track patients across different settings. This means that counting the number of patients who have completed their treatment is not currently possible.

In view of these difficulties, it is common practice to define output in the health sector by counting the number of activities undertaken – for instance, the number of patients treated in hospital. If only a single activity (x) is undertaken, the index is rewritten as:

$$I^2 = \frac{\text{activity}_{yr2}}{\text{activity}_{yr1}} = \frac{x_2}{x_1}$$

But, of course, the health sector performs many different activities – patients visit their general practitioners, are treated in hospital, are provided with medicine by pharmacists, and so on. To be able to assess the output of the health system, it is necessary both to count all of these activities ($x_j, j=1 \dots J$) and to attach a relative value to each type of activity ($v_j, j=1 \dots J$). Thus, in Laspeyres form, where activities are valued in the base period, the index becomes:

$$P^3 = \frac{(\text{number_of_activities}_{y2}) \times (\text{value_per_activity}_{y1})}{(\text{number_of_activities}_{y1}) \times (\text{value_per_activity}_{y2})} = \frac{\sum_{j=1}^J x_{j2} v_{j1}}{\sum_{j=1}^J x_{j1} v_{j2}}$$

Even counting activities can be difficult. In the hospital sector, activities are counted reasonably accurately. As well as being able to count the number of patients admitted to, or discharged from, hospital, there are good ways of distinguishing between one type of patient and another, the most common classification system being diagnosis related groups (DRGs) and this is the approach recommended by Eurostat. Eight EU countries, as well as Australia and New Zealand, use some form of DRGs as the basis for quantifying hospital activity.

While recognising that DRGs represent a considerable improvement to highly aggregated descriptions of hospital activity, for example, in-patient admissions and out-patient visits, participants at the workshop pointed out the lag between the appearance of new technologies and their inclusion in the classification system. It was noted, however, that this was a similar issue to the quality change problem in the measurement of the consumer prices index.

Outside hospitals, counting activities is more difficult. Often data are unavailable. In the UK, for instance, no routine data are collected on the number of consultations patients have with general practitioners. Instead, the UK National Accounts rely on estimates derived from surveys of the general population. Reliance on survey data may give a misleading impression both of the volume of activity, because this

depends on accuracy of recall and how representative the sample is of the general population, and of changes in volume over time, particularly if a new sample is surveyed in each period.

The method adopted to counting activities varies according to institutional stratification and by country. A survey of the range of approaches currently in place across European and OECD countries was reported at the conference. A summary of the findings is reported in **Box 3**.

While counting activities is difficult, it is even more problematic to attach a value (v_j) to these activities, as required to calculate total output. The value of hospital treatment following cardiac arrest will be different from the value of a consultation with a GP about back pain. But how should these relative values be determined? By definition, for non-market services, there are no market prices to indicate the consumer's marginal willingness to pay for them. Instead, the recent convention in the National Accounts has been to use cost to reflect the value of non-market outputs. Thus the index becomes:

$$P^4 = \frac{(\text{number_of_activities}_{y2}) \times (\text{cost_per_activity}_{y1})}{(\text{number_of_activities}_{y1}) \times (\text{cost_per_activity}_{y2})} = \frac{\sum_{j=1}^J x_{j2} c_{j1}}{\sum_{j=1}^J x_{j1} c_{j2}}$$

where c_j reflects the cost of activity j . This practice is consistent with the SNA and the recommendations of the EU. However, it implies that costs reflect the marginal value that society places on these activities. So, in the UK, a cochlear implant to treat deafness (at £23,889) is assumed to be fifteen times

more 'valuable' than a normal delivery in maternity care (at £1,598). The use of costs to reflect value also rests on strong implicit assumptions, which are unlikely to be valid, especially that healthcare resources are allocated in line with societal preferences, that is, the health system is allocatively efficient.

Nevertheless, cost weights have the advantage that they are reasonably easy to obtain and incorporate into the index. In general, participants at the workshop indicated little support at the current time for an index in which cost weights are replaced by value weights, because of the conceptual and practical challenges involved. However, some did take the view that this was the right direction for the future.

One way to capture aspects of quality is to incorporate them as adjustments in a cost-weighted output index. An example of this approach has been developed by the University of York and National Institute of Economic and Social Research (Dawson *et al* 2005). The English Department of Health has used some partial measures of quality (waiting times, 30-day survival after hospital admission, blood pressure control in general practice) to demonstrate the method.

In practical terms, this raises the question of how to define quality in healthcare. Ultimately, quality adjustment requires deciding upon the domains of quality in which people are interested, which might include the following:

- the contribution made to improving health
- having a choice about when and where care is delivered

Box 3

Methods to count activities

Stratification

Hospital services

In-patient services

Hospital psychiatric services

Rehabilitation services provided in rehabilitation centres/hospitals

Nursing services

Medical practice services

Services provided by medical specialists

Services provided by GPs

Dental practice services

Other human health services

Most common method

Number of treatments by DRG

Occupant bed days

Occupant bed days

Occupant bed days by level of care

Number of consultations (by type of treatment)

Number of consultations (by type of treatment)

Number of consultations (by type of treatment)

Number of treatments

Other methods

Occupant bed days

Number of treatments by DRG

Number of treatments by DRG

Number of treatments by DRG

Number of treatments

Number of treatments

Number of treatments

- the delay (waiting time) before receipt of care
- patient satisfaction or patient experience
- the environment in which care is delivered

Quality adjustment is difficult most fundamentally because people do not demand healthcare for its own sake, but because of the contribution it makes to their health status. This requires a means of measuring the health outcome of treatment. At the workshop, the following definition was provided: ‘The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge’ (Kelley, 2006).

Ideally, the measure of health outcome should indicate the value added to health as a result of contact with the health system. This reflects the need to isolate the specific contribution of health services to health outcome – the problem of attribution. Value-added measures have proved difficult to make operational in the health sector, mainly because the counterfactual – what health status would have been in the absence of intervention – is rarely observed. Instead, health status measurement tends to rely on comparisons of health states before and (sometime) after intervention. For the purposes of measuring output growth in the National Accounts, before and after measurements can be considered reasonable approximations to with- and without-treatment comparisons. However, currently available data on quality are too limited in virtually every OECD country for such an adjustment to be made adequately.

Education

Participants at the workshop suggested that measurement of output was more manageable in the educational sector than in health: education is less complex, there is more stability over time, there is greater homogeneity among service users, and there is greater availability of data. But there are other challenges, particularly in reaching agreement about the primary purpose of education.

This challenge can be reformulated as a question: ‘What does the education system aim to produce?’ It was argued that the focus of measurement should be on the contribution that the education system makes to social and economic welfare. In addition to educational attainment, outcomes such as generating social skills, making good citizens, producing healthy

people, as well as the purely custodial function of providing childcare could also be considered. These are not easily measured, so the current focus in the National Accounts is to count the volume of education delivered, and then make adjustments for educational quality.

The general form of an output index in education is as follows:

$$F = \frac{(\text{number_of_outputs}_{y2}) \times (\text{cost_per_output}_{y1})}{(\text{number_of_outputs}_{y1}) \times (\text{cost_per_output}_{y1})} = \frac{\sum_{j=1}^J x_{j2} c_{j1}}{\sum_{j=1}^J x_{j1} c_{j1}}$$

Here, outputs are weighted to reflect the differential costs of teaching pupils at different stages of the educational pathway. Eurostat suggests an institutional stratification comprising six levels:

- preschool
- primary
- lower secondary
- upper secondary
- higher (tertiary) education, and
- other education

This institutional stratification is not always applied, with some countries finding it difficult to separate lower and upper secondary education in particular.

Eurostat’s recommended approach to how best to count output depends on the educational level:

- number of student hours is recommended except in higher education, though it is acceptable to use number of students if hours per pupil is considered stable
- number of students is considered a better reflection of output in higher education

Workshop participants recognised, however, that hours of teaching may not be highly correlated with the quality of teaching. In international comparisons, Finnish children (7 to 15 year olds) receive among the lowest number of student instruction hours but achieve the best scores in internationally comparable assessments. This suggests that input (hours of instruction) does not necessarily equate with outcome in terms of test results.

Countries have been considering how to account for the quality of their educational services, drawing on such things as national inspection regimes. While these might be politically important measures within countries, incorporating them into the National Accounts raises problems of cross-country comparability. There is also a concern with consistency across time.

Atkinson (Atkinson 2005) proposed a 1.5 per cent annual adjustment for the changing value of education, the rationale being that educational qualifications have higher returns for individuals today than they used to have in the past because of increasing earnings in a growing economy. At the workshop, the economic basis for making this adjustment was questioned, it being argued that the output index should not incorporate income effects. ONS has recently launched a consultation exercise to explore this controversy.

At present, those countries that have tried to account for educational quality have adopted different strategies, though most make adjustments for class size or test scores attained by pupils. In Italy, there is a class size adjustment, in the belief that the quality of teaching declines once classes become too large – ‘congested’. In practice, this adjustment will have minimal effect if class size does not vary over time. However, if class sizes were falling, this would imply productivity decreases if no account were taken of enhanced student experience.

There are a number of ways to measure educational attainment, including examination data, moving up data (proportion of students who pass to higher year) and standardised assessment tests. The measures of attainment available in the education sector have the potential to be substantially more powerful than any equivalent in the health sector. The reason is that, because students can be tested over time, it is possible to calculate the value added provided by the education sector. This approach seeks to isolate the extent to which educational attainment can be attributed to the education sector.

