

Economic & Labour Market Review

Volume 4, Number 10

Edition No.: **October 2010**

Editor: **Graeme Chamberlin**

Office for National Statistics

October 2010

ISBN 978-0-230-27299-6

ISSN 1751-8334

A National Statistics publication

National Statistics are produced to high professional standards set out in the Code of Practice for Official Statistics. They are produced free from political influence.

About us

The Office for National Statistics

The Office for National Statistics (ONS) is the executive office of the UK Statistics Authority, a non-ministerial department which reports directly to Parliament. ONS is the UK government's single largest statistical producer. It compiles information about the UK's society and economy, and provides the evidence-base for policy and decision-making, the allocation of resources, and public accountability. The Director-General of ONS reports directly to the National Statistician who is the Authority's Chief Executive and the Head of the Government Statistical Service.

The Government Statistical Service

The Government Statistical Service (GSS) is a network of professional statisticians and their staff operating both within the Office for National Statistics and across more than 30 other government departments and agencies.

Contacts

This publication

For information about the content of this publication, contact ELMR team

Email: elmr@ons.gsi.gov.uk

Other customer enquiries

ONS Customer Contact Centre

Tel: 0845 601 3034

International: +44 (0)845 601 3034

Minicom: 01633 815044

Email: info@statistics.gsi.gov.uk

Fax: 01633 652747

Post: Room 1.101, Government Buildings,
Cardiff Road, Newport, South Wales NP10 8XG

www.ons.gov.uk

Media enquiries

Tel: 0845 604 1858

Email: press.office@ons.gsi.gov.uk

Copyright and reproduction

© Crown copyright 2010

You may re-use this information (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence.

To view this licence, go to:

<http://www.nationalarchives.gov.uk/doc/open-government-licence/>

or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU

email: psi@nationalarchives.gsi.gov.uk

Economic & Labour Market Review

Volume 4, Number 10
October 2010

Contents

Regulars

In brief	4
Welcome to the new online edition of Economic & Labour Market Review; ELMR online economic and labour market tables – an update; Public sector employment – a mixed picture across the regions; 841,000 households are workless due to health-related reasons; People's views important when measuring wellbeing; New chapters of Social Trends to be published in November; Statistics show gap between rich and poor pensioners; Prices consultation on the Measurement of Seasonal Items within the CPI and the RPI.	
Updates and Forthcoming releases	11
Economic Indicators	13
Economic Review	15

Articles

The experimental tourism satellite account for the United Kingdom (E-UKTSA) <i>Tullio Bucciato, Dominic Webber and Sean White</i>	39
A proposed methodology for nowcasting the demand and supply estimates of tourism activities <i>Tullio Bucciato, Dominic Webber and Sean White</i>	62
Estimating regional exports of services trade for the UK <i>Keith Brook and Kelly Taylor</i>	74
Total public service output, inputs and productivity <i>Mike G Phelps, Sophia Kamarudeen, Katherine Mills and Richard Wild</i>	89
Quality adjusted labour input: new estimates for 1993 to 2008 <i>Alex Turvey, Peter Goodridge and Mark Franklin</i>	113
Volume of capital services: annual estimates for 1950 to 2008 and new quarterly series <i>Gavin Wallis, Katy Long and Alex Turvey</i>	132

Data and support

Key time series	149
Directory of online tables	156
Recent and future articles	160

In brief

Welcome to the new online edition of Economic Labour Market Review

Welcome to this latest edition of ELMR – the first to be exclusively available online. Although a printed version of the journal is no longer being officially produced, most of the content continues to be freely available and easily downloadable. ELMR aims to be an unparalleled source of up-to-date and relevant commentary, analysis and data for users of both economic and labour market statistics. It draws on the full range of economic and labour market analysis undertaken by the Office for National Statistics and includes a mix of feature articles, a regular economic review, news on statistical developments and access to the wealth of official UK economic and labour market data in online tables. We hope that ELMR will continue to be a valuable resource to users of statistics and those interested in better understanding developments in the UK economy in these interesting times.

Further information

www.statistics.gov.uk/elmr/

Contact

elmr@ons.gov.uk

ELMR online economic and labour market tables – an update

Economic & Labour Market Review was formed as ONS's flagship monthly journal through the merger of *Economic Trends* and *Labour Market Trends* in January 2007. As a result, the range of economic and labour market data that were published as part of these previous journals were moved into online tables – available as downloadable spreadsheets and updated every month. A number of recent changes have been made to this online content:

- Tables 1.13 and 1.14 have been reintroduced having been discontinued in January 2009. These tables provide balance sheet information for the private non-financial corporations (PNFC) sector
- New tables on construction output and new orders (Tables 4.02 and 4.03) have replaced previous tables on engineering output and motor vehicle and steel production
- Retail sales data in Table 4.08 has been expanded to include automotive fuel in line with recent classification changes
- Workforce Jobs data in Tables 2.05, 2.06, 6.03, 6.04 and 6.05 are now based on the 2007 Standard Industrial Classification and provide a comprehensive source of data on jobs in the UK

Further information

www.statistics.gov.uk/elmr/10_10/data_page.asp

Contact

elmr@ons.gov.uk

Public sector employment – a mixed picture across the regions

Employment in the National Health Service increased across the UK in the first quarter of this year, new figures reported in the article 'Regional analysis of public sector employment', published on 6 September 2010 by ONS, show. However, public sector employment in education and public administration saw increases in some parts of the country and decreases in others.

By industry, the largest public sector employer is the NHS. During this period it was 1.626 million (seasonally adjusted), or 27 per cent of total public sector employment. Employment in the NHS increased by 4.2 per cent compared to the first quarter of 2009, a rise of 66,000 overall. NHS employment grew in all parts of the UK; however it increased most in the East Midlands, where it was up by 7.3 per cent, followed by the East of England at 7.0 per cent and the West Midlands at 6.1 per cent. NHS employment grew least in Scotland, at 1.2 per cent, followed by the North East at 1.3 per cent.

At the same time, education accounted for 23 per cent of total public sector employment (a headcount of 1.417 million (seasonally adjusted)). However, this was not spread evenly across the regions: education accounts for 29 per cent of total public sector employment in the West Midlands but only 18 per cent in London. Overall, public sector employment in education was up 0.5 per cent on 2009. However across the UK this ranged from an increase of 6.6 per cent for the East of England, followed by 5.2 per cent in Wales and 3.2 per cent in the East Midlands, to a decline of 3.6 per cent in the North West, followed by a drop of 3.2 per cent in the South West.

Public administration accounted for 20 per cent of public sector employment in the first quarter of 2010. This was up by 0.4 per cent (seasonally adjusted) on the same quarter of 2009. Again, however, there were marked variations between the regions, varying between an increase of 8.2 per cent in the North East, followed by 5.0 per cent in Yorkshire and the Humber, and a decrease of 6.2 per cent in Wales, followed by a drop of 3.2 per cent in the West Midlands.

Further information

www.statistics.gov.uk/CCI/article.asp?ID=2568

Contact

david.matthews@ons.gov.uk

841,000 households workless due to health-related reasons

There were 841,000 UK households that were workless in April–June 2010 because all members of the household were sick, injured or disabled, up 68,000 on a year earlier. Just over half of the people in these households are aged 50 to 64, with a further third aged 35 to 49. A further 612,000 workless households had some but not all members sick, injured or disabled, making a total of 1.5 million households containing at least one person aged 16 to 64 where these health-related reasons are at least partly the cause of worklessness. These figures are reported in an article 'Households and families participation in the labour market', published by the Office for National Statistics on 08 September 2010. Released alongside the annual statistics on workless households, it gives new analysis on the reasons for worklessness.

Another major reason for not working is domestic responsibilities. A total of 368,000 households were workless because all members of the household were looking after family or the home. Of these, virtually all – 357,000 – had only one member aged 16 to 64. Most of these individuals – 92 per cent – were women and most, 93 per cent, were lone parents. There were another 482,000 workless households with some but not all members not working for this reason, making 851,000 households in total.

There were also 681,000 households that were workless because all members of the household were retired, with a further 490,000 workless households with some members retired, accounting for 1.2 million households in total.

The article also looks at housing tenure, which is also a key factor for household worklessness. Almost half, or 49 per cent, of households living in socially rented properties were workless, compared with 24 per cent of those that own their homes outright, 22 per cent of households that rent privately and just 4 per cent of households with a mortgage.

Among the facts to emerge in the annual statistical bulletin on 'Work and worklessness among households' are:

- the overall number of households containing at least one person aged 16 to 64 with no one in work in April to June 2010 was 3.9 million, up 148,000 households from a year earlier. Of these households, over three-quarters, or 3.0 million, were workless because all individuals within them were inactive, which means they were either not looking for work or were not available for it
- of the 11.5 million children aged 0 to 15 in households, 1.9 million (16.1 per cent) live in workless households, with most of these in lone parent households. For lone parent households with dependent children, 39.7 per cent are workless compared with 5.4 per cent of couple households with dependent children
- the number and percentage of children in workless households has fallen from a year earlier, as nearly all of the increase in workless households has been in one-person households, up 162,000 to 1.5 million
- the number of people aged 16 to 64 living in workless households was 5.4 million, up 26,000 from a year earlier, representing 13.5 per cent of all people aged 16 to 64

Further information

www.statistics.gov.uk/StatBase/Product.asp?vlnk=8552

Contact

jamie.jenkins@ons.gov.uk

People's views important when measuring wellbeing

Assessing how people think and feel about various aspects of their lives is important when measuring wellbeing, according to an article published by ONS on 14 September 2010. 'Measuring subjective wellbeing in the UK' discusses ways that people's views about their own wellbeing can be measured.

Interest in this concept has grown substantially in recent years. The Stiglitz, Sen & Fitoussi report, published in 2009, recommended that national statistics offices conduct subjective (as well as objective) measures of wellbeing. It saw a role for institutions such as the Office for National Statistics and the wider Government Statistical Service to generate and analyse high quality subjective wellbeing data to inform public debate and policy.

The article also describes the extent to which estimates of subjective wellbeing can be derived from existing official surveys and other sources. This forms a good basis from which fuller and wider measures could be constructed over time.

Further information

www.statistics.gov.uk/cci/article.asp?ID=2578

Contact

equalitiesandwellbeing@ons.gov.uk

New chapters of Social Trends to be published in November

On 11 November 2010, the Office for National Statistics will publish the first 4 articles of the 41st edition of *Social Trends*. These are the first articles to be only published online and are the start of a rolling quarterly release of articles. The articles to be released in November are:

- **Expenditure** – containing information on households and family expenditure, consumer credit and transactions
- **Income and wealth** – detailing trends in the economy and household income, sources of household income, household income distribution, low income households, inequality in household income during recession, household wealth, household savings, earnings and taxes

- **International comparisons** – providing data on the economy and concerns over the economic situation, education and employment, crime and criminal justice, population, health, political engagement and the environment
- **e-Society** – describing household and individual access to the Internet, household and individuals without access to the Internet, use of other new technology and media activities, children's use of new technology, Internet security, online communication and social networking, new technology in education and work, e-commerce and e-government

The next group of articles are planned for release in February and will cover Transport, Housing and Lifestyles and Social Participation.

Further information

www.statistics.gov.uk/socialtrends

Contact

social.trends@ons.gov.uk

Number of UK businesses down

New data released by ONS on the 27 September 2010 in the annual report 'UK Business, Activity, Size and Location' show there were 2.10 million enterprises registered for Value Added Tax (VAT) and/or Pay As Your Earn (PAYE) in March 2010. This compares to 2.15 million in March 2009, a 2.4 per cent decrease. Between March 2009 and March 2010 there was a reduction in the number of sole proprietors, partnerships and corporate businesses:

- corporate businesses (companies and public corporations) represent 58.9 per cent of total enterprises, a proportional increase from 58.2 per cent in 2009
- sole proprietors represent 23.8 per cent of total enterprises, a decrease from 24.4 per cent in 2009
- partnerships represent 13.2 per cent of total enterprises, a decrease from 13.5 per cent in 2009
- general government and non-profit making bodies represent 4.1 per cent of total enterprises, an increase from 4.0 per cent in 2009

The professional, scientific and technical sector accounts for the largest number of businesses with 15.4 per cent of all enterprises registered. This is followed by construction with 13.1 per cent of all enterprises registered and retail with 9.0 per cent.

Analysis by age shows that 14.3 per cent of businesses were under two years old, and 28.8 per cent were under four years old. A further 43.5 per cent of businesses were 10 or more years old.

All regions experienced a decrease in the number of businesses with the North West and the West Midlands experiencing the greatest decrease of 3.3 per cent each. Scotland experienced the smallest decrease of 0.8 per cent. London accounts for the largest number of businesses with 15.8

per cent followed by the South East and East regions at 15.7 per cent and 10.2 per cent respectively.

Further information

www.statistics.gov.uk/StatBase/Product.asp?vlnk=933

Contact

PA1003@ons.gov.uk

Statistics show gap between poorer and richer pensioners

Analysis released on 29 September 2010 by the Office for National Statistics shows that the average income of the top 20 per cent of pensioner couples is nearly four times greater than those at the bottom of the income scale. In 2006–09, the top 20 per cent of pensioner couples had median net weekly income of £755 in 2008/09 prices, compared with £197 for the bottom 20 per cent.

Older pensioner couples in the '75 or over' category had lower incomes than those aged under 75. In 2008/09, those aged under 75 had a 28 per cent higher average income than those aged 75 or over, mainly because they had some income from employment which those in the older group were less likely to have.

Chapters 11, 12 and 13 of Pension Trends, published on the same day, examined:

- Pensioner income and expenditure (Chapter 11)
- Household pension resources (Chapter 12)
- Inequalities and poverty in retirement (Chapter 13)

Chapter 13 reveals that over the last three decades the financial position of retired households has improved. However, while those with the highest incomes increased their share of the total, retired households at the bottom of the income scale saw their share fall. Pensioners with private pensions were more likely to be in the higher income groups in comparison to those relying on state pensions and related benefits (such as pension credit and carers allowance) and on other sources of non-pension income.

The chapter also shows that in the three years up to and including 2008/09, 40 per cent of Pakistani and Bangladeshi pensioners were found in the bottom 20 per cent of the income scale compared with 14 per cent of white pensioners. Just over one third (34 per cent) of white pensioners were in the top two income groups, closely followed by those from Chinese or other ethnic groups (31 per cent) and Indian pensioners (30 per cent). These differences may reflect differences in work patterns, in rates of employment and earnings, in pension scheme participation and in eligibility for the additional state pension.

Chapter 11 (Pensioner income and expenditure) makes the point that average pensioner incomes have risen faster than average earnings since the mid-1990s, underlying the rising contribution of

occupational pensions. These have offset the effect of the basic state pension link to prices, which in this period rose more slowly than earnings.

Chapter 12 (Household pension resources) focuses on the part of total pension income that comes from pension saving. In 2008/09, most pensioner households (6.4 million) received state pensions and/or benefits, but only 4.6 million received private pensions.

For those with private pension income, the mean annual amount received by pensioner couples was £11,200 in 2008/09, while for single men it was £7,100 and for single women £5,500. However, these averages conceal significant numbers of people with small amounts of private pension income. For instance, 25 per cent of pensioner couples with private pension income received £3,200 or less from private pensions in 2008/09. For single men, the figure was £1,800, while for single women it was £1,400.

Further information

www.statistics.gov.uk/pensiontrends

Contact

pensionsanalysis@ons.gov.uk

Public consultation on the Measurement of Seasonal Items within the Consumer Prices Index and the Retail Prices Index

The UK Statistics Authority has endorsed proposals from the Consumer Prices Advisory Committee (CPAC) to change the measurement methods used for seasonal items within the Consumer Prices Index (CPI) and Retail Prices Index (RPI). CPAC recommends that an improved imputation based approach is introduced. This would replace the current method where the last collected price is carried forward each month (when the item is 'out of season') until the item becomes available again.

The Authority plans to reach a final decision in January 2011 following public consultation as well as discussions with the Bank of England, and if required with the Chancellor, under the provisions of the relevant part of the Statistics and Registration Service Act 2007. The public consultation of this proposed change is currently underway, closing on 23 December 2010. The Office for National Statistics (ONS) currently plans to introduce this change from the January 2011 CPI and RPI published on the 15 February 2011.

More information

www.ons.gov.uk/about/consultations/open-consultations/index.html

Contact

CPI@ons.gov.uk

Updates

Updates to statistics on www.statistics.gov.uk

08-Sep	Employment <i>Employment rate up to 70.7%</i> www.statistics.gov.uk/cci/nugget.asp?id=12	28-Sep Balance of payments <i>Current account deficit reduced</i> www.statistics.gov.uk/cci/nugget.asp?id=194
Index of production <i>July shows 1.9% annual rise</i> www.statistics.gov.uk/cci/nugget.asp?id=198	Public sector employment <i>Employment decreases in Q2 2010</i> www.statistics.gov.uk/cci/nugget.asp?id=407	GDP growth <i>Economy grows by 1.2% in Q2 2010</i> www.statistics.gov.uk/cci/nugget.asp?id=192
09-Sep UK Trade <i>Deficit widened to £4.9 billion in July</i> www.statistics.gov.uk/cci/nugget.asp?id=199	16-Sep Retail sales <i>Growth slows in August</i> www.statistics.gov.uk/cci/nugget.asp?id=256	Business investment <i>0.7% up in second quarter 2010</i> www.statistics.gov.uk/cci/nugget.asp?id=258
Travel and tourism <i>Overseas visits down in 2010</i> www.statistics.gov.uk/cci/nugget.asp?id=352	21-Sep Public sector <i>August: £15.9 billion net borrowing (ex measure)</i> www.statistics.gov.uk/cci/nugget.asp?id=206	29-Sep Index of services <i>1.2% annual rise into July</i> www.statistics.gov.uk/cci/nugget.asp?id=558
10-Sep Construction output <i>Growth of 9% in the 3 months to July</i> www.statistics.gov.uk/cci/nugget.asp?id=2570	24-Sep Net investment <i>Institutional net investment £2.7 billion</i> www.statistics.gov.uk/cci/nugget.asp?id=396	30-Sep UK government debt and deficit <i>Deficit 11.4% of GDP</i> www.statistics.gov.uk/cci/nugget.asp?id=277
Producer prices <i>Factory gate inflation rises 4.7%</i> www.statistics.gov.uk/cci/nugget.asp?id=248	27-Sep Businesses <i>Number of UK businesses down</i> www.statistics.gov.uk/cci/nugget.asp?id=1238	06-Oct Corporate profitability <i>11.6% in Q2 2010</i> www.statistics.gov.uk/cci/nugget.asp?id=196
14-Sep Inflation <i>CPI inflation 3.1%, RPI inflation 4.7%</i> www.statistics.gov.uk/cci/nugget.asp?id=19		
15-Sep Average weekly earnings <i>Regular pay growth increases</i> www.statistics.gov.uk/cci/nugget.asp?id=10		

Forthcoming releases

Future statistical releases on www.statistics.gov.uk

07-Oct

Index of production – August 2010

08-Oct

Producer price index – September 2010

Output and employment in the construction industry – August 2010

12-Oct

Consumer price indices – September 2010

UK Trade – August 2010

International comparisons of productivity – new estimates for 2009

13-Oct

Average weekly earnings – August 2010

Labour market statistics – October 2010

14-Oct

Overseas travel and tourism – August 2010

19-Oct

Turnover & orders in production and services industries – August 2010

20-Oct

Public sector finance – September 2010

21-Oct

Retail sales – September 2010

26-Oct

Index of services – August 2010

Gross Domestic Product: preliminary estimate – Q3 2010

28-Oct

Occupational Pension Scheme Survey annual report – 2009

Local area labour market – October 2010

05-Nov

Producer price index – October 2010

09-Nov

UK Trade – September 2010

10-Nov

Low pay – April 2010

Annual Survey of Hours and Earnings – Results 2010

11-Nov

Overseas travel and tourism – September 2010

Social Trends 41 – Income and wealth

Social Trends 41 – Expenditure

Social Trends 41 – International comparisons

Social Trends 41 – E-society

12-Nov

Output and employment in the construction industry – September 2010

Economic Indicators

PRICES AND INFLATION	Value	Period	Monthly change	Annual change	Release date
Consumer Prices Index (CPI) (2005=100)	114.9	Aug-10	0.5	3.1	14-Sep-10
Retail Prices Index (all items) (Jan 1987=100)	224.5	Aug-10	0.4	4.7	14-Sep-10
RPI excluding mortgage interest (RPIX) (Jan 1987=100)	223.6	Aug-10	0.4	4.7	14-Sep-10
Producer Prices Index - Output (2005=100)	119.6	Aug-10	0	4.7	10-Sep-10
Producer Prices Index - Input prices (materials and fuel) (2005=100)	143.3	Aug-10	-0.5	8.1	10-Sep-10
LABOUR MARKET	Value	Period	Change on 3 months	Change on 1 year	Release date
Employment rate (%)	70.7	May-Jul 10	0.4	0.1	15-Sep-10
Unemployment rate (%)	7.8	May-Jul 10	-0.1	-0.1	15-Sep-10
Average Weekly Earnings - total pay (%)	1.5	May-Jul 10	-2.6	0.9	15-Sep-10
Average Weekly Earnings - regular pay (%)	1.8	May-Jul 10	-0.1	-0.1	15-Sep-10
Claimant count (Jobseeker's Allowance) (Thousands) (2005=100)	1,466.30	Aug-10	-14.6	-135.5	15-Sep-10
Vacancies (Thousands)	467	Jun-Aug 10	-14	31	15-Sep-10
NATIONAL ACCOUNTS ECONOMIC ACTIVITY	Value	Period	Quarterly change	Change on 1 year ³	Release date
UK Gross Domestic Product (chained volume measure £ billion)	328.8	Q2 10	1.2	1.7	28-Sep-10
Private Non-Financial Corporations Net Lending (£ billion)	17.5	Q2 10			28-Sep-10
Household Saving Ratio (%)	3.2	Q2 10			28-Sep-10
Public Sector current budget (£ billion)	-13.3	Aug-10			21-Sep-10
Public Sector net debt as a % of GDP	56.3	Aug-10			21-Sep-10
Public Sector net borrowing (£ billion)	3.8	Jul-10			19-Aug-10
Public Sector net cash requirement (£ billion)	5.8	Aug-10			21-Sep-10
Public sector net borrowing (excluding financial interventions) (£ billion)	15.9	Aug-10			21-Sep-10

Public sector net debt as a % of GDP (excluding financial interventions)	53.5	Q4 09-10			18-Jun-10
BALANCE OF PAYMENTS AND TRADE	Value	Period	Change on 3 months	Change on 1 year	Release date
UK's trade balance (£ billion)	-4.9	Jul- 10			09-Sep-10
Balance of Payments current account - (£ billion)	-£7.40	Q2 10			28-Sep-10
of which: EU	-£9.30				
non-EU	£2.00				
Goods export volumes - excluding oil and erratics (2006=100)	87.9	Jul-10			09-Sep-10
Goods import volumes - excluding oil and erratics (2006=100)	93.5	Jul-10			09-Sep-10
SHORT TERM INDICATORS	Value	Period	Change on 3 months¹	Change on 1 year²	Release date
Retail Sales (2006=100) (chained volume, seasonally adjusted)	107.8	Aug-10	1.4	0.7	16-Sep-10
Index of Manufacturing (2006=100)	90.8	Jul-10	0.9	4.3	08-Sep-10
Index of Production (2006=100)	89.1	Jul-10	0.6	2	08-Sep-10
Productivity - Whole economy (2005=100)	99.3	Q2 10	0.5	1.4	29-Sep-10
Productivity - Manufacturing (2005=100)	106.2	Q2 10	2.2	7.9	29-Sep-10
Index of Services (2006=100)	101.6	Jul-10	0.5	1.5	29-Sep-10

Notes:

1. Three months on previous three months
2. Three months on corresponding period one year ago
3. Quarter on corresponding period one year ago

Economic Review

October 2010

Graeme Chamberlin
Office for National Statistics

Summary

Gross Domestic Product (GDP) grew by 1.2 per cent in the second quarter of the year. The acceleration from the previous quarter reflected a pick up in household consumption, exports (net trade) and stockbuilding as businesses increased their holdings of inventories for the first time since late 2008. The UK corporate sector remains a net-lender to the rest of the economy, mainly due the weakness of fixed capital spending. Cash reserves have been used to reduce liabilities (loans) rather than purchase new assets. The household sector became a net borrower in 2010 Q2 for the first time since 2009 Q1, mainly due to the fall in the saving ratio to 3.2 per cent. Central government was a large net borrower, consistent with the large current budget deficit. The UK current account remained in deficit (£7.4 billion in 2010 Q2), with recent movements driven by the balance in direct investment income.

Household consumption and business restocking lead growth in the second quarter

The United Kingdom Economic Accounts, published on 28 September 2010, provide a full set of National Accounts for the second quarter of the year. This not only includes a fuller description of economic activity as measured by the output, expenditure and income methods, but also a set of financial balance sheets for each of the main sectors (households, corporations, government and so on). This article will focus on recent expenditure and income patterns in the UK as this is where the latest data adds most value. The two previous monthly Economic Review articles concentrated more on the output or production side of the economy, in line with data availability in earlier National Accounts releases covering 2010 Q2.

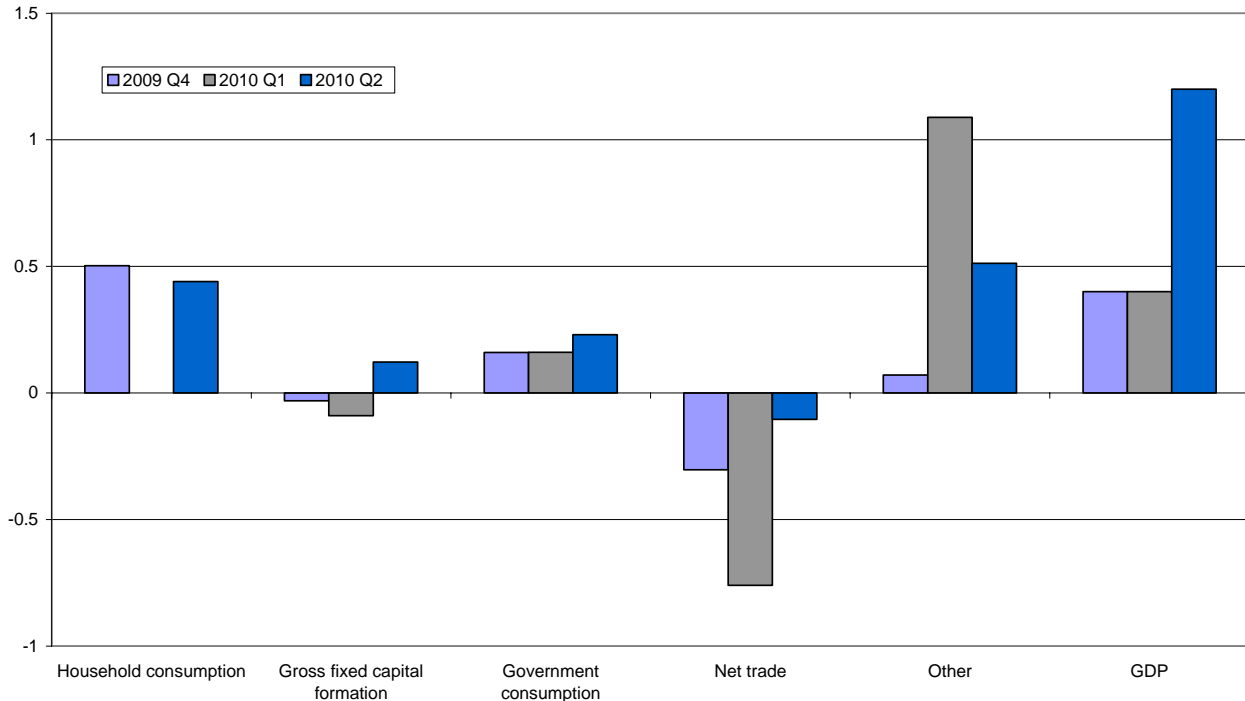
Gross Domestic Product (GDP) picked up strongly in the second quarter as the headline seasonally adjusted chain volume measure grew by 1.2 per cent. GDP has now expanded for three successive quarters, but the latest data shows a marked acceleration from the 0.4 per cent growth recorded in the final quarter of 2009 and the first quarter of 2010.

Contributions to growth by the main categories of expenditure are shown in **Figure 1**. This identifies household consumption, net trade and the 'other' category as having the strongest impact on growth in 2010 Q2 relative to the previous quarter.

Figure 1 Contributions to GDP growth by main items of expenditure

Percentages

Quarter of quarter



Source: UK Economic Accounts

Household consumption was flat in the first quarter, sandwiched between stronger growth in both the preceding and succeeding quarters. In January the rate of Value Added Tax (VAT) returned to the higher rate of 17.5 per cent having been temporarily cut to 15 per cent in December 2008 as part of the fiscal stimulus package announced in the 2008 Pre-Budget Report. Consequently some consumption may have been brought forward to the final quarter of 2009, especially on durable goods. Disruption caused by heavy snowfall in January may also have weighed on household consumption in the first quarter, as evidenced by weaker retail sales and lower spending in the distributive, hotels and restaurants sectors. Stronger growth in second quarter consumption may therefore be partly in response to a weaker first quarter. The level of household consumption is still 3.6 per cent lower than before the recession started in 2008 Q1.

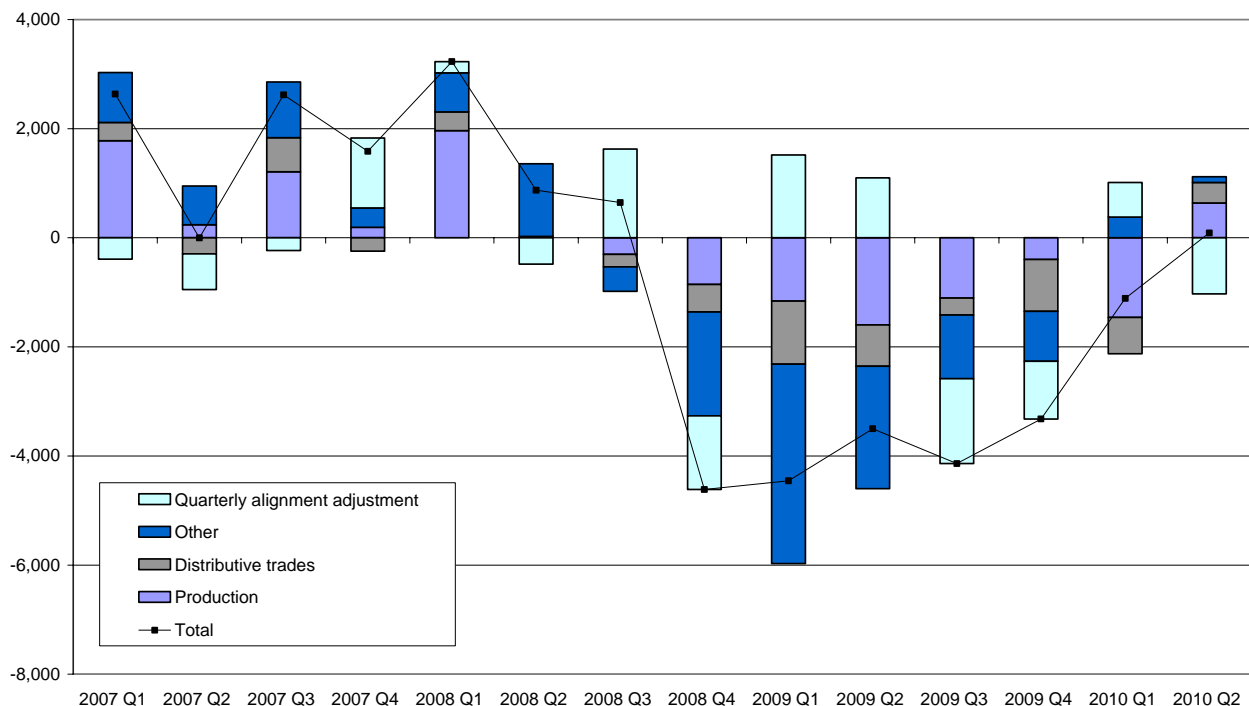
Although Gross Fixed Capital Formation (GFCF) grew in the latest quarter, following two quarters of small declines, the overall contribution to GDP growth was small at around 0.1 percentage points. GFCF is now just under 20 per cent below its pre-recession peak in 2007 Q4, and the fall was larger in this most recent recession compared to those in the early 1980s and 1990s. In contrast, government consumption has continued to grow consistently, making a small positive contribution to growth.

Net trade made a significant negative contribution to growth in the first quarter of the year. This could partly be attributed to the impact of the bad weather disrupting the transport of goods to ports and thus exports. Imports would not have been so adversely affected. Exports rebounded in the second quarter reducing the extent to which net trade made a negative contribution to GDP growth. Since the global economy started to recover in the second half of 2009, growth in imports has tended to outstrip the growth in exports, so despite the large depreciation in sterling in the second half of 2008, net trade has subtracted from GDP growth.

The 'other' category shown in Figure 1 consists of the consumption expenditure of the non-profit sector and changes in business' holdings of valuables and stocks (raw materials, work in progress, finished goods). In level terms each of these is a relatively small proportion of GDP, but changes in stockholdings (or inventories) have an important impact on changes in GDP. Positive contributions to GDP growth have recently occurred as firms reduce the rate at which they were de-stocking (running down their inventories). This deceleration was particularly strong in the first quarter of the year, when it is now evident that GDP growth would have been much stronger had it not been for the weather-disruption to household consumption and exports. This trend continued into the second quarter to the extent that businesses have started to restock for the first time since 2008 Q4.

Figure 2 **Change in inventories**

£ millions



Source: UK Economic Accounts

The recent pattern in inventories is shown in more detail in **Figure 2**. Clearly as the economy entered recession in the second quarter of 2008 businesses first began to reduce the rate at which

they accumulated inventories before leading to actual de-stocking. Since the economy started to recover the rate of de-stocking has slowed before positive stockbuilding was recorded in the latest quarter. It is also noticeable that these trends have been uniform across the production, distributive and other sectors of the economy, and had it now been for the alignment adjustment which is used to help reconcile the output and expenditure measures of the economy, the increase in inventories in the second quarter would have been even stronger.