International comparisons of the quality of education might best be secured by drawing on the OECD’s Programme for International Student Assessment (PISA) exercise (Davidson, 2006). PISA is a collaborative process among the 30 member countries of the OECD and nearly 30 partner countries, which attempts to measure student achievement. Under PISA, a sample of students is tested periodically in key competencies in reading, maths and science. PISA also asks students about their ‘soft skills’, such as their engagement and motivation. The availability of student-level data also allows country-level comparisons to be made both of the level of educational attainment and the variation in results among students.

It would be difficult and, perhaps, inappropriate to extend PISA to tertiary education, given the more specialised

nature of teaching at this level and because institutions have objectives in addition to teaching, including research and broader contributions to public services. Therefore, alternative ways of measuring tertiary educational quality are required. Many countries have attempted to do this in order to facilitate performance management and evaluation of higher education at a time when institutions have a large degree of autonomy over management and organisation of their activities. Norway has attempted to assess the performance of its higher education institutions by taking account of teaching and research activities, engagement with the community, and resource management.

Attempts in the US to move from relatively straightforward counts of the number of students taught towards an outcome-based measure were described at the workshop. This involves applying a human capital approach to measuring educational output, the argument being that this would capture more accurately the likely significant contribution of education to economic growth. This involves estimating the wage gap between groups of people who have had different levels of education.

General themes emerging from the workshop

In this section, the main themes emerging from the workshop are summarised.

There was widespread (if not unanimous) agreement that the pursuit of DVM for non-market output in the National Accounts is a desirable objective, as it is more likely to offer meaningful information than the input=output convention for resource allocation and accountability in the public services. Considerable progress has already been made in implementing the DVM approach in EU Member States and other OECD countries. However, there remain many challenges, and progress towards more satisfactory treatment of non-market services is likely to be a long-term project.

Measurement of activities at quite a fine level of detail has been shown to be feasible across a wide range of healthcare. In the education sector, outputs in the form of pupils at various stages of education are readily measured. This offers considerable potential for some very rapid improvement in the estimates of output growth in these sectors.

However, a persistent concern of the workshop was how to attach 'values' to the various activities or outputs. The traditional approach of using costs as a proxy for value

has the virtue of feasibility, but assumes that resources within the sector under scrutiny are already being allocated in line with the traditional market rule (marginal benefits equal marginal costs). In a non-market setting, this is unlikely to be the case.

An alternative approach is to seek to attach valuations derived from other sources to activities and outputs. For example, in healthcare, the additional quality-adjusted life years secured per patient offers a good indication of the relative values of different treatments. In practice, pursuit of this value-added metric is at a very early stage and some aspects of value may not be captured in this measure. However, if measured properly, these weights would address the problem of isolating the specific contribution of the healthcare sector to health outcomes.

Even if acceptable values can be inferred, there remains the question of whether they are sensitive to changes in the 'quality' of the service under scrutiny. For example, the health benefits of a treatment may remain unchanged, but the non-health characteristics of the treatment may improve (for example, in the form of reduced waiting times). The multidimensional nature of measures of the quality of public services becomes a particular challenge as attention shifts from measures of output towards measures of outcome.

The workshop also highlighted other challenges. There was some concern about the need to maintain usable time series of data with which to assemble estimates of productivity change. The rapid changes in methodologies run the risk of fracturing the continuity of data series, and there is a need to maintain the integrity of series wherever possible.

At present, most countries are seeking to enhance their own country's methodology without too much regard for international standardisation. Yet international comparison remains one of the most important vehicles for promoting improvement in public services, so the pursuit of comparability remains a high priority. Contributions to the workshop demonstrated the feasibility of making progress in this domain. The work of OECD on the PISA initiative offers a promising model in the education sector. However, the challenges in healthcare are more formidable.

Finally, while the workshop emphasised the issues in healthcare and education, the agenda is also relevant to a range of other collective services, such as criminal justice

and transport. Although not a central feature of the discussion at the workshop, it is clear that the challenges in these services, which are generally less measurable in terms of individual activities, are greater than those in the health and education sectors, and any major advances are likely to be in the longer term.

Conclusions and priorities for the future

These concluding remarks indicate what the authors feel should be the priorities in the development of detailed international guidelines for improving the measurement of non-market output in the National Accounts. It should be emphasised that these are personal observations, developed in the light of the workshop proceedings. They do not necessarily reflect the views of the sponsors or the participants at the workshop.

First, there is an urgent need to secure the active engagement of all relevant stakeholders. Advances will be made only if they meet the priorities and needs of those stakeholders, including governments, legislatures, national statistical agencies, and other users of national accounts. At an early stage, therefore, participants in this work should seek out the information needs and priorities of these key stakeholders, and ensure that they are taken into account in the subsequent methodological developments.

There is then a clear need to continue to survey existing practice in participant countries. The workshop identified a great deal of common practice across many countries, but also marked differences in methodology. Documenting these should create an important resource for sharing existing practice.

Many of the fundamental principles to which all systems of national accounts should seek to adhere in measuring non-market output have been addressed already, notably in the SNA, the Eurostat Manual on Prices and Volumes (Eurostat, 2001) and the Atkinson Review Report (Atkinson, 2005). Future work should act as a focus for developing and refining international guidelines on the implementation of these principles. To that end, it is noted that, as a result of the workshop, OECD is preparing a handbook on measuring education and health volume output.

Future work in the area of health should seek confirmation that health gain (in the form, for example, of quality-adjusted life years) should be the fundamental outcome on which methodology is developed.

System responsiveness unrelated to health gain (in the form, for example, of waiting times) is likely to be a secondary issue at this early stage of methodological development, but the research should verify that this is the case.

In the short term, it is likely that healthcare methodology will be driven by counts of activities rather than outputs. However, there is an imperfect relationship between the number of activities delivered and health gain, and research should examine the possibility of moving towards measures of completed treatments, at least for a subset of healthcare.

Existing methodology relies almost universally on the use of cost weights to aggregate measures of activity or output in healthcare. In due course, measures of activity or output should be aggregated using value weights, based on the relative contribution of the treatment to health gain. In many circumstances, these may yield very different measures of volume growth. Research efforts should examine the scope for developing value weights as a matter of urgency, and recommend methodologies for estimating such weights.

It is clearly desirable to seek out indices of the quality of healthcare with which to augment the counts of activities or outputs. However, these indices may merely indicate the extent to which the value of the treatment is increasing over time, and a good measure of value, updated every year, may render such quality measurement redundant. That is, if a system of accounts uses adequate disaggregation with value weights, the need to measure quality change is less urgent.

The treatment of pharmaceutical expenditure in healthcare volume measurement is an especially challenging problem that deserves urgent attention, given its importance as a percentage of total expenditure. This involves determining the relationship between the amount of input, for example, prescriptions dispensed, and healthcare output; and deciding whether these contributions to output should be attributed to the health or pharmaceutical sector.

Volume measurement is much more straightforward in education than in healthcare, and it is felt that a great deal of progress can be made in developing guidelines for such measurement in national accounts. However, there is less agreement than in healthcare about the ultimate outcomes of educational services. This diversity of views still permits individual countries to develop measures of growth. However, in the interests of promoting international comparison, future research should examine the scope for a broader consensus on the measurement of educational outcome.

The lack of clarity on outcomes leads to special challenges on the estimation of weights with which to aggregate measures of educational output. It may be the case that – in education – society has been more successful in aligning expenditure with values, so that the divergence between cost weights and value weights may be less marked in this sector than in other domains of government activity. Nevertheless, research should seek to clarify this issue.

Because of the lack of value weights, measures of quality improvement may be more important in education than in healthcare, and this deserves careful attention in the project. Here, the challenge may be to ensure that the metric for quality remains consistent over time. The PISA initiative may yield a useful resource in this respect.

More generally, further research should explore the scope for measuring levels of output as well as growth. Inter-country comparisons are one of the most powerful devices for engaging policy interest and prompting the search for service improvements, and developing robust methodology to that end, building on experience with PPP, should be a priority.

Considerable progress has already made across EU Member States and other OECD countries in implementing DVM in the National Accounts. This has made the National Accounts more meaningful as measures of the changes in output over time and for making international comparisons. Future efforts should build on the foundation that has been laid in order to further enhance international comparison of non-market output in the health and education sectors.

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REFERENCES

- Atkinson T (2005) *Atkinson Review: Final Report. Measurement of Government Output and Productivity for the National Accounts*, Palgrave Macmillan: Basingstoke.
- Chessa A and Kleima F (2006): The Dutch experience in measuring health output and labour productivity, OECD/ONS/Government of Norway Workshop on 'Measurement of non-market output in education and health' London, 3–5 October 2006.
- Davidson M (2006): PISA database for pupils of 15 year old, and similar data for other projects: output and outcome, OECD/ONS/Government of Norway Workshop on 'Measurement of non-market output in education and health' London, 3–5 October 2006.
- Dawson D, Gravelle H, O'Mahony M, Street A, Weale M, Castelli A, Jacobs R, Kind P, Loveridge P, Martin S, Stevens P and Stokes L (2005) *Developing new approaches to measuring NHS outputs and productivity, Final Report*, Centre for Health Economic research paper 6: York.
- Eurostat (2001) *Handbook on price and volume measures in national accounts* (2001 edition), Luxembourg: Office for Official Publications of the European Communities.
- Kelley E (2006): Measuring health care quality at the international level, OECD/ONS/Government of Norway Workshop on 'Measurement of non-market output in education and health' London, 3–5 October 2006.

Methods explained

Methods explained is a quarterly series of short articles explaining statistical issues and methodologies relevant to ONS and other data in a simple, non-technical way. As well as defining the topic areas, the notes explain when, why and how these methodologies are used. Where relevant, the reader is also pointed to further sources of information.

Contributions to growth rates under annual chain-linking

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SUMMARY

When growth rates of series such as GDP are published by the Office for National Statistics, the contributions of individual components are also often reported. These contributions are a reflection of the importance of each area to the overall total. This article demonstrates the stages involved in calculating these contributions and explains their relevance in decomposing growth.

As the UK economy grows over time, its components will inevitably change in size and structure. For example, the last 40 years have seen a steady decline in the importance of the UK manufacturing sector, but an equally stark rise in services. Consequently, the impact that a specific area of the economy has on the overall growth is related not only to its own performance but also to its relative share in the total. It is therefore of interest to calculate the effect that a given area is having at aggregate levels. Contributions to growth show the percentage that a given area adds to an overall rate. In general, contributions are a simple way of analysing disaggregated economic data. This article will use a numeric example to describe the stages involved in calculating the contributions of separate industries to overall, annually chain-linked gross domestic product (GDP) growth.

The relevance of contributions

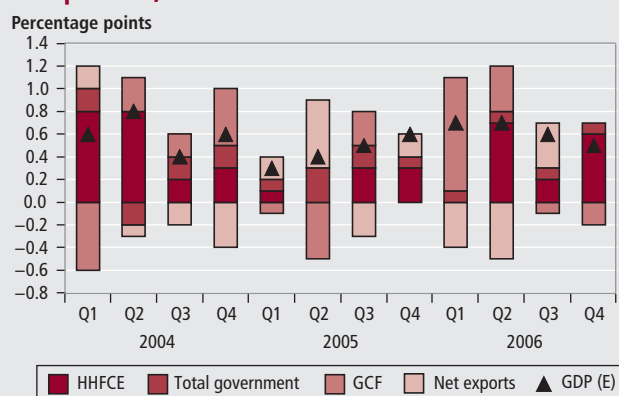
Growth contributions can be calculated by sectors or components of totals. The growth of GDP can be split into its output components by industry or its expenditure and income components. Equation 1 shows how total output can be split into its very broad expenditure components. The total is the sum of consumption (C), investment (I) and government (G) expenditure, in addition to the net effect of exports (X) and imports (M).

$$Y_t = C_t + I_t + G_t + (X_t - M_t) \quad (1)$$

Figure 1 demonstrates the contributions to GDP growth of its expenditure components using chained volume measures. The chart shows the quarterly contributions to growth of each expenditure category. It is evident that while household final consumption expenditure (HHFCE) has a consistently positive impact on growth, net exports and gross capital formation (GCF) vary in their contribution, having both positive and negative overall effects throughout the period. This technique may be useful in informing commentary, and indeed policy, in discerning the key sources of economic growth and, in this case, the impact of government

Figure 1

Contributions to GDP growth: by expenditure component, chained volume measures



expenditure. Calculating the contribution to growth has quantified both the direction of impact and its magnitude.

The use of this approach is not limited to the growth of GDP. Contributions are also used to measure the price effect of groups of goods and services on total inflation as measured by the consumer prices and retail prices indices (CPI and RPI). For example, fuel and light contributed -0.22 per cent to the 4.5 per cent RPI inflation in April 2007. The Office for National Statistics (ONS) publishes inflation contributions data in its monthly first release of RPI and CPI figures.

Calculating contributions to growth

For *Blue Book* 2003, ONS moved to a system of annual chain-linking estimates of GDP from the previous fixed-base system. Practically, calculating the contributions to overall growth of individual industries is similar for fixed-based and chain-linked estimates of GDP. For further reading on the differences between these two systems see Lynch (1996). Annual chain-linking updates the industry weights on a yearly basis and hence better reflects the changing structure of an economy. It uses previous year prices to produce growth rates and weights for contributions calculations.

The contribution that any given industry makes to the overall growth rate is simply a combination of the growth within that industry and the weight that the industry holds in the economy as a whole. The weight is the proportion of total volume that the industry

contributes. This can be affected over time by both the quantity and price of the output produced by the industry. So, the weight that any industry holds may be affected by rapid price changes. It is possible to use an algebraic and numerical approach to demonstrate how to calculate growth contributions. The examples used here focus on industry contributions to the output measure of GDP. The calculations focus on annual growth contributions, but the same approach can also be used for other time periods.

The growth of an index I (for example GDP) can be defined as follows:

$$g_t = \left(\frac{I_t - I_{t-1}}{I_{t-1}} \right) * 100 = \left(\frac{I_t}{I_{t-1}} - 1 \right) * 100 \quad (2)$$

The total index can be thought of as a weighted sum of each index at the desired level of disaggregation. The weight used will be the proportion of the total that the industry or sector represents in the previous year.

Annually chain-linked contributions

As explained in a previous Methodology Note (Robjohns, 2006), annual chain-linking is essentially a shifting of the base forward by one year each year. Therefore, instead of using weights from a base year at a defined point in the past, the previous year's weights are used. This is demonstrated algebraically first.

The total, aggregated growth rate under annual chain-linking is equal to:

$$\left(\sum w_{i,t-1} \frac{q_{i,t}}{q_{i,t-1}} - 1 \right) * 100 = \left(\sum w_{i,t-1} \frac{q_{i,t}}{q_{i,t-1}} - \sum w_{i,t-1} \right) * 100 \text{ as } \sum w_{i,t-1} = 1$$

$$\left(\sum w_{i,t-1} \frac{q_{i,t}}{q_{i,t-1}} - 1 \right) * 100 \quad (3)$$

So,

$$C_{i,t} = w_{i,t-1} \left(\frac{q_{i,t}}{q_{i,t-1}} - 1 \right) * 100 \quad (4)$$

The contribution under annual chain-linking uses the growth rate of the indices between t and t-1 and also the weight of the given industry at t-1. This contribution can be calculated at the level at which annual chain-linking is implemented. The contribution to GDP growth of industry i is equal to its weight, as defined in the previous year, multiplied by growth within that industry and divided by the overall index for the economy in the previous period. This is then multiplied by 100 to create a percentage contribution. A detailed description of this approach can be seen in Tuke (2002).

Table 1 and **Table 2** give the constant and current price series for a hypothetical economy with three industries: A, B and C. These tables can be used to demonstrate how growth contributions for each industry are calculated using the equations already shown.

The annual chain-linked growth rates can be seen in **Table 3**. The aim of contributions is to decompose these overall growth rates. This can be done simply using equation 4 and the data in Tables 1 and 2.

Table 1

Example industry breakdown, constant (2005) prices

	Industry		
	A	B	C
1995	518	1,213	647
1996	555	1,241	639
1997	569	1,290	636
1998	589	1,300	637
1999	613	1,320	626
2000	640	1,338	618
2001	647	1,392	614
2002	661	1,410	605
2003	670	1,508	598
2004	690	1,542	593
2005	702	1,576	584

Table 2

Example industry breakdown, current prices

	Industry		
	A	B	C
1995	405	1,040	622
1996	449	1,080	617
1997	472	1,145	620
1998	500	1,166	624
1999	531	1,195	620
2000	571	1,224	612
2001	598	1,299	608
2002	623	1,329	599
2003	644	1,449	595
2004	676	1,512	590
2005	702	1,576	584

For example, using Table 2, to calculate the weights for industry A's contribution to growth in 2003:

$$W_{A,2002} = \frac{623}{623 + 1329 + 599} = 0.243 \quad (5)$$

It is now possible to calculate the chain-linked contributions using equation (5):

$$C_{A,2002} = 0.243 * \left(\frac{670}{661} - 1 \right) * 100 = 0.33 \quad (6)$$

This approach is then replicated for each year and industry. **Table 4** reports the contributions for each industry using this approach. The contributions for each industry sum to give the total for that year (although rounding may influence these tables). So, industry A made a 0.3 per cent (one decimal place) contribution to the 3.68 per cent (two decimal places) overall growth in 2003. In this example, it is evident that industry C seems to have a consistently negative impact on total growth.

Fixed-base tails and additivity

Table 4 serves as an example of the techniques used to calculate contributions to growth from chained volume measures. There is an important caveat to note and this is that current ONS series maintain a fixed-base tail in the most recent years. That is to say that the latest years are reported in constant prices referenced to a base year that advances annually. In *Blue Book 2006*, this reference year was 2003 and so years before 2003 were chain-linked whereas years

Table 3
Annual chain-linked growth rates

	Price base												Growth (per cent)
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
1995		2,067											
1996		2,112	2,146										2.19
1997			2,197	2,237									2.38
1998				2,264	2,291								1.18
1999					2,318	2,346							1.20
2000						2,378	2,407						1.35
2001							2,459	2,504					2.15
2002								2,525	2,551				0.83
2003									2,644	2,688			3.68
2004										2,735	2,778		1.75
2005											2,814	2,862	1.30

Table 4
Annual chain-linked growth rates: by industry contributions

	Percentages			
	Industry			Total
	A	B	C	
1996	1.40	1.16	-0.37	2.19
1997	0.53	1.99	-0.13	2.38
1998	0.74	0.40	0.04	1.18
1999	0.89	0.78	-0.47	1.20
2000	1.00	0.69	-0.34	1.35
2001	0.26	2.05	-0.16	2.15
2002	0.52	0.67	-0.36	0.83
2003	0.33	3.62	-0.27	3.68
2004	0.72	1.22	-0.19	1.75
2005	0.42	1.20	-0.32	1.30

afterwards used 2003 as the fixed base. This is particularly important to the calculation of growth contributions because of the concept of additivity.