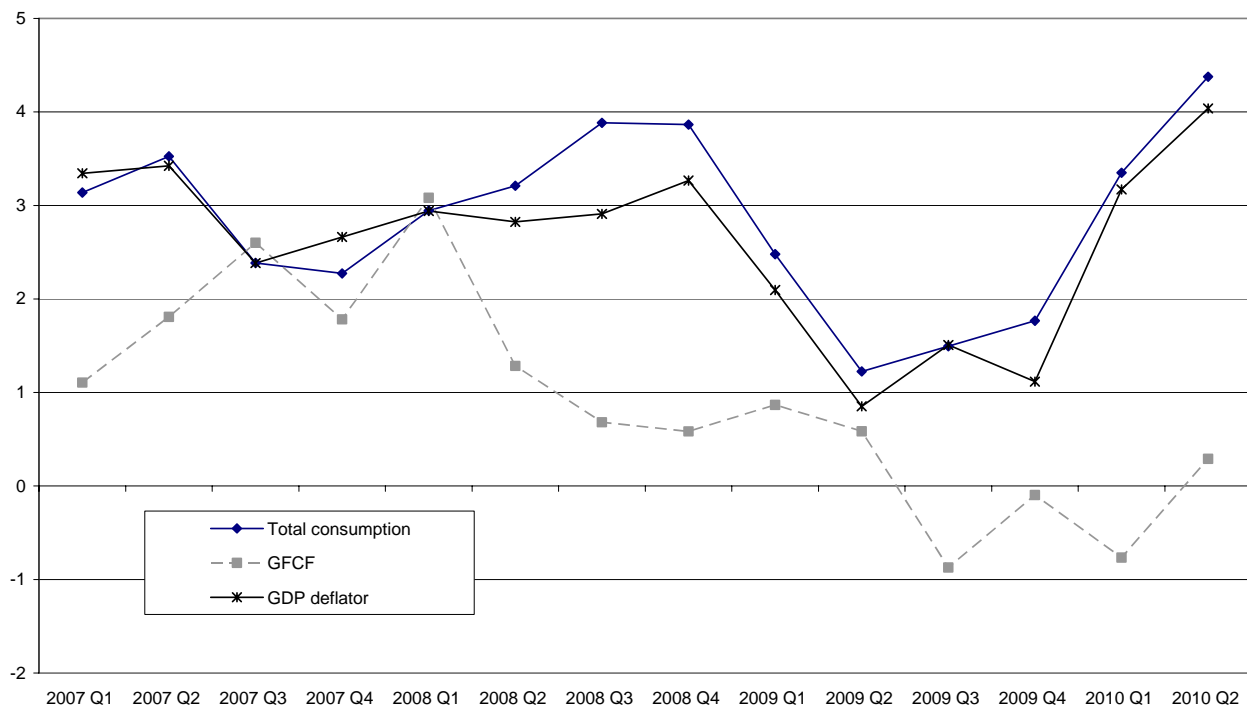
Stronger growth in consumption deflators than investment deflators

Implied deflators can be calculated for the expenditure components of GDP from chain volume and current market price measures. **Figure 3** shows the GDP deflator, and those for consumption and investment (GFCF). In 2010 Q2, the GDP deflator was 4 per cent higher than the same quarter a year earlier, having picked up in the last two quarters. The consumption deflator (consisting of household, NPISH and government consumption) appears to have been the main factor in driving the trend in the GDP deflator. Here recent movements, as also shown in headline rates of Consumer Price Index (CPI) inflation, have reflected the increase in VAT and annual increases in fuel and food prices.

Figure 3 Consumption and fixed investment deflators

Percentages

Quarter on same quarter one year ago



Source: UK Economic Accounts

Annual growth in the fixed investment deflator though has remained muted through the recession and into the early stages of recovery. Being predominately exempt from VAT, the deflator is unlikely to be affected by the reversion to the higher rate than the household consumption deflator. However, as many investment goods are imported, it might have been expected that the depreciation of sterling could have had a positive impact on the GFCF deflator by increasing the price of imported capital goods.

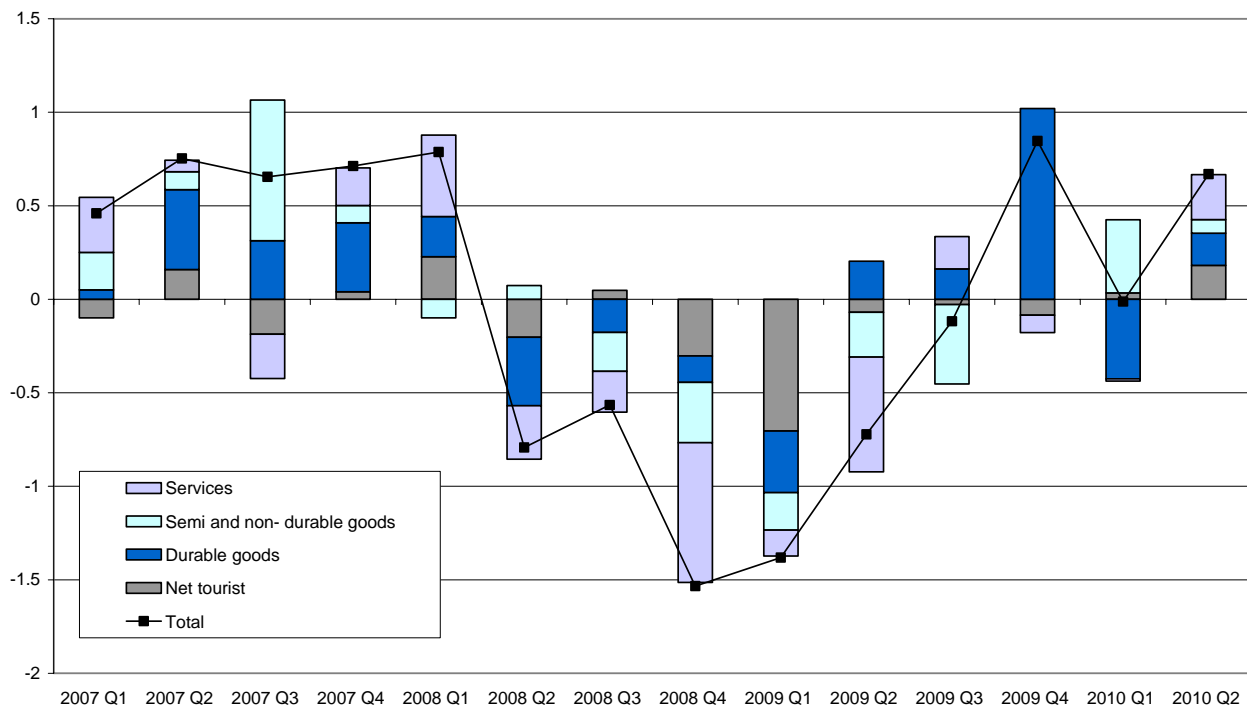
Household consumption rises by 0.7 per cent in 2010 Q2

Contributions to the quarter-on-quarter growth in household consumption by main type of spending are shown in **Figure 4**. In the latest quarter, positive contributions arose from all the categories – net tourist, durable, semi- and non- durables, and services. All these items of spending have generally behaved as would be expected through the recession period and in the early stages of recovery in line with movements in consumer confidence.

Figure 4 Contributions to growth in household¹ expenditure

Percentages

Quarter on quarter



Source: UK Economic Accounts

Note

¹ Includes spending by non-profit institutions serving households (NPISH)

In the final quarter of 2009 household consumption grew by 0.8 per cent, which was more than accounted for by the durable goods component. This is supportive of the notion that households brought forward spending on bigger ticket items (household goods, cars and so on) before the return of VAT to the higher rate in the new year. This and the bad weather may also explain why durable goods consumption then subsequently fell in the first quarter of the year.

Net tourism spending reflects the difference between household consumption overseas and the spending by foreign visitors to the UK. This is designed to adjust household consumption data so they reflect the spending of UK households anywhere in the world rather than the spending by households (UK and foreign) in the UK. This will make a negative contribution to household consumption growth if foreign spending in the UK grows faster than domestic tourist spending overseas. Overall, net tourist spending is a fairly small part of total household consumption, averaging about one and a third per cent between 2005 and 2010. Despite this, the contribution to changes in total consumption growth can be important, as evidenced by the strong negative contributions through 2008 Q4 and 2009 Q1. Data on travel and tourism, taken from the International Passenger Survey, support this viewpoint, recording a strong fall in overseas trips by UK residents during the recession whilst visits to the UK from overseas' residents were more robust. The depreciation in sterling, especially against the euro, may have been an important factor here in making domestic trips relatively cheaper compared to those overseas. Recent analysis undertaken by the Tourism Intelligence Unit within the Office for National Statistics found evidence of a 'staycation' effect during the recession, with UK households choosing to substitute foreign holidays by those in the UK.

Annual changes in the household consumption deflators are presented in **Figure 5**. The overall consumption deflator has predominately moved in line with consumption of services – the largest component of household consumption – and the recent increases reflect the higher rate of VAT. For consumption goods, the annual growth rates in deflators have converged and are now also broadly in line with the trends in services. Before the second half of 2009 these goods categories showed more marked differences.

For instance, the rate of inflation in the non-durable goods deflator rose strongly through the second half of 2008 as significant price increases in oil and commodities fed through to energy, fuel and food prices. Deflators for durable consumption goods though showed the opposite movement, with prices generally falling within this category of consumption up until the end of 2009. Falling prices of durable goods has, in part, been a longer term phenomenon. Increasing production in lower-cost emerging market economies, notably China, has pushed down on manufactured goods prices around the world, benefiting UK consumers through a stronger terms of trade. Price indices have also been adjusted downwards to reflect rapid quality improvements in many household goods such as computers, audio-visual equipment, mobile and telecommunication devices and so on. Furthermore, as the UK entered recession stronger deflation may have resulted from more aggressive discounting in the face of weaker demand.

Durable goods consumption would be expected to be particularly vulnerable in the downturn. Households concerned with protecting or rebuilding their balance sheets would be less inclined to make larger and more discretionary purchases, as reported in several surveys of consumer confidence at the time. Durable goods, by their very description, are not fully used up in consumption so households can also delay their replacement. The credit crunch, and its tightening

of consumer credit would also have reduced the ability of households to undertake 'bigger ticket' purchases.

The general fall in durable goods prices though may have acted to offset some of these negative factors. This also appears to be a similar feature in the retail sales data, where strong discounting in the predominately non-food sector, particularly clothing and footwear, has supported volumes through the recession period. Falling prices of consumption goods allow households to maintain the same volume of consumption whilst reducing the share of consumption in household income in value terms.

Figure 5 Consumption deflators

Percentages

Quarter on same quarter one year ago



Source: UK Economic Accounts

Fixed investment growth remains weak

The level of gross fixed capital formation (GFCF) fell by 20.7 per cent between 2007 Q3 and 2009 Q4 before recovering by 4.3 per cent over the first half of 2010. The peak to trough fall in GFCF was more severe in the latest recession than those of the early 1980s and early 1990s, where the peak to trough falls were 14.9 per cent and 13.9 per cent respectively. The current weakness in GFCF growth reflects the uncertain economic outlook and the unwillingness of businesses to commit to expanding future capacity. There is also some evidence, looking at financial sector

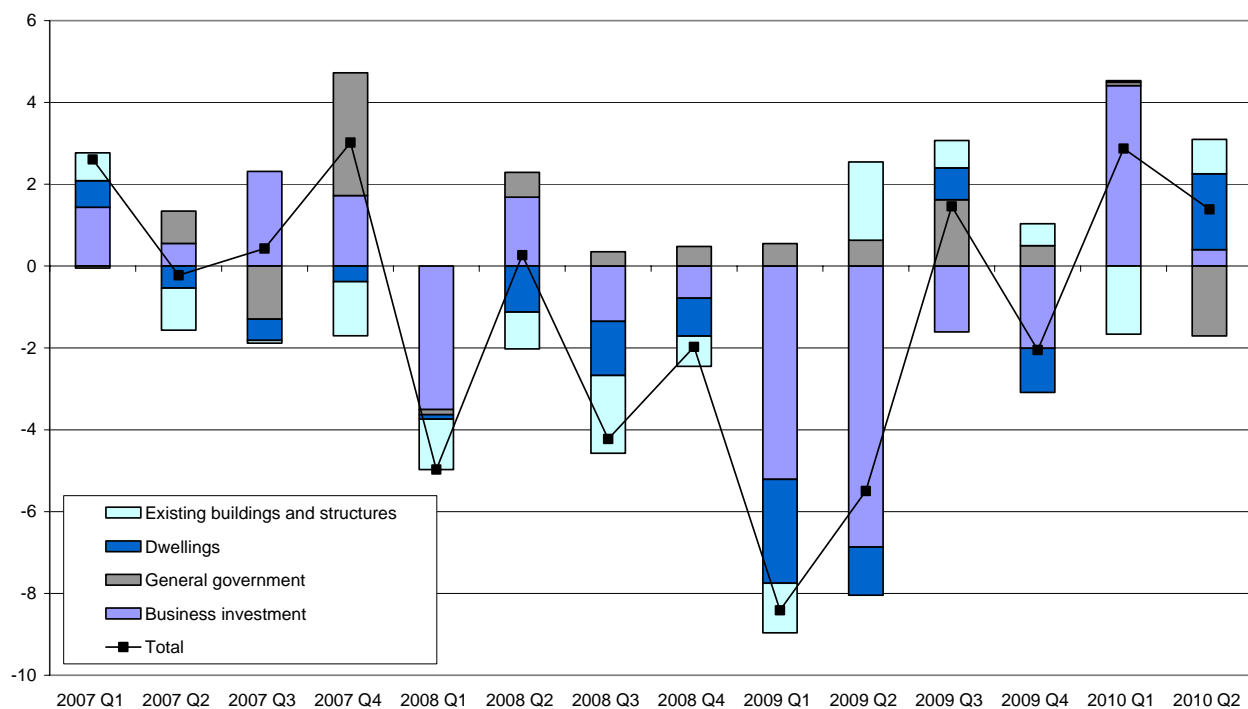
balance sheets, that investment may have been restricted in order to generate cash reserves as a defence against the uncertain economic outlook and to pay down existing debts (the corporate sector has become an increasing net lender with cash reserves used to reduce its financial liabilities). Restrictions in the availability of credit may also constrain investment spending, with loans to the private non-financial corporations (PNFC) sector remaining at low levels – although here it is difficult to identify the extent to which this is demand led or supply led. A number of business surveys have suggested that credit constraints have only been of secondary importance in accounting for low investment intentions, with uncertainty over future demand much the primary factor.

GFCF estimates can be disaggregated both by sector (**Figure 6a**) and by asset (**Figure 6b**).

Figure 6a Contributions to GFCF growth by sector

Percentages

Quarter on quarter



Source: UK Economic Accounts

By sector, business investment, accounting for around 60 per cent of the level of fixed investment, has generally been the largest contributor to growth. General government fixed investment has made a positive contribution to growth over the period, although it fell by 8.6 per cent in 2010 Q2 reducing overall GFCF growth by 1.7 percentage points. Investment in dwellings and existing buildings and structures have broadly followed the same cyclical path of the economy and property

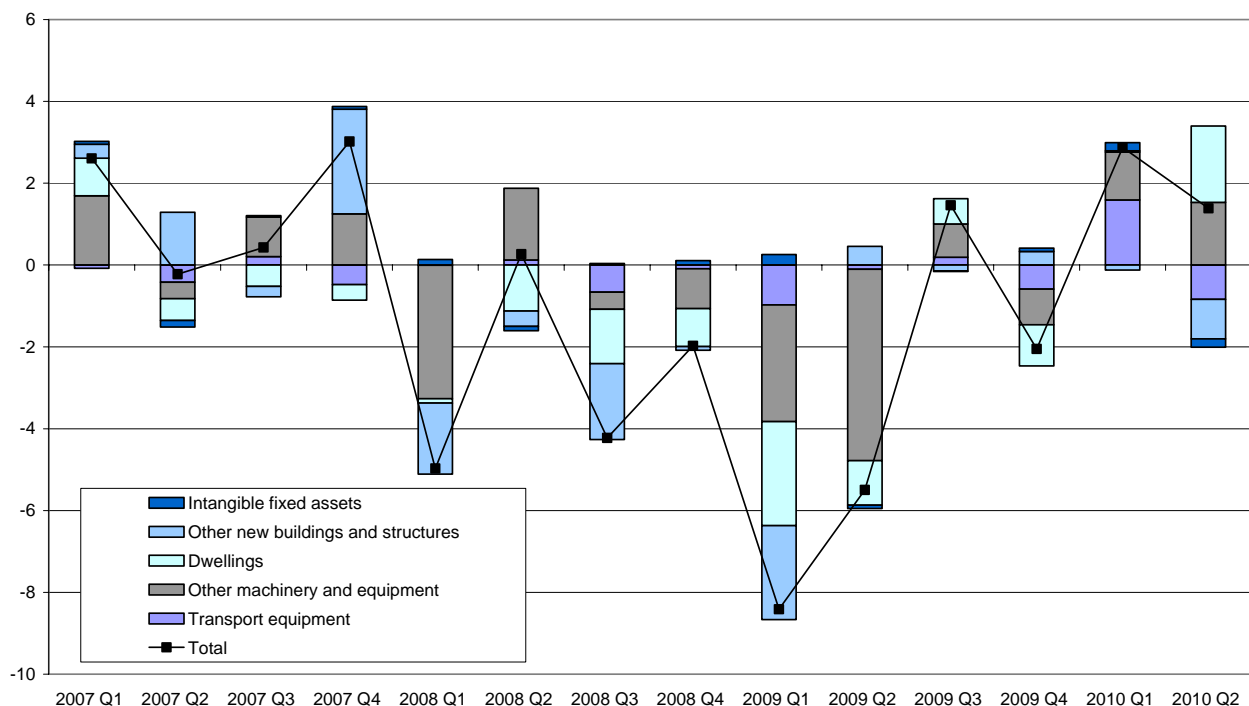
market in particular. In the latest quarter, though, these two components added 1.9 percentage points and 0.8 percentage points respectively to GFCF growth, which is in line with the strong rise in construction output during the quarter.

GFCF contributions by asset bear a close resemblance to those by sector. 'dwellings' and 'other new buildings and structures' assets have shown the same general movements as the 'dwellings' and 'existing buildings and structures' sectors. Both 'transport equipment' and 'other machinery and equipment' have moved in roughly the same directions as business investment.

Figure 6b Contributions to GFCF growth by asset

Percentages

Quarter on quarter



Source: UK Economic Accounts

Implied deflators of these main GFCF assets are shown in **Figure 7**. This chart also provides a breakdown of the components making up the total GFCF deflator which is also presented in Figure 3. The overall change in fixed investment appears to be the outcome of two main trends. For dwellings and other new buildings and structures, deflator movements have followed price trends from the housing and commercial property markets. Depressed prices through the recession have therefore held the total GFCF deflator down.

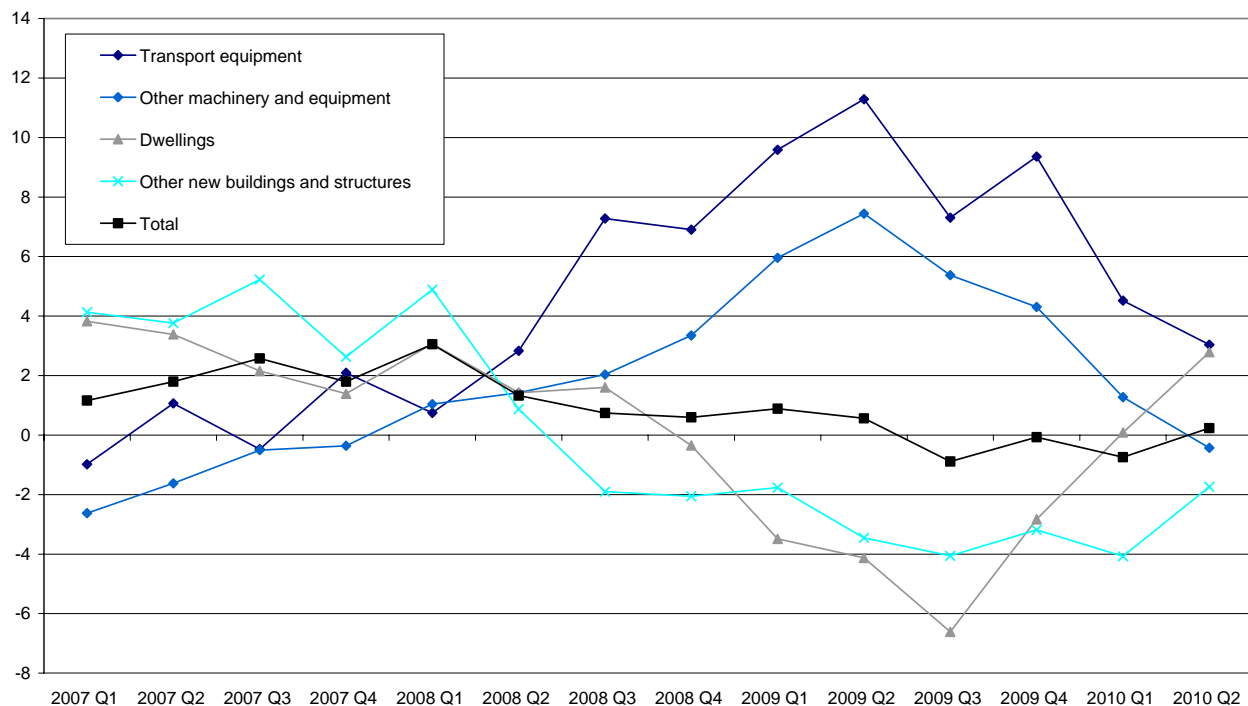
Deflator movements for transport and other machinery and equipment though have followed the opposite trajectory, with price inflation of these capital goods picking up through late 2008 and

early 2009. Here there is more evidence that sterling depreciation in the second half of 2008 has impacted on the price of imported capital goods.

Figure 7 Price deflation for main GFCF assets

Percentages

Quarter on same quarter one year ago



Source: UK Economic Accounts

Imports grow faster than exports for the fourth successive quarter

There has been much interest in the contribution of net trade to GDP growth. First, the UK has run a persistent deficit in its current account, so it has been suggested that in the long run there would be a rebalancing of the economy away from consumption towards exports (replacing some domestic demand with foreign demand). Second, and more immediate, following the depreciation of sterling in the second half of 2008 it was anticipated that net trade would make a positive contribution to growth in much the same way as when sterling left the European Exchange Rate Mechanism in the Autumn of 1992.

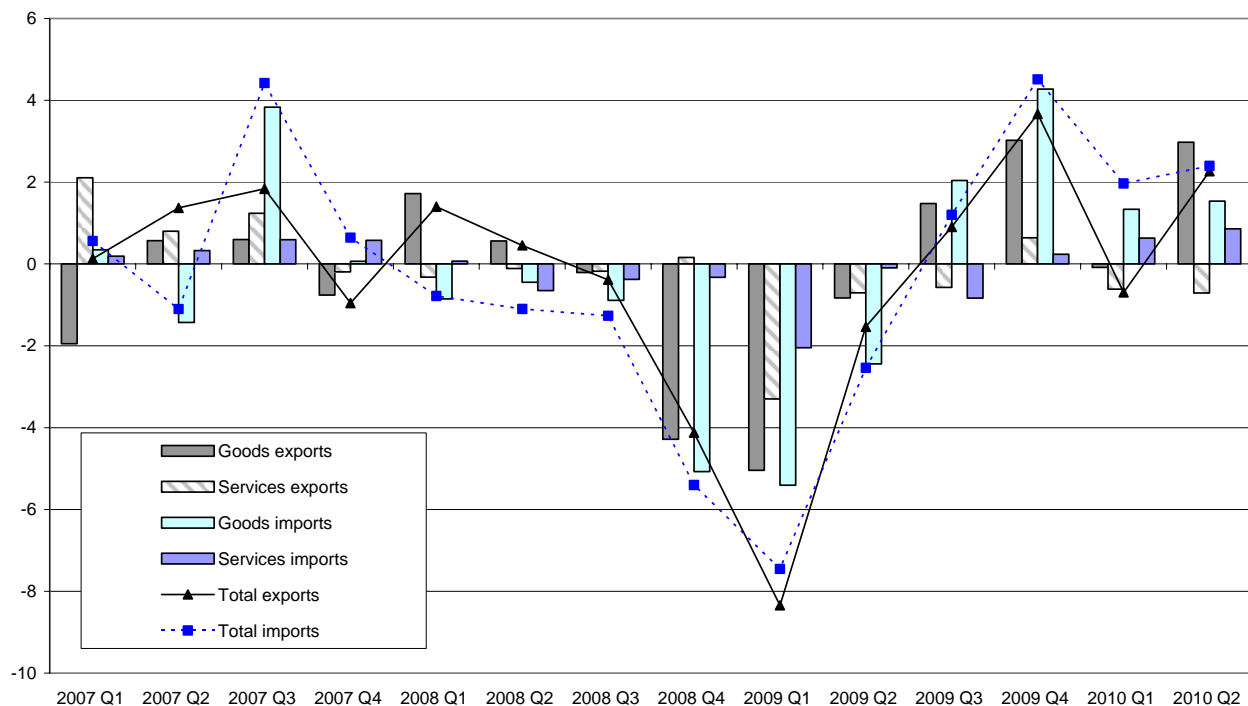
Figure 8 shows recent growth in UK exports and imports, and also the contributions of services and goods to each. In the early quarters of the downturn, net trade made a positive contribution to growth as imports contracted faster than exports. However, as the global economy began to recover, and UK imports and exports began to increase again, the growth of UK imports has

outstripped that of exports. As a result, net trade has subtracted from GDP growth over the last four quarters.

Figure 8 Growth in volumes of UK imports and exports

Percentages

Quarter on quarter



Source: UK Economic Accounts

Sterling depreciation has therefore not provided the boon that was expected, although it is difficult to disprove the counterfactual that the UK's net trade performance would have been worse had it not been for the competitive advantages of depreciation. There are a number of possible reasons why this may be the case.

First, although the 25 per cent depreciation in sterling in the second half of 2008 was similar in magnitude to that in late 1992, the impact on the UK terms of trade has been less pronounced. This suggests that 'pricing to market effects' may have offset the impact of the exchange rate change on export and import prices through margins. UK exporters could use depreciation to increase their margins when selling in overseas markets, whilst exporters to the UK may have reduced their margins in order to sustain a certain price in the UK market.

This leads to the second argument – that the structure of UK trade has changed to make the net trade position less price sensitive than in previous decades. In the last three decades UK trade has tended to move up the value chain, especially in response to the rise of low-cost producers in emerging market economies. As a result, the competitiveness of UK exports, in areas like

pharmaceuticals and aerospace, rely more on quality and less on price. Likewise, by increasing imports of lower-grade manufactured goods, which are more competitively priced in global markets, means that exporters to the UK may be more willing to absorb the effects of depreciation in margins than exporters from the UK. Results from business surveys have tended to find that exports remain more sensitive to foreign demand than pricing considerations.

Annual income growth picks up in the first half of 2010

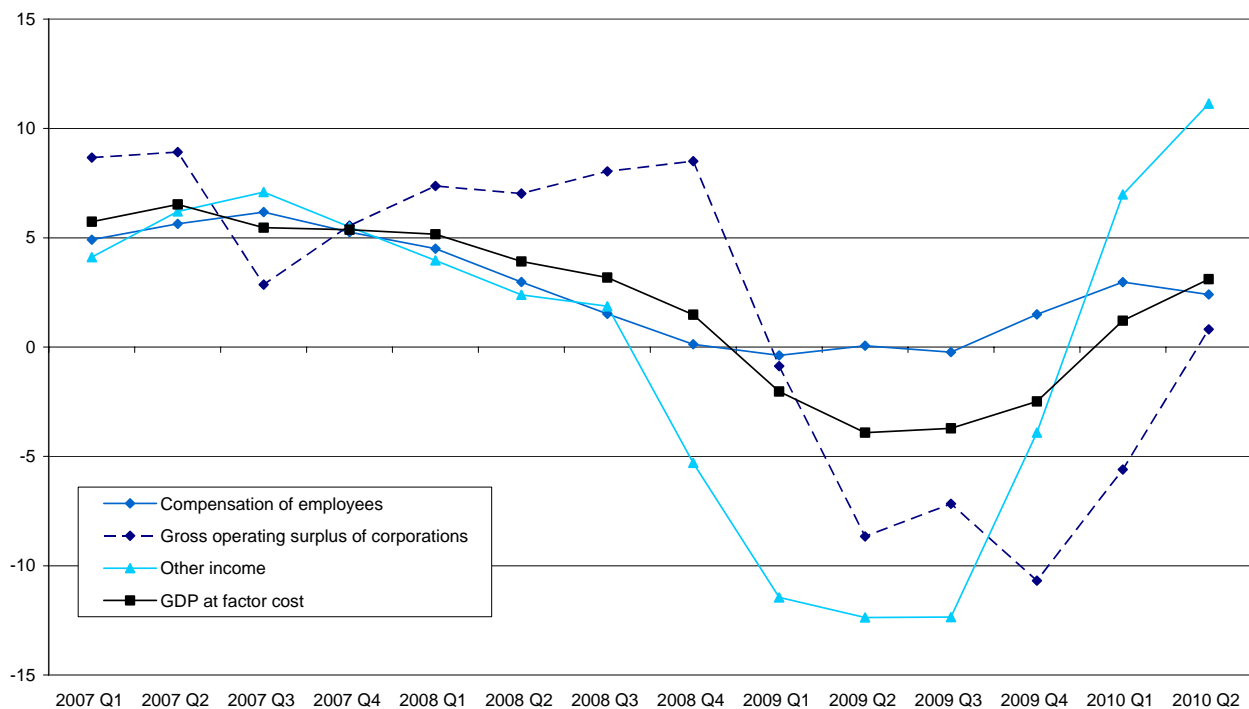
Figure 9 shows the growth rates in GDP at factor cost (which removes the effects of taxes and subsidies from market prices) and the main income components of GDP (in current prices). Clearly, as the economy entered recession, income growth slowed or turned negative but in the first half of 2010 there is evidence of a recovery.

Compensation of employees stagnated, as unemployment rose and wages growth slowed. However, gross operating surpluses of the corporate sector and 'other' income (which includes the income of the self-employed and operating surpluses of the non-corporate sector) fell even more sharply, being the main factors in turning overall income growth negative.

Figure 9 Growth in the main categories of UK income

Percentages

Quarter on same quarter one year ago



Source: UK Economic Accounts

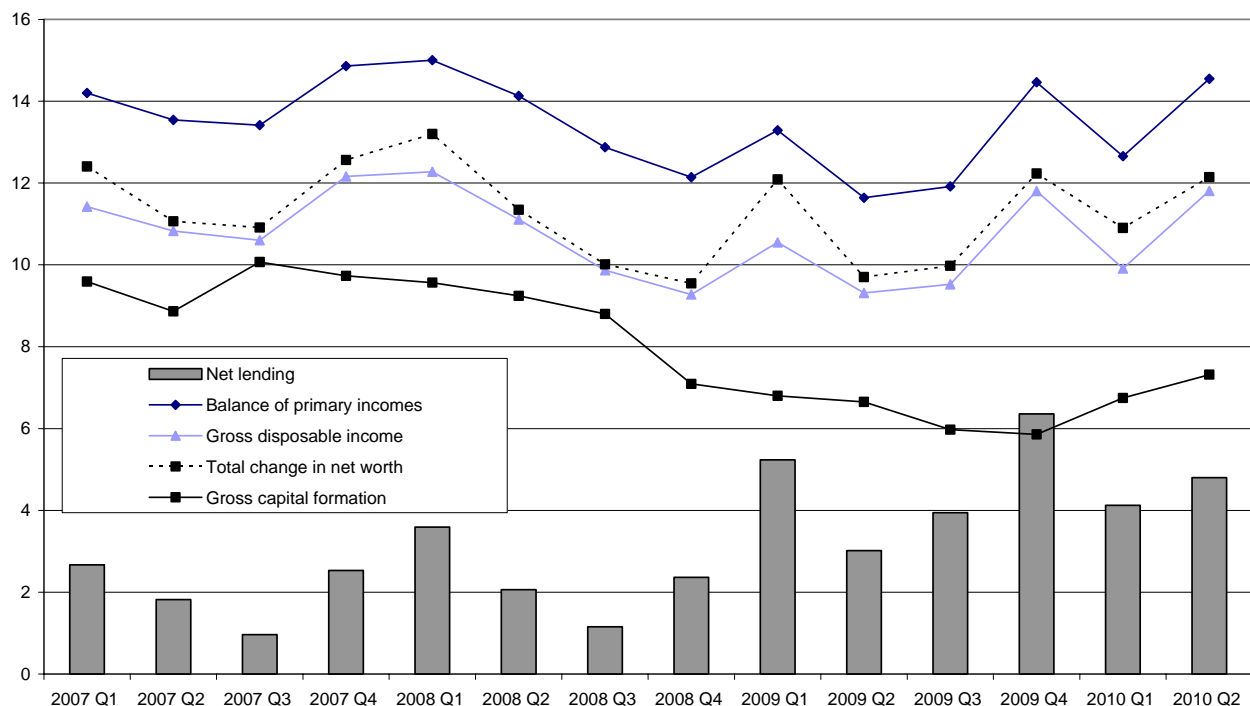
These income flows form key parts of the balance sheets of individual sectors. The next sections will look at these in more detail for the private non-financial corporations (PNFC), financial corporations (FC), households (and non-profit institutions), central government and the rest of the world sectors, focussing on the impact of the recession and recent developments in the early stages of recovery. Financial balance sheets provide useful information that may help to understand better the financial health of each sector, helping to explain consumption and investment decisions taken.

PNFC net-lending grows as fixed investment remains weak

Figure 10 outlines the main components of the PNFC balance sheet and how they have behaved in recent years.

Figure 10 PNFC balance sheet and net lending

Percentage of GDP



Source: UK Economic Accounts

The balance of primary incomes reflects two main factors. First, gross operating surplus essentially measures the profits/losses generated from business activities. Second, net property income reflects the difference in income received and paid through the sector's ownership of financial assets. As Figure 9 shows, gross operating surpluses in the corporate sector as a whole fell

sharply in the recession (although the fall for the private non-financial sector was not as severe as that overall for the corporate sector). Despite some modest recent pick up, gross operating surpluses for the PNFC sector are still over 10 per cent lower than the pre-recession peak in 2008 Q1.

The impact on primary incomes though has been offset by a rise in net property income. The reduction in interest rates has reduced the cost of servicing debts – a loan represents a financial liability so the interest accrued is a property payment. Likewise, falling profitability has been transmitted into lower dividends (or other forms of distributed income) to shareholders and equity owners in other sectors. Therefore, as Figure 10 shows, PNFC primary incomes have been supported by falling net property income payments. In fact, PNFC primary incomes have started to improve in recent quarters in line with the recent upturn in gross operating surpluses whilst interest rates continue to remain low.

The sector's gross disposable income reflects the primary income balance adjusted for net social contributions and taxes on income. These too, as expected, have shown a small reduction during the recession as lower profitability and headcounts feed through to lower net social and tax payments.

The change in the sector's net worth is its gross disposable income for the period plus net capital transfers (that is investment grants minus capital taxes) – and reflects the amount the sector has at its disposal to increase its net worth by purchasing assets (or reducing liabilities). Purchasing capital goods, either fixed capital (GFCF) or working capital (inventories) is one means that the sector may increase its assets. The difference between investment spending and net worth equals net lending/borrowing – which shows the funds available to lend to or borrow from other sectors of the economy.

The robustness of primary incomes combined with a sharp fall in investment spending has resulted in the sector becoming an increasing net lender. In the most recent quarter investment has shown a slight increase as businesses begin to restock (purchase inventories), but overall fixed investment spending remains weak and is the main factor accounting for the net lending status of the sector.