A series can be said to be additive if the sum of the volume measures for each component (or industry grouping) is equal to the aggregate volume measure. A simple constant price series will always be additive because the total is simply a sum of its components. Under annual chain-linking, however, the series will only be additive in its fixed-base tail, that is, after its reference year. A fixed-base series will be additive from its last base year. This makes the calculation of growth contributions all the more crucial as the contributions will always sum to the total growth rate (see Table 4) or indeed the desired level of interest.

Contributions data

Table 5 and **Table 6** report actual ONS figures for industry growth rates (Table 5) and contributions to overall growth (Table 6). It is clear from this that the steady growth in total services had a large impact on the economy as a whole, as services holds a substantial weight. Note that the total production and services contributions are the sum of the more disaggregated industry level contributions. This is a demonstration of the additivity already mentioned.

The contrast between Tables 5 and 6 is well shown by agriculture. Only in 2002, when agriculture grew by 12.3 per cent, does it have

an appreciable contribution to growth. This is due to the sector's relatively small size. It follows that, as an industry's weight in the economy declines, so too will its impact on the total growth rate.

Calculating the contributions of individual components to overall growth is a simple process for annually chain-linked time series. These contributions can be used for GDP and other time series to isolate the impact that individual industries have on the aggregates. They reflect both the strength of growth within that industry coupled with the relative weight of that industry in the whole economy. The comparability and additivity of these contributions make them useful tools for assessing the importance of specific areas of the economy.

Table 5
Industry growth rates

	Percentages				
	2002	2003	2004	2005	2006
Agriculture	12.3	-2.1	-1.0	2.4	-1.8
Total production	-1.9	-0.3	0.8	-1.9	0.1
Manufacturing	-2.6	0.2	2.0	-1.0	1.5
Extraction	0.4	-5.1	-7.9	-9.5	-7.9
Utilities	0.4	1.6	1.1	-0.2	-2.8
Construction	3.6	4.7	4.0	1.5	1.1
Total services	2.6	3.2	3.9	2.9	3.7
Distribution, hotels and catering	4.6	3.8	5.2	1.2	3.3
Transport, storage and communication	1.2	1.9	2.5	4.3	3.1
Business services and finance	2.0	3.9	5.1	4.3	5.4
Government and other	2.5	2.4	2.0	2.0	2.0

Table 6
Industry contributions to growth

	Percentage points				
	2002	2003	2004	2005	2006
Agriculture	0.1	0.0	0.0	0.0	0.0
Total production	-0.4	-0.1	0.1	-0.3	0.0
Manufacturing	-0.4	0.0	0.3	-0.1	0.2
Extraction	0.0	-0.1	-0.2	-0.2	-0.1
Utilities	0.0	0.0	0.0	0.0	0.0
Construction	0.2	0.3	0.2	0.1	0.1
Total services	1.9	2.3	2.9	2.2	2.8
Distribution, hotels and catering	0.7	0.6	0.8	0.2	0.5
Transport, storage and communication	0.1	0.1	0.2	0.3	0.2
Business services and finance	0.5	1.1	1.4	1.2	1.5
Government and other	0.6	0.6	0.5	0.5	0.5

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REFERENCES

Lynch R (1996) 'Measuring real growth index numbers and chain-linking', *Economic Trends* 512 pp 22–6

Robjohns J (2006) 'Annual chain-linking', *Economic Trends* 630 pp 25–8

Tuke A (2002) 'Analysing the effect of annual chain-linking on the output measure of GDP', *Economic Trends* 581 pp 26–33

Tuke A (2002) 'The effect of annual chain-linking on components of the expenditure measure of GDP', *Economic Trends* 587 pp 39–43

Tuke A and Beadle J (2003) 'The effect of annual chain-linking on Blue Book 2002 annual growth estimates', *Economic Trends* 593 pp 29–40

Key time series

National accounts aggregates

Last updated: 25/05/07

Seasonally adjusted

	£ million		Indices (2003 = 100)						
	At current prices		Value indices at current prices				Chained volume indices		Implied deflators ³
	Gross domestic product (GDP) at market prices	Gross value added (GVA) at basic prices	GDP at market prices ¹	GVA at basic prices	Gross national disposable income at market prices ²	GDP at market prices	GVA at basic prices	GDP at market prices	GVA at basic prices
	YBHA	ABML	YBEU	YBEX	YBFP	YBEZ	CGCE	YBGB	CGBV
2001	996,987	882,753	89.8	89.6	93.8	95.4	95.7	94.1	93.6
2002	1,048,767	930,297	94.5	94.4	97.2	97.4	97.4	97.0	96.9
2003	1,110,296	985,558	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2004	1,176,527	1,044,165	106.0	105.9	103.4	103.3	103.3	102.6	102.6
2005	1,225,978	1,088,506	110.4	110.4	104.5	105.3	105.3	104.9	104.9
2006	1,289,989	1,145,167	116.2	116.2	106.6	108.2	108.2	107.4	107.4
2001 Q1	246,345	217,972	88.7	88.5	93.2	95.0	95.4	93.4	92.7
2001 Q2	248,058	219,362	89.4	89.0	93.4	95.1	95.4	94.0	93.3
2001 Q3	249,447	220,955	89.9	89.7	94.5	95.7	95.9	93.9	93.5
2001 Q4	253,137	224,464	91.2	91.1	94.2	96.0	96.1	95.0	94.8
2002 Q1	257,368	228,051	92.7	92.6	95.9	96.5	96.6	96.1	95.8
2002 Q2	261,028	231,626	94.0	94.0	96.3	97.1	97.0	96.9	96.9
2002 Q3	264,049	234,316	95.1	95.1	98.4	97.8	97.7	97.3	97.3
2002 Q4	266,322	236,304	95.9	95.9	98.3	98.3	98.2	97.6	97.6
2003 Q1	270,918	240,577	97.6	97.6	99.4	98.8	98.8	98.8	98.8
2003 Q2	275,130	244,438	99.1	99.2	98.9	99.3	99.3	99.8	99.9
2003 Q3	280,024	248,520	100.9	100.9	100.0	100.4	100.4	100.5	100.5
2003 Q4	284,224	252,023	102.4	102.3	101.7	101.5	101.6	100.9	100.7
2004 Q1	286,975	254,169	103.4	103.2	101.9	102.2	102.2	101.1	100.9
2004 Q2	293,120	260,148	105.6	105.6	103.2	103.1	103.2	102.4	102.4
2004 Q3	295,998	262,789	106.6	106.7	103.0	103.5	103.5	103.0	103.0
2004 Q4	300,434	267,059	108.2	108.4	105.4	104.1	104.2	103.9	104.0
2005 Q1	301,795	267,882	108.7	108.7	104.2	104.5	104.6	104.1	104.0
2005 Q2	304,745	270,605	109.8	109.8	105.6	104.9	105.0	104.6	104.6
2005 Q3	306,936	272,028	110.6	110.4	103.9	105.5	105.5	104.8	104.6
2005 Q4	312,502	277,991	112.6	112.8	104.4	106.1	106.2	106.1	106.2
2006 Q1	315,133	279,917	113.5	113.6	105.3	107.0	107.1	106.1	106.1
2006 Q2	319,346	283,338	115.0	115.0	107.0	107.8	107.9	106.7	106.6
2006 Q3	325,413	288,772	117.2	117.2	107.0	108.6	108.6	108.0	107.9
2006 Q4	330,097	293,140	118.9	119.0	107.1	109.3	109.3	108.8	108.8
2007 Q1	334,521	297,286	120.5	120.7		110.1	110.1	109.5	109.6

Percentage change, quarter on corresponding quarter of previous year⁴

2001 Q1	5.0	5.3	5.0	5.4	3.3	2.9	2.9	2.0	2.3
2001 Q2	4.6	5.0	4.6	5.0	3.1	2.3	2.1	2.3	2.8
2001 Q3	4.1	4.5	4.2	4.5	3.1	2.4	1.9	1.7	2.5
2001 Q4	4.7	5.1	4.7	5.2	3.7	2.0	1.6	2.7	3.5
2002 Q1	4.5	4.6	4.5	4.6	2.9	1.6	1.3	2.9	3.3
2002 Q2	5.2	5.6	5.1	5.6	3.1	2.1	1.7	3.1	3.9
2002 Q3	5.9	6.0	5.8	6.0	4.1	2.2	1.9	3.6	4.1
2002 Q4	5.2	5.3	5.2	5.3	4.4	2.4	2.2	2.7	3.0
2003 Q1	5.3	5.5	5.3	5.4	3.6	2.4	2.3	2.8	3.1
2003 Q2	5.4	5.5	5.4	5.5	2.7	2.3	2.4	3.0	3.1
2003 Q3	6.1	6.1	6.1	6.1	1.6	2.7	2.8	3.3	3.3
2003 Q4	6.7	6.7	6.8	6.7	3.5	3.3	3.5	3.4	3.2
2004 Q1	5.9	5.6	5.9	5.7	2.5	3.4	3.4	2.3	2.1
2004 Q2	6.5	6.4	6.6	6.5	4.3	3.8	3.9	2.6	2.5
2004 Q3	5.7	5.7	5.6	5.7	3.0	3.1	3.1	2.5	2.5
2004 Q4	5.7	6.0	5.7	6.0	3.6	2.6	2.6	3.0	3.3
2005 Q1	5.2	5.4	5.1	5.3	2.3	2.3	2.3	3.0	3.1
2005 Q2	4.0	4.0	4.0	4.0	2.3	1.7	1.7	2.1	2.1
2005 Q3	3.7	3.5	3.8	3.5	0.9	1.9	1.9	1.7	1.6
2005 Q4	4.0	4.1	4.1	4.1	-0.9	1.9	1.9	2.1	2.1
2006 Q1	4.4	4.5	4.4	4.5	1.1	2.4	2.4	1.9	2.0
2006 Q2	4.8	4.7	4.7	4.7	1.3	2.8	2.8	2.0	1.9
2006 Q3	6.0	6.2	6.0	6.2	3.0	2.9	2.9	3.1	3.2
2006 Q4	5.6	5.4	5.6	5.5	2.6	3.0	2.9	2.5	2.4
2007 Q1	6.2	6.2	6.2	6.3		2.9	2.8	3.2	3.3

Notes:

1 "Money GDP".

2 This series is only updated once a quarter, in line with the full quarterly national accounts data set.

3 Based on chained volume measures and current price estimates of expenditure components of GDP.

4 For index number series, these are derived from the rounded figures shown in the table.

Source: Office for National Statistics

Gross domestic product: by category of expenditure

Last updated: 25/05/07

£ million, chained volume measures, reference year 2003, seasonally adjusted

	Domestic expenditure on goods and services at market prices							Exports of goods and services	Gross final expenditure	less imports of goods and services	Statistical discrepancy (expenditure)	Gross domestic at product market prices
	Final consumption expenditure			Gross capital formation								
	Households	Non-profit institutions¹	General government	Gross fixed capital formation	Changes in inventories²	Acquisitions less disposals of valuables	Total					
	ABJR	HAYO	NMRY	NPQT	CAFU	NPJR	YBIM	IKBK	ABMG	IKBL	GIXS	ABMI
2001	653,326	27,155	217,359	171,639	5,577	342	1,075,760	277,694	1,353,632	294,449	0	1,059,648
2002	676,833	27,130	224,868	178,066	2,289	183	1,109,596	280,593	1,390,217	308,706	0	1,081,469
2003	697,160	27,185	232,699	178,751	3,983	-37	1,139,741	285,397	1,425,138	314,842	0	1,110,296
2004	721,434	27,327	240,129	189,492	4,597	-42	1,182,937	299,289	1,482,225	335,703	0	1,146,523
2005	731,274	28,119	247,412	195,107	3,611	-354	1,205,170	322,869	1,528,039	359,132	-233	1,168,674
2006	744,933	29,883	253,235	207,704	5,501	66	1,241,322	360,440	1,601,762	401,331	529	1,200,960
2001 Q1	161,204	6,873	53,609	42,555	1,643	-26	265,928	71,295	337,389	73,841	0	263,631
2001 Q2	162,333	6,788	53,894	43,242	1,802	202	268,431	69,333	337,813	73,937	0	263,935
2001 Q3	164,239	6,762	54,600	43,357	1,743	30	270,836	67,921	338,708	73,327	0	265,519
2001 Q4	165,550	6,732	55,256	42,485	389	136	270,565	69,145	339,722	73,344	0	266,563
2002 Q1	167,588	6,762	55,756	42,927	1,047	66	274,166	69,440	343,608	75,709	0	267,948
2002 Q2	168,803	6,756	56,288	43,981	385	48	276,273	71,533	347,850	78,367	0	269,392
2002 Q3	169,715	6,793	56,429	44,765	511	62	278,337	71,056	349,422	78,006	0	271,368
2002 Q4	170,727	6,819	56,395	46,393	346	7	280,820	68,564	349,337	76,624	0	272,761
2003 Q1	171,828	6,843	57,099	44,934	-571	-8	280,285	72,662	352,958	78,836	0	274,119
2003 Q2	174,146	6,779	57,684	44,161	-644	94	282,367	70,611	352,971	77,283	0	275,712
2003 Q3	175,140	6,790	58,445	43,924	2,264	-68	286,503	70,334	356,830	78,089	0	278,748
2003 Q4	176,046	6,773	59,471	45,732	2,934	-55	290,586	71,790	362,379	80,634	0	281,717
2004 Q1	178,197	6,830	59,969	47,256	-381	112	291,983	73,389	365,373	81,648	0	283,725
2004 Q2	180,362	6,805	59,530	47,102	1,050	-90	294,759	74,861	369,620	83,313	0	286,307
2004 Q3	181,032	6,826	60,002	47,813	1,025	-96	296,603	75,097	371,700	84,300	0	287,400
2004 Q4	181,843	6,866	60,628	47,321	2,903	32	299,592	75,942	375,532	86,442	0	289,091
2005 Q1	182,197	6,996	60,908	48,106	2,029	-158	300,079	75,533	375,611	85,591	-75	289,945
2005 Q2	182,206	6,975	61,792	47,937	678	86	299,673	79,293	378,967	87,595	-75	291,297
2005 Q3	182,998	7,028	62,272	49,524	474	-201	302,095	82,167	384,262	91,391	-58	292,813
2005 Q4	183,873	7,120	62,440	49,540	430	-81	303,323	85,876	389,199	94,555	-25	294,619
2006 Q1	183,907	7,325	62,705	50,616	2,173	-128	306,599	93,903	400,502	103,587	89	297,004
2006 Q2	185,998	7,415	63,106	51,207	2,407	233	310,366	96,086	406,451	107,282	126	299,295
2006 Q3	186,543	7,508	63,495	52,273	1,310	-29	311,100	85,409	396,509	95,344	150	301,316
2006 Q4	188,485	7,635	63,929	53,608	-389	-10	313,257	85,042	398,300	95,118	164	303,345
2007 Q1	189,559	7,680	64,200	54,519	-581	73	315,449	84,491	399,940	94,556	135	305,519

Percentage change, quarter on corresponding quarter of previous year

2001 Q1	2.1	3.9	1.8	3.0			2.8	9.7	4.3	9.0		2.9
2001 Q2	2.9	0.6	1.6	5.4			3.2	3.0	3.1	6.1		2.2
2001 Q3	3.4	-1.6	2.8	3.6			3.0	1.0	2.6	3.6		2.3
2001 Q4	4.0	-3.0	3.3	-1.8			2.7	-1.6	1.7	0.7		2.0
2002 Q1	4.0	-1.6	4.0	0.9			3.1	-2.6	1.8	2.5		1.6
2002 Q2	4.0	-0.5	4.4	1.7			2.9	3.2	3.0	6.0		2.1
2002 Q3	3.3	0.5	3.3	3.2			2.8	4.6	3.2	6.4		2.2
2002 Q4	3.1	1.3	2.1	9.2			3.8	-0.8	2.8	4.5		2.3
2003 Q1	2.5	1.2	2.4	4.7			2.2	4.6	2.7	4.1		2.3
2003 Q2	3.2	0.3	2.5	0.4			2.2	-1.3	1.5	-1.4		2.3
2003 Q3	3.2	0.0	3.6	-1.9			2.9	-1.0	2.1	0.1		2.7
2003 Q4	3.1	-0.7	5.5	-1.4			3.5	4.7	3.7	5.2		3.3
2004 Q1	3.7	-0.2	5.0	5.2			4.2	1.0	3.5	3.6		3.5
2004 Q2	3.6	0.4	3.2	6.7			4.4	6.0	4.7	7.8		3.8
2004 Q3	3.4	0.5	2.7	8.9			3.5	6.8	4.2	8.0		3.1
2004 Q4	3.3	1.4	1.9	3.5			3.1	5.8	3.6	7.2		2.6
2005 Q1	2.2	2.4	1.6	1.8			2.8	2.9	2.8	4.8		2.2
2005 Q2	1.0	2.5	3.8	1.8			1.7	5.9	2.5	5.1		1.7
2005 Q3	1.1	3.0	3.8	3.6			1.9	9.4	3.4	8.4		1.9
2005 Q4	1.1	3.7	3.0	4.7			1.2	13.1	3.6	9.4		1.9
2006 Q1	0.9	4.7	3.0	5.2			2.2	24.3	6.6	21.0		2.4
2006 Q2	2.1	6.3	2.1	6.8			3.6	21.2	7.3	22.5		2.7
2006 Q3	1.9	6.8	2.0	5.6			3.0	3.9	3.2	4.3		2.9
2006 Q4	2.5	7.2	2.4	8.2			3.3	-1.0	2.3	0.6		3.0
2007 Q1	3.1	4.8	2.4	7.7			2.9	-10.0	-0.1	-8.7		2.9

Notes:

- 1 Non-profit institutions serving households (NPISH).
- 2 This series includes a quarterly alignment adjustment.