In this sense, net lending may have arisen automatically as a result of weak investment spending. Faced with an uncertain economic outlook, businesses may be reluctant to invest in extra capacity, and therefore cash balances naturally accumulate. This could also be viewed in the opposite direction, that in order to strengthen balance sheets by building cash flows, firms have deliberately cut back on investment spending. For example, much of the net-lending generated by PNFCs appears to have gone in reducing liabilities to other sectors by paying down loans. Impairment in the credit market, the weak economic outlook and other issues such as the funding of pension fund deficits may have encouraged firms to build their cash positions by suppressing new capital goods spending.

Figure 3 shows that capital goods price inflation has been lower than that for consumption goods and services and the growth in the GDP deflator. This implies that capital goods are becoming cheaper relative to other goods and services and as a result the share of spending in nominal GDP will naturally decline over time unless GFCF grows faster than total expenditure as a whole.

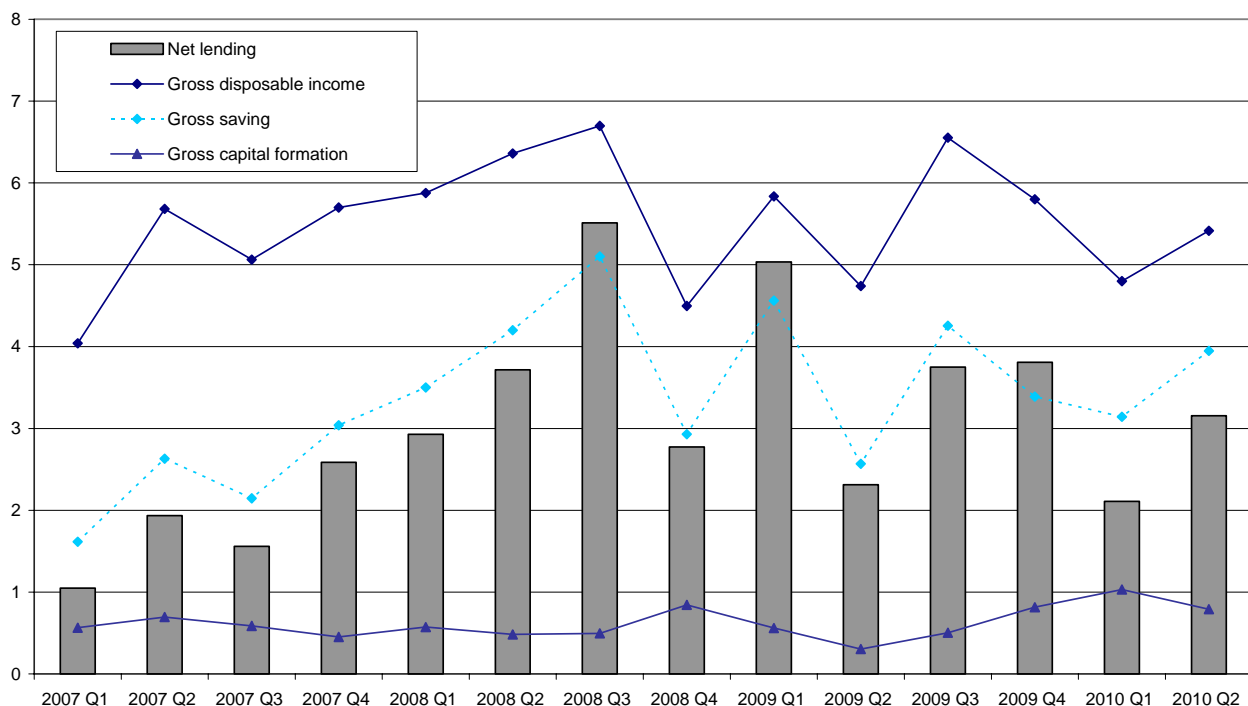
Changes in the structure of the economy may also account for the downward trend in PNFC investment in GDP. Service sector businesses are less likely to purchase traditional plant and machinery, but are more likely to spend on intangible products such as software, R&D, design, training, organisational capital and so on. However, many of these intangible products are not recognised in the National Accounts as capital goods, suggesting that the 'narrower' definition of capital will increasingly bias measures of investment spending downwards.

Financial corporations net lending

As gross capital formation is relatively low, the financial corporations sector is generally a net lender to the rest of the economy, the extent to which is largely determined by the amount of disposable income it generates. In the second quarter of 2010 net lending was 3.2 per cent of GDP, slightly above the recent average of 3 per cent of GDP from 2007 Q1 onwards (**Figure 11**).

Figure 11 Net lending of financial corporations

Per cent of GDP



Source: UK Economic Accounts

Gross disposable income though has recently shown some quarter on quarter volatility, in turn driven by primary income balances. For example, in 2008 Q4 primary incomes fell sharply relative

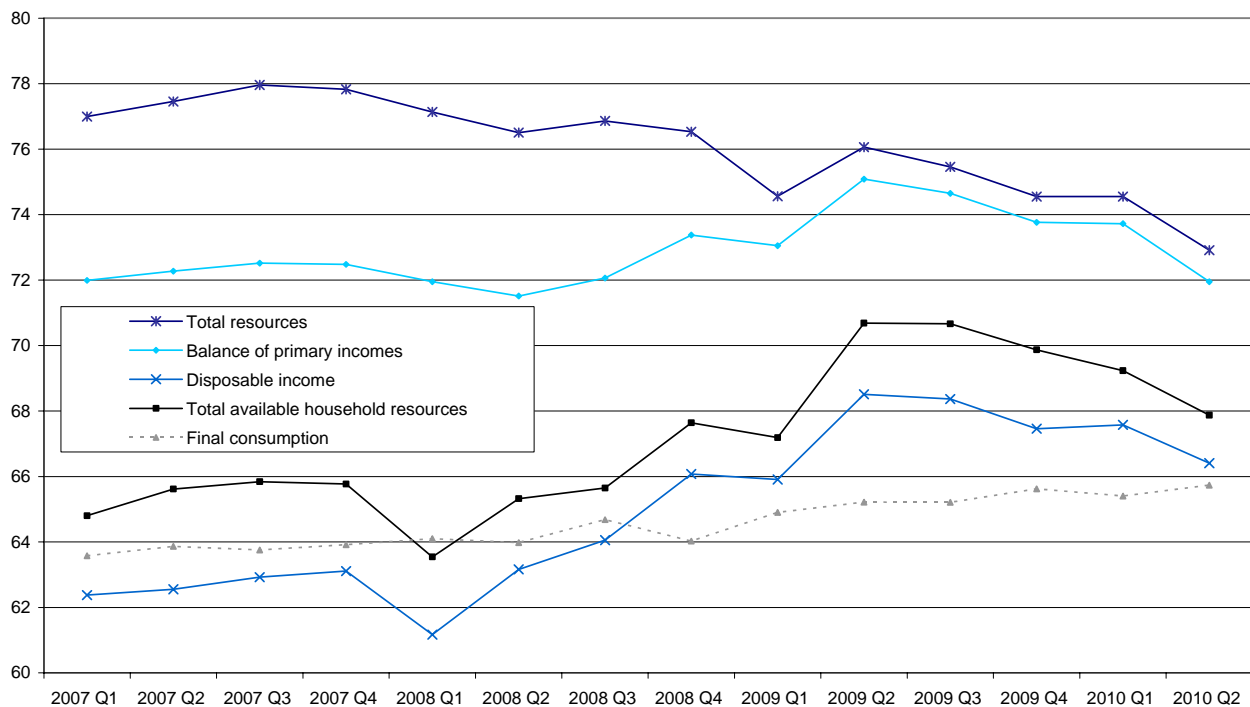
to the previous quarter due to a large fall in reinvested earnings from overseas. The distributed income of corporations paid and received has also shown strong quarterly movements. Therefore most of the recent fluctuation in gross disposable income can be attributed to net property income. In 2008 Q3, net property income of financial corporations was 2.1 per cent of GDP but fell to -1.9 per cent in the following quarter. In the latest quarter net property income of financial corporations had picked up to 0.2 per cent of GDP relative to -1 per cent in the previous quarter – accounting for almost all the change in the sector's net lending between the first two quarters of 2010.

Households become net borrowers for the first time since 2009 Q1 as the saving ratio falls

A summary of the household balance sheets is presented in two parts in **Figures 12a** and **12b**. The first of these two charts shows the income and expenditure side of the sector, whilst the second shows the saving and net-lending components.

Figure 12a Household sector¹ total available resources and consumption

Per cent of GDP



Source: UK Economic Accounts

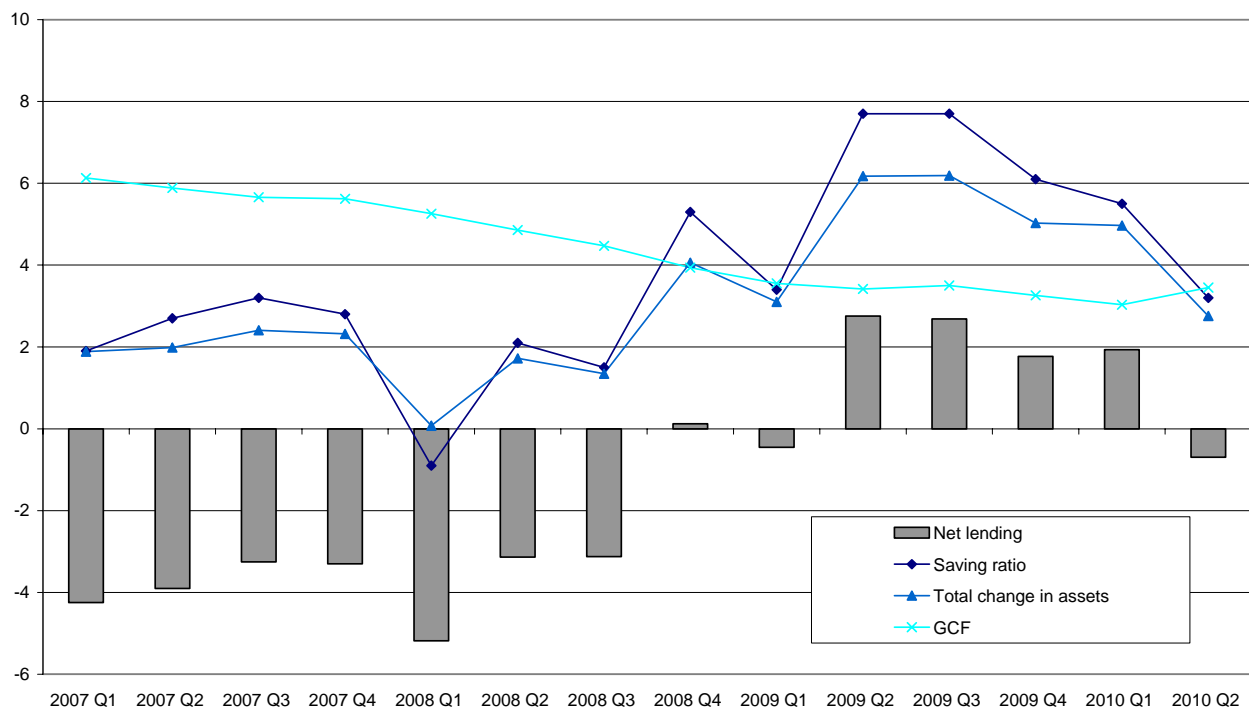
Note

¹ Includes NPISH

Household total resources basically show the primary incomes earned by the household sector, consisting of compensation of employees, operating surpluses from household businesses (and the income of the self-employed) and property income (dividends from equities, interest from savings and so on). As a proportion of GDP, household resources fell from 77 per cent in 2007 Q1 to 72.9 per cent in 2010 Q2. Falling property income, from lower interest rates and dividend payments, accounted for 4.4 percentage points of this fall.

Figure 12b Household¹ saving ratio² and net lending³

Per cent of GDP/Household available resources



Source: UK Economic Accounts

Notes

1. Includes NPISH
2. Saving ratio is gross saving as a proportion of total available resources
3. Net lending, gross capital formation (GCF which is GFCF, inventories and valuables) and the total change in assets are shown as a proportion of GDP

However, in terms of the balance of primary incomes, the household sector's position is more buoyant. This is because property income paid, as well as received, has fallen as a result of the sharp reduction in interest rates in 2008/09 which have been sustained through to the present. The strong rise in house prices between 1993 and 2008 meant that as new mortgages replaced older mortgages the stock of interest-bearing secured borrowing by the sector rose significantly. Consequently, as the UK entered recession and interest rates were cut sharply, the household sector's interest-bearing liabilities exceeded its interest-bearing assets. Therefore the cut in

interest rates generated overall positive net property income for the sector by reducing property payments by more than property incomes.

The balance in primary incomes is linked to household gross disposable income through net social transfers including taxes on incomes. In the aggregate these generally subtract from primary incomes, although net tax and social contributions tend to show a relative fall in a downturn as the tax and benefits system support gross disposable income. As a percentage of GDP, household gross disposable income was 5.5 percentage points lower than the balance in primary incomes in the latest quarter compared with a 10.8 percentage point gap in the first quarter of 2008.

Total available household resources, so called as this defines the size of funds available for consumption or saving, is gross disposable income with the addition of an adjustment for the change in net equity in pension funds. Household consumption is also plotted in Figure 12a. Gross saving is calculated as the difference between this and total available resources.

The saving ratio is the ratio of gross saving to total available resources. In 2010 Q2 the household saving ratio dropped to 3.2 per cent, a further decline from the local peak of 7.7 per cent reached in 2009 Q2 (see Figure 12b). As Figure 12a shows, this has been the result of recent falls in total household resources and a slight improvement in consumption spending. Between 2009 Q2 and 2010 Q2, both total household resources and balances of primary incomes, as a share of GDP, fell by around 4 percentage points leading to an eventual fall of total available household resources in GDP by around 3 percentage points.

The remainder of Figure 12b refers to the components of household sector net lending. These are expressed as a proportion of GDP, rather than total available household resources as in the saving ratio, so care must be observed when looking at the chart. The total change in household assets refers to the resources available for the sector to increase assets or reduce its liabilities. This is mainly driven by the level of gross saving, but also includes the difference between capital transfers and taxes.

In the National Accounts purchases of new housing/dwellings is treated as investment by the household sector. In this case, each household is viewed as a small business which provides itself with housing services at the cost of an imputed rent. This allows GDP to be compared across different countries and times when the degree of owner-occupied housing differs. The fall in house prices and restrictions in the availability of mortgage lending acted to reduce the share of household fixed investment in GDP. Rising household saving and falling investment therefore meant that the sector became a net lender to the rest of the economy between 2009 Q2 and 2010 Q1. In the latest quarter, however, after a further fall in gross saving and a slight rise in investment spending, households became slight net borrowers once again to the tune of 0.7 per cent of GDP.

Central government current budget deficit over £100 billion in the year to August 2010

The central government sector accounts for the large majority of the flows that make up the public sector balance sheet (also including local government and public corporations). As a result, trends

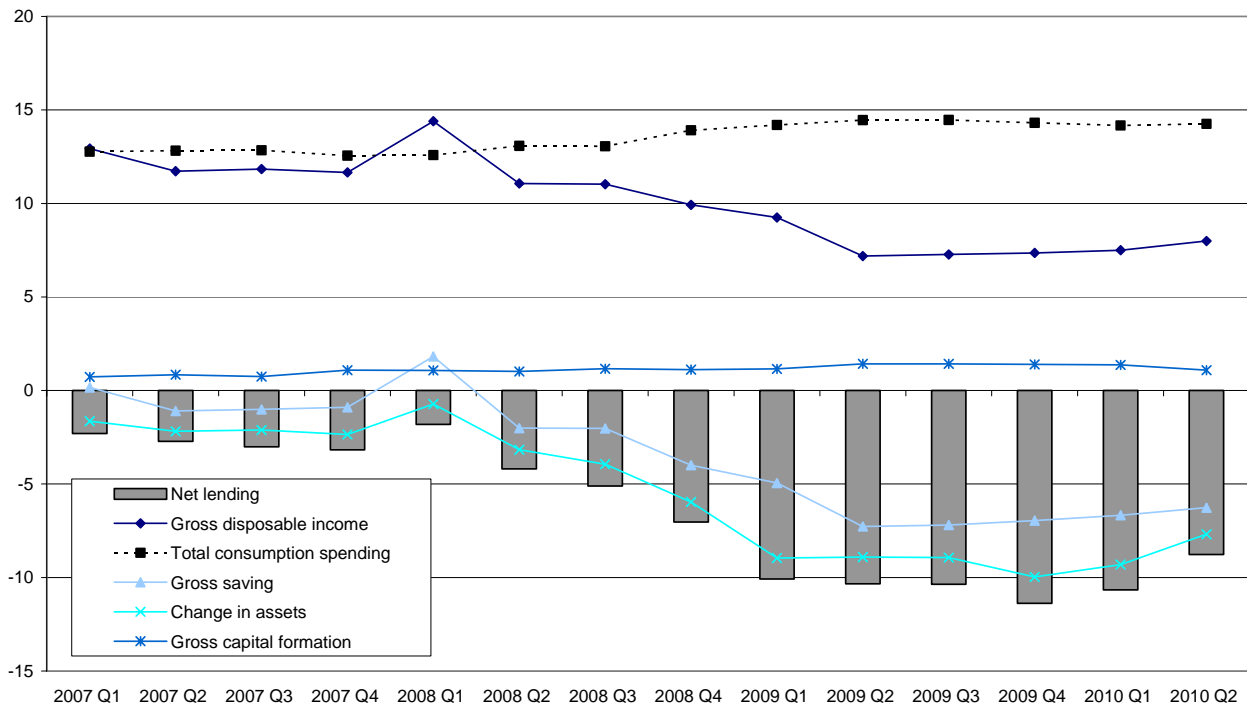
in public sector finances can be mostly explained by developments in the central government balance sheet, which is summarised in **Figure 13**.

The gross disposable income of central government essentially reflects its net receipts from taxes on production and imports, property income, taxes on income and wealth and net social contributions. In the second quarter of 2010 these amounted to around 8 per cent of GDP, down from 14.4 per cent of GDP in 2008 Q1. As a share of GDP, central government disposable income has risen very slightly over the last year due to tax increases (notably the reversion of the rate of VAT to 17.5 per cent from 15 per cent and the levy on bank bonus payments among others) and due to an improvement in GDP growth. However, as Figure 13 shows, central government disposable income (net receipts) have been severely hit by the recession, and are currently far below the peak in 2008 Q1 as a proportion of GDP. In contrast, modest growth in central government spending has continued unabated.

As a result of the significant fall in disposable income and the steady rise in consumption, central government saving, which can be thought of as being similar to the current budget balance, has moved significantly into negative territory at around -6.3 per cent of GDP in the latest quarter.

Figure 13 Central government balance sheet and net lending

Per cent of GDP



Source: UK Economic Accounts

Central government net lending reflects the difference between the change in assets (net worth) of the sector and its gross capital formation (fixed investment and inventories). The change in assets primarily reflects gross saving, but also the difference between capital taxes received and capital

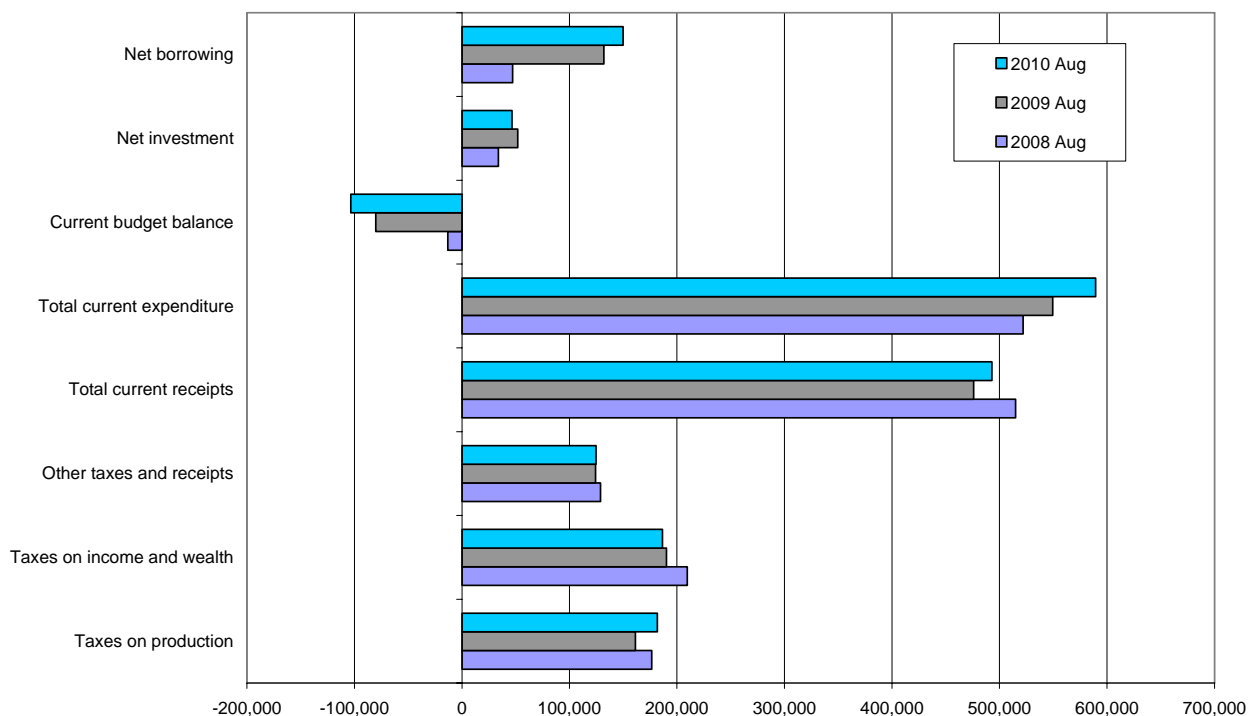
transfers paid. As capital investment grants tend to exceed the revenues from capital taxes this means the change in the asset position of the sector is slightly worse than its gross saving as a percentage of GDP. This measure describes the total resources available to the sector to purchase assets, but being strongly negative is a sign that the sector is in fact funding its position by increasing its liabilities, that is net worth is being reduced. As gross capital formation has been maintained at a fairly small percentage of GDP, the overall net lending position of the sector has been more negative still, implying that central government had become a large net borrower (8.8 per cent of GDP in 2010 Q2).

Central government net borrowing has increased markedly as its disposable income fell during the recession, from 1.8 per cent of GDP in 2008 Q1 to a high of 11.4 per cent in 2009 Q4. Slight recent improvements, as already mentioned, reflect increases in taxes in the first half of the year and also a reduction in capital transfers and investment grants from the previous quarter. However it should be noted that this component tends to be quite erratic from quarter to quarter.

Figure 14 Key elements of the public sector finances

£ millions

12 months to August (September–August)



Source: Public Sector Finances

Figure 14 shows some summary statistics from the latest Public Sector Finances release pertaining to Central Government in August 2010. In the 12 months up to and including August 2010, revenues from taxes on production (which includes VAT) increased relative to the same period a year earlier due to rises in the rate of VAT and other indirect taxes. Revenues from taxes on income and wealth continued to fall over the three year period shown in the chart, but at a

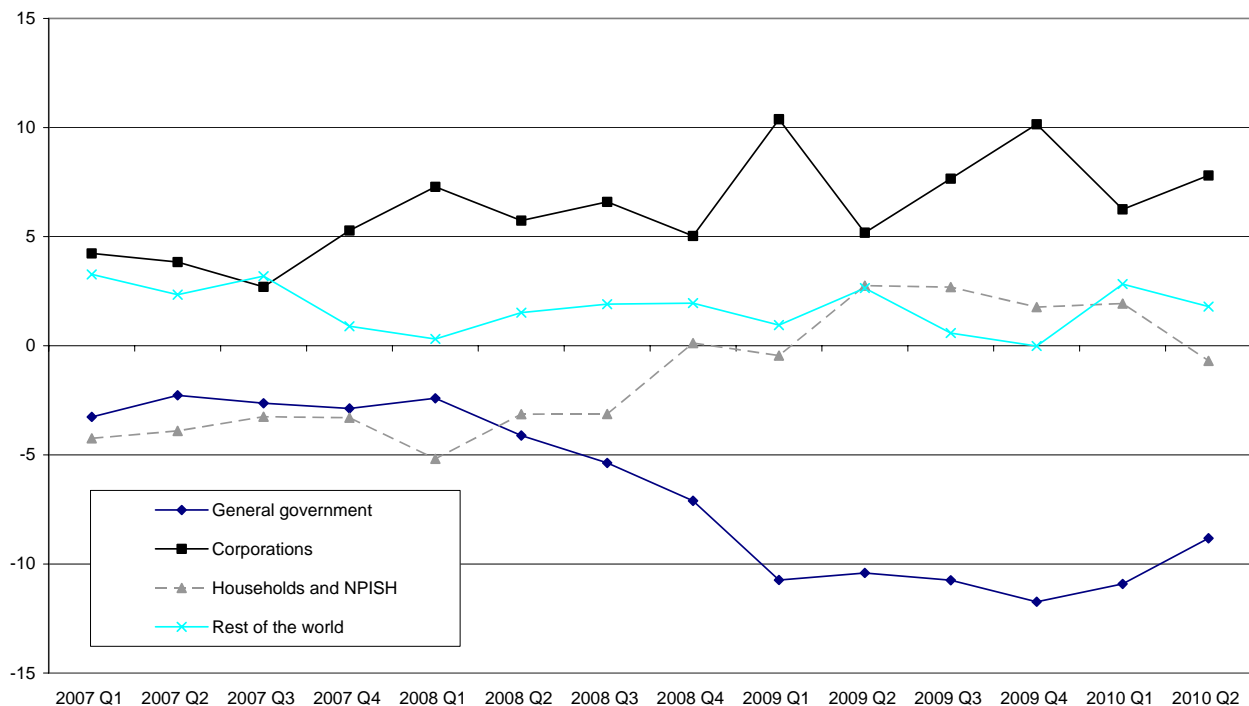
slower rate in the latest year. Overall, current receipts rose in the 12 months September 2009–August 2010 relative to the same period in 2009, but still remain below current receipts in the year to August 2008.

Net lending by sector

Figure 15 summarises the overall net lending positions of the main sectors of the UK economy – corporations (private non-financial, financial and public), households and non-profit institutions, general government (central and local government) and the rest of the world sector. The rises in corporate sector net lending and general government net borrowing are clear, and although the household sector was a small net borrower in the second quarter, its net borrowing position has diminished significantly since the second half of 2008. It therefore appears that through the recession period and into the first quarters of the recovery, the private sector has been seeking to strengthen balance sheets by paying down existing financial liabilities while suppressing new investment, whilst general government indebtedness (borrowing) has risen markedly.

Figure 15 Summary of net lending by sector

Per cent of GDP



Source: UK Economic Accounts

As net lending in one sector implies net borrowing in another, the sum of these positions for a country should sum to zero. Net lending or borrowing from overseas will offset domestic total net

borrowing or lending. In Figure 15 the rest of the world sector has generally been a net lender to the UK, reflecting that the domestic sectors are an overall net borrower. This would be manifest in the UK running a current account deficit in its balance of payments.

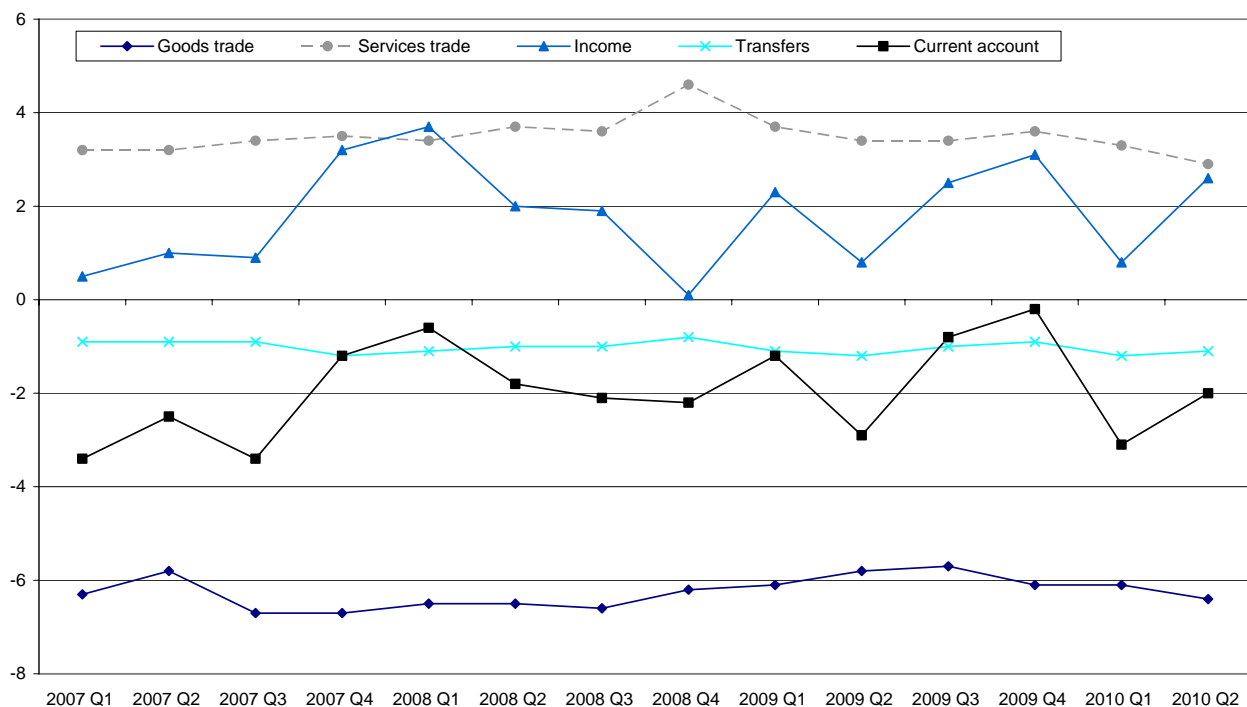
UK Current Account deficit at £7.4 billion in 2010 Q2

The Balance of Payments records one nation's transactions with the rest of the world and is basically split into two parts. The current account records international trade in goods and services, income flows arising from workers' remittances and the cross-border ownership of financial assets and current transfers. The financial account is the counterpart to the current account, explaining how the current account position is funded by the accumulation of financial assets and liabilities.

In 2010 Q2 the UK current account was in deficit by £7.4 billion (2 per cent of GDP). As **Figure 16** shows, the UK current account deficit has averaged around 2 per cent of GDP between 2007 Q1 and 2010 Q2, but although the deficit hasn't shown a distinct up or down trend over this period, the deficit has fluctuated from a low of 0.2 per cent of GDP in 2009 Q4 to a high of 3.4 per cent of GDP in 2007 Q3. Figure 16 also breaks down the current account balance into its main constituent parts.

Figure 16 UK Balance of Payments Current Account balances

Per cent of GDP



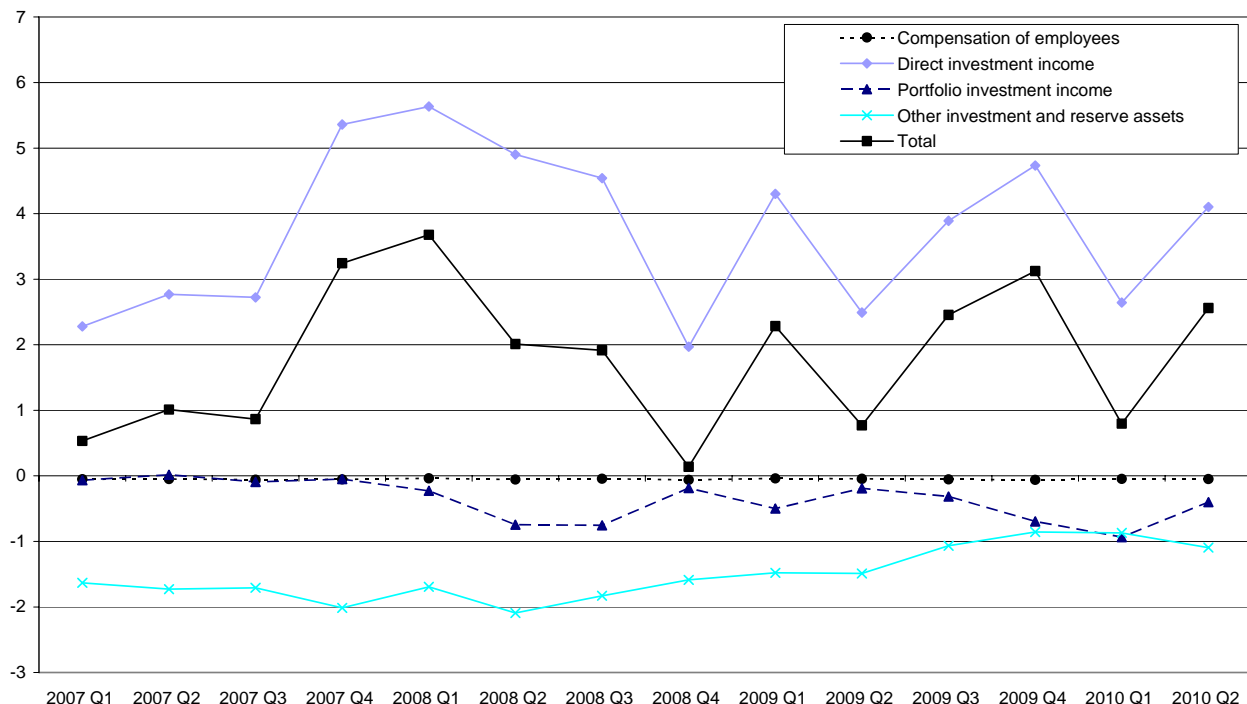
Source: Balance of Payments

The UK deficit in the trade in goods in 2010 Q2 was 6.4 per cent of GDP (£12.6 billion), close to the average since 2007 Q1 of 6.3 per cent. This deficit has also been fairly stable around this average over the period shown in the chart. In services trade the UK has traditionally run a surplus, amounting to 2.9 per cent of GDP (£10.5 billion) in 2010 Q2, but this is below the post 2007 Q1 average of 3.5 per cent of GDP. Current transfers primarily consist of spending on aid and international development programmes and the financial contributions arising from membership of supranational organisations like the European Union and United Nations. The UK's deficit in current transfers has been very stable at close to 1 per cent of GDP.

Most of the recent variation in the current account balance has therefore been driven by the balance in income flows which are shown in more detail in **Figure 17**. Historically, the UK has run a surplus on the income account largely due to its large accumulation of overseas direct investment assets that have been built up over time. Recently, quarterly movements in the direct investment income balance have been volatile, ranging from 5.6 per cent of GDP in 2008 Q1 to 2 per cent in 2008 Q4, which has been transmitted into the current account balance as a whole. This has tended to coincide with volatility in the net property income of Financial Corporations.