Source: Office for National Statistics

Labour market summary

Last updated: 16/05/07

United Kingdom (thousands), seasonally adjusted

All aged 16 and over									
	All	Total economically active	Total in employment	Unemployed	Economically inactive	Economic activity rate (%)	Employment rate (%)	Unemployment rate (%)	Economic inactivity rate (%)
	1	2	3	4	5	6	7	8	9
All persons	MGSL	MGSF	MGRZ	MGSC	MGSI	MGWG	MGSR	MGSX	YBTC
Jan-Mar 2005	47,650	30,087	28,676	1,411	17,563	63.1	60.2	4.7	36.9
Jan-Mar 2006	48,038	30,486	28,887	1,599	17,552	63.5	60.1	5.2	36.5
Apr-Jun 2006	48,131	30,613	28,930	1,683	17,518	63.6	60.1	5.5	36.4
Jul-Sep 2006	48,224	30,696	28,986	1,711	17,527	63.7	60.1	5.6	36.3
Oct-Dec 2006	48,316	30,723	29,036	1,687	17,593	63.6	60.1	5.5	36.4
Jan-Mar 2007	48,409	30,681	28,981	1,700	17,728	63.4	59.9	5.5	36.6
Male	MGSM	MMSG	MGSA	MGSD	MGSJ	MGWH	MGSS	MGSY	YBTD
Jan-Mar 2005	23,089	16,317	15,485	832	6,772	70.7	67.1	5.1	29.3
Jan-Mar 2006	23,302	16,471	15,539	932	6,831	70.7	66.7	5.7	29.3
Apr-Jun 2006	23,353	16,553	15,578	975	6,800	70.9	66.7	5.9	29.1
Jul-Sep 2006	23,404	16,636	15,642	994	6,768	71.1	66.8	6.0	28.9
Oct-Dec 2006	23,457	16,625	15,661	964	6,832	70.9	66.8	5.8	29.1
Jan-Mar 2007	23,509	16,637	15,665	971	6,872	70.8	66.6	5.8	29.2
Female	MGSN	MGSH	MGSB	MGSE	MGSK	MGWI	MGST	MGSZ	YBTE
Jan-Mar 2005	24,561	13,770	13,191	579	10,790	56.1	53.7	4.2	43.9
Jan-Mar 2006	24,736	14,015	13,348	667	10,721	56.7	54.0	4.8	43.3
Apr-Jun 2006	24,778	14,061	13,352	708	10,717	56.7	53.9	5.0	43.3
Jul-Sep 2006	24,819	14,060	13,344	716	10,759	56.6	53.8	5.1	43.4
Oct-Dec 2006	24,859	14,099	13,375	723	10,761	56.7	53.8	5.1	43.3
Jan-Mar 2007	24,900	14,044	13,315	728	10,856	56.4	53.5	5.2	43.6

All aged 16 to 59/64									
	All	Total economically active	Total in employment	Unemployed	Economically inactive	Economic activity rate (%)	Employment rate (%)	Unemployment rate (%)	Economic inactivity rate (%)
	10	11	12	13	14	15	16	17	18
All persons	YBTF	YBSK	YBSE	YBSH	YBSN	MGSO	MGSU	YBTI	YBTL
Jan-Mar 2005	36,908	29,022	27,630	1,392	7,885	78.6	74.9	4.8	21.4
Jan-Mar 2006	37,186	29,326	27,754	1,572	7,860	78.9	74.6	5.4	21.1
Apr-Jun 2006	37,252	29,430	27,775	1,656	7,822	79.0	74.6	5.6	21.0
Jul-Sep 2006	37,310	29,475	27,794	1,681	7,835	79.0	74.5	5.7	21.0
Oct-Dec 2006	37,351	29,497	27,832	1,665	7,854	79.0	74.5	5.6	21.0
Jan-Mar 2007	37,391	29,453	27,777	1,675	7,939	78.8	74.3	5.7	21.2
Male	YBTG	YBSL	YBSF	YBSI	YBSO	MGSP	MGSV	YBTJ	YBTM
Jan-Mar 2005	19,081	15,952	15,130	822	3,130	83.6	79.3	5.2	16.4
Jan-Mar 2006	19,252	16,080	15,158	922	3,172	83.5	78.7	5.7	16.5
Apr-Jun 2006	19,294	16,149	15,186	963	3,145	83.7	78.7	6.0	16.3
Jul-Sep 2006	19,334	16,221	15,241	980	3,114	83.9	78.8	6.0	16.1
Oct-Dec 2006	19,373	16,217	15,260	957	3,156	83.7	78.8	5.9	16.3
Jan-Mar 2007	19,411	16,225	15,264	961	3,185	83.6	78.6	5.9	16.4
Female	YBTH	YBSM	YBSG	YBSJ	YBSP	MGSQ	MGSW	YBTK	YBTN
Jan-Mar 2005	17,826	13,071	12,500	570	4,756	73.3	70.1	4.4	26.7
Jan-Mar 2006	17,934	13,246	12,596	650	4,688	73.9	70.2	4.9	26.1
Apr-Jun 2006	17,958	13,281	12,589	692	4,677	74.0	70.1	5.2	26.0
Jul-Sep 2006	17,975	13,254	12,553	701	4,722	73.7	69.8	5.3	26.3
Oct-Dec 2006	17,978	13,280	12,572	708	4,698	73.9	69.9	5.3	26.1
Jan-Mar 2007	17,981	13,227	12,513	714	4,753	73.6	69.6	5.4	26.4

Notes:

Relationship between columns: 1 = 2 + 5; 2 = 3 + 4; 6 = 2/1; 7 = 3/1; 8 = 4/2;

9 = 5/1; 10 = 11 + 14; 11 = 12 + 13; 15 = 11/10; 16 = 12/10; 17 = 13/11; 18 = 14/10

The Labour Force Survey is a survey of the population of private households, student halls of residence and NHS accommodation.

Source: Labour Force Survey, Office for National Statistics
Labour Market Statistics Helpline: 020 7533 6094

Prices

Last updated: 15/05/07

Percentage change over 12 months

	Consumer prices						Not seasonally adjusted, except for series PLLW, RNPE and RNPF			
	Consumer prices index (CPI)			Retail prices index (RPI)			Producer prices			
							Output prices		Input prices	
	All items	CPI excluding indirect taxes (CPIY) ¹	CPI at constant tax rates (CPI-CT)	All items	All items excluding mortgage interest payments (RPIX)	All items excluding mortgage interest payments and indirect taxes (RPIY) ²	All manufactured products	Excluding food, beverages, tobacco and petroleum products	Materials and fuels purchased by manufacturing industry	Excluding food, beverages, tobacco and petroleum products
	D7G7	EL25	EAD6	CZBH	CDKQ	CBZX	PLLU ³	PLLW ³	RNPE ³	RNPF ³
2003 Jan	1.3			2.9	2.7	2.9	1.3	0.9	1.7	-2.2
2003 Feb	1.6			3.2	3.0	3.1	1.5	1.1	2.5	-2.0
2003 Mar	1.5			3.1	3.0	3.2	2.1	1.3	0.8	-1.5
2003 Apr	1.4			3.1	3.0	2.9	1.6	1.3	-1.3	-0.6
2003 May	1.3			3.0	2.9	2.7	1.1	1.2	-0.1	-0.2
2003 Jun	1.1			2.9	2.8	2.7	1.1	1.2	0.0	-1.2
2003 Jul	1.3			3.1	2.9	2.8	1.3	1.3	0.6	-0.5
2003 Aug	1.4			2.9	2.9	2.7	1.5	1.2	1.9	0.0
2003 Sep	1.4			2.8	1.0	2.7	1.4	1.4	1.3	1.0
2003 Oct	1.4			2.6	2.7	2.4	1.5	1.3	2.5	1.2
2003 Nov	1.3			2.5	2.5	2.1	1.7	1.4	4.6	1.7
2003 Dec	1.3	1.1	1.1	2.8	2.6	2.2	1.8	1.5	2.0	0.4
2004 Jan	1.4	1.5	1.3	2.6	2.4	2.0	1.6	1.4	-0.3	0.0
2004 Feb	1.3	1.3	1.1	2.5	2.3	1.9	1.6	1.5	-1.3	-0.5
2004 Mar	1.1	1.1	1.0	2.6	2.1	1.7	1.4	1.5	0.9	-0.1
2004 Apr	1.1	1.1	1.0	2.5	2.0	1.8	1.8	1.3	2.9	-0.2
2004 May	1.5	1.4	1.3	2.8	2.3	2.2	2.5	1.4	5.6	0.7
2004 Jun	1.6	1.5	1.4	3.0	2.3	2.3	2.6	1.4	3.7	1.3
2004 Jul	1.4	1.4	1.2	3.0	2.2	2.0	2.6	1.7	3.7	1.4
2004 Aug	1.3	1.3	1.1	3.2	2.2	2.0	2.8	2.2	4.6	2.3
2004 Sep	1.1	1.0	0.9	3.1	1.9	1.7	3.1	2.3	8.1	3.8
2004 Oct	1.2	1.2	1.1	3.3	2.1	2.0	3.5	2.9	9.2	4.8
2004 Nov	1.5	1.4	1.4	3.4	2.2	2.2	3.5	2.9	6.7	4.6
2004 Dec	1.7	1.7	1.6	3.5	2.5	2.5	2.9	2.5	4.4	4.2
2005 Jan	1.6	1.7	1.5	3.2	2.1	2.0	2.6	2.5	9.6	7.5
2005 Feb	1.7	1.7	1.6	3.2	2.1	2.0	2.7	2.5	11.0	8.2
2005 Mar	1.9	2.0	1.8	3.2	2.4	2.3	2.9	2.4	11.1	7.4
2005 Apr	1.9	2.0	1.9	3.2	2.3	2.3	3.3	2.6	10.0	7.0
2005 May	1.9	2.0	1.8	2.9	2.1	2.2	2.7	2.5	7.6	6.5
2005 Jun	2.0	2.2	1.9	2.9	2.2	2.2	2.5	2.3	12.0	7.4
2005 Jul	2.3	2.5	2.3	2.9	2.4	2.5	3.1	2.2	13.9	8.6
2005 Aug	2.4	2.6	2.3	2.8	2.3	2.3	3.0	1.9	12.8	7.5
2005 Sep	2.5	2.6	2.4	2.7	2.5	2.5	3.3	2.1	10.5	5.7
2005 Oct	2.3	2.5	2.3	2.5	2.4	2.3	2.6	1.4	8.9	7.0
2005 Nov	2.1	2.3	2.1	2.4	2.3	2.3	2.3	1.3	13.6	9.6
2005 Dec	1.9	2.1	1.8	2.2	2.0	2.0	2.4	1.7	17.9	12.1
2006 Jan	1.9	2.1	1.9	2.4	2.3	2.3	2.9	1.8	15.8	10.3
2006 Feb	2.0	2.1	2.0	2.4	2.3	2.3	2.9	1.8	15.4	10.7
2006 Mar	1.8	1.9	1.7	2.4	2.1	2.2	2.5	1.9	12.9	10.1
2006 Apr	2.0	2.1	2.0	2.6	2.4	2.3	2.5	2.2	15.2	10.1
2006 May	2.2	2.3	2.2	3.0	2.9	2.8	3.1	2.5	13.6	8.6
2006 Jun	2.5	2.6	2.4	3.3	3.1	3.2	3.4	2.9	11.1	8.7
2006 Jul	2.4	2.4	2.3	3.3	3.1	3.2	2.9	2.5	10.5	8.2
2006 Aug	2.5	2.6	2.4	3.4	3.3	3.4	2.7	2.3	8.0	7.8
2006 Sep	2.4	2.6	2.3	3.6	3.2	3.3	1.9	2.1	5.1	7.0
2006 Oct	2.4	2.7	2.3	3.7	3.2	3.3	1.6	2.6	4.7	6.1
2006 Nov	2.7	3.0	2.6	3.9	3.4	3.6	1.8	2.6	3.3	4.7
2006 Dec	3.0	3.2	2.9	4.4	3.8	3.9	2.2	2.5	2.1	2.8
2007 Jan	2.7	2.9	2.6	4.2	3.5	3.7	2.2	2.5	-2.1	1.5
2007 Feb	2.8	2.9	2.6	4.6	3.7	3.9	2.3	2.6	-0.9	1.3
2007 Mar	3.1	3.1	2.9	4.8	3.9	4.0	2.7	2.7	0.7	2.2
2007 Apr	2.8	2.9	2.6	4.5	3.6	3.7	2.5	2.4	-0.3	2.3