Figure 17 Components of the UK Income balance

Per cent of GDP



Source: Balance of Payments

The path of the current account balance in Figure 16 shows a good correspondence with the path of rest of the world net lending in Figure 15. If the domestic sectors of the economy (households,

corporations and government) are together net borrowers, then it implies that spending on consumption and investment goods exceeds the resources generated by the sectors, with the difference accounted for by borrowing from the rest of the world. A current account deficit implies that a nation is consuming beyond its available resources. The counterpart to a current account deficit is an offsetting surplus on the financial account, implying that the current account position is being funded through the accumulation of foreign liabilities or a reduction in foreign assets – both of which correspond to net lending from the rest of the world.

Contact

elmr@ons.gov.uk

The Experimental Tourism Satellite Account for the United Kingdom (E-UKTSA)

Tullio Buccellato, Dominic Webber and Sean White
Office for National Statistics

Summary

Since its formation within the Office for National Statistics (ONS) in August 2008, the Tourism Intelligence Unit (TIU) has been working on the creation of an Integrated System of Tourism Statistics (ISTS), whose core component is represented by the E-UKTSA (Experimental UK Tourism Satellite Account). This paper describes the construction of the E-UKTSA and presents some headline figures derived from it. The paper concludes by highlighting possible avenues for improvements to the E-UKTSA and suggesting future research connected with the satellite account framework.

Introduction

The tourism sector has increasingly captured attention in the UK, particularly in the period following the economic crisis which witnessed a significant growth in domestic tourism¹ (see Webber et al 2010). The measurement of the economic impact of tourism has, accordingly, acquired a central role for many tourism organisations and other parties interested in having precise figures relating to tourism activities. This measurement requires consideration of the supply and the demand side of tourism economic activity as well as a need to ensure comparability with other economic activities in the economy and with tourism elsewhere.

The Tourism Satellite Account (TSA) is a technique that seeks to calculate the value of tourism in a way that allows such comparisons. This paper details the development of a TSA for the UK, a process that has been underway at the ONS over the last twelve months through the work of the Tourism Intelligence Unit (TIU).

The TIU was established within the ONS in August 2008 with funding from the nine English Regional Development Agencies (RDAs) and Visit England. The aim of the unit is to improve tourism statistics, especially those that relate to the tourism industry, the visitor economy and the economic impact of tourism.

Initially, the TIU was charged with reviewing the various TSAs that have been produced in the UK and elsewhere. Additionally, the Unit has been exploring how TSAs might be used and developed in future. As this review process progressed, the importance of a TSA in contributing to an ISTS became clear. Indeed, where such integrated systems exist (examples include Canada and New Zealand), the TSA is regarded as the central component and is used as a tool to not only assess the value of tourism but also to identify gaps in knowledge of the sector. Furthermore, the TSA can be employed to show linkages between tourism and other parts of the economy within a National Accounting framework, for example Environmental Accounts.

The next section describes in more detail the TSA framework. The third section then provides detail on the compilation of the core tables of the TSA, detailing the data sources used in each table and presenting headline figures. The fourth section focuses on the unresolved issues with data which make it difficult to publish the TSA without the label 'experimental'. The final section suggests further research.

The TSA framework

The measurement of tourism can be achieved using two perspectives – either considering it as a demand side or as a supply side phenomenon. The demand side of the tourism sector is related to the activities of visitors and their consumption behaviours. The supply side refers instead to the tourism related industries as defined by recommended international recommendations. One of the main advantages of the TSA methodology is to allow for a reconciliation of these two elements of tourism measurement.

In general terms, a satellite account is an extension to a System of National Accounts (SNA) which enables an understanding of the size and role of economic activity within a particular sector which can not be included explicitly within the SNA. In essence, the TSA allows for the separation of expenditure of residents and tourists, which are treated as one within the SNA.

This separation enables the estimation of key variables such as how much individual industries depend upon tourists, and, by extension, the amount of economic output (value-added) and employment supported by tourists. It is the case that the supply and use of goods and services for tourism purposes, including value added and employment generated, can be shown systematically by a supply and use table. This is possible as long as tourism characteristic products and industries are distinguished from the additional, or secondary, tourism-connected products. The internationally agreed primary tourism characteristic products are shown in **Box 1**:

Box 1 Primary tourism characteristic products¹

- Accommodation services for visitors
- Food and beverage serving services
- Railway passenger transport services
- Road passenger transport services
- Water Passenger transport services
- Air passenger transport services
- Transport equipment rental services
- Travel agencies and other reservation services
- Cultural services
- Sports and recreational services
- Country-specific tourism characteristic goods
- Country-specific tourism characteristic services

Note

1. Based on the Tourism Satellite Account Recommended Methodological Framework (UNWTO, EUROSTAT, OECD, 2008)

The TSA can be simply described as a collection of information ordered in 10 tables, the first six of which can be considered as core tables (see Tourism Satellite Account Recommended Methodological Framework, UNWTO, EUROSTAT, OECD, 2008, hereafter TSA:RFM 2008). The first three tables² summarize the demand side information categorizing it respectively in inbound tourism expenditure, domestic tourism expenditure and outbound tourism expenditure. The fourth table provides the total internal tourism expenditure by combining tables one and two. The fifth table contains supply side data and the sixth table reconciles demand and supply figures as displayed in tables four and five. The seventh table collects data concerning the employment in tourism industries. The eighth table collects data on the tourism gross fixed capital formation of tourism industries and other industries. The ninth table displays figures on tourism collective consumption by products and levels of government. The tenth and final concludes showing the non-monetary indicators. The first six are generally considered to be the core tables of the TSA in that they can be directly linked to the SNA. The ten tables of the TSA are summarised in **Box 2**:

Box 2 Tourism Satellite Account: summary of tables

Table 1: Inbound tourism expenditure

Part of aggregate demand; such as an export

Table 2: Domestic tourism expenditure

Part of domestic total consumption

Table 3: Outbound tourism expenditure

Generally linked to other TSA tables so is often not estimated

Table 4: Domestic 'tourism final consumption'

Synthesised from Tables 1 and 2

Table 5: Production of tourism commodities

The services and products of 'tourist related' industries but also of non-tourist related industries

Table 6: Domestic supply and consumption by product

A reconciliation of Tables 4 and 5. The heart of the TSA

Table 7: Employment and labour use

Not Currently Reported

Table 8: Tourism Fixed capital formation (investment)

Not Currently Reported

Table 9: Tourism Collective Consumption

Not Currently Reported

Table 10: Non-monetary Indicators

such as tourism volumes/night; types of tourist etc. Structure can reflect most useful indicators.

In conclusion, the TSA can be considered an accounting procedure summarizing a complex and substantial amount of information as derived by other surveys or data sources. If the ordering of the information is relatively simple (reporting and apportioning), the collection of the information is a time consuming and often expensive procedure that countries are not always prepared to carry out.

Within the TSA, data are ordered according to a demand/supply framework and the most important output is represented by the reconciliation of the expenditure dimension with its production counterpart. It follows that the central component of the TSA is Table 6, where demand-to-supply ratios are reported industry by industry and for the whole UK economy (see **Box 3**). This has been referred to as the 'heart' of the TSA.

Box 3 Linkages between the TSA tables

Table 1 – Inbound Tourism Expenditure

Including overnight visitors and excursionists. Main data source: IPS.

Table 3 – Outbound Tourism Expenditure (not strictly necessary for reconciliation)

Table 2 – Domestic Tourism Expenditure

Including overnight visitors, excursionists and outbound trips with UKTS, England Nature and Jones et al (2004) representing the main data sources for the three components respectively.

Table 4 – Internal tourism consumption by product

Table 6 – Total domestic production and tourism internal consumption (at purchaser's prices)

Table 5 - Production account of tourism industries and other industries (at basic prices)

With the SUT and the ABI representing the main data sources.

RECONCILIATION

D
E
M
A
N
D

S
U
P
P
L
Y

The compilation of TSA Core Tables

This section refers to the production of the six core tables of the TSA for the reference year of 2006 in the United Kingdom. These form the E–UKTSA and are included in full in the **Annex** of this article.

Table 1: Inbound tourism expenditure by products and classes of visitors

Table 1 (summarised in **Figure 1**), which measures inbound tourism expenditure, was constructed using data from the 2006 International Passenger Survey (IPS). The Family Spending Survey 2008 was used to augment the content of the table where IPS data was not sufficient.

The headline output of Table 1, total expenditure of inbound visitors, is sourced from Table 2.02 of the IPS annual report, *Travel Trends 2006*. This report also included the expenditure of inbound nil–night visitors, or excursionists, in Table 2.13. As visitors are either overnight visitors or excursionists, the expenditure of overnight visitors was acquired by simply subtracting the expenditure of nil–night visitors from the expenditure of all visitors.

Disaggregating expenditure by product purchased requires the use of an expenditure trailer from the IPS. The last such trailer was carried out in 1997 so this is an area where improvements to the data inputs to the TSA could be made. Work is on–going within ONS to assess the feasibility of collecting more detailed expenditure data using the IPS. In the absence of more up to date information the expenditure trailer for 1997 is used here.

As suggested by the TSA Recommended Methodological Framework (TSA:RMF, 2008), expenditure must be disaggregated between the product groups shown in Box 1. For Table 1, the IPS expenditure trailer was used to do this. Shares of expenditure by product to total expenditure from the 1997 expenditure trailer were applied to the totals from 2006. Apart from the fact that the expenditure trailer is out of date, three more issues arise from its use.

Firstly, there is no distinction between the spend of same day excursionists and overnight visitors. Therefore, in the E–UKTSA these two groups' spend on products are in the same proportions, with the exception of accommodation services, which excursionists, by definition, spend nothing on.

The second issue is that the expenditure trailer breakdown is not sufficient to meet the product breakdown as laid out by TSA RMF 2008. Therefore the ONS' Family Spending Survey 2008 was used to fill in some of these information gaps. For example, the expenditure trailer reported how much was spent on taxi and car hire together. However, for TSA purposes this needs to be separated in order for taxis to be included in road passenger transport services, and car hire is included in transport equipment rental services. The Family Spending Survey provided the ratio of spending between taxis and car hire, which was then applied to the expenditure trailer share. This, however, implies an assumption that domestic residents' spending patterns are the same as those of international visitors.

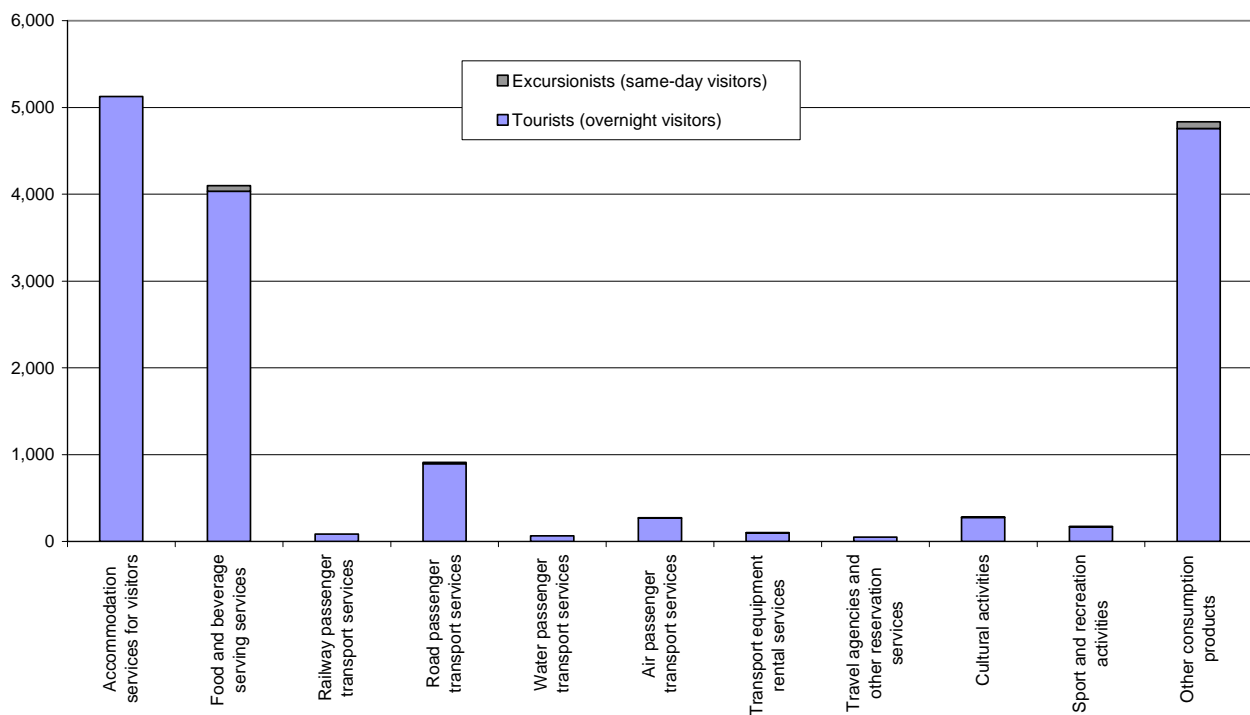
The final issue is that the expenditure trailer doesn't report on expenditure on travel agencies and other reservation services. Therefore, the E-UKTSA draws on a pilot TSA for the UK for 2000 (see Jones et al 2004), by using the share of expenditure on travel agencies of the total expenditure of inbound visitors for that year.

To rectify these three issues fully would ultimately require an update of the IPS expenditure trailer, which will be discussed in greater detail later.

The headline figure of Table 1, total expenditure by inbound visitors to the UK in 2006 was £16 billion, with 1.1 per cent spent by excursionists, and the remainder attributable to overnight visitors. Accommodation services drew the greatest expenditure from visitors, at approximately £5.1 billion, while Travel agencies and other reservation services comprise the smallest amount of revenue for inbound residents as these services are normally drawn upon in the country of origin of inbound visitors. Patterns of expenditure are shown in Figure 1.

Figure 1 Inbound tourism expenditure by product and class of visitor, 2006

£ millions



Source: Table 1 of the E-UKTSA

Table 2: Domestic tourism expenditure by products, classes of visitors and types of trip

Table 2 (summarised in **Figure 2**), which measures domestic tourism expenditure, utilises a variety of different sources and includes two sources of such expenditure: domestic residents taking trips within the UK and domestic residents who are travelling abroad. The first of these two aspects of Table 2 is split between overnight stays and same day excursionists but the second is not.

Expenditure of overnight visitors taking trips within the UK is sourced from the United Kingdom Tourism Survey (UKTS) 2006, which also provides an expenditure breakdown by product purchased. Although the UKTS provides this breakdown, a similar problem to the one faced in TSA Table 1 arises, in that it is not adequate to provide the breakdown required by the TSA:RMF 2008. Therefore, shares are calculated from the ONS Supply and Use Tables (SUT), and in particular the 'Final demand of households' element. For example, the UKTS expenditure data only reports expenditure on travel costs to and from the destination, and has to be broken down further using the final demand of households. This of course is problematic, as the expenditure of households as a group is likely to be different to the expenditure of tourists.

Where the SUT is unable to completely disaggregate the total expenditure, Table 2, in similar fashion to Table 1, draws on the Family Spending Survey 2008.

For excursionists taking trips within the UK, the most recent survey which is suitable to use is the English Leisure Visits Survey (ELVS) of 2005. This survey was carried out in England only and projections provided by Visit Britain were used for Wales and Scotland. A 2003 TSA for Northern Ireland (NI)³ completes the picture for the UK. The NI breakdown by product is in line with TSA:RMF 2008 but there is no suitable breakdown for the ELVS 2005. Therefore, the E-UKTSA again uses shares from the pilot TSA for 2000. To obtain excursionist expenditure in 2006 prices, both the NI and the rest of the UK figures were inflated, making use of ONS price indices for each separate product. For example, the price index for 'Passenger transport by air' was directly applied to the air transport products purchased by visitors.

The component of Table 2 measuring domestic tourism expenditure by domestic residents who are travelling abroad captures expenditure of UK residents on UK industries for the sole purpose of travelling outbound, or away, from the UK. This is characterised by expenditure on outbound transport services and travel agencies. At present this data is not collated centrally and, as a result, the E-UKTSA uses inflated figures from the pilot TSA 2000 for the UK whilst also accounting for the trend in outbound visitors over the time period (see Jones et al 2004). This study does not split expenditure between excursionists and overnight visitors and, as a result, this experimental TSA is similarly constrained.

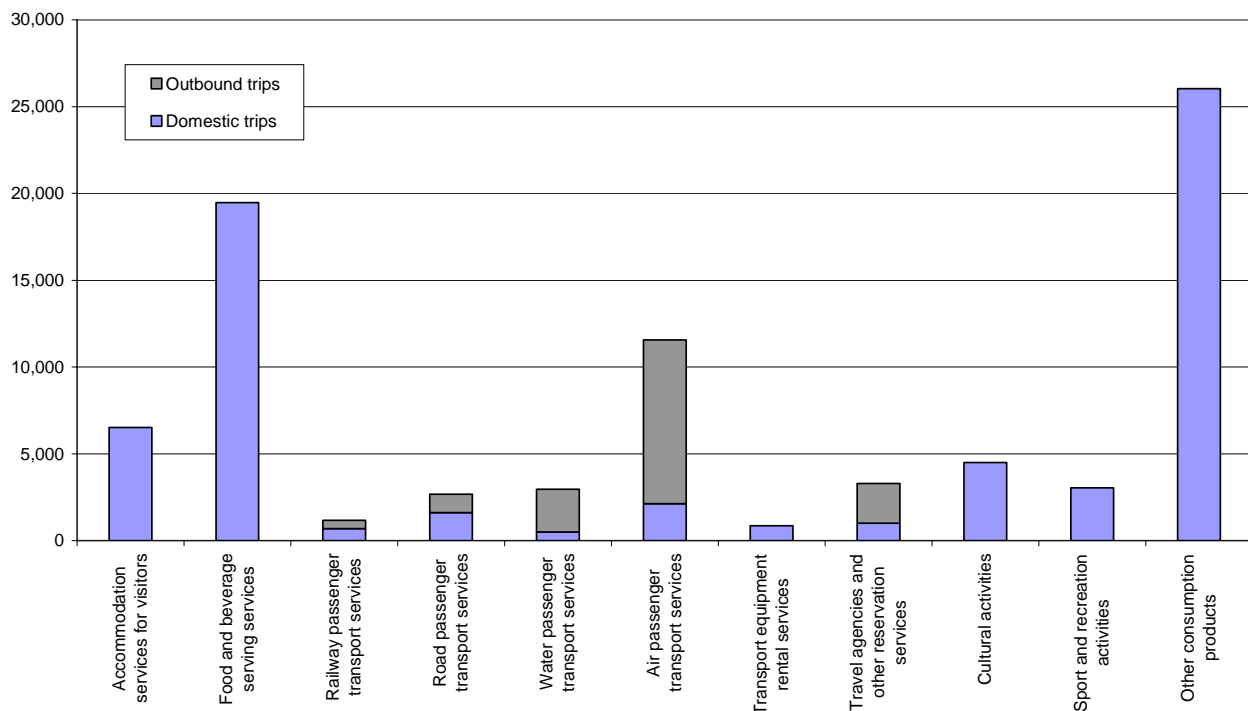
The total expenditure of domestic residents making domestic visits is approximately £66 billion, with 68 per cent being consumed by excursionists and the rest by overnight visitors. As might be expected, the spending patterns of domestic visitors differ from those of inbound visitors.

Accommodation for domestic visitors only accounts for 10 per cent of total expenditure, while food and beverage services draw the most revenue, almost £19 billion or 29 per cent of total

expenditure. Perhaps surprisingly, air travel accounts for 3 per cent of total expenditure of domestic visitors travelling in the UK. Indeed, it is much larger in magnitude than railway travel, which one might consider a more traditional mode of transport for the UK holidaymaker, which generates almost £2 billion of revenue. Unsurprisingly, air travel accounts for 60 per cent of total domestic expenditure on outbound trips, at approximately £9.4 billion.

Figure 2 Domestic tourism expenditure by products, classes of visitors and types of trips

£ millions



Source: Table 2 of the E-UKTSA

Table 3: Outbound tourism expenditure by products and classes of visitors

Table 3 (summarised in **Figure 3**) measures the expenditure of UK residents, outside the UK, on outbound trips. As the spending occurs outside the UK, it is not included in Table 6, the reconciliation of tourism demand and supply, which is used to determine the economic impact of tourism in the UK. Nonetheless, the information it conveys is important from a balance of payments perspective as it shows the imports of tourism goods and services as a result of final demand from UK residents.

The headline figure, the total expenditure of all types of visitors on outbound trips, is taken from the IPS in Table 3.02. Similarly, the total expenditure of excursionists is from the IPS, from Table 3.13. The 1997 expenditure trailer used for Table 1 is not appropriate here as it measures the

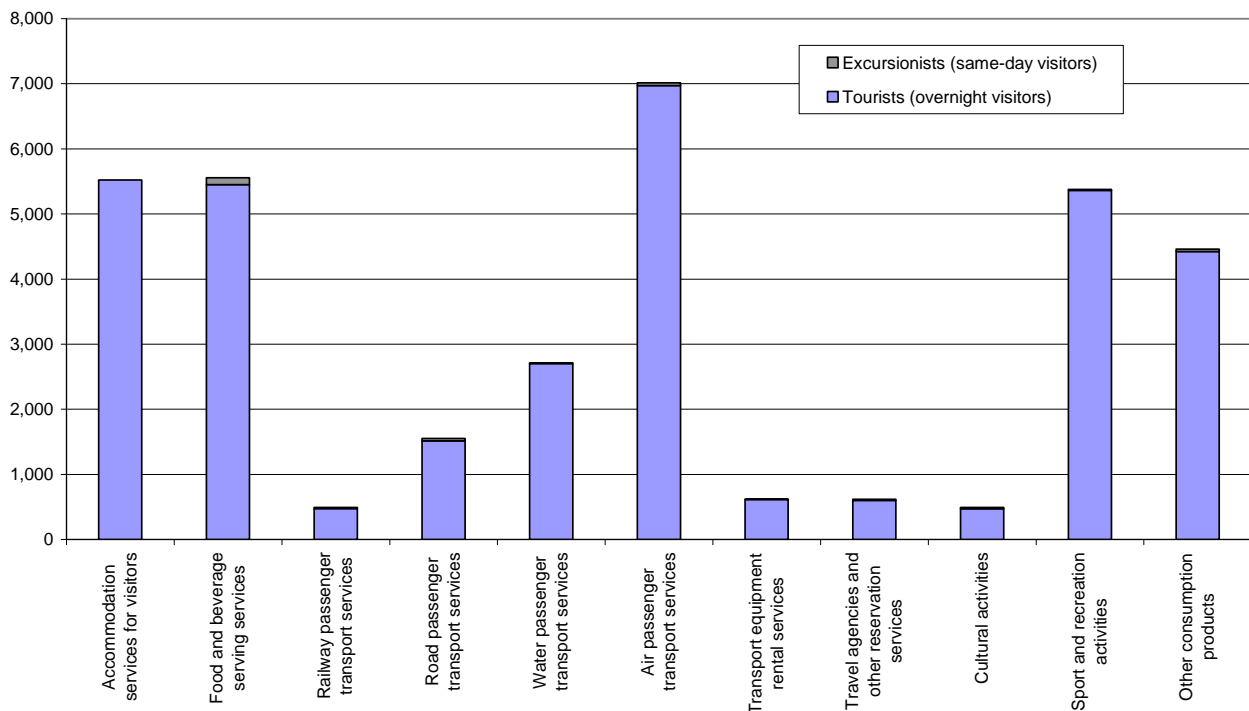
expenditure of tourists visiting the UK. Therefore two ONS sources are used to disaggregate the total expenditure of all types of visitors: the SUT, and the Annual Business Inquiry (ABI).

The SUT disaggregates spending between accommodation and food services; the transport categories; and recreational services by taking the shares of imports of goods and services for these. To further disaggregate accommodation and food; sport and culture; and transport rental and travel agencies into their separate components required their respective shares of gross value added obtained from the ABI. The only category of product which could not be estimated is 'other consumption products'. This was resolved by using the 2000 pilot TSA for the UK.

The breakdown of expenditure by outbound excursionists on 'other consumption products' was obtained by applying the same shares as those identified for domestic excursionists. This assumes that the two types of excursionists purchase goods in the same proportions. Finally, the expenditure of overnight visitors was obtained by subtracting the expenditure of excursionists from total expenditure.

Figure 3 Outbound tourism expenditure by products and classes of visitors

£ millions



Source: Table 3 of the E-UKTSA

The total expenditure of outbound visitors in 2006 was £34.5 billion, with 99 per cent of this due to overnight visitors. The largest category of spending, with 20 per cent of total spend is air

passenger transport services. This might be representative of the fact that people purchase flights from foreign airlines, like Ryanair for example, when leaving the country. Purchases from foreign companies to leave the UK should be included in Table 3 as opposed to the section for resident visitors travelling in Table 2. The other major categories of spend of outbound visitors are food and beverage serving services; accommodation services and sports and recreational services accounting for 16.2 per cent, 16.0 per cent and 15.6 per cent respectively.

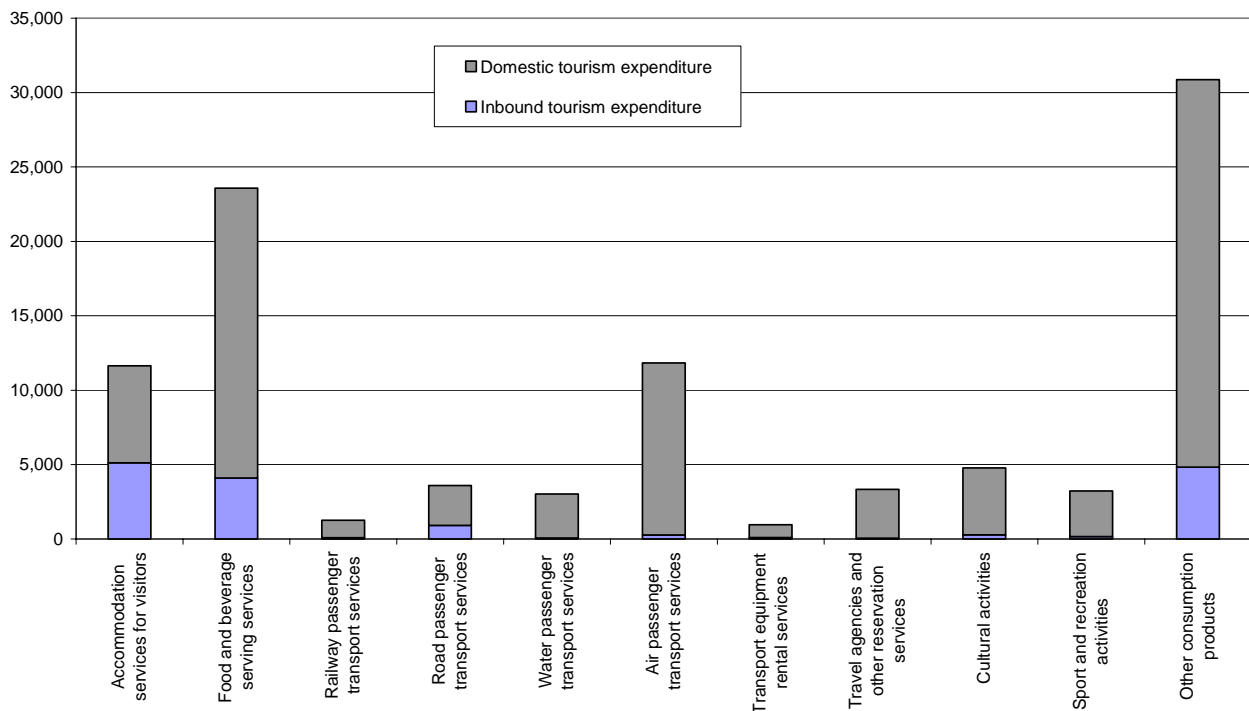
Table 4: Internal tourism consumption by products

Table 4 (summarised in **Figure 4**), which measures internal tourism consumption, is an aggregation of Table 1 and Table 2. In the E-UKTSA, 'Other components of tourism consumption' has not been completed. This column represents elements such as the maintenance of second homes. There is little reliable source data upon which to compute the importance of second homes and as a result this is not included in this experimental account.

Food and beverage, air travel, and other consumption products represent the products which visitors demand the most with amounts of £23.6 billion, £11.8 billion, and £30.9 billion respectively.

Figure 4 Internal tourism consumption by products

£ millions



Source: Table 4 of the E-UKTSA

Table 5: Production accounts of tourism industries and other industries (at basic prices)

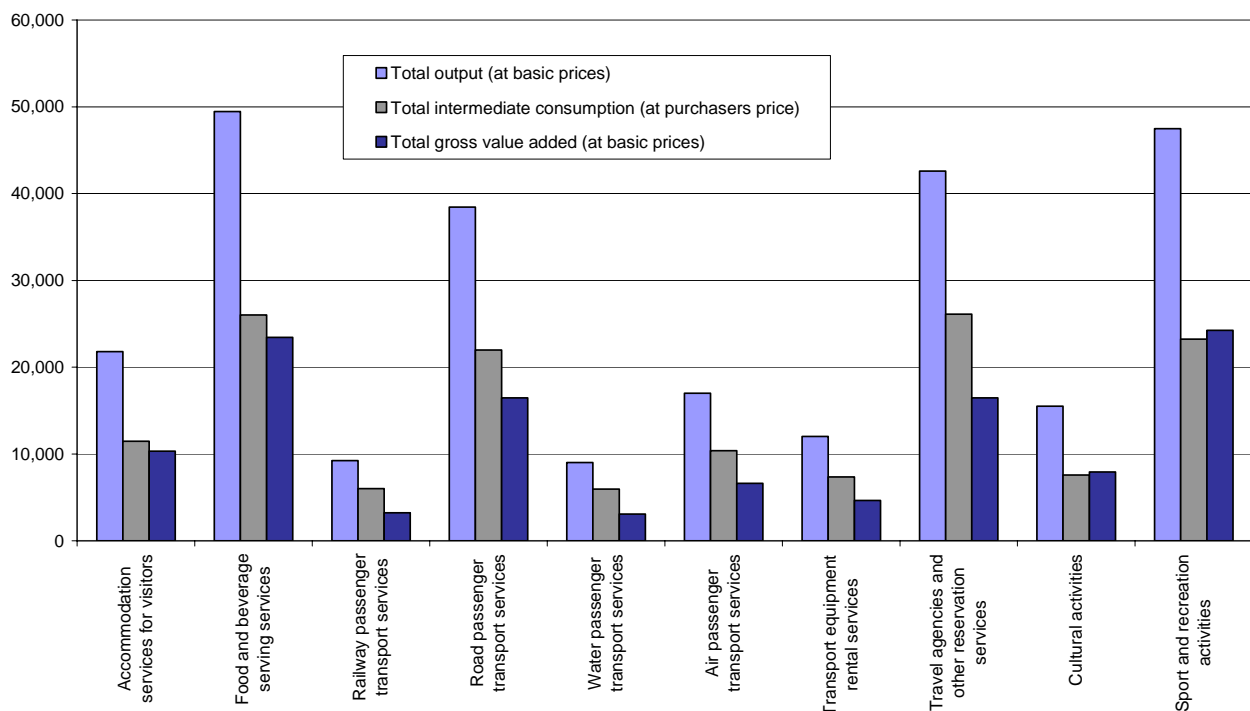
Table 5 (summarised in **Figure 5**) displays figures on the supply side of tourism which are derived from two main sources: the 2006 ABI (converted to SIC07 codes), and the SUT. These sources are combined with the Make Matrix (MM) 2004³ and some information derived from the pilot 2000 UK TSA of Jones et al (2004).

Firstly, figures concerning the tourism industries are directly extracted from the SUT. In particular, figures can be tracked sector-by-sector for total output at basic prices, total intermediate consumption at purchasers' prices and gross value added at basic prices.

The MM 2004 is then used to calculate what proportion of each of the tourism related products is exactly produced by its corresponding industry, or by other industries in the economy. For instance, the MM 2004 describes what proportion of food and beverage serving services are produced by the food and beverage serving industry, and what is produced by other industries, tourism or otherwise.

Figure 5 Production accounts of tourism industries and other industries

£ millions



Source: Table 5 of the E-UKTSA

The figures derived from the SUT are produced according to the 2003 Standard Industrial Classification (SIC) and we, therefore, make use of a version of the ABI from 2006 which has been converted to SIC 2007 categories in order to split the former SIC 2003 into the SIC 2007 industries.

This allows for the production of the E–UKTSA according to the most recent international recommendations.

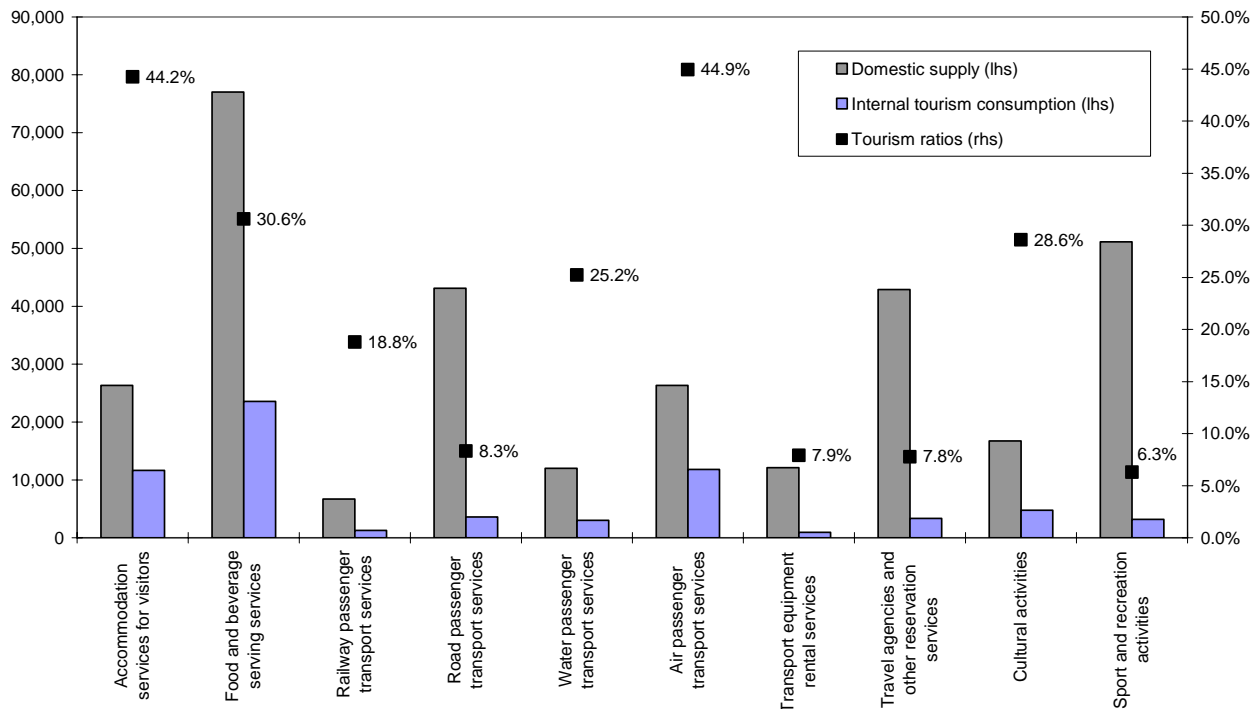
Table 5 shows, for example, that the accommodation industry had an output of £21.8 billion in 2006, with approximately £280 million of accommodation service products produced by non–tourism industries. With £11.5 billion of intermediate consumption, the gross value added of the accommodation industry is calculated at £10.3 billion.

Table 6: Total domestic supply and internal tourism consumption (at purchaser prices)

Table 6 (summarised in **Figure 6**) inherits the figures displayed in Tables 4 and 5 for the reconciliation of demand and supply. In addition to the data reported in Table 5, data concerning imports and taxes less subsidies on products nationally produced or imported are also reported to obtain the total domestic supply at purchasers' prices (all these figures are again obtained from the SUTs and apportioned in SIC 2007 according to the ABI 2006 converted in SIC 2007 codes).

Figure 6 Total domestic supply and internal tourism consumption (at purchaser prices)

£ millions



Source: Table 6 of the E–UKTSA

Table 6 reports the demand to supply ratios of the tourism industry (the final column in the table which is entitled 'Tourism Ratios'). The estimated ratio for total demand to supply is 3.3 per cent. This implies that this proportion of the output of the tourism and non-tourism industries is consumed by visitors to and of the UK. This allows the production of aggregates, particularly Tourism Direct Gross Value Added (TDGVA). A simplified method of estimating this is to use the demand to supply ratio and apply it to the total GVA of domestic producers (in basic prices) reported in Table 6. This method has been reported on previously by Buccellato, Webber, White, Ritchie and Begum (2010) and gives a figure of £39.2 billion for TDGVA. The TIU is currently working on an updated TSA for the UK that will refine the measurement of this aggregate, particularly considering the influence of non-tourism industries in its calculation. The use of the term 'direct' in this aggregate refers to the fact that the TSA only measures that part of value added (by tourism industries and other industries) due to the consumption of visitors and leaves aside the indirect and induced effects that such a consumption might generate (TSA:RMF 2008).

Ratios for other industries are also calculated, for example the railway industry has a demand to supply ratio of 19 per cent which implies that almost a fifth of the output of the industry is consumed by UK tourism demand.

Problems and limitations of the Experimental UK-TSA

This experimental version of the TSA suffers a number of problems and limitations due to the lack of sources for some fundamental figures reported in the tables. This has required the use of some relatively out of date resources to fill the information gap.

The first such source is the use of an IPS Expenditure Trailer from 1997 in the central part of Table 1 to break down the inbound tourism expenditure among the different definitions of tourism consumption. Since 1997 tourism consumption habits have considerably changed, an example being the wider use of new technology (such as mobile phones) before and during the visiting period. Therefore, to improve the Table 1 there needs to be a regular update of the IPS expenditure trailer detailing the expenditure of products purchased by inbound visitors in line with the TSA RMF. It would also be useful to have a similar expenditure trailer for outbound visitors but this information would not be reported in Table 6 as it is not directly relevant to the impact of tourism on the UK economy. For the purposes of constructing a TSA the priority is to collect more detailed expenditure information in the IPS for inbound visitors. Some progress has been made in this area with pilot expenditure questions tested on the survey but a key problem is the expense and subsequent funding arrangements for the collection of this information.

Table 2 uses the ELVS 2005 and the NI TSA 2003 in order to report the total expenditure of day visitors. The lack of an up to date source of information on day visits is well recognised within the tourism sector. The TIU has been working with the national tourist boards in Great Britain to address this issue. Following extensive piloting work a new GB day visits survey will now be in the field in 2011. In Northern Ireland information on day visits is currently being collected separately but this uses a similar approach to the GB study. The degree of error due to the out of date nature

of some of these key sources used in Table 1 and 2 is directly transmitted to Table 4, as this is a synthesis of the first two TSA tables.

Furthermore, information on UK-based expenditure of UK residents travelling abroad is severely limited. The importance of this element of tourism expenditure is highlighted in the pilot TSA from 2000, where it accounts for 16 per cent of total tourism demand. As a result the TIU is planning to direct more attention towards the accurate measurement of this element by investigating and using potential alternative data sources. For instance, the Chamber of Shipping (CoS) collects data on most of the activities of UK-based shipping companies, both for freight and passenger transport and, as the transport categories in the SUT do not differentiate between passenger and freight transport, any such insight into the respective shares would add great value to the TSA work.

Table 5 is heavily affected by the lack of an up to date MM. To fill the central part of the table, the only available source is a MM dated 2004. Table 5 is also based on a relatively sophisticated estimation procedure to convert the SIC03 coding of the SUT into the SIC07 format matching international recommendations, which could cause some problems in terms of determining how the splits are made between industries. By 2011 there will be an improvement on the supply side, when the SUT will be produced in the SIC07 classification, which incorporates breakdowns that are useful for the tourism sector (for example splitting hotels and accommodation from food and beverage which is not the case under the SIC03 classification).

Table 6 is a reconciliation of the demand and supply side data and therefore inherits all the problems of the information contained in Table 4 and in Table 5.

Suggestions for further research

There is further research that can be conducted, drawing from the TSA as a central component of an integrated system of tourism statistics. Much of this is now underway within the TIU and relates to three broad areas.

Firstly, it is possible to produce current values for the main figures relating to the demand side and the supply side of the TSA. Also in this edition of Economic & Labour Market Review, Buccellato, Webber and White (2010) show how more recent TSA figures can be 'nowcasted'.

Secondly, it is possible to adopt a top-down approach to calculate regional figures from the TSA national figures. A bottom-up approach would provide more precise regional figures, but the top-down approach ensures comparability between regions and, furthermore, the total should correspond to that at the national level. The TIU has already published a proposed hybrid approach towards the measurement of the economic impact of tourism regionally (Buccellato, Webber, White, Ritchie and Begum 2010).

Finally, the updating and improvement of the TIU experimental TSA, will require also the additional draft of the remaining tables as suggested by the international recommendations (TSA:RMF 2008). The availability of data within the ONS would allow for the completion of Table 3 which relates to 'Outbound tourism expenditure by products and classes of visitors', Table 7 which details

employment in the tourism industries (including self employed, employees, number of hours worked and number of FTEs, and Table 10 which comprises four tables relating to non-monetary indicators: a) number of trips and overnights by different forms of tourism and classes of visitors; b) inbound tourism- number of arrivals and overnights by mode of transport; c) number of establishments and capacity by types of accommodation, and d) number of establishments in tourism industries classified according to average number of jobs. The TIU is currently working on updating the TSA to the reference year 2008 and some of these elements will form part of that update process.

Acknowledgements

We would like to acknowledge the help of Dr. Calvin Jones of Cardiff University in the preparation of the TSA and Eddie Smith and Felix Ritchie of ONS for valuable comments on the paper.

Notes

- 1 The 'staycation' effect refers to UK households substituting foreign for domestic holidays. The depreciation of sterling in the second half of 2008 may be one factor that has further encouraged this.
2. Table three can be considered of secondary importance in that it does not contribute to the determination of the national tourism demand to supply ratio.
3. *See* Northern Ireland Tourism Board, Department for Enterprise, Trade and Investment (2007), *Tourism in the Northern Ireland Economy*.
4. *See* Stockholm Environment Institute (2008)

Contact

elmr@ons.gov.uk

References

Buccellato T, Webber D and White S (2010) 'A proposed methodology for nowcasting the demand and supply estimates of tourism', *Economic & Labour Market Review* (October). Available at: www.statistics.gov.uk/elmr/10_10/

Buccellato T, Webber D, White S, Ritchie F and Begum S (2010) 'The economic impact of tourism across regions and nations of the UK', *Economic & Labour Market Review* (May). Available at: www.statistics.gov.uk/CCI/article.asp?ID=2415

Jones C J, Munday M, Bryan J and Roberts A (2004), *United Kingdom Tourism Satellite Account – First Steps Project*, a report for the Department of Culture, Media and Sport (DCMS)

Northern Ireland Tourism Board, Department for Enterprise, Trade and Investment (2007), *Tourism in the Northern Ireland Economy*.

Stockholm Environment Institute (2008) 'Development of an Embedded Carbon Emissions Indicator - Producing a Time Series of Input-Output Tables and Embedded Carbon Dioxide Emissions for the UK by Using a MRIO Data Optimisation System' .

UNWTO, EUROSTAT, OECD (2008) Tourism Satellite Account: Recommended Methodological Framework (TSA:RMF), Madrid, Luxembourg, Paris.

Webber D, Buccellato T, and White S (2010) 'The impact of the global recession of tourists' spending in the UK, Economic & Labour Market Review 2010 (August).

Annex: Tourism Satellite Accounts tables

Table 1 Inbound tourism expenditure by products and classes of visitors

£ millions

Products	Inbound Tourism Expenditure		
	Tourists (overnight visitors)	Excursionists (same-day visitors)	Visitors
Tourism Consumption Products			
1.1 Accommodation services for visitors	5126.0	-	5126.0
1.2 Food and beverage serving services	4033.1	65.1	4098.2
1.3 Railway passenger transport services	83.8	1.4	85.1
1.4 Road passenger transport services	898.0	14.5	912.5
1.5 Water passenger transport services	65.0	1.1	66.1
1.6 Air passenger transport services	269.4	4.3	273.7
1.7 Transport equipment rental services	100.1	1.6	101.7
1.8 Travel agencies and other reservation services	50.7	0.0	50.7
1.9 Cultural activities	276.9	4.5	281.4
1.10 Sport and recreation activities	169.5	2.7	172.3
1.11 Other consumption products	4756.6	76.8	4833.4
Total	15829.0	172.0	16001.0

Sources: International Passenger Survey (IPS) 2006 and IPS Expenditure Trailer 1997, Family Spending Survey 2008 and Jones et al (2004)

Table 2 Domestic tourism expenditure by products, classes of visitors and types of trip

£ millions

Consumption Products		Domestic Tourism Expenditure							
		Domestic Trips			Outbound trips			All types of trips	
		Overnight	Excursionists	Total	Tourists	Excursionists	Total	Tourists	Excursionists
Tourism Consumption Products									
2.1	Accommodation services for visitors	6,517.2	x	6,517.2			0.0	6,517.2	-
2.2	Food and beverage serving services	4,238.8	15,232.0	19,470.8			0.0	4,238.8	15,232.0
2.3	Railway passenger transport services	564.1	128.6	692.8			481.8	564.1	128.6
2.4	Road passenger transport services	1,330.7	280.8	1,611.6			1,064.1	1,330.7	280.8
2.5	Water passenger transport services	438.0	52.9	491.0			2,467.4	438.0	52.9
2.6	Air passenger transport services	1,814.4	323.0	2,137.5			9,422.2	1,814.4	323.0
2.7	Transport equipment rental services	163.2	694.6	857.8			0.0	163.2	694.6
2.8	Travel agencies and other reservation services	791.4	218.2	1,009.6			2,282.1	791.4	218.2
2.9	Cultural services	762.7	3,737.7	4,500.4			0.0	762.7	3,737.7
2.10	Sports and recreational services	513.7	2,532.1	3,045.8			0.0	513.7	2,532.1
									0.0
2.11	Other consumption products	3,663.2	22,378.6	26,041.9			0.0	3,663.2	22,378.6
TOTAL		20,797.6	45,578.6	66,376.2			15,717.6	20,797.6	45,578.6
									82,093.8

Sources: United Kingdom Tourism Survey 2006, Supply and Use Tables 2006, Family Spending Survey 2008, English Leisure Visits Survey 2005, Northern Ireland Tourist Board 2005, ONS price indices 2003–2006, Jones et al 2004.

Table 3 **Outbound tourism expenditure by products and classes of visitors**

£ millions

Products	Outbound tourism expenditure		
	Tourists (overnight visitors)	Excursionist (same-day visitors)	Visitors
Tourism Consumption Products			
3.10 Accommodation services for visitors	5,521.6	-	5,521.6
3.20 Food and beverage serving services	5,450.9	107.1	5,557.9
3.30 Railway passenger transport services	475.5	14.5	490.0
3.40 Road passenger transport services	1,517.4	35.7	1553.1
3.50 Water passenger transport service	2,702.7	10.3	2,713.0
3.60 Air passenger transport services	6,971.3	43.5	7,014.8
3.70 Transport equipment rental services	612.7	4.4	617.2
3.80 Travel agencies and other reservation services	600.2	18.6	618.8
3.90 Cultural services	470.4	19.6	490.0
3.10 Sports and recreational services	5,360.9	13.5	5,374.4
3.11 Other consumption products	4,420.5	39.8	4,460.3
TOTAL	34,104.0	307.0	34,411.0

Sources: IPS 2006, SUT 2006, ABI 2006, Jones et al 2004

Table 4 **Internal tourism consumption by products**

£ millions

Products	Internal tourism expenditure			Other components of tourism consumption	Internal tourism consumption
	Inbound tourism expenditure	Domestic tourism expenditure	Internal tourism expenditure		
Tourism Consumption Products					
4.1 Accommodation services for visitors	5126.0	6517.2	11643.2		11643.2
(i) Second homes					
4.2 Food and beverage serving services	4,098.2	19,470.8	23,569.0		23,569.0
4.3 Railway passenger transport services	85.1	1,174.6	1,259.7		1,259.7
4.4 Road passenger transport services	912.5	2,675.7	3,588.1		3588.1
4.5 Water passenger transport services	66.1	2,958.4	3,024.5		3,024.5
4.6 Air passenger transport services	273.7	11,559.6	11,833.4		11,833.4
4.7 Transport equipment rental services	101.7	857.8	959.5		959.5
4.8 Travel agencies and other reservation services	50.7	3,291.7	3,342.4		3,342.4
4.9 Cultural activities	281.4	4,500.4	4,781.8		4,781.8
4.10 Sport and recreation activities	172.3	3,045.8	3,218.0		3,218.0
4.11 Other consumption products	4,833.4	26,041.9	30,875.2		30,875.2
TOTAL	16,001.0	82,093.8	98,094.8		98,094.8

Source: Same as Tables 1 and 2

Table 5 **Production accounts of tourism industries and other industries (at basic prices)**

£ millions

Products		Tourism Industries										Other Industries	Output of domestic producers (at basic prices)	
		Accommodation for visitors	Food and beverage serving industry	Railway passenger transport	Road passenger transport	Water passenger transport	Air passenger transport	Transport equipment rental	Travel agencies and other reservation services industry	Cultural Industry	Sports and recreational industry			TOTAL
5.1	Accommodation services for visitors	15,861.5	1,820.3	1.5	23.0	21.8	32.9	29.7	105.1	9.5	29.0	17,934.3	281.3	18,215.6
5.2	Food and beverage serving services	5,894.1	47,531.0	1.5	23.0	21.8	32.9	29.7	105.1	97.8	299.0	54,035.9	4,593.0	58,628.9
5.3	Railway passenger transport services	0.0	0.0	9,051.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9,051.9	0.0	9,051.9
5.4	Road passenger transport services	0.0	0.0	177.7	38,288.3	0.0	0.0	0.0	0.0	0.0	0.0	38,465.9	2,307.9	40,773.8
5.5	Water passenger transport services	0.0	0.0	0.0	0.0	8,762.2	0.0	0.0	0.0	0.0	0.0	8,762.2	0.0	8,762.2
5.6	Air passenger transport services	0.0	0.0	0.0	0.0	0.0	16,677.2	0.0	0.0	0.0	0.0	16,677.2	0.0	16,677.2
5.7	Transport equipment rental services	0.0	0.0	0.0	0.0	0.0	0.0	11,667.9	0.0	0.0	0.0	11,667.9	0.0	11,667.9
5.8	Travel agencies and other reservation services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41,320.8	0.0	0.0	41,320.8	0.0	41,320.8
5.9	Cultural activities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13,641.5	0.0	13,641.5	0.0	13,641.5
5.10	Sport and recreation activities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41,714.4	41,714.5	0.0	41,714.5
5.11	Other Products	40.7	92.2	7.5	115.8	221.1	263.0	297.2	1,052.5	1,776.5	5,432.4	9,299.0	2,115,073.8	2,124,372.7
	TOTAL OUTPUT (at basic prices)	21,796.3	49,443.7	9,240.0	38,450.0	9,027.0	17,006.0	12,024.5	42,583.5	15,525.2	47,474.8	262,571.0	2,122,256.0	2,384,827.0
	TOTAL INTERMEDIATE CONSUMPTION (at purchasers price)	11,466.0	26,010.0	6,017.0	21,999.0	5,952.0	10,381.0	7,374.8	26,117.2	7,594.3	23,222.7	146,134.0	1,061,461.0	1,207,595.0
	TOTAL GROSS VALUE ADDED (at basic prices)	10,330.3	23,433.7	3,223.0	16,451.0	3,075.0	6,625.0	4,649.7	16,466.3	7,930.9	24,252.1	116,437.0	1,060,795.0	1,177,232.0

Sources: Supply and Use Tables 2006, Stockholm Environment Institute 2008, Jones et al 2004, ABI 2006

Table 6 Total domestic supply and internal tourism consumption (at purchasers prices)

£ millions

Products		Tourism Industries											Other Industries	Output of domestic producers (at basic prices)	Imports	Taxes less subsidies on products nationally produced and imported	Domestic supply (at purchasers' prices)	Internal tourism consumption	Tourism ratios (%)
		Accommodation for visitors	Food and beverage serving industry	Railway passenger transport	Road passenger transport	Water passenger transport	Air passenger transport	Transport equipment rental	Travel agencies and other reservation services industry	Cultural Industry	Sports and recreational industry	TOTAL							
6.1	Accommodation services for visitors	15,861.5	1,820.3	1.5	23.0	21.8	32.9	29.7	105.1	9.5	29.0	17,934.3	281.3	18,215.6	4,275.7	3,825.4	26,316.7	11,643.2	44.24
6.2	Food and beverage serving services	5,894.1	47,531.0	1.5	23.0	21.8	32.9	29.7	105.1	97.8	299.0	54,035.9	4,593.0	58,628.9	9,699.3	8,677.6	77,005.8	23,569.0	30.61
6.3	Railway passenger transport services	0.0	0.0	9,051.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9,051.9	0.0	9,051.9	618.0	-2,963.0	6,706.9	1,259.7	18.78
6.4	Road passenger transport services	0.0	0.0	177.7	38,288.3	0.0	0.0	0.0	0.0	0.0	0.0	38,465.9	2307.9	40,773.8	1,959.0	394.0	43,126.8	3,588.1	8.32
6.5	Water passenger transport services	0.0	0.0	0.0	0.0	87,62.2	0.0	0.0	0.0	0.0	0.0	87,62.2	0.0	87,62.2	3,422.0	-196.0	11,988.2	3,024.5	25.23
6.6	Air passenger transport services	0.0	0.0	0.0	0.0	0.0	16,677.2	0.0	0.0	0.0	0.0	16,677.2	0.0	16,677.2	8,848.0	808.0	26,333.2	11,833.4	44.94
6.7	Transport equipment rental services	0.0	0.0	0.0	0.0	0.0	0.0	11,667.9	0.0	0.0	0.0	11,667.9	0.0	11,667.9	343.3	107.9	12,119.1	959.5	7.92
6.8	Travel agencies and other reservation services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41,320.8	0.0	0.0	41,320.8	0.0	41,320.8	1,215.7	382.1	42,918.6	3,342.4	7.79
6.9	Cultural activities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13,641.5	0.0	13,641.5	0.0	13,641.5	1,822.9	1,251.9	16,716.2	47,81.8	28.61
6.1	Sport and recreation activities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41,714.4	41,714.5	0.0	41,714.5	5,574.1	3,828.1	51,116.7	32,18.0	6.30
6.1	Other Products	40.7	92.2	7.5	115.8	221.1	263.0	297.2	10,52.5	17,76.5	5,432.4	9,299.0	2,115,073.8	2,124,372.7	381,810.0	12,8512.0	2,634,694.7	30,875.2	1.17
	TOTAL OUTPUT (at basic prices)	21,796.3	49,443.7	9,240.0	38,450.0	9,027.0	17,006.0	12,024.5	42,583.5	15,525.2	47,474.8	26,2571.0	2,122,256.0	2,384,827.0	419,588.0	144,628.0	2,949,043.0	98,094.8	3.33
	TOTAL INTERMEDIATE CONSUMPTION (at purchasers price)	11,466.0	26,010.0	6,017.0	21,999.0	5,952.0	10,381.0	7,374.8	26,117.2	7,594.3	23,222.7	146,134.0	1,061,461.0	1,207,595.0					
	TOTAL GROSS VALUE ADDED (at basic prices)	10,330.3	23,433.7	3,223.0	16,451.0	3,075.0	6,625.0	4,649.7	16,466.3	7,930.9	24,252.1	116,437.0	1,060,795.0	1,177,232.0					

Sources: Same as Tables 1,2 and 5

A proposed methodology for nowcasting the demand and supply estimates of tourism activities

Tullio Buccellato, Dominic Webber and Sean White
Office for National Statistics

Summary

The main objective of this work is to produce up to date and frequent figures of the demand and supply sides of the tourism sector. Demand here refers to tourism consumption or expenditure, while supply refers to the output from tourism related industries. This is carried out to address one of the weaknesses of the Tourism Satellite Account (TSA), which is based on data from the System of National Accounts (SNA) which is published two years after the reference date. The requirement for timely and frequent figures for tourism demand and supply has emerged from all the main actors in the UK tourism sector: the national tourism boards, for example VisitEngland; Department for Culture, Media, and Sport (DCMS); and the nine regional development agencies (RDA).

Introduction

The production of statistically precise figures concerning the tourism sector is in itself a difficult task. Tourism is a sector that, unlike other sectors in the economy, is not characterised by a clear production function. Both the final good consumed by tourists and input used on their production are not clearly identifiable. International recommendations strongly advise the use of the TSA framework to tackle the difficulties of measuring tourism economic impact in the most complete fashion. The main feature of the TSA is to measure separately the demand components of tourism and the supply industries in the sector and to then reconcile them. This comprehensive reconciliation procedure allows measuring, sector-by-sector, the share of output produced in tourism related industries absorbed directly by tourists' demand. As a result of these characteristics the TSA represents the core part of the emerging integrated system of tourism statistics (ISTS) within ONS.

Experimental Tourism Satellite Account for the UK are published in this edition of the *Economic & Labour Market Review* (ELMR) (see Buccellato et al 2010). This, as the name suggests, attempts to construct a TSA for the UK based on data sources from 2006. As mentioned in greater detail within that paper there are issues regarding the accuracy of some of the figures reported. Furthermore, the timeliness remains an unresolved issue. The construction of the TSA is a very

complex procedure resulting from the synthesis of several data sources, some of which are largely out of date due to the demanding production process they have to undergo to be published.

Therefore, the most appropriate step forward is to *nowcast*¹ some of the most relevant headline figures contained in the TSA. The main obstacle to overcome in this sense is to find alternative data sources to benchmark the headline figures both on the supply and on the demand side. In a perfect world it would have been possible to access data sources allowing for the construction of a monthly TSA with a three months delay with respect to the reference period. With this ideal objective in mind data sources allowing for the best compromise will be looked for. Or, stated differently, it will be attempted to solve one of the main drawbacks of the TSA within the TSA demand–supply framework. In this way the role of the TSA within the ISTS is further strengthened.

This article focuses mainly on proposing a methodology to *nowcast* tourism figures rather than actually attempting to produce up to date figures on demand and supply of the tourism sector. However, the current work represents an essential milestone towards the creation of a production system of up to date figures based on the TSA framework. As a result, it is shown how data availability allows obtaining *nowcasted* figures up to two quarters after the reference period.

The second section will provide a summarised background of the TSA framework, on which the content of this paper relies heavily. The third section outlines the methodology for nowcasting the demand and the supply side of tourism. The fourth section details the supply side, while the fifth section describes the overall results. The sixth and final section draws some general conclusions.

A quick catch-up on the TSA framework

Following and updating the 'First Steps project'², the Tourism Intelligence Unit (TIU) has started setting up the framework for a UK TSA reflecting the most up to date international recommendations. The remainder of this document reports the details of this experimental TSA for the UK.

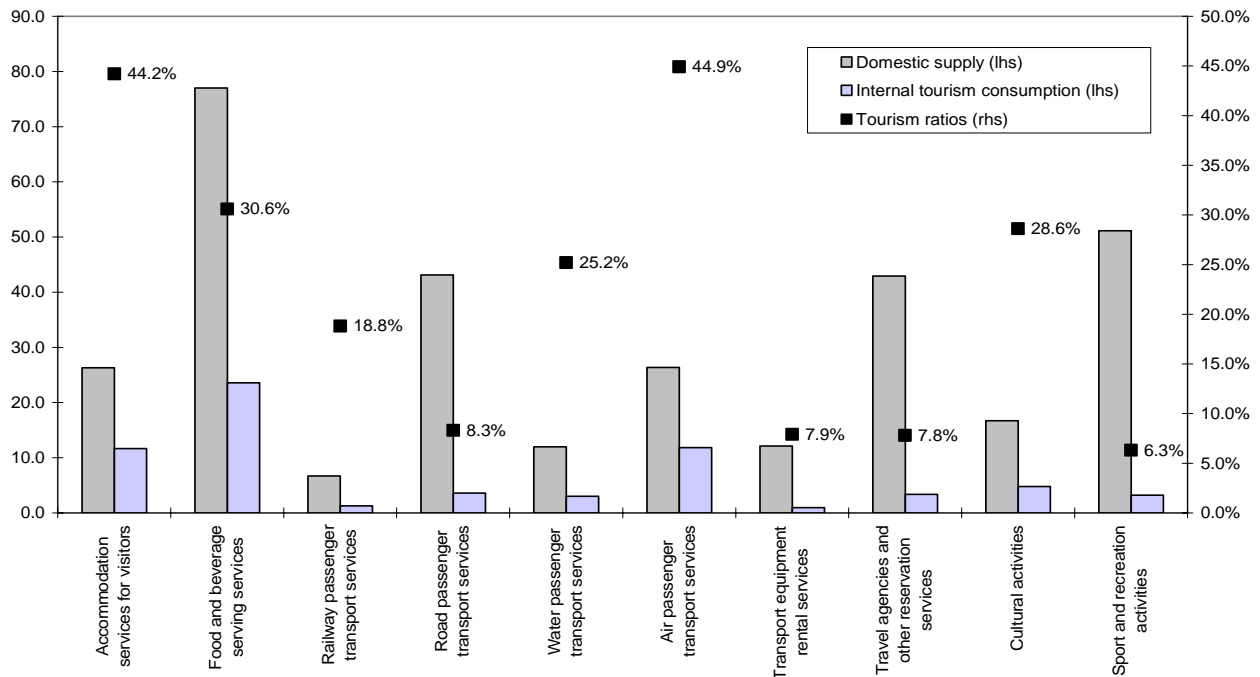
The measurement of tourism can be achieved in a twofold perspective – either as a demand side or as a supply side phenomenon. The demand side of the tourism sector refers to all the activities of visitors and their consumption behaviours. The supply side refers instead to the tourism related industries as indicated by international recommendations, shown in the first column of the table in **Box 1**. One of the main advantages of the TSA methodology is to allow for a reconciliation of the twofold nature of tourism measurement.

The TSA can be simply described as a collection of information ordered in 10 tables, six of which can be considered as core tables. The first three tables summarize the demand side information categorizing it respectively in inbound tourism expenditure, domestic tourism expenditure and outbound tourism expenditure³. The fourth table provides the total tourism expenditure summing up figures displayed in tables one and two. The fifth table contains supply side data and the sixth table reconciles demand and supply figures as displayed in table four and five respectively. The seventh table collects data concerning the employment in tourism industries. The eighth collects data on the tourism gross fixed capital formation of tourism industries and other industries. The

ninth displays figures on tourism collective consumption by products and levels of government. The tenth and final table concludes showing the non-monetary indicators.

Figure 1 Domestic supply and consumption of products, 2006

£ billions



Product	Domestic supply (£ billions)	Internal tourism consumption (£ billions)	Tourism ratios (%)
Accommodation services for visitors	26.3	11.6	44.2
Food and beverage serving services	77.0	23.6	30.6
Railway passenger transport services	6.7	1.3	18.8
Road passenger transport services	43.1	3.6	8.3
Water passenger transport services	12.0	3.0	25.2
Air passenger transport services	26.3	11.8	44.9
Transport equipment rental services	12.1	1.0	7.9
Travel agencies and other reservation services	42.9	3.3	7.8
Cultural activities	16.7	4.8	28.6
Sport and recreation activities	51.1	3.2	6.3
Other industries	2,634.7	30.9	1.2
TOTAL	2,949.0	98.1	3.3

Source: E-UKTSA

In the construction of the experimental TSA for the UK (E–UKTSA) the focus is on the first six tables. This is where the process of reconciliation between demand and supply of tourism industries actually takes place (with the exclusion of Table 3 which contains outbound tourism expenditure so is not necessary for the final reconciliation of demand and supply). It is within this core part of the TSA framework that demand and supply of the tourism related industries are reconciled in the so-called demand-to-supply ratio (DSR). The importance of the DSR is based on the fact that it allows disentangling what share of the national economy is directly dependent upon tourism consumption and is a necessary step towards the computation of tourism direct gross value added (TDGVA).

Figure 1 summarises some highlights from Table 6 of the E–UKTSA. The three columns reported below the chart represent the reconciliation of supply and demand of tourism industries and the implied DSR. The chart in the upper part of the figure summarises the numbers at quick glance. The contents of Figure 1 will be crucial in the development of the methodology that, ultimately, will provide a dynamic version of both columns 1 and 2 thanks to the tourism DSRs reported in column 3.

A simple methodology to *nowcast* the E–UKTSA implied figures

This section gives details of the methodology to *nowcast* the demand and supply aspects of tourism.

The domestic demand of tourism can be broadly divided into two main parts – inbound and domestic visitors' expenditure. Both these components can be further classified into excursionists and overnight visitors. An additional component of tourism consumption is represented by the domestic expenditure of resident visitors travelling abroad (RVTA). This represents the expenditure of domestic residents in their domestic economy on services for outbound travel. It is characterised by expenditure on UK-based carriers and travel agencies.

The focus now turns to a review of the available data sources and the way these could be used to benchmark the annual figures contained in the national TSA.

The overall procedure to estimate timely and frequent time series for each of the components of tourism demand can be articulated in four steps. First, total tourism demand is estimated. Second, for inbound and domestic overnight tourists' expenditure direct use of available time series is made to benchmark the correspondent annual figures of the E–UKTSA. Third, an estimate of the domestic expenditure of resident visitors travelling abroad is obtained. Finally, an estimate of excursionists expenditure is obtained as the net of total demand and all the other components estimated in the previous steps.

Obtaining a quarterly time series for the total demand of tourism is rendered quite straightforward by the availability of a quarterly time series for the total UK gross value added (GVA). Using the tourism demand to total supply ratio (DSR), calculated in Table 6 of the TSA, allows for the following estimation procedure

$$Total_Demand_t = DSR_{2006}^{E-UKTSA} \times Total_Supply_t \quad (1)$$

Having obtained quarterly estimates of the total demand of the tourism economy over the time span 2006 Q1–2009 Q1, the next step is to break it down into its main components.

The International Passenger Survey (IPS) collects spend and volume data for inbound tourists. This data source is both frequent (monthly), and timely (approximately six weeks after the reference period). The IPS measures both excursionists' and overnight visitors' inbound expenditure. Timely and frequent data are also available for the overnight component of domestic tourists. The UK Tourism Survey (UKTS) implemented by Taylor Nelson Sofres (TNS) and funded by the national tourist boards provides quarterly estimates for the total overnight domestic tourism expenditure. Hence, this data source can fit the purpose of benchmarking the national figure reported in the E–UKTSA with a relatively high degree of accuracy.

More problematic is to find a way to benchmark the annual figures for the expenditure of resident visitors travelling abroad (RVTA). The IPS collects volume and expenditure data for these visitors while they are abroad. However, at present, no survey details the UK-based spending of this group of tourists. To tackle the problem of generating up-to-date figures for the spending in the UK of RVTA involves benchmarking the 2006 figures to the volume of RVTA. In formula,

$$RVTA_t = (1 + r_{t-1,t}^i) RVTA_{t-1} \quad (2)$$

where $RVTA_t$ represents estimated quarterly time series for the expenditure of residents travelling abroad at time t . The rate of growth of outbound tourist volumes between t and $t-1$ is represented by $r_{t-1,t}$. Estimates obtained from equation (2) heavily rely on the assumption that the outbound tourist's volume and the domestic expenditure of RVTA enjoy the same time series properties.

The last step of the procedure consists of estimating the quarterly time series of excursionists' expenditure as a residual from the total demand. This can now be easily achieved subtracting the time series obtained in the second and third steps of our procedure from the estimate for total demand obtained through equation (1). This approach nonetheless requires that the series are seasonally adjusted to avoid the potential that the newly estimated series exhibit an artificial seasonal pattern with respect to the other main demand components.

The supply side is addressed adopting a bottom-up approach. This involves nowcasting the supply of each tourism industry individually and simply summing up to obtain the total supply of the tourism industries. This is achieved by benchmarking E–UKTSA industry supply figures, as reported in Table 6 to a quarterly non-seasonally adjusted (NSA) GVA index series for each tourism industry. Measured in current prices, these series are available from internal ONS

resources. Each series is weighted according to the importance of each component in an industry. The components of each industry are summarised in **Box 1**.

Box 1 Tourism industries and their components

Industry	Components
Accommodation services for visitors	Hotels Camping etc Restaurants
Food and beverage serving services	Bars Canteens
Railway passenger transport services	Trains Other scheduled passenger land transport
Road passenger transport services	Taxi operation Other passenger land transport
Water passenger transport services	Sea and coastal passenger water transport Inland water transport
Air passenger transport services	Scheduled air transport
Transport equipment rental services	Renting of Automobiles Renting of other transport equipment
Travel agencies and other reservation services	Activities of travel agencies and tour operators; tourist assistance activities n.e.c. Motion pictures and video activities Artistic and literary creation and interpretation
Cultural services	Operation of arts facilities ; fair and amusement park activities ; other entertainment activities n.e.c. Library, archives, museums and other cultural activities (market) Library, archives, museums and other cultural activities (non-market) Sporting activities and other recreational activities n.e.c
Sports and recreational services	Sporting activities and other recreational activities n.e.c Gambling and betting activities
n.e.c. not elsewhere classified	

The final stage in the process is to nowcast 'Other consumption products'. This is realized by benchmarking the corresponding E–UKTSA figure to a non–seasonally adjusted GVA index series for the whole economy, again measured at current prices.

Formally, the method for *nowcasting* the tourism industries is as follows

$$Y_{i,t} = (1 + (\sum_{j=1}^n w_j^i \cdot r_j^i)) \cdot Y_{i,t-1} \quad (3)$$

where $Y_{i,t}$ is the time series for the tourism industry i at quarter t with $t=2002$ Q1, 2002 Q2,..., 2009 Q1 refers to the quarter and $i=1,2,\dots,11$. W_j represents the weight of the GVA component j part of the industry i . r_j represents the rate of growth in GVA of component j .