Notes:

Source: Office for National Statistics

1 The taxes excluded are VAT, duties, insurance premium tax, air passenger duty and stamp duty on share transactions.

2 The taxes excluded are council tax, VAT, duties, vehicle excise duty, insurance premium tax and air passenger duty.

3 Derived from these identification (CDID) codes.

NOTES TO TABLES

Identification (CDID) codes

The four-character identification code at the top of each alpha column of data is the ONS reference for that series of data on our time series database. Please quote the relevant code if you contact us about the data.

Conventions

Where figures have been rounded to the final digit, there may be an apparent slight discrepancy between the sum of the constituent items and the total shown. Although figures may be given in unrounded form to facilitate readers' calculation of percentage changes, rates of change, etc, this does not imply that the figures can be estimated to this degree of precision as they may be affected by sampling variability or imprecision in estimation methods.

The following standard symbols are used:

- .. not available
- nil or negligible
- P provisional
- break in series
- R revised
- r series revised from indicated entry onwards

CONCEPTS AND DEFINITIONS

Labour Force Survey 'monthly' estimates

Labour Force Survey (LFS) results are three-monthly averages, so consecutive months' results overlap. Comparing estimates for overlapping three-month periods can produce more volatile results, which can be difficult to interpret.

Labour market summary**Economically active**

People aged 16 and over who are either in employment or unemployed.

Economically inactive

People who are neither in employment nor unemployed. This includes those who want a job but have not been seeking work in the last four weeks, those who want a job and are seeking work but not available to start work, and those who do not want a job.

Employment and jobs

There are two ways of looking at employment: the number of people with jobs, or the number of jobs. The two concepts are not the same as one person can have more than one job. The number of people with jobs is measured by the Labour Force Survey (LFS) and includes people aged 16 or over who do paid work (as an employee or self-employed), those who have a job that they are temporarily away from, those on government-supported training and employment programmes, and those doing unpaid family work. The number of jobs is measured by workforce jobs and is the sum of employee jobs (as measured by surveys of employers), self-employment jobs from the LFS, people in HM Forces, and government-supported trainees. Vacant jobs are not included.

Unemployment

The number of unemployed people in the UK is measured through the Labour Force Survey following the internationally agreed definition recommended by the ILO (International Labour Organisation) – an agency of the United Nations.

Unemployed people:

- are without a job, want a job, have actively sought work in the last four weeks and are available to start work in the next two weeks, or
- are out of work, have found a job and are waiting to start it in the next two weeks

Other key indicators**Claimant count**

The number of people claiming Jobseeker's Allowance benefits.

Earnings

A measure of the money people receive in return for work done, gross of tax. It includes salaries and, unless otherwise stated, bonuses but not unearned income, benefits in kind or arrears of pay.

Productivity

Whole economy output per worker is the ratio of Gross Value Added (GVA) at basic prices and Labour Force Survey (LFS) total employment. Manufacturing output per filled job is the ratio of manufacturing output (from the Index of Production) and productivity jobs for manufacturing (constrained to LFS jobs at the whole economy level).

Redundancies

The number of people who:

- were not in employment during the reference week, and
- reported that they had been made redundant in the month of, or the two calendar months prior to, the reference week

plus the number of people who:

- were in employment during the reference week, and
- started their job in the same calendar month as, or the two calendar months prior to, the reference week, and
- reported that they had been made redundant in the month of, or the two calendar months prior to, the reference week

Unit wage costs

A measure of the cost of wages and salaries per unit of output.

Vacancies

The statistics are based on ONS's Vacancy Survey of businesses. The survey is designed to provide comprehensive estimates of the stock of vacancies across the economy, excluding those in agriculture, forestry and fishing. Vacancies are defined as positions for which employers are actively seeking recruits from outside their business or organisation. More information on labour market concepts, sources and methods is available in the *Guide to Labour Market Statistics* at www.statistics.gov.uk/about/data/guides/LabourMarket/default.asp

Directory of online tables

The tables listed below are available as Excel spreadsheets via weblinks accessible from the main *Economic & Labour Market Review* (ELMR) page of the National Statistics website. Tables in sections 1, 3, 4 and 5 replace equivalent ones formerly published in *Economic Trends*, although there are one or two new tables here; others have been expanded to include, as appropriate, both unadjusted/seasonally adjusted, and current price/chained volume measure variants. Tables in sections 2 and 6 were formerly in *Labour Market Trends*. The opportunity has also been taken to extend the range of dates shown in many cases, as the online tables are not constrained by page size.

In the online tables, the four-character identification codes at the top of each data column correspond to the ONS reference for that series on our time series database. The latest data sets for the old *Economic Trends* tables and the Labour Market Statistics First Release tables are still available on this database via the 'Time Series Data' link on the National Statistics main web page. These data sets can also be accessed from links at the bottom of each section's table listings via the 'Data tables' link in the individual ELMR edition pages on the website.

Weblink: www.statistics.gov.uk/elmr_tables

Title	Frequency of update	Updated since last month
UK economic accounts		
1.01 National accounts aggregates	M	✓
1.02 Gross domestic product and gross national income	M	✓
1.03 Gross domestic product, by category of expenditure	M	✓
1.04 Gross domestic product, by category of income	M	✓
1.05 Gross domestic product and shares of income and expenditure	M	✓
1.06 Income, product and spending per head	Q	.
1.07 Households' disposable income and consumption	M	✓
1.08 Household final consumption expenditure	M	✓
1.09 Gross fixed capital formation	M	✓
1.10 Gross value added, by category of output	M	✓
1.11 Gross value added, by category of output: service industries	M	✓
1.12 Summary capital accounts and net lending/net borrowing	Q	✓
1.13 Private non-financial corporations: allocation of primary income account	Q	.
1.14 Private non-financial corporations: secondary distribution of income account and capital account	Q	.
1.15 Balance of payments: current account	M	✓
1.16 Trade in goods (on a balance of payments basis)	M	✓
1.17 Measures of variability of selected economic series	Q	.
1.18 Index of services (NEW)	M	✓

Selected labour market statistics

2.01 Summary of Labour Force Survey data	M	✓
2.02 Employment by age	M	✓
2.03 Full-time, part-time and temporary workers	M	✓
2.04 Public and private sector employment	Q	.
2.05 Workforce jobs	Q	.
2.06 Workforce jobs by industry	Q	.
2.07 Actual weekly hours of work	M	✓
2.08 Usual weekly hours of work	M	✓
2.09 Unemployment by age and duration	M	✓
2.10 Claimant count levels and rates	M	✓
2.11 Claimant count by age and duration	M	✓
2.12 Economic activity by age	M	✓
2.13 Economic inactivity by age	M	✓
2.14 Economic inactivity: reasons	M	✓
2.15 Educational status, economic activity and inactivity of young people	M	✓
2.16 Average earnings – including bonuses	M	✓
2.17 Average earnings – excluding bonuses	M	✓
2.18 Productivity and unit wage costs	M	✓
2.19 Regional labour market summary	M	✓

Weblink: www.statistics.gov.uk/elmr_tables

2.20	International comparisons	M	✓
2.21	Labour disputes	M	✓
2.22	Vacancies	M	✓
2.23	Vacancies by industry	M	✓
2.24	Redundancies: levels and rates	M	✓
2.25	Redundancies: by industry	Q	✓
2.26	Sampling variability for headline labour market statistics	M	✓