Data availability allows obtaining *nowcasted* figures up to two quarters after the reference period.

Box 2 summarises the above mentioned data sources used in our methodology and their respective timeliness.

Box 2 The main variables and their respective data sources used in this analysis

Variable	Survey	Source	Frequency	Timeliness
Inbound expenditure	International Passenger Survey	Office for National Statistics	Monthly	6 weeks after the reference month
Outbound volumes	International Passenger Survey	Office for National Statistics	Monthly	6 weeks after the reference month
Overnight Visitors expenditure	UK Travel Survey	Taylor Nelson and Sofres	Monthly	12 weeks after the reference month
Gross Value Added series	Internal ONS resources	Office for National Statistics	Quarterly	4 weeks after the reference quarter

Results

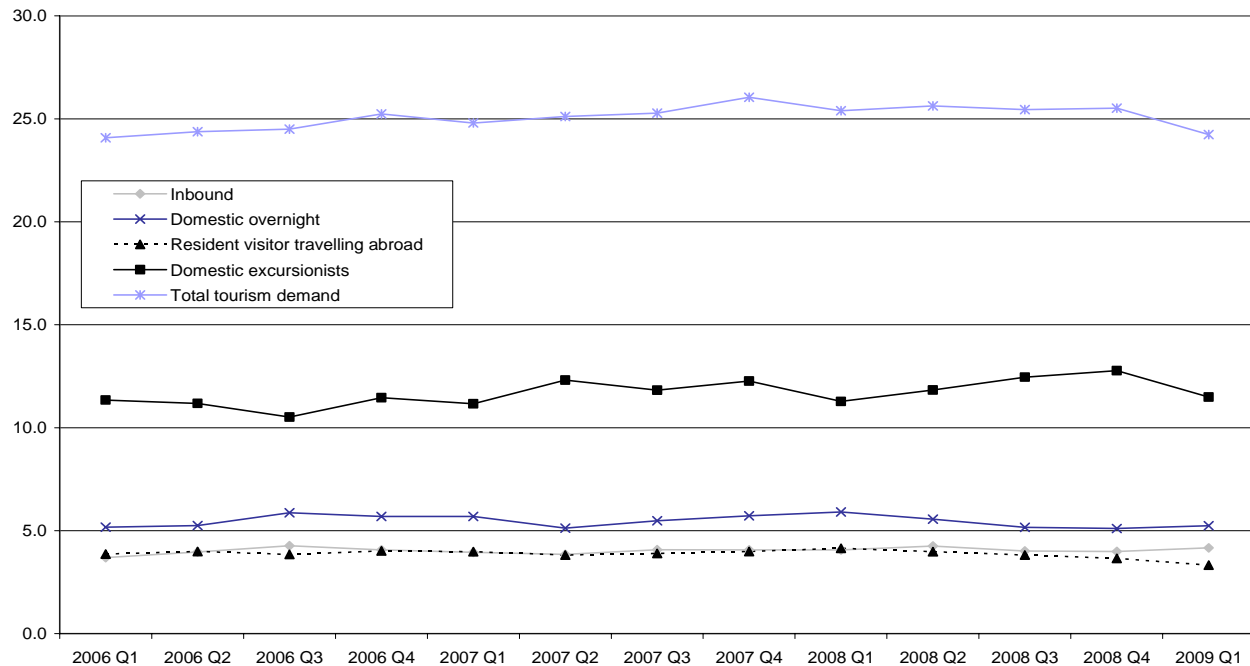
This section is devoted to presenting the results implied by the methodology. The presentation of this will follow the TSA framework, highlighting first the demand followed by the supply side separately, and then their direct reconciliation.

Figure 2 presents the *nowcasted* series of the four components that compose the tourism demand which are essentially proposing a dynamic version of the headline figures contained in Table 4 of the E-UKTSA. The estimated series for the domestic expenditure of RVTA looks fairly stable over time with a slight slowdown towards the end of the series reflecting the fall of outbound tourism that corresponds with the start of the international crisis. In the case of the UK the crisis has induced a sharp depreciation of the sterling and this, perhaps, explains partly at least why the inbound expenditure has been moving in the opposite direction with respect to the expenditure of outbound

expenditure. For more detail on the impact of the recession on tourism please refer to an earlier paper from the TIU (see Webber et al 2010).

Figure 2 **Nowcasts of the main components of tourism demand, 2006 Q1 – 2009 Q1**

£ billions



Time	Inbound	Domestic overnight	Resident visitor travelling abroad	Domestic excursionists	Total tourism demand
2006 Q1	3.7	5.2	3.9	11.3	24.1
2006 Q2	4.0	5.2	4.0	11.2	24.4
2006 Q3	4.3	5.9	3.8	10.5	24.5
2006 Q4	4.1	5.7	4.0	11.5	25.2
2007 Q1	4.0	5.7	4.0	11.2	24.8
2007 Q2	3.9	5.1	3.8	12.3	25.1
2007 Q3	4.1	5.5	3.9	11.8	25.3
2007 Q4	4.1	5.7	4.0	12.3	26.0
2008 Q1	4.1	5.9	4.1	11.3	25.4
2008 Q2	4.3	5.6	4.0	11.8	25.6
2008 Q3	4.0	5.2	3.8	12.5	25.5
2008 Q4	4.0	5.1	3.7	12.8	25.5
2009 Q1	4.2	5.2	3.3	11.5	24.2

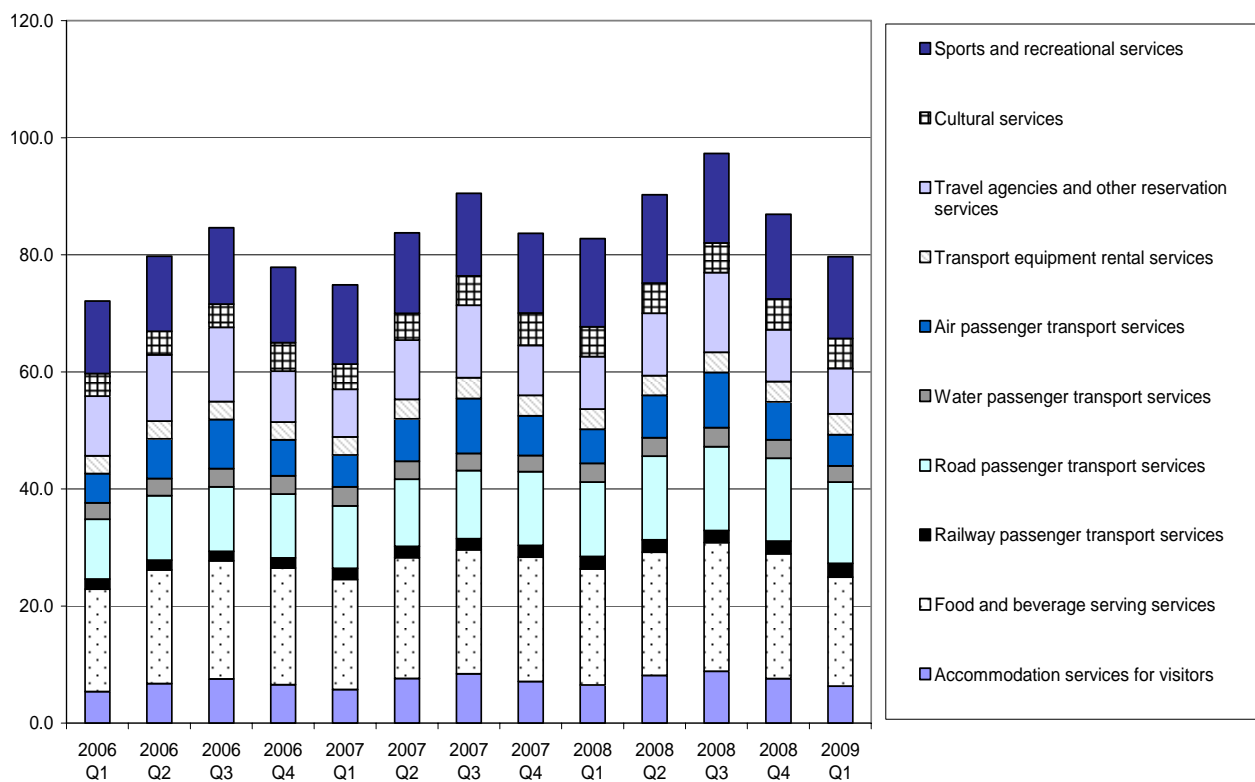
Sources: E–UKTSA, International PASSENGER Survey (average 2006–2008), UK Tourism Survey (average 2006–2008), Great Britain Day Visit Survey 2002/3, English Leisure Visits Survey 2005 and Authors' calculations.

Excursionist expenditure is the series which has required the heaviest estimation procedure. This could be a contributing factor in explaining the slightly higher volatility exhibited by the series. It is interesting to highlight the opposing behaviour of this series in relation to the economic crisis with respect to the domestic overnight visitor component. Domestic overnight visitor expenditure has increased perhaps because it represents the direct substitute of outbound tourism, which has fallen quite sharply over the same period. Overall, tourism related consumption in the UK appears to be fairly stable exhibiting a slightly positive trend with total consumption of tourists passing from around £98 billion in 2006 to £101 billion in 2007 to £102 billion in 2008. The first quarter of 2009 suggests that the trend could revert, possibly due to the current economic crisis.

Figure 3a displays the evolution of the supply side dimension of tourism over time. It should be noticed in Figure 3 that we are referring to the same time trend that we have reported for the demand side series reported in Figure 2. In this sense it is worth insisting on the fact that the total demand cannot be directly derived from available data sources, but instead employs an estimation procedure based on the data sources for the supply side of tourism and the DSR of 3.3 per cent calculated in the E–UKTSA.

Figure 3a The supply of tourism industries, 2006 Q1 – 2009 Q1

£ billions



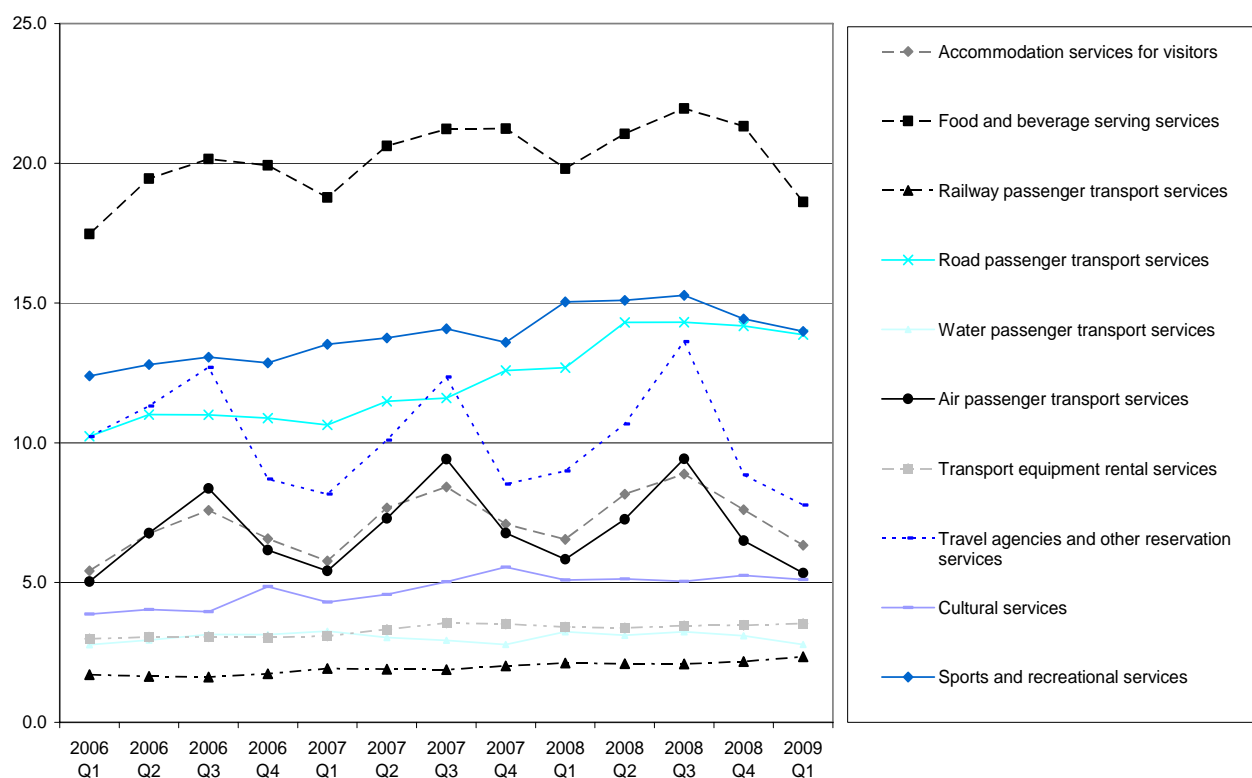
Source: Quarterly Gross Value Added series, ONS

The higher accuracy of supply side data allows for the breakdown of the total supply in its components over time. The proportion of the components and their respective shares in the total supply of tourism related products remains fairly stable over time with food and beverage, road passenger transport and air transport exhibiting the largest shares.

Figure 3b completes the supply side analysis showing the seasonal patterns of the figures involved. Some series, such as hotel and accommodation, travel agencies, air passenger transport and even food and beverage to some extent have very similar seasonal patterns. This might result from the higher dependence on actual tourism consumption of these sectors as opposed to road and rail passenger transport or sports and recreation services, for example. One would normally expect that tourism demand peaks during the third quarter of the year during the summer period.

Figure 3b The supply of tourism industries, 2006 Q1 – 2009 Q1

£ billions

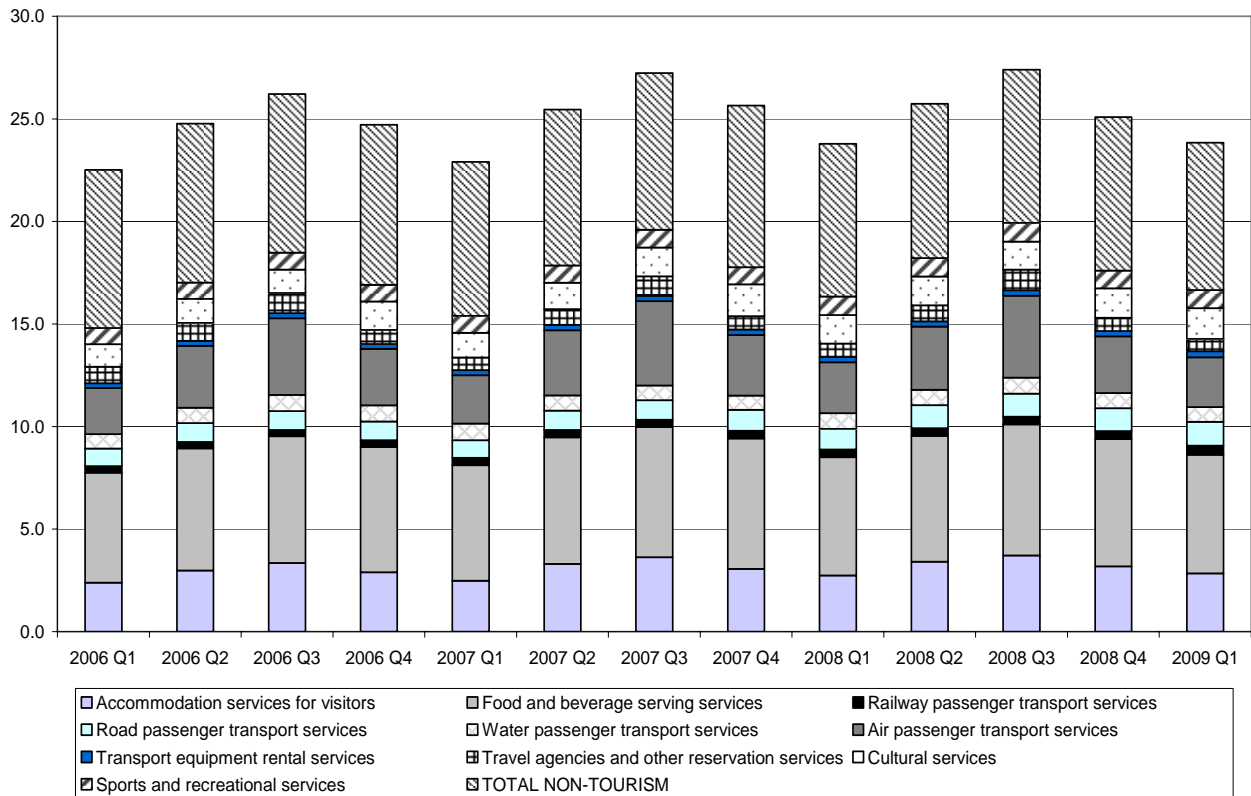


Source: Quarterly Gross Value Added series, ONS

The final step of the analysis consists of using the main demand–supply reconciliation results contained in Table 6 the E–UKTSA in order to have a dynamic breakdown of tourist expenditure in its main components. **Figure 4** illustrates the results of this procedure both in a numerical and in a graphical way. By construction, the shares of each of the industries, in terms of total economy supply, remain constant over time and equal to the ones displayed in Figure 2; the seasonal pattern will be the same of the total supply of tourism related products.

Figure 4 Estimates of tourist expenditure and its main components

£ billions



	Accommodation services for visitors	Food and beverage serving services	Railway passenger transport services	Road passenger transport services	Water passenger transport services	Air passenger transport services	Transport equipment rental services	Travel agencies and other reservation services	Cultural services	Sports and recreational services	TOTAL TOURISM	TOTAL NON-TOURISM	TOTAL DEMAND
2006 Q1	2.4	5.4	0.3	0.9	0.7	2.3	0.2	0.8	1.1	0.8	14.8	7.7	24.1
2006 Q2	3.0	6.0	0.3	0.9	0.7	3.0	0.2	0.9	1.2	0.8	17.0	7.7	24.4
2006 Q3	3.3	6.2	0.3	0.9	0.8	3.7	0.2	1.0	1.1	0.8	18.5	7.7	24.5
2006 Q4	2.9	6.1	0.3	0.9	0.8	2.8	0.2	0.7	1.4	0.8	16.9	7.8	25.2
2007 Q1	2.5	5.6	0.4	0.9	0.8	2.4	0.2	0.6	1.2	0.8	15.4	7.5	24.8
2007 Q2	3.3	6.2	0.4	0.9	0.8	3.2	0.3	0.8	1.3	0.8	17.9	7.6	25.1
2007 Q3	3.6	6.4	0.3	0.9	0.7	4.1	0.3	0.9	1.4	0.9	19.6	7.6	25.3
2007 Q4	3.1	6.4	0.4	1.0	0.7	3.0	0.3	0.6	1.6	0.8	17.8	7.9	26.0
2008 Q1	2.7	5.8	0.4	1.0	0.8	2.5	0.3	0.7	1.4	0.9	16.3	7.4	25.4
2008 Q2	3.4	6.1	0.4	1.1	0.7	3.1	0.3	0.8	1.4	0.9	18.2	7.5	25.6
2008 Q3	3.7	6.4	0.4	1.1	0.8	4.0	0.3	1.0	1.4	0.9	19.9	7.5	25.5
2008 Q4	3.2	6.2	0.4	1.1	0.7	2.8	0.3	0.7	1.4	0.9	17.6	7.5	25.5
2009 Q1	2.8	5.8	0.4	1.2	0.7	2.4	0.3	0.6	1.5	0.9	16.7	7.2	24.2

Source: E-UKTSA

Conclusions

The main purpose of this paper was to present a methodology which derives up-to-date figures for the main components of both the demand and supply of tourism. While for the supply side a good set of data sources can be relied on for the demand side some of the time series components have had to be estimated. At this stage, the period starting from the reference date of the E-UKTSA which is 2006 until the first quarter of 2009 has been covered. The estimated figure for the total demand of tourism has increased from £98bn in 2006, to £101 billion in 2007 and £102 billion in 2008. Furthermore the paper has shown how the results of the E-UKTSA can be applied to estimate the level of tourism demand across the various tourism industries. This provides an insight into the seasonal nature of demand and how this translates across the various industries related to the tourism sector.

Notes

1. As opposed to forecasting, nowcasting implies estimation of current values of variables for which there is a natural lag.
2. UK Tourism Satellite Account – First Steps Projects, prepared by the Cardiff Business School.
3. Table 3 can be considered of secondary importance in that it does not contribute to the determination of the national tourism demand to supply ratio.

Contact

elmr@ons.gov.uk

References

Buccellato T, Webber D, and White S (2010) 'The Experimental Tourism Satellite Account for the United Kingdom (E-UKTSA)', Economic & Labour Market Review (October), available at: www.statistics.gov.uk/elmr/10_10/

Webber D, Buccellato T and White S (2010) 'The global recession and its impact on tourists' spending in the UK', Economic & Labour Market Review (August), available at: www.statistics.gov.uk/CCI/article.asp?ID=2554

Acknowledgements

We are grateful to Chris Jackson from Statistics Canada for extremely valuable suggestions and advice offered to improve the present work. Furthermore, we would like to thank Calvin Jones, Felix Ritchie and Eddie Smith for their useful contributions to this piece of work.

Estimating regional exports of services trade for the UK

Keith Brook and Kelly Taylor

Economic and Policy Analysis, Department for Business, Innovation and Skills (BIS)

SUMMARY

The Department for Business, Innovation and Skills (BIS) undertakes an annual analysis of regional exports of services. Coverage is limited to about 30 per cent of the value of the UK's exports of services and includes Communication, Computer and information and parts of Royalties and license fees and Other business services. This paper describes the methodology used, the available results and the limitations of the analysis.

Introduction

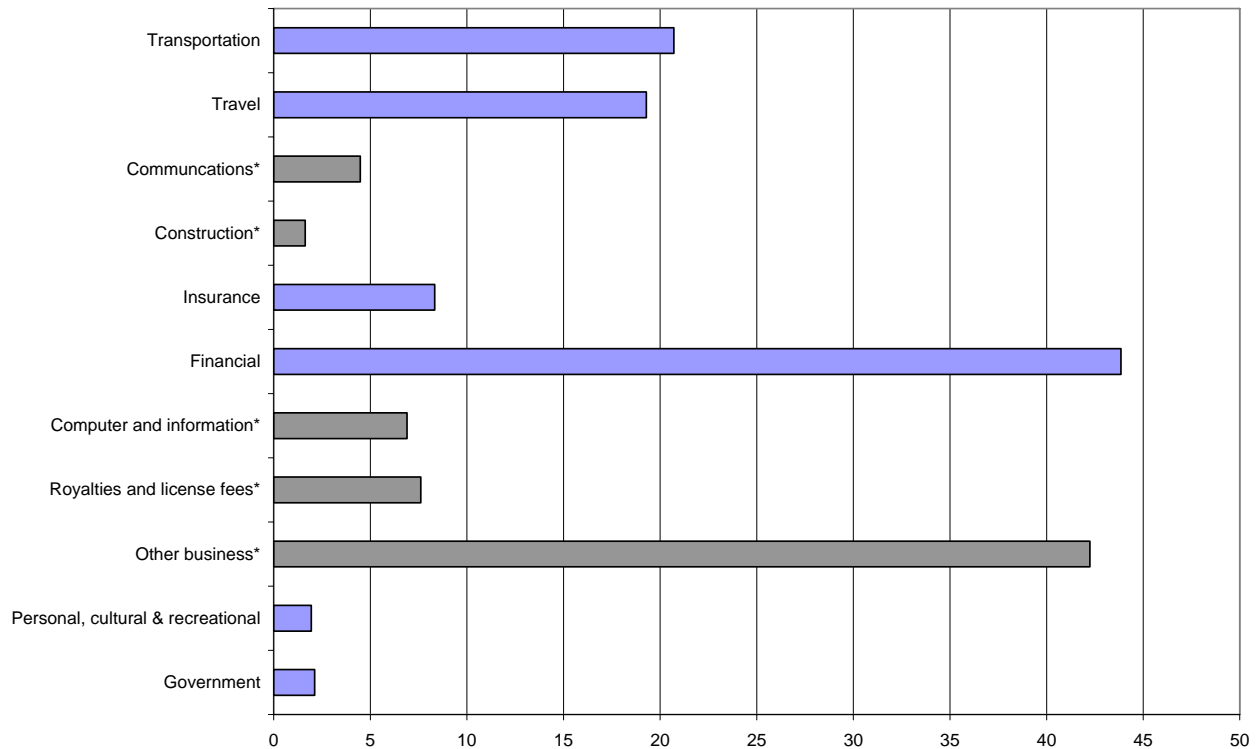
In 2009, total UK exports of services were £159 billion at current prices, down from a peak of £171 billion in 2008. Between 2000 and 2008 UK exports of services more than doubled while exports of goods increased by only about 30 per cent over the same period. In recent years, the UK has consistently recorded the second highest level of exports of services in the world, following the USA.

Figure 1 shows the breakdown of UK exports of services using product groupings consistent with those defined in the IMF Balance of Payments and International Investment Position Manual (BPM6). Data are collated from a number of different sources and published by the Office for National Statistics (ONS). Major sources include:

- Transportation – Civil Aviation Authority and Chamber of Shipping
- Travel – ONS International Passenger survey
- Insurance and finance – Lloyds and other insurance companies, Bank of England, Security dealers
- Communication, Construction, Computers and information, Royalties and licence fees and Other business services – ONS International Trade in Services survey (ITIS)

Figure 1 Exports of services by product, 2009

£ billions



Source: ONS Pink Book 2010

Note

* The categories in grey are regionalised

The regional analysis is limited to data collected from the ITIS survey covering Communication, Construction, Computers and information, Royalties and licence fees and the majority (about 75 per cent) of Other business services. These account for about 30 per cent of total UK exports of services. From 2009 reference year, a separate Film and Television survey has been merged into the ITIS survey and from next year this will give a small increase in the coverage of Royalties and licence fees in the regional analysis.

Data for Transportation, Travel, Insurance and Finance are not available in a suitable format which allows a regional allocation to be undertaken. For these services allocation to a region may be less meaningful since the geographic location of the sales transaction and of the service activity may differ.

International Trade in Services (ITIS) survey

The ITIS survey records the value of both exports and imports for 51 different services products. A number of products are combined together to give a particular BPM category. For example the

Business management and management consulting category in the Pink Book (Table 3.9) comprises seven separate ITIS products.

ITIS is a survey of about 19,000 businesses which are stratified by industry covering mainly the production, distribution, business and other services in the market sector. The sample is split between a panel of known traders and a random sample of 'high propensity' companies from Standard Industrial Classification (SIC) industries which are known to have significant levels of services trade. This includes computer services, research and development and other business services (UK SIC 72–74).

The ONS Annual Business Inquiry (ABI) includes a question which asks businesses if they trade in services and the value of any trade. This ABI filter question is used to identify businesses which routinely trade in services and are included in a panel of about 7,000 companies which are queried each year. The largest traders (about 700 companies) are required to give a quarterly return to allow quarterly trade in services data to be estimated for National Accounts purposes.

In past years the ITIS survey also sampled about 4,000 businesses which were outside of the high propensity industries. The majority of these companies gave a nil return and in total accounted for only about 2–3 per cent of the total ITIS value for exports. From 2007, this part of the sample has been dropped and replaced by ABI returns which are not included in the ITIS panel or covered by the 'high propensity' industries. The ABI does not collect product and partner country details and these are imputed. **Table 1** gives a summary of the ITIS sample and the contribution of each component to the total ITIS export value. In 2008, the ABI component accounted for about 3 per cent of total ITIS exports.

Table 1 **Sample structure of IT IS survey, 2008**

	Number	Approximate share of ITIS export value
Known traders		
Quarterly panel	674	58%
Annual panel	6,455	29%
Weighted sample from IDBR		
High propensity industries	7,660	10%
ABI	4,481	3%
Total Sample	19,270	100%

Source: ONS International Trade in Services (ITIS) survey

Coverage and regional allocation

Out of 51 ITIS products, 37 are included in the regional exports analysis comprising about 80 per cent of collected ITIS export value. This corresponds to about 30 per cent of total UK exports of services. ITIS products are only regionalised where the ITIS data is the source of all or nearly all of the corresponding Pink Book category.

For some categories, data from other sources are added to the ITIS data to obtain the Pink Book total. For example ITIS data only accounts for about 20 per cent of Other miscellaneous business services published in Table 3.9 of the Pink Book. Such data are excluded from the Regional analysis. The other major exclusion is Insurance and auxiliary financial services, where ITIS accounts for only about 25 per cent of total UK exports of insurance and financial services.

The regional allocation is undertaken at the NUTS1 geographic level. These comprise nine English regions plus the devolved administrations of Scotland, Wales and Northern Ireland which are combined together.

The ITIS survey does not collect the geographic location of the transaction, partly due to the need to minimise response burden on companies. It is also likely that if collected, the quality of the geographic location would be low. The geographic location of the transactions are modelled by linking the ITIS data back into the Inter-Departmental Business Register (IDBR) from which the detailed company structure can be determined.

The ITIS survey collects and reports transactions at a company reporting unit (RU) level. Each RU may comprise one or more local units (LU) across which a number of different or similar business activities may take place. Where a company has more than one LU, these may be located in the same or across different regions. The IDBR includes an employment measure for each LU and this is used to apportion the export value of each product within a company to its local units.

As noted, ITIS products are grouped into corresponding Pink Book categories. Pink Book data differ from ITIS totals due to adjustments which are made as part of the National Accounts balancing process. The published regional export data are adjusted to be consistent with the published Pink book data and so take account of the balancing adjustments. As noted, the regional allocation is limited to Pink Book categories where ITIS is primarily the only source of data.

Data for each product and region are disclosure checked to ensure that there are more than three companies and that a company with the largest component cannot be identified if it dominates other companies in the cell. The cell is considered to be non-disclosive if:

$$T - M - N > 0.1M$$

where T is the total export value in the cell, M the value of the company with the largest transaction and N the value of the company with the second largest transaction.

No regional totals are included in the published tables because coverage is only partial and comprises groups of products which do not make a meaningful aggregate in terms of BPM definitions. This helps to reduce the risk that the published data is considered to be representative of the regional picture for all service products.

Apportioning trade to the regions using LU employment

Where the RU comprises more than one LU the reported trade in service may occur at one or more of the LUs, which may be in a number of different regions and more than likely includes the RU region. In the absence of any specific geographic knowledge of where the actual export transaction is taking place, apportioning the export value to each of the company's LUs is considered to be the best available compromise when the company has only a few LUs.

However, this approach is considered to be questionable where the company has a large number of LUs since it is unlikely that all of the sites will be actively involved in the specialised activity associated with export of services. Companies with a high number of LUs are often in the Communication or Distribution sectors and the LUs are retail outlets. In such cases allocating the transaction to the RU, which may be the location of the company headquarters, is considered to be the best compromise.

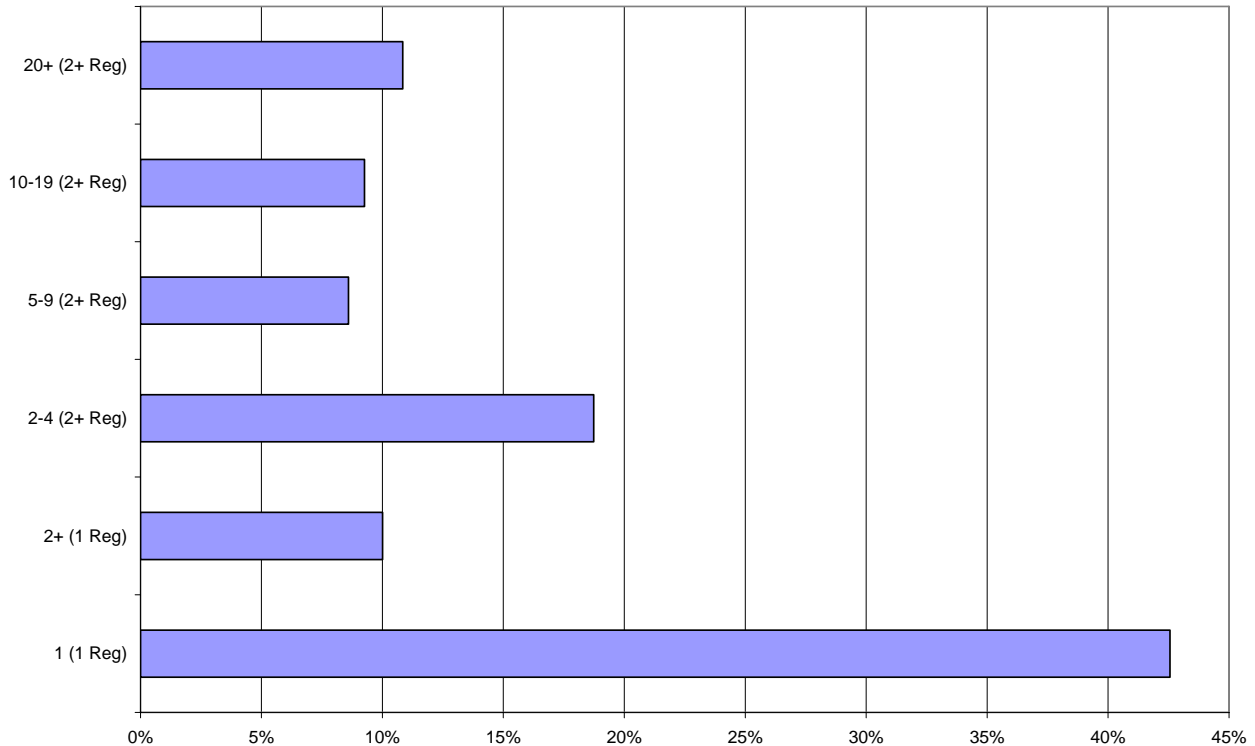
A choice needs to be made on a threshold for the maximum number of LUs in a company, when this allocation change is made. The share of export value in relation to the number of local units and regions is shown in **Figure 2**. In 2008, 43 per cent of the export value was reported by companies with only 1 LU with a further 10 per cent accounted by companies with 2 or more LUs, where all of the LUs are in the same region. Hence, 53 per cent of the total export value was derived from companies where the region is correctly allocated because all of the LUs are in one region.

A further 19 per cent of the export value is accounted for by companies which have between 2 and 4 LUs, and as shown in **Table 2**, the majority of these companies have LUs in only 2 regions. In this case apportioning the export value to each LU is considered to be the best approach since one or more of the LUs may be the exporter.

However, as the number of LUs increases the likelihood that all of the LUs are involved in services export activity reduces and more than likely it will be concentrated either in the RU or selected LUs. Figure 2 shows that 11 per cent of the export value is accounted for by companies with 20 or more LUs with Table 2 showing that more than two-thirds of the value is from companies with LUs being present in all 10 regions. With 10–19 LUs the export value is 9 per cent of the total and Table 2 shows that no regional total dominates.

Figure 2 Share of ITIS export value (%) for different company LU structures and number of regions with a LU presence, 2008

Number of local units and regions



Source: BIS analysis of the ONS International Trade in Services (ITIS) survey

Table 2 Share of ITIS export value for different company LU structure and number of regions with a LU presence, 2008

Percentages

Number of Local Units	Number of Regions with a Local Unit presence											Total
	1	2+	2	3	4	5	6	7	8	9	10	
1	43%											43%
2-4	7%	19%	15%	3%	1%							26%
5-9	2%	9%	1%	2%	3%	2%	0%	0%	0%	0%		10%
10-19	0%	9%	0%	1%	1%	2%	1%	1%	1%	2%	0%	10%
20+	1%	11%	2%	0%	0%	0%	0%	0%	0%	1%	8%	11%
Total	53%	47%	17%	7%	5%	4%	2%	1%	1%	3%	8%	100%

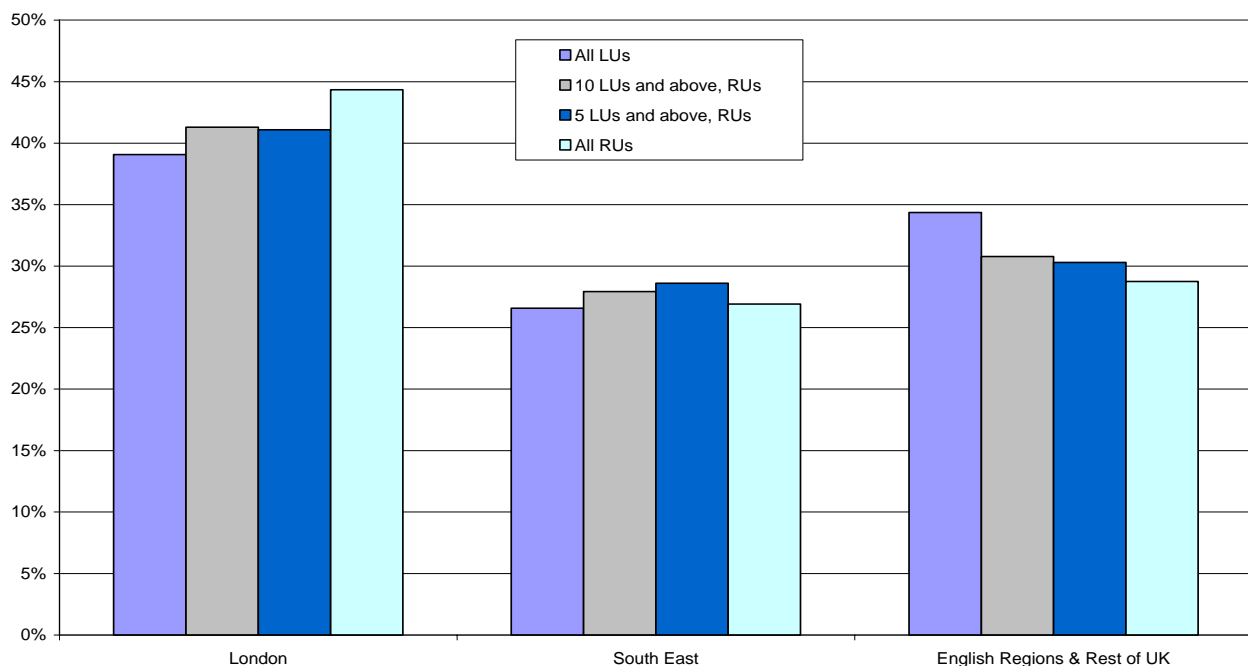
Source: BIS analysis of the ONS International Trade in Services (ITIS) survey

As noted, companies with a large number of LUs are typically in the retail or communication sector and it is considered that the export activity will more than likely be undertaken by the headquarters, probably the RU, or at most one or two LUs. Apportioning the service exports to all LUs is not considered to be meaningful in such cases and these are allocated to the region of the RU.

The remaining LU group 5–9 accounts for 9 per cent of the services export value with the majority of the value shared by companies with a presence in typically 3, 4 or 5 regions. For this group there is some uncertainty as to whether it is more appropriate to allocate to the RU or apportion to each LU. **Figures 3a** and **3b** show the regional allocation for two scenarios with a threshold of 10 or 5 LUs, together with apportioning all exports to all of the LUs or to the RU. These last two cases represent bounds in the allocation method.

Figure 3a Effect of different LU allocation methods on share of regional export of services

Percentages

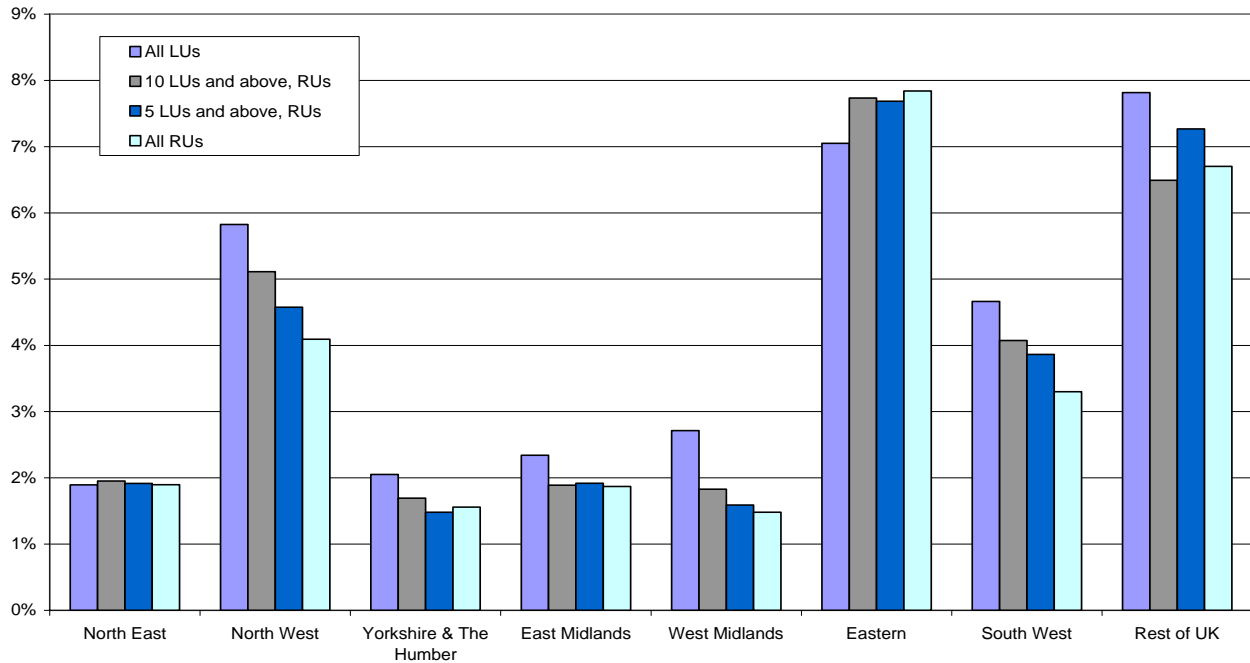


Source: BIS analysis of the ONS International Trade in Services (ITIS) survey

Figure 3a shows that the allocation to London increases as more of the value is allocated to the RUs, which is to be expected due to the high presence of company headquarters in London. The converse is true for the English regions and the Rest of the UK which is again consistent with fewer headquarters being in these areas. The trend for the South East differs in that the RU and LU shares are the same with the other cases being higher. This is possible due to the interplay of the effects of apportioning to the LUs and/or the RUs and their geographic location in the four different scenarios. Figure 3b shows similar trends for the regions excluding London and the South East, with the pattern for the East being similar to London and most of the remaining regions being similar to the English regions and the Rest of the UK group shown in Figure 3a.

Figure 3b Effect of different LU allocation methods on share of regional export of services, 2008

Percentages



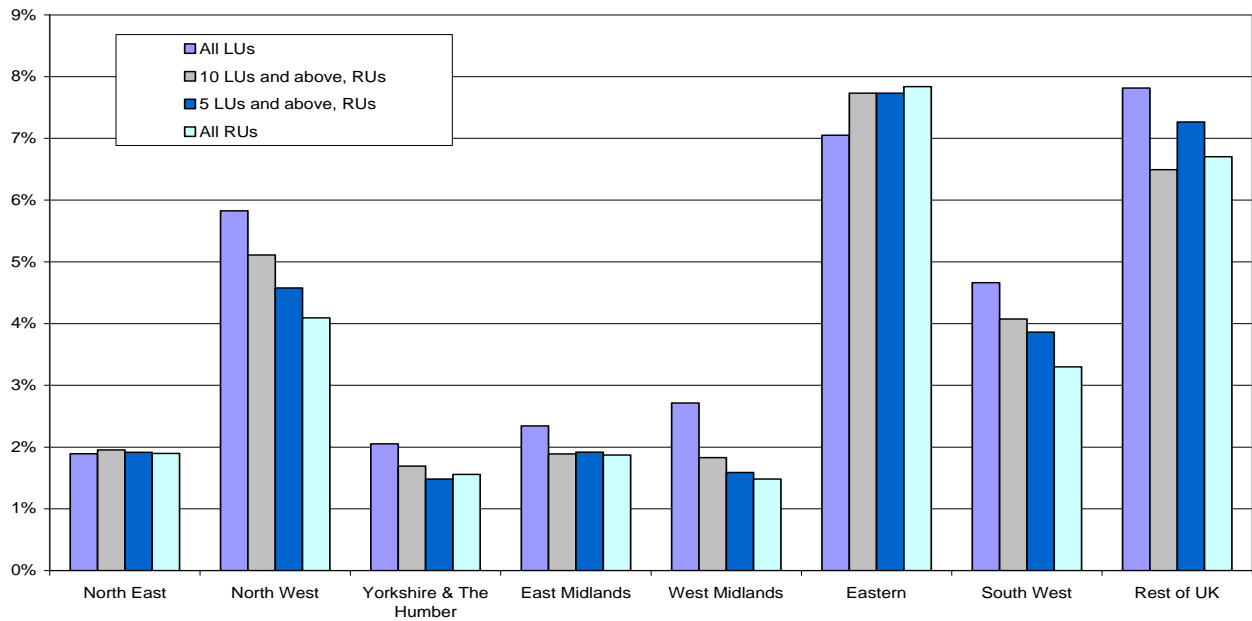
Source: BIS analysis of the ONS International Trade in Services (ITIS) survey

Figures 3a and 3b show that when using a threshold of 10 or 5 for the number of LUs, there is little difference in the share of the allocation for most of the regions. This is to be expected since, as shown in Figure 2, companies with between 5–9 LUs only account for 9 per cent of the total export value. The different allocation methods may have a greater impact at the product level as shown in **Figure 4** for Computer and information services. However, for most regions the greatest change arises from moving from allocating all of the data to the LUs, to allocating to the RU where there are more than 10 LUs. Generally, the differences are smaller between using a threshold of 10 or 5. Taking all of these considerations into account it has been decided to fix the threshold at 10 and apportion to the LUs using LU employment where there are fewer than 10 LUs and to allocate all of the value to the RU where there are 10 or more LUs.

In 1999, the former Department for Trade and Industry (DTI) funded a one-off voluntary supplement to the ONS ITIS survey to investigate the regional pattern of services exports. For one quarter some panel members were supplied with a list of their local units and addresses from the IDBR and asked to identify which of these local units undertook the reported exports of services. No additional product or value details were collected for the LUs. Returns were received for 74 companies which had 2 or more local units located in different regions.

Figure 4 Effect of different LU allocation methods on share of regional export of computer and information services, 2008

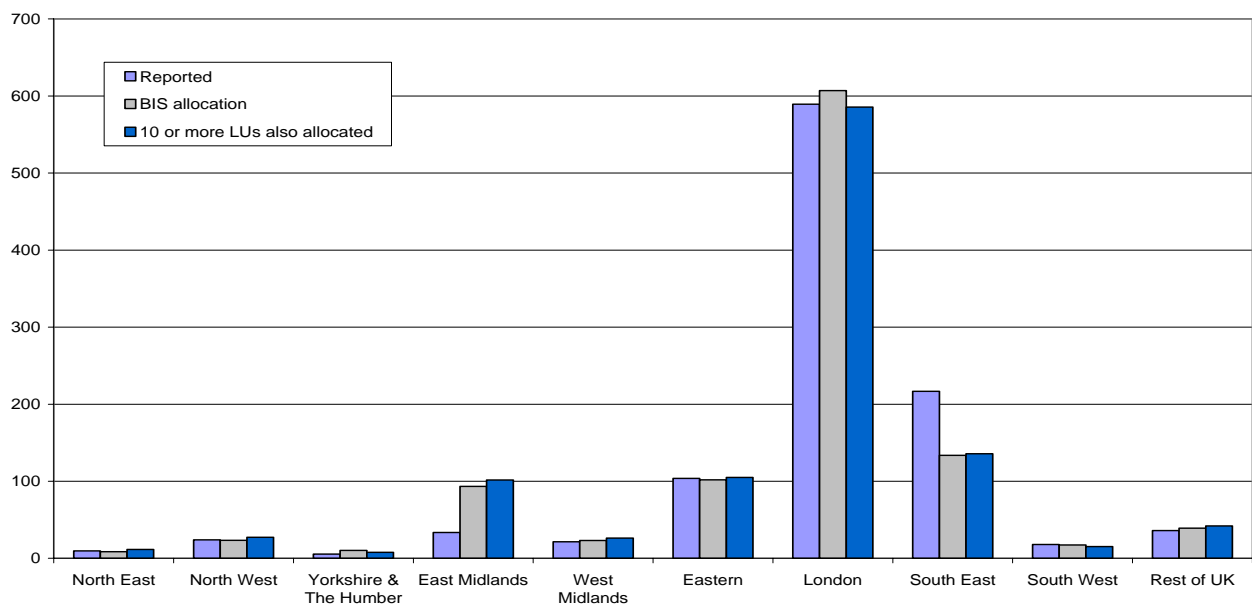
Percentages



Source: BIS analysis of ONS International Trade in Services (ITIS) survey

Figure 5 Comparison of actual and BIS allocation methods, 1999¹

£ thousands



Source: Supplementary survey to identify exporting local units (LU) in ITIS sample, 1999

Note

¹ Based on 74 returns

For these companies, **Figure 5** shows the reported regional allocation compared with that based on the allocation used in the BIS analysis. Considering the low number of returns, it is considered that there is reasonable agreement between the reported values and the BIS allocation method. Only 10 of the companies had 10 or more LUs which in the BIS method are now allocated to the reporting unit. Figure 5 also shows the impact of allocating these exports to each LU using the employment. The impact is minimal, although this cannot be construed that allocating to the RU is necessarily correct.

Results for regional exports of services analysis

Tables 3 and **4** show for each service product that has been regionalised, the 2008 value and share as a percentage of its total UK service exports. The data can be used to show the relative size of exports between regions for a particular product or between products within a region. The analysis covers about 30 per cent of UK exports of services.

There can be considerable variability between years for a particular product and region. This can be due to changing patterns in exports of services, where individual companies obtain new or end existing export contracts. It may also reflect the level of reliability of the data, partly due to use of a sample survey for an activity that is not normally distributed across companies and partly due to the apportionment method.

Table 4 shows that exports of services are dominated by London and the South East regions. This is shown on a map of the UK regions in **Map 1** for the aggregated value of the service products that have been regionalised. In 2008 London and the South East exported 42 and 27 per cent of the share with the East, North West and Rest of the UK having a share of 8, 5 and 6 per cent respectively. The remaining regions exported less than 5 per cent of the share.

While short term annual variations may be somewhat volatile, it is possible that longer term comparisons will be more reliable. Between 2001 and 2006 the share in London, South East and East have decreased by 6, 3 and 2 percentage points respectively with most of the other regions increasing their share by between 1 and 3 percentage points. This gives some evidence that the gap is decreasing across the regions.

In order to assess whether this trend is still valid when differences in population are taken into account, **Figure 6** shows the regionalised service export value per economically active adult, indexed to UK=100 for each year. Over the five year period between 2001 and 2006 the index in London, South East and East has decreased by 40, 20 and 15 index points respectively with most of the other regions increasing by between 15 and 25 index points.

Table3 **Regional value¹ of exports of selected services, 2008**

£ millions in current prices

Government Office Region (GOR)											
Service	North East	North West	Yorkshire & Humber	East Midlands	West Midlands	Eastern	London	South East	South West	Rest of UK	UK
Table 3.4											
Communications Services	*	*	20	*	190	155	2,165	1,420	165	25	4,260
Table 3.7											
Computer and Information	15	95	90	100	75	485	2,965	3,015	170	250	7,260
Table 3.8											
Royalties and Licence Fees (part ²)	320	605	80	175	115	370	1,340	2,765	530	125	6,425
Table 3.9											
Other business services (part ³)											
Merchanting and other trade related services	30	155	50	55	40	100	2,000	310	30	120	2,890
Legal and accounting	30	*	60	*	50	95	3,835	190	70	115	4,865
Business management & consulting	105	310	175	60	155	470	4,210	1,270	360	430	7,545
Advertising and Market Research	5	80	55	10	55	90	2,015	250	40	30	2,630
Research and development	120	525	175	295	150	1,245	435	2,200	70	465	5,680
Architectural, surveying and construction ⁴	*	80	55	55	*	75	375	630	50	350	1,770
Engineering & technical services ⁵	295	405	85	165	85	1,095	1,325	2,060	470	1,270	7,255
Services between related enterprises	75	145	90	95	85	220	2,460	1,130	235	320	4,855
Services Not Regionalised											115,380
Total											170,820

Source: BIS analysis of the ONS International Trade in Services (ITIS) survey

Notes

1 Figures are not National Statistics and may not be accurate to the level shown. Regional data and UK totals are rounded to the nearest £5 million and are adjusted to be consistent with Tables 3.1, 3.4, 3.7, 3.8 and 3.9 in the 2010 Pink Book.

2 Excluding Film and television royalties and license fees, see Table 3.8 in the 2010 Pink Book

3 Excluding other miscellaneous business services, see Table 3.9 in the 2010 Pink Book

4 Construction figures from Table 3.1 in the 2010 Pink Book have been combined with figures for Architectural and surveying from Table 3.9

5 Also includes operational leasing and agricultural, mining and on-site processing

* Disclosive data, not available for publication

Table 4 **Regional share¹ of exports of selected services (current prices), 2008**

Percentages

Service	Government Office Region (GOR)										
	North East	North West	Yorkshire & Humber	East Midlands	West Midlands	Eastern	London	South East	South West	Rest of UK	UK
Table 3.4											
Communications Services	*	*	0%	*	5%	4%	51%	33%	4%	1%	100%
Table 3.7											
Computer and Information	0%	1%	1%	1%	1%	7%	41%	42%	2%	3%	100%
Table 3.8											
Royalties and Licence Fees (part ²)	5%	9%	1%	3%	2%	6%	21%	43%	8%	2%	100%
Table 3.9											
<i>Other business services (part³)</i>											
Merchanting and other trade related services	1%	5%	2%	2%	1%	3%	69%	11%	1%	4%	100%
Legal and accounting	1%	*	1%	*	1%	2%	79%	4%	1%	2%	100%
Business management & consulting	1%	4%	2%	1%	2%	6%	56%	17%	5%	6%	100%
Advertising and Market Research	0%	3%	2%	0%	2%	3%	77%	9%	2%	1%	100%
Research and development	2%	9%	3%	5%	3%	22%	8%	39%	1%	8%	100%
Architectural, surveying and construction ⁴	*	5%	3%	3%	*	4%	21%	36%	3%	20%	100%
Engineering & technical services ⁵	4%	6%	1%	2%	1%	15%	18%	28%	6%	18%	100%
Services between related enterprises	1%	3%	2%	2%	2%	4%	51%	23%	5%	7%	100%

Source: BIS analysis of the ONS International Trade in Services (ITIS) survey

Notes

1 Figures are not National Statistics and may not be accurate to the level shown. Regional data and UK totals are rounded to the nearest £5 million and are adjusted to be consistent with Tables 3.1, 3.4, 3.7, 3.8 and 3.9 in the 2010 Pink Book.

2 Excluding Film and television royalties and license fees, see Table 3.8 in the 2010 Pink Book

3 Excluding other miscellaneous business services, see Table 3.9 in the 2010 Pink Book

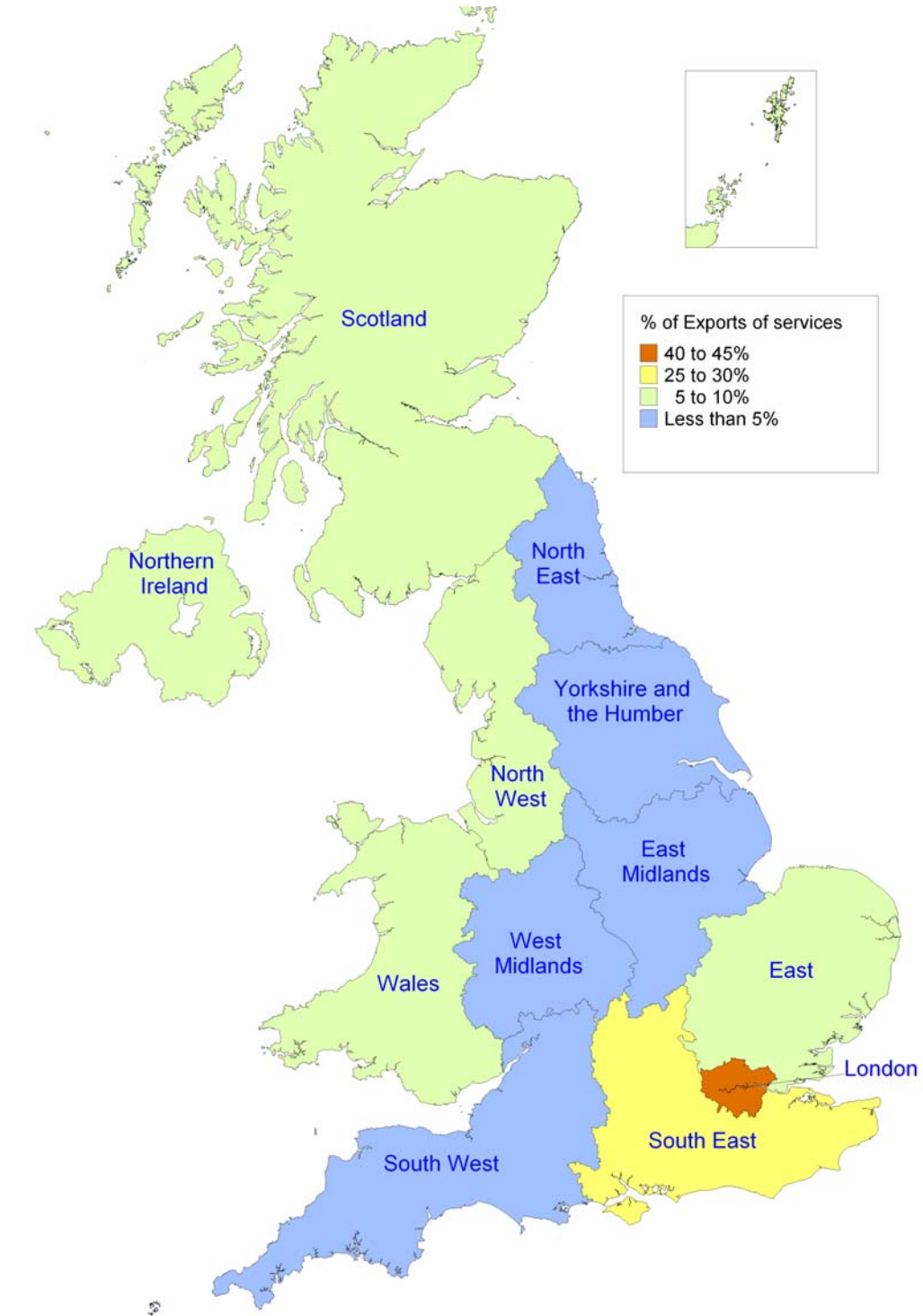
4 Construction figures from Table 3.1 in the 2010 Pink Book have been combined with figures for Architectural and surveying from Table 3.9

5 Also includes operational leasing and agricultural, mining and on-site processing

* Disclosive data, not available for publication

Map1 Regional share of exports of selected services, 2008

Percentages of exports of services

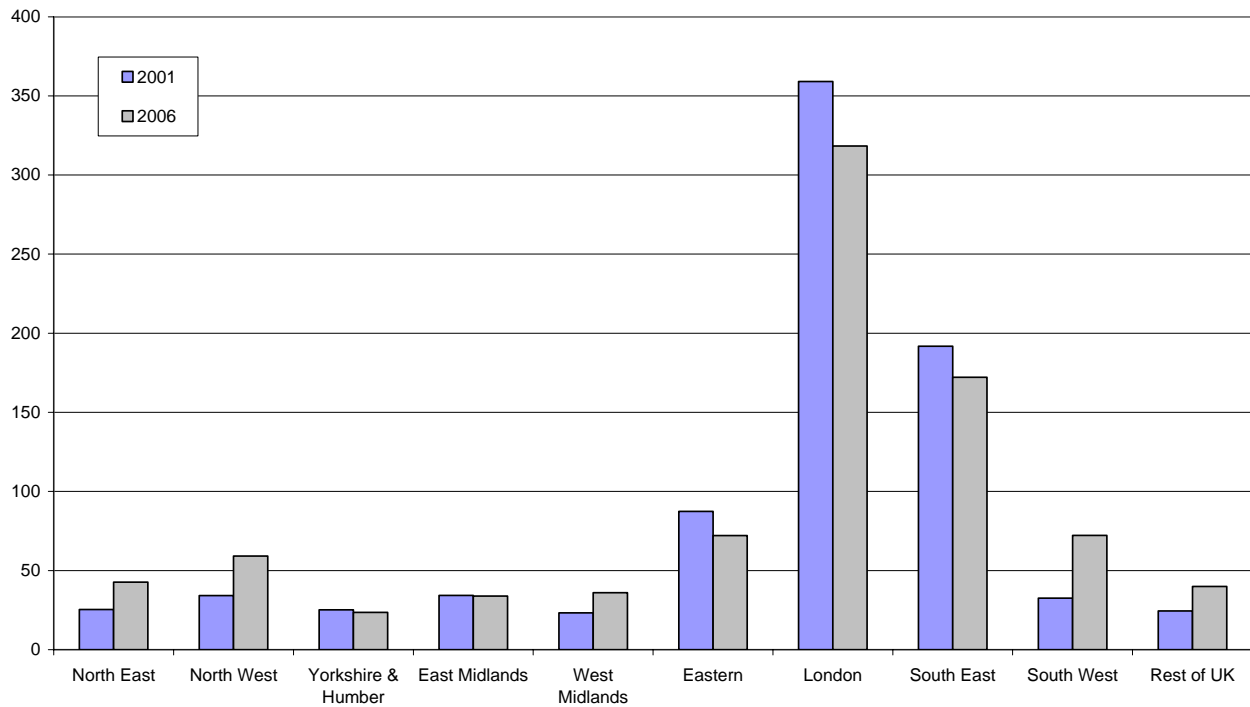


Source: BIS analysis of ONS International Trade in Services (ITIS) Survey

Note: Scotland, Wales and Northern Ireland are combined and treated as a single region

Figure 6 Indexed regionalised exports of services value per economically active adult in 2001 and 2006

Index, UK = 100



Source: BIS analysis of the ONS International Trade in Services (ITIS) survey

Conclusions

The Department of Business, Innovation and Skills (BIS) has demonstrated that a regional exports of services analysis can be undertaken by linking company data back into the Inter-Departmental Business Register (IDBR) and apportioning exports to regions using local unit (LU) employment data.

The analysis is mainly limited to Business services and covers about 30 per cent of UK exports of services. Services such as Travel, Transportation, Insurance and Financial services are not available in a format that allows a regional analysis to be undertaken. Allocating some of these services to a region may be less meaningful since the geographic location of the sales transaction and of the service activity may differ.

Apportioning export value to regions by LU employment data is considered to be appropriate where there are a small number of LUs. As the number of LUs in a company increases this is considered to be less valid, since it is unlikely that all of the LUs will be involved in activity

associated with exports of services. This is particularly so for retail outlets in the Communication and Distribution sectors.

From an analysis of the distribution of the number of LUs in a company and the corresponding number of regions that the LUs have a presence, an allocation method has been adopted that apportions across the LUs where there are less than 10 LUs and allocates to the RU where there are 10 or more LUs. A sensitivity analysis of using an alternative threshold of 5 shows that there is little difference in the regional allocation when using a threshold of 10 or 5. Results from a one-off 1999 survey of panel members give some support for the validity of the allocation method, although this is based on less than 80 company returns.

Annual variations for a particular product and region may be volatile due to changing patterns in exports of services as individual companies obtain new or end existing contracts. It may also reflect the level of the reliability of the data and analysis method.

It is considered that longer term changes will be less volatile and changes in shares over 5 years, between 2001 to 2006, indicate that the share of exports of services in London and the South East are reducing slightly as other regions increase their share.

Contact

elmr@ons.gov.uk

Total public service output, inputs and productivity

Mike G Phelps, Sophia Kamarudeen, Katherine Mills and Richard Wild
Office for National Statistics

Summary

In 2008, public services accounted for approximately 22 per cent of the expenditure measure of Gross Domestic Product (GDP) in the UK. Given the Government's announced intention to cut government spending and given that almost everyone is a potential user of public services such as the NHS or schools there is a particular concern about 'what we are getting for our money'. One important aspect of this, though not the only aspect, is productivity: the quantity of output that is produced divided by the quantity of input used. The Office for National Statistics (ONS) has published periodic assessments of the productivity performance of key public services. This article updates the experimental estimates for all public services which were produced last year (Phelps 2009).

Introduction

Figure 1 shows the year-on-year growth in overall output, inputs and productivity¹. Key points to note are that:

on inputs

- annual input growth, that is growth in the quantity of labour, materials and capital assets used in production, was at an annual average rate of 3.2 per cent over the whole period
- the annual rate of growth in inputs rose from a low point of 1.0 per cent in 1998 to a high of 6.0 per cent in 2002. Between 2002 and 2005 growth rates were at or above the whole period average
- rates fell every year between 2002 and 2007. In 2007 the annual rate was 1.2 per cent
- input growth rose again in 2008, though not back to the very high rates seen between 2002 and 2004

on outputs

- output, measured by activities performed together with some quality adjustments, grew over the whole period at an annual average rate of 2.9 per cent. Over the same period total GDP grew at an annual average rate of 2.7 per cent

- output growth followed a similar profile to input growth, but when input growth was increasing the rate of output growth was generally lower, and as input growth rates fell, output growth rates fell less
- annual output growth was highest at 4.4 per cent in 2002, the same year that input growth was highest. Growth rates fell in subsequent years, reaching a low of 1.3 per cent in 2007
- in 2008 output growth rose compared to the low growth in 2007, to 1.9 per cent but was still well below the growth rates between 2000 and 2004

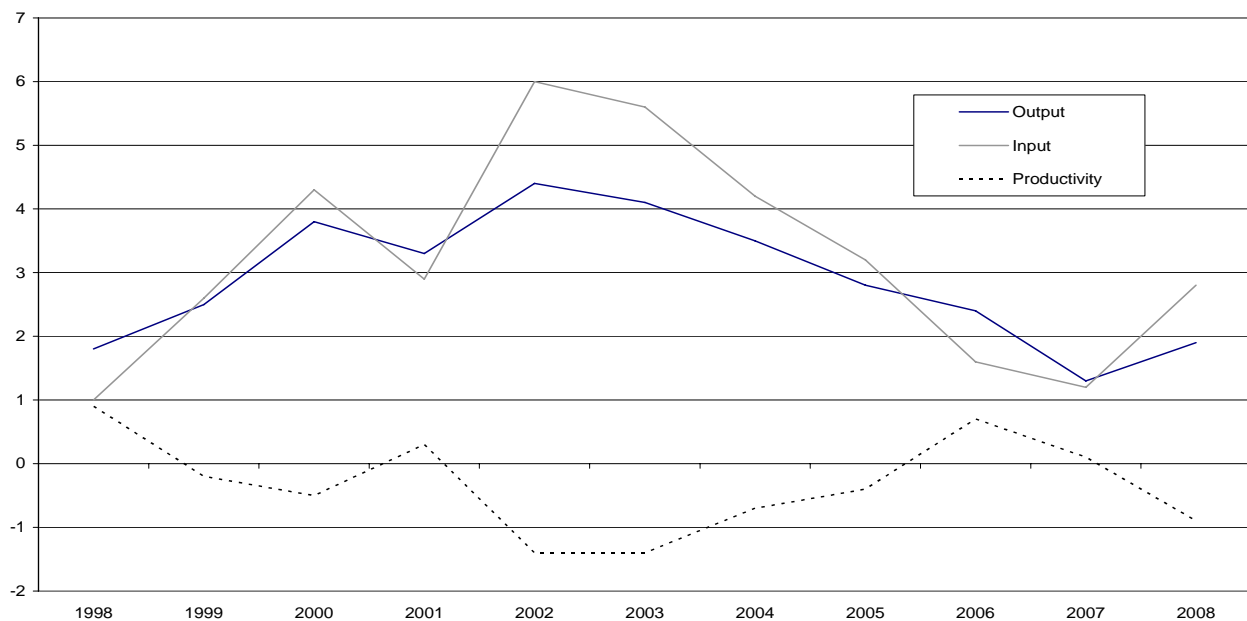
and on productivity

- because inputs grew a little faster than output, productivity over the whole period fell, on average by 0.3 per cent a year
- with the exception of 1998 and 2001, productivity fell in each year until 2006
- in 2006 and 2007 annual productivity in total public services rose, by 0.7 per cent in 2006 and 0.1 per cent in 2007
- however, in 2008, although output growth rose, input growth was faster than output growth, so productivity fell by 0.9 per cent
- the largest annual falls in productivity were in 2002 and 2003, when productivity fell by 1.4 per cent in each year. These were the years when input growth and output growth were at their highest

Figure 1 **Growth in total public service output, inputs and productivity, 1997–2008**

United Kingdom

Annual percentage change



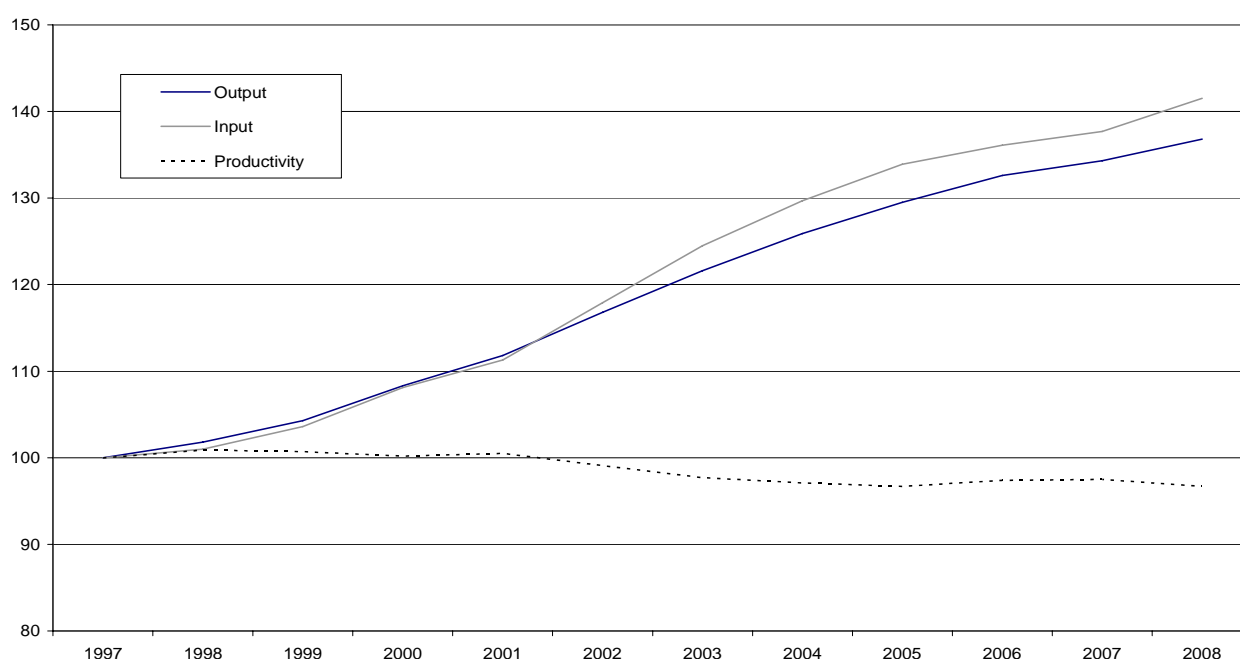
Source: Office for National Statistics

All figures are based on the latest data available in May 2010. Some data for 2008 are partly forecast, because comprehensive measures of actual activity at the required level of detail (for example health procedures performed together with appropriate cost weights) are not yet available for 2008/09.