Prices

3.01	Producer and consumer prices	M	✓
3.02	Harmonised Indices of Consumer Prices: EU comparisons	M	✓

Selected output and demand indicators

4.01	Output of the production industries	M	✓
4.02	Engineering and construction: output and orders	M	✓
4.03	Motor vehicle and steel production	M	✓
4.04	Indicators of fixed investment in dwellings	M	✓
4.05	Number of property transactions	M	✓
4.06	Change in inventories	Q	✓
4.07	Inventory ratios	Q	.
4.08	Retail sales, new registrations of cars and credit business	M	✓
4.09	Inland energy consumption: primary fuel input basis	M	✓

Selected financial statistics

5.01	Sterling exchange rates and UK reserves	M	✓
5.02	Monetary aggregates	M	✓
5.03	Counterparts to changes in money stock M4	M	✓
5.04	Public sector receipts and expenditure	Q	.
5.05	Public sector key fiscal indicators	M	✓
5.06	Consumer credit and other household sector borrowing	M	✓
5.07	Analysis of bank lending to UK residents	M	✓
5.08	Interest rates and yields	M	✓
5.09	A selection of asset prices	M	✓

Further labour market statistics

6.01	Working-age households	A	.
6.02	Local labour market indicators by unitary and local authority	Q	✓
6.03	Employment by occupation	Q	✓
6.04	Employee jobs by industry	M	✓
6.05	Employee jobs by industry division, class or group	Q	.
6.06	Employee jobs by region and industry	Q	.
6.07	Key productivity measures by industry	Q	.
6.08	Total workforce hours worked per week	Q	✓
6.09	Total workforce hours worked per week by region and industry group	Q	.
6.10	Job-related training received by employees	Q	✓
6.11	Unemployment rates by previous occupation	Q	✓

Weblink: www.statistics.gov.uk/elmr_tables

6.12	Average Earnings Index by industry: excluding and including bonuses	M	✓
6.13	Average Earnings Index: effect of bonus payments by main industrial sector	M	✓
6.14	Median earnings and hours by main industrial sector	A	•
6.15	Median earnings and hours by industry section	A	•
6.16	Index of wages per head: international comparisons	M	✓
6.17	Regional Jobseeker's Allowance claimant count rates	M	✓
6.18	Claimant count area statistics: counties, unitary and local authorities	M	✓
6.19	Claimant count area statistics: UK parliamentary constituencies	M	✓
6.20	Claimant count area statistics: constituencies of the Scottish Parliament	M	✓
6.21	Jobseeker's Allowance claimant count flows	M	✓
6.22	Number of previous Jobseeker's Allowance claims	Q	•
6.23	Interval between Jobseeker's Allowance claims	Q	✓
6.24	Average duration of Jobseeker's Allowance claims by age	Q	•
6.25	Vacancies by size of enterprise	M	✓
6.26	Redundancies: re-employment rates	Q	✓
6.27	Redundancies by Government Office Region	Q	✓
6.28	Redundancy rates by industry	Q	✓
6.29	Labour disputes: summary	M	✓
6.30	Labour disputes: stoppages in progress	M	✓

Notes

A Annually
Q Quarterly
M Monthly

More information

Time series are available from www.statistics.gov.uk/statbase/tsdintro.asp

Subnational labour market data are available from www.statistics.gov.uk/statbase/Product.asp?vlnk=14160 and www.nomisweb.co.uk

Labour Force Survey tables are available from www.statistics.gov.uk/statbase/Product.asp?vlnk=14365

Annual Survey of Hours and Earnings data are available from www.statistics.gov.uk/StatBase/Product.asp?vlnk=13101

Contact points

Recorded announcement of latest RPI

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Labour Market Statistics Helpline

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Earnings Customer Helpline

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National Statistics Customer Contact Centre

☎ 0845 601 3034
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Skills and Education Network

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DfES Public Enquiry Unit

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For statistical information on

Average Earnings Index (monthly)

☎ 01633 819024

Claimant count

☎ 020 7533 6094

Consumer Prices Index

☎ 020 7533 5874

Earnings

Annual Survey of Hours and Earnings

☎ 01633 819024

Basic wage rates and hours for manual workers with a collective agreement

☎ 01633 819008

Low-paid workers

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Labour Force Survey

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Economic activity and inactivity

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Employment

Labour Force Survey

☎ 020 7533 6094
✉ labour.market@ons.gsi.gov.uk

Employee jobs by industry

☎ 01633 812318

Total workforce hours worked per week

☎ 01633 812766
✉ productivity@ons.gsi.gov.uk

Workforce jobs series – short-term estimates

☎ 01633 812318
✉ workforce.jobs@ons.gsi.gov.uk

Labour costs

☎ 01633 819024

Labour disputes

☎ 01633 819205

Labour Force Survey

☎ 020 7533 6094
✉ labour.market@ons.gsi.gov.uk

Labour Force Survey Data Service

☎ 01633 655732
✉ lfs.dataservice@ons.gsi.gov.uk

New Deal

☎ 0114 209 8228

Productivity and unit wage costs

☎ 01633 812766

Public sector employment

General enquiries

☎ 020 7533 6178

Source and methodology enquiries

☎ 01633 812362

Qualifications (DfES)

☎ 0870 000 2288

Redundancy statistics

☎ 020 7533 6094

Retail Prices Index

☎ 020 7533 5874
✉ rpi@ons.gsi.gov.uk

Skills (DfES)

☎ 0114 259 4407
Skill needs surveys and research into skill shortages
☎ 0114 259 4407

Small firms (DTI)

Small Business Service (SBS)

☎ 0114 279 4439

Subregional estimates

☎ 01633 812038

Annual employment statistics

✉ annual.employment.figures@ons.gsi.gov.uk

Annual Population Survey, local area statistics

☎ 020 7533 6130

LFS Subnational Data Service

☎ 020 7533 6135
✉ snds@ons.gsi.gov.uk

Trade unions (DTI)

Employment relations

☎ 020 7215 5934

Training

Adult learning – work-based training (DWP)

☎ 0114 209 8236

Employer-provided training (DfES)

☎ 0114 259 4407

Travel-to-Work Areas

Composition and review

☎ 020 7533 6114

Unemployment

☎ 020 7533 6094

Vacancies

Vacancy Survey: total stocks of vacancies

☎ 020 7533 6162

ONS economic and labour market publications

ANNUAL

Financial Statistics Explanatory Handbook

2007 edition. Palgrave Macmillan, ISBN 1-4039-9783-7. Price £45.

www.statistics.gov.uk/products/p4861.asp

Foreign Direct Investment (MA4)

2005 edition

www.statistics.gov.uk/products/p9614.asp

Input-Output analyses for the United Kingdom

2006 edition

www.statistics.gov.uk/products/p7640.asp

Research and development in UK businesses (MA14)

2005 edition

www.statistics.gov.uk/statbase/product.asp?vlnk=165

Share Ownership

2004 edition

www.statistics.gov.uk/products/p930.asp

United Kingdom Balance of Payments (Pink Book)

2006 edition. Palgrave Macmillan, ISBN 1-4039-9387-4. Price £45.

www.statistics.gov.uk/products/p1140.asp

United Kingdom National Accounts (Blue Book)

2006 edition. Palgrave Macmillan, ISBN 1-4039-9388-2. Price £45.

www.statistics.gov.uk/products/p1143.asp

First releases

- Annual survey of hours and earnings
- Business enterprise research and development
- Foreign Direct Investment
- Gross domestic expenditure on research and development
- Low pay estimates
- Regional gross value added
- Share Ownership
- UK trade in services
- Work and worklessness among households

QUARTERLY

Consumer Trends

2006 quarter 4

www.statistics.gov.uk/products/p242.asp

United Kingdom Economic Accounts

2006 quarter 4. Palgrave Macmillan, ISBN 978-0-230-52617-4. Price £32.

www.statistics.gov.uk/products/p1904.asp

UK trade in goods analysed in terms of industry (MQ10)

2006 quarter 4

www.statistics.gov.uk/products/p731.asp

First releases

- Business investment
- Government deficit and debt under the Maastricht Treaty (six-monthly)
- GDP preliminary estimate
- International comparisons of productivity (six-monthly)
- Internet connectivity
- Investment by insurance companies, pension funds and trusts
- Productivity
- Profitability of UK companies
- Public sector employment
- UK Balance of Payments
- UK National Accounts
- UK output, income and expenditure

MONTHLY

Financial Statistics

May 2007. Palgrave Macmillan, ISBN 978-0-230-52588-7. Price £45.

www.statistics.gov.uk/products/p376.asp

Focus on Consumer Price Indices

April 2007

www.statistics.gov.uk/products/p867.asp

Monthly review of external trade statistics (MM24)

April 2007

www.statistics.gov.uk/products/p613.asp

Producer Price Indices (MM22)

April 2007

www.statistics.gov.uk/products/p2208.asp

First releases

- Consumer Price Indices
- Index of distribution
- Index of production
- Labour market statistics
- Labour market statistics: regional
- Producer Prices
- Public Sector Finances
- Retail Sales Index
- UK Trade

OTHER

Labour Market Review

2006 edition. Palgrave Macmillan, ISBN 1-4039-9735-7. Price £40.

www.statistics.gov.uk/products/p4315.asp

National Accounts Concepts, Sources and Methods

www.statistics.gov.uk/products/p1144.asp

Sector classification guide (MA23)

www.statistics.gov.uk/products/p7163.asp

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ICT deflation and productivity measurement
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