Figure 2 shows, instead of the annual change, the index for output, inputs and productivity since 1997.

Figure 2 Total public service output, inputs and productivity estimates

United Kingdom
Index numbers 1997=100



Source: Office for National Statistics

Key points to note are that:

- over the period 1997 to 2008, the output of total public services rose by 36.8 per cent, an annual average rate of 2.9 per cent
- the volume of inputs used to provide these services grew by 41.5 per cent over the period, an annual average rate of 3.2 per cent
- as a result, the total public service productivity index fell over the period by 3.3 per cent, an annual average fall of 0.3 per cent

Measuring public service output presents special difficulties, particularly in taking adequate account of quality change. The methods are still being developed, so the estimates here are experimental statistics. For Healthcare and Education services, which account for half of all spending on public services, the estimates include an adjustment for quality. It has not yet been

possible to develop satisfactory quality measures for the smaller spending areas. Absence of quality adjustment can lead to measured output falling if high cost activities are replaced by lower cost activities with improved or equivalent quality (or rising if the converse is true). Errors can also arise if there are changes in the characteristics of the population to whom services are delivered, for example, increasing levels of need of those in care homes.

Background

With increased attention being paid to what is actually provided by public spending it is important to explain how ONS measures the output of public services. There is (usually) no market for public services in which well-defined units of output are bought and sold for well-defined prices. So it is difficult to provide a measure of how much the quantity of service changes over time, or what 'price' should be used to value the quantity, to combine with other sectors of the economy in an overall output total. There is, however, information on the inputs (of labour, goods and services and capital) used to provide the services. The output of public services in the National Accounts, therefore, used to be measured by assuming that output growth was simply equal to the growth in inputs. However since 1998, some parts of public service output have been measured using direct measures of activity such as pupil attendance or health procedures performed as the units of output; and unit cost weights have been used instead of market prices to add the different measures of activity together.

In 2003, the then National Statistician commissioned Sir Tony Atkinson to conduct an independent review of the measurement of government inputs and output in the context of National Accounts (Atkinson 2005). The UK Centre for the Measurement of Government Activity (UKCeMGA) was launched within the ONS in July 2005 to take forward the Atkinson agenda and has since worked to improve measures of public service output. Productivity articles for individual services, have been published previously, and in June 2009 an article was published which brought together, for the first time since Sir Tony Atkinson's review, an overall assessment of the public services collectively. UKCeMGA now produces regular annual articles on productivity in Healthcare and Education, the two largest services, and an annual article assessing all the public services collectively. The first annual article on Education productivity was published in December 2009 (Wild *et al.* 2009); the first annual article on Healthcare in March 2010 (Penaloza *et al.* 2010). This is the second article on public service productivity as a whole, which also provides the latest estimates of productivity by broad service category.

For the purposes of this article, the public services fall into distinct categories:

- the majority (representing 64 per cent of the total by expenditure in 2008) have their output measured largely by **direct output indicators**
- the remainder are currently measured using the '**output = inputs**' convention. That is, the output is deemed to be equal to the volume of the inputs used in generating the output

The output of Healthcare, Education, Adult Social Care, Social Security Administration (SSA) and Public Order and Safety² (POS) is measured directly, using measures of activity, quality adjusted in the case of Healthcare and Education. Children's Social Care uses direct measures for looked-after children and indirect measures for the remainder such as preventative services. The output measurements are for the whole of the UK. However, in some areas it has not yet been possible to directly measure the output in Northern Ireland, Scotland or Wales. For example, the measure of Healthcare activity only uses data for England, Wales and Northern Ireland. In such cases the output index for each service refers to what is measured directly, but the weights used to combine different services into the overall total reflect total UK spending on each service. ONS is working with the Devolved Administrations to improve coverage further.

The services for which the 'output=inputs' convention is used include those services provided collectively to all national residents. The most important of these are the services of the Police and Defence. This is in line with current international National Accounts guidance for collective services. The 'output=inputs' convention is also used for the 'Other'³ category. In some cases, development work is under way to generate direct measures of output for services currently subject to the 'output=inputs' convention. However, that work has not yet reached fruition. The implication of this approach is that productivity for such services is always unchanged.

In large part, the methods underpinning these estimates have been accepted for use in the National Accounts, following ONS' normal rigorous methods approval processes. So the associated estimates themselves are also the ones implicit in the National Accounts. However, there are some exceptions:

- not all of the relevant methods have yet completed the National Accounts approval process. These include quality adjustments for Healthcare and Education, a new measure for labour inputs to defence, new output measures for Prisons, Probation and Children's Social Care.
- in the National Accounts, Further Education is included in the final consumption spending of the Non-Profit Institutions Serving Households (NPISH) sector, not the General Government sector. But most of Further Education for under-19s is funded by public sector grants. This article, therefore, includes estimates for Further Education for under-19s⁴

Estimate of the volume of output

What is being measured?

This section reports estimates of the growth in the output of public services from 1997 to 2008. It uses the most up-to-date methods and quality adjustments, whether in National Accounts or still in development. More detail on the output measures can be found in the relevant productivity articles produced by UKCeMGA. For Healthcare see Penaloza *et al.* (2010), Education (Wild *et al.* 2009), Adult Social Care (ONS 2007), and SSA (ONS 2008). Methods have recently been improved for Prisons (Baird and Rowlinson 2010), for Probation (Baird 2010) and Children's Social Care (Phelps 2010a).

Estimates used are the latest available as at May 2010. Healthcare output for 2008 is thus a forecast based on only the first quarter of 2008 (the remaining quarters falling in the subsequent

financial year). The next Healthcare productivity article will incorporate estimates based on the full calendar year. In some other areas the 2008 estimates are also partly forecast. Output data for all areas starts in 1997 because that is the earliest date for which the latest data delivered to Eurostat broken down by Classification of Functions of Government (COFOG) for inputs (ONS 2009) are available on a consistent basis.

What is included and how are the parts combined?

The different individual service output indices are combined together into a single overall index using weights based on relevant service spending as a proportion of total General Government Final Consumption Expenditure (GGFCE), plus that part of Further Education dealing with under-19s (GGFCEplusFE).

Table 1 General government final consumption expenditure weights by service¹, 1997–2008

United Kingdom

Percentages

	Healthcare	Education	Adult social care	Social security administration	Children's social care	Public order & safety	Police	Defence	Other	Total
1997	27.6	18.9	5.8	2.2	1.9	4.3	5.5	15.1	18.8	100
1998	28.3	19.0	5.9	2.1	1.9	4.2	5.5	14.3	18.7	100
1999	28.7	19.1	5.9	2.2	2.0	4.5	5.3	13.1	19.1	100
2000	28.4	19.1	6.0	2.3	2.0	4.7	5.2	13.5	18.8	100
2001	28.8	19.6	5.9	1.9	2.1	4.5	5.6	12.4	19.2	100
2002	29.0	19.7	6.1	1.8	2.1	4.4	5.6	12.3	18.9	100
2003	29.3	19.2	6.3	2.2	2.2	4.5	5.5	12.4	18.4	100
2004	29.8	18.9	6.5	2.0	2.3	4.5	5.5	11.6	18.8	100
2005	30.1	19.3	6.5	2.0	2.3	4.5	5.5	11.4	18.5	100
2006	31.0	19.1	6.4	1.7	2.4	4.3	5.4	11.5	18.2	100
2007	31.5	19.6	6.4	1.6	2.4	4.3	5.5	10.7	18.1	100
2008	31.6	20.1	6.4	1.6	2.4	4.3	5.2	11.0	17.4	100

Source: Office for National Statistics

1. Includes that part of Further Education dealing with under-19s

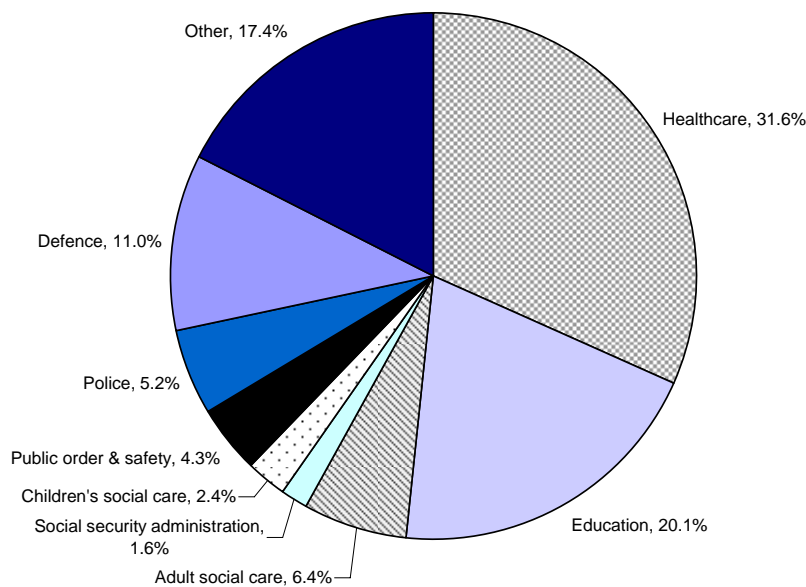
Table 1 illustrates movements in these proportions between 1997 and 2008. The most notable change is the rise in the share of Healthcare spending from 27.6 per cent of the total in 1997 to 31.6 per cent in 2008 (with most of the rise occurring between 1997 and 2006), broadly matched by the fall in the share of Defence spending from 15.1 per cent to 11.0 per cent over the same period. The share of Education spending also rose, from 18.9 per cent in 1997 to 20.1 in 2008, with

most of the rise in 2007 and 2008. Elsewhere there were rises of approximately half a percentage point in the share of both Adult and Children's Social Care, and a fall in the share of spending on Social Security Administration, Public Order and Safety and Other.

The breakdown of the 2008 values is illustrated in **Figure 3**. Healthcare is the largest identified component of GGFCEplusFE, followed by Education and Defence. Adult Social Care, POS and Police also account for substantial proportions of GGFCEplusFE. There is also a substantial 'Other' category.

Figure 3 General government final consumption expenditure weights by service, 2008

United Kingdom
Percentages



Source: Office for National Statistics

What measures of output are used?

Most of the direct measures are cost weighted activity indices. For example, Healthcare output largely consists of activities divided into Healthcare Resource Groups (HRGs) – health procedures of a similar type, and in Education the basic unit is pupil attendances.

Which areas are quality-adjusted?

The output figures for Education are quality-adjusted using GCSE scores (Standard grades in Scotland) over the whole period (Wild *et al.* 2009). The Healthcare output figures are quality-adjusted for the period 2001 to 2008 (using an estimate for 2008). The overall adjustment incorporates adjustments for patient experience, reflecting how patients are treated; clinical outcomes in general practice; and health effects, measuring impact in terms of life expectancy, health gains, survival rates and waiting times (Penaloza *et al.* 2010).

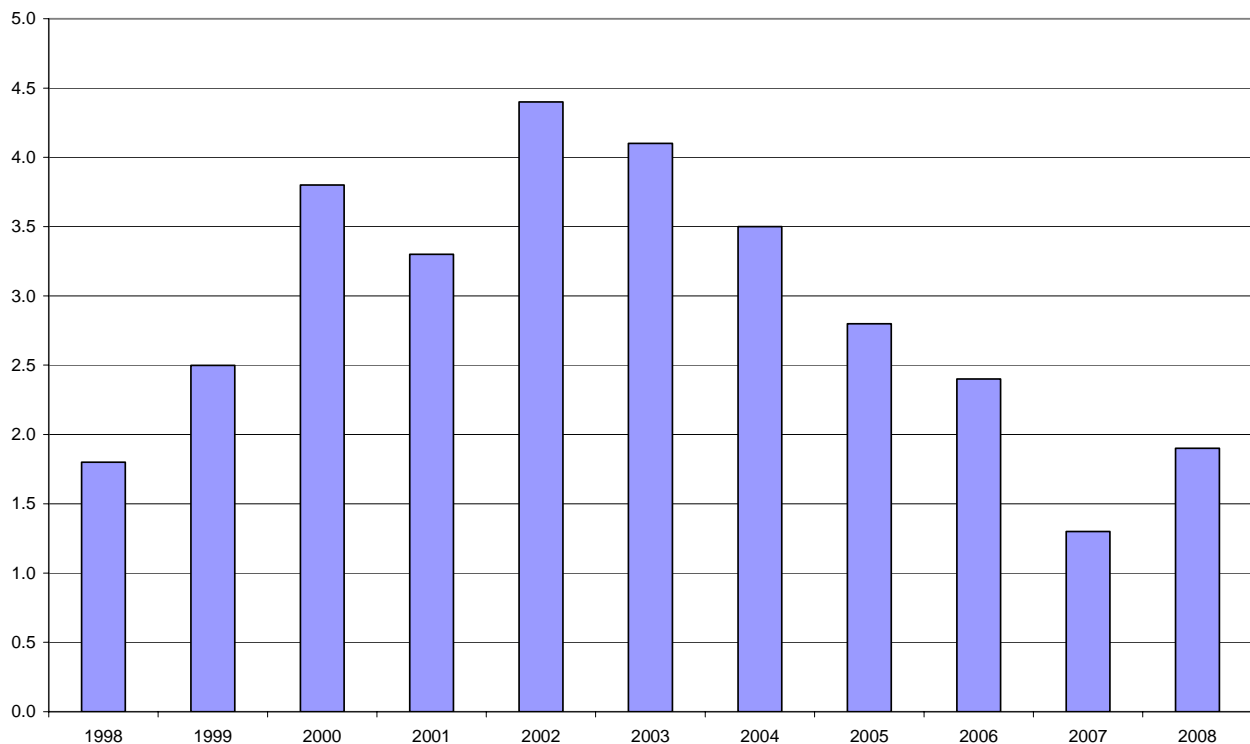
There are no further quality adjustments. For certain areas this is likely to lead to underestimation of output. For example, education may lead to improved wider outcomes that a simple GCSE-adjusted pupil attendance measure cannot capture, such as improved child health or improved outcomes in later life not related to exam attainment.

How much has overall output grown?

Figure 4 shows the year-on-year growth in overall output.

Figure 4 **Growth in total public service output, 1997–2008**

United Kingdom
Percentages



Source: Office for National Statistics

Key points to note are:

- from 1997 to 2008, the total public service output index increased by 36.8 per cent (see table 2.2), an average of 2.9 per cent a year
- from 2000 to 2004 annual growth was always above the average of 2.9 per cent, and below the average in all other years
- output growth was particularly high in 2002 and 2003 with annual growth of 4.4 per cent and 4.1 per cent respectively
- from the peak in 2002 growth slowed in every year to 2007, where it reached 1.3 per cent
- in 2008 growth rose again, to 1.9 per cent, still below the average for the whole period

Which services grew fastest?

Table 2 shows the index of outputs for each service and for total public services. The last row of the table shows the mean annual average growth rates over the whole period.

Table 2 **Total public service output estimates by service, 1997–2008**

United Kingdom

Index numbers 1997=100 and mean annual percentage change

	Healthcare	Education	Adult social care	Social security administration	Children's social care	Public order & safety	Police	Defence	Other	Total
1997	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1998	103.9	103.1	102.4	98.4	118.9	101.3	99.6	96.3	101.2	101.8
1999	107.4	106.5	101.6	97.5	136.7	102.5	98.5	91.9	108.4	104.3
2000	112.7	108.4	102.6	96.1	151.0	103.0	98.0	98.4	113.3	108.3
2001	118.8	110.2	104.5	94.3	166.9	106.2	99.9	94.7	121.7	111.8
2002	124.9	113.4	112.0	94.6	179.1	104.2	103.4	100.5	127.5	116.8
2003	131.7	115.3	116.1	97.1	188.2	107.2	108.4	107.9	131.2	121.6
2004	138.2	117.7	118.8	100.5	193.8	104.8	113.2	106.9	141.2	125.9
2005	145.1	120.7	120.1	97.1	197.7	105.3	115.5	107.6	145.5	129.5
2006	150.2	123.2	121.4	98.4	197.1	106.3	118.2	111.7	147.4	132.6
2007	156.1	126.3	118.8	98.0	199.3	106.7	120.0	107.2	147.9	134.3
2008	162.7	128.8	114.8	102.8	192.4	108.8	118.7	111.5	147.3	136.8
Mean(%)	4.5	2.3	1.3	0.3	6.1	0.8	1.6	1.0	3.6	2.9

Source: Office for National Statistics

Key points to note are:

- over the whole period 1997-2008, Children's Social Care grew the fastest, by 92.4 per cent in total, an annual average of 6.1 per cent
- Healthcare output had the next highest growth. Over the whole period it grew by 62.7 per cent, with an annual average growth of 4.5 per cent
- the omnibus 'Other' category, including for example Environmental Protection and General Public Services, grew in total by 47.3 per cent, an annual average of 3.6 per cent
- Children's Social Care, Healthcare and 'Other' were the only services whose output grew faster than the public service total
- over this period GDP as a whole grew at an annual average rate of 2.7 per cent
- there was one more service which grew faster than GDP, though more slowly than public services in total. This was Education, whose output grew in total by 28.8 per cent, an annual average growth of 2.3 per cent. Education output is strongly affected by the number of school age children, which has been little changed over the period, though academic attainment has improved
- the output of all the remaining categories grew, though more slowly
- the below average growth of Adult Social Care may reflect the failure of the measure to account for an increasingly complex case mix and a shift from residential care to cheaper care provided at home

Contributions to growth

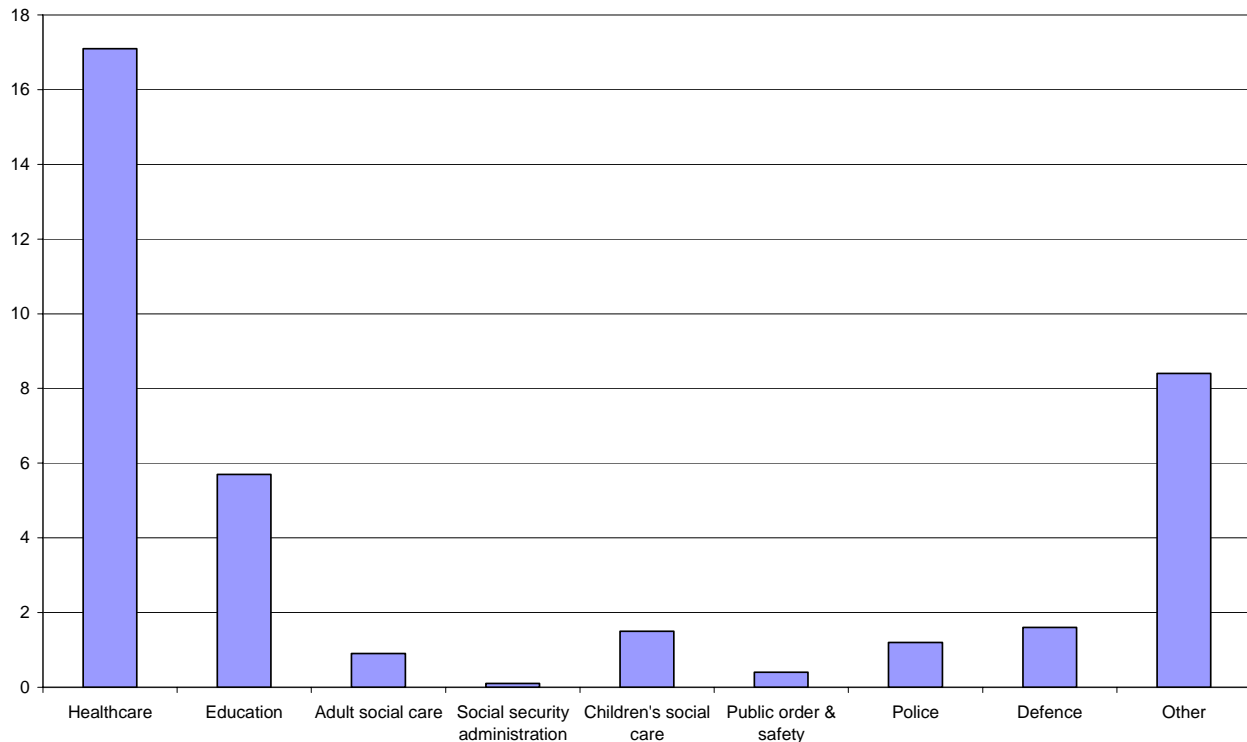
The fastest growing individual services do not necessarily make the biggest difference to the total growth of all the services, because they may only account for a small share in the total when weighted by expenditure. **Figure 5** shows the contribution each service makes to the growth in the total between 1997 and 2008, taking account of its individual share as well as its individual growth rate.

Of the total 36.8 percentage change:

- Healthcare made the largest contribution of 17.1 percentage points, almost half the total, reflecting both its large share in the total and its high individual growth rate
- the next largest contribution is the omnibus 'Other' category, with 8.4 percentage points
- Education contributed 5.7 percentage points, reflecting its relatively large share
- the remaining services made small contributions of 1.6 percentage points or less
- the low share of Children's Social Care in total spending offsets its high individual growth rate, such that it contributes 1.5 percentage points to the total

Figure 5 Contribution to growth in total public service output by service, 1997–2008

United Kingdom
Percentage points



Source: Office for National Statistics

Estimates of the volume of inputs

What is being measured?

This section reports estimates of the growth in the volume of inputs used in providing public services: that is the amount of quality-adjusted labour, goods and services and capital (usually capital consumption). Within each category different kinds of input, for example teachers and teachers' assistants, are calculated separately and weighted together using appropriate weights to account for the differences in 'quality'. An overall index of inputs to public services as a whole is calculated by combining the various inputs using the proportions of expenditure in Table 1 as weights.

Input should ideally be measured directly (OECD 2001), for example, using hours worked or a measure of staff numbers in the case of labour input. Where data do not allow for a direct measure of inputs a volume measure can be derived by dividing a figure for the value of spending on an input by an appropriate estimate of the price of the input (the deflator)⁵.

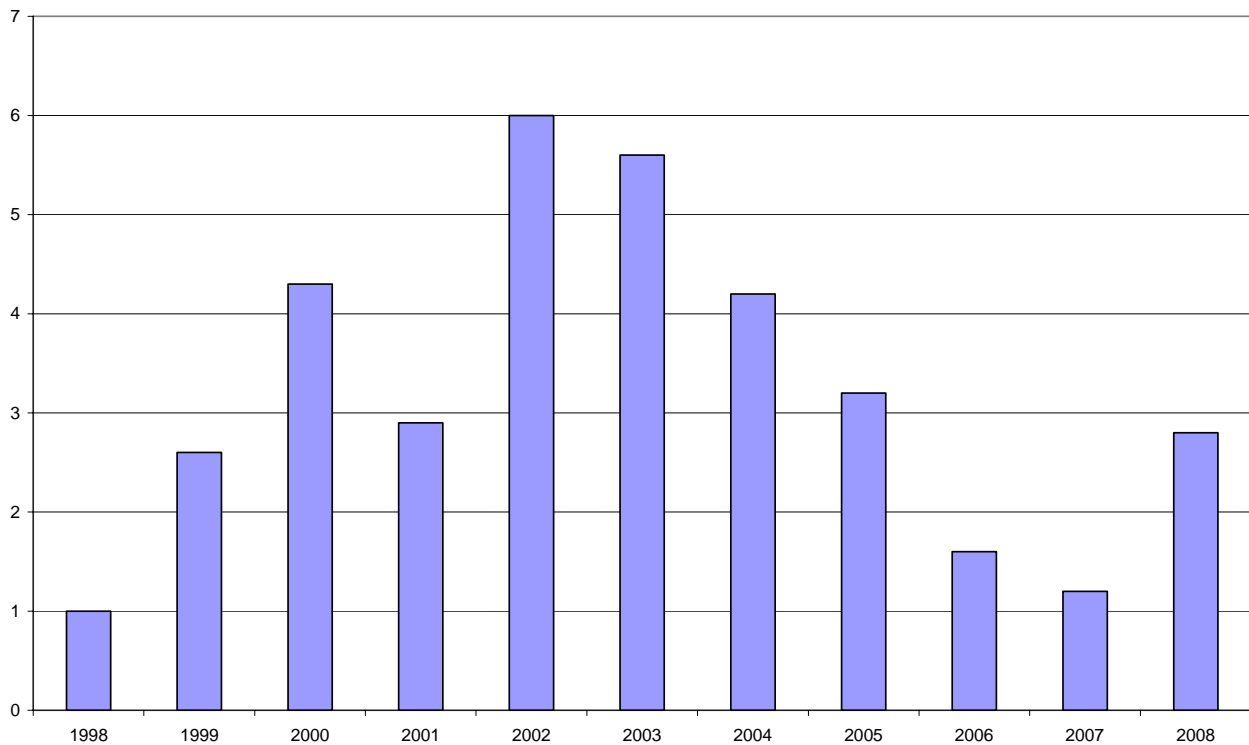
For the services where output was assumed to be the same as inputs, inputs were usually measured by deflating relevant expenditure by some appropriate price index. However, in some areas, notably defence labour, inputs are measured directly. ONS has recently published new estimates of defence labour inputs (Kamarudeen 2010) based on differentiating labour inputs. These are included in this article.

How much have inputs grown?

Figure 6 shows the year-on-year growth in overall inputs.

Figure 6 Growth in total public service inputs, 1997–2008

United Kingdom
Percentages



Source: Office for National Statistics

Key points to note are that:

- over the period 1997 to 2008, the volume of total public service inputs increased by 41.5 per cent (see table 3.1), an annual average increase of 3.2 per cent
- over the same period GDP grew at an annual average rate of 2.7 per cent
- input growth was particularly high in 2002 and 2003, with annual growth rates of 6.0 per cent and 5.6 per cent respectively, but was on or above average in every year between 2000 and 2005, apart from 2001
- input growth reduced from its peak in 2002 in each succeeding year until 2007, when input growth was 1.2 per cent

- in 2008 input growth picked up again, to 2.8 per cent, but remained below the overall average

In which services did inputs grow fastest?

Table 3 shows the index of inputs for each service and for total public services. The last row of the table shows the annual growth rates over the whole period.

Table 3 Total public service inputs estimates by service, 1997–2008

United Kingdom

Index numbers 1997=100 and mean annual percentage change

	Healthcare	Education	Adult social care	Social security administration	Children's social care	Public order & safety	Police	Defence	Other	Total
1997	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1998	104.4	101.3	100.7	95.2	104.8	95.7	99.6	96.3	101.2	101.0
1999	107.5	102.4	104.0	102.5	118.1	104.8	98.5	91.9	108.4	103.6
2000	113.2	104.2	106.2	108.1	122.0	113.5	98.0	98.4	113.3	108.1
2001	118.0	108.5	108.7	95.8	128.3	112.4	99.9	94.7	121.7	111.3
2002	126.7	114.3	117.6	97.2	139.4	118.2	103.4	100.5	127.5	117.9
2003	135.7	116.4	127.0	122.4	153.7	124.9	108.4	107.9	131.2	124.5
2004	142.4	120.7	132.9	113.5	166.4	131.6	113.2	106.9	141.2	129.7
2005	149.4	124.7	133.8	120.2	172.3	133.9	115.5	107.6	145.5	133.9
2006	152.3	127.6	133.7	105.1	182.7	132.0	118.2	111.7	147.4	136.1
2007	158.7	130.5	132.4	95.8	183.7	130.3	120.0	107.2	147.9	137.7
2008	166.5	134.7	135.5	96.1	188.8	133.7	118.7	111.5	147.3	141.5
Mean(%)	4.7	2.7	2.8	-0.4	5.9	2.7	1.6	1.0	3.6	3.2

Source: Office for National Statistics

Key points to note are:

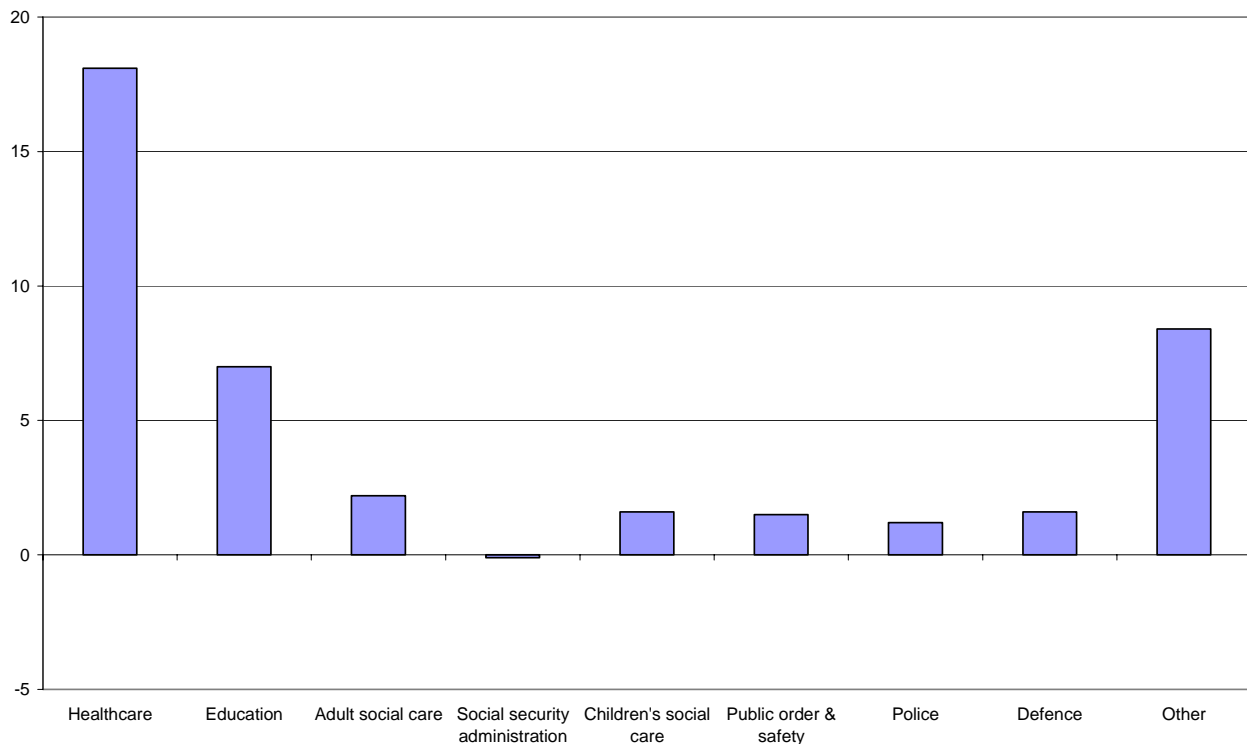
- inputs have risen fastest in the areas where output growth has also been the fastest, Children's Social Care and Healthcare
- Children's Social Care inputs increased by 88.8 per cent, an annual average of 5.9 per cent
- Healthcare inputs increased by 66.5 per cent, an annual average of 4.7 per cent
- these were the only directly-measured or partly directly-measured areas in which inputs increased faster than the public service average, though inputs increased in all areas
- in Social Security Administration inputs actually fell, by 3.9 per cent over the whole period, an annual average fall of 0.4 per cent

Contributions to growth

As with output, the fastest growing individual services do not necessarily make the biggest differences to the total inputs growth of all the services, because they may only account for a small share in the total. **Figure 7** illustrates the contribution each service makes to the growth in the total between 1997 and 2008, taking account of its individual share as well as its individual growth rate.

Figure 7 Contribution to growth in total public service inputs by service, 1997–2008

United Kingdom
Percentage points



Source: Office for National Statistics

Of the growth in the total inputs index of 41.5 per cent:

- Healthcare contributed 18.1 percentage points, reflecting both the strong growth in inputs and the high share of total spending
- the 'Other' category contributed 8.4 percentage points
- Education contributed 7.0 percentage points, reflecting its relatively high share of total expenditure
- the remaining services all contributed relatively small amounts, 2.2 percentage points or less
- Social Security Administration actually made a small negative contribution of 0.1 percentage points, reflecting the overall fall in Social Security Administration inputs dampened by its small share in total spending

- although inputs into Children's Social Care grew the fastest, its contribution to overall inputs growth was quite small (1.6 percentage points) because of its relatively small share in total expenditure

Total productivity growth in public services

What is being measured?

This section reports estimates of productivity. The productivity index is derived by dividing the index of output by the index of inputs and multiplying by 100; productivity change is then calculated using the periodic growth in this index.⁶ These estimates provide information relevant to the measurement of the efficiency with which public services are provided. However, they do not provide direct information on how far (if at all) public service productivity is below best practice (which would require systematic quantitative measures of best practice), or on how much of any productivity change is due to changes in the way services are provided (which would require an estimate of what would have happened if the changes had not been made).

More information on services can be found from other sources such as the reports of the National Audit Office. These offer some information relevant to the above questions. The individual articles on public service productivity from ONS include, in their sections on triangulation, discussions of studies relevant to productivity in the particular service.

The approach taken here is to account, as far as possible, for all inputs. Any changes in the index therefore reflect some combination of changes in the efficiency with which measured inputs are used, returns to scale (where the amount of inputs used per unit of output changes with the scale of inputs) and changes in unmeasured inputs. Note that increases in the quality of inputs, such as labour, will reduce this measure of productivity growth if output does not increase in proportion. This may be a particular problem if improved quality of input is expected to lead to an improved quality of output, which is not fully captured by existing measures. For example, using better trained teachers raises pupil attainment but only at some future date outside the time period covered as there may be lags between changes in inputs and resulting changes in output which may only become apparent over longer periods.

Estimates of total public service productivity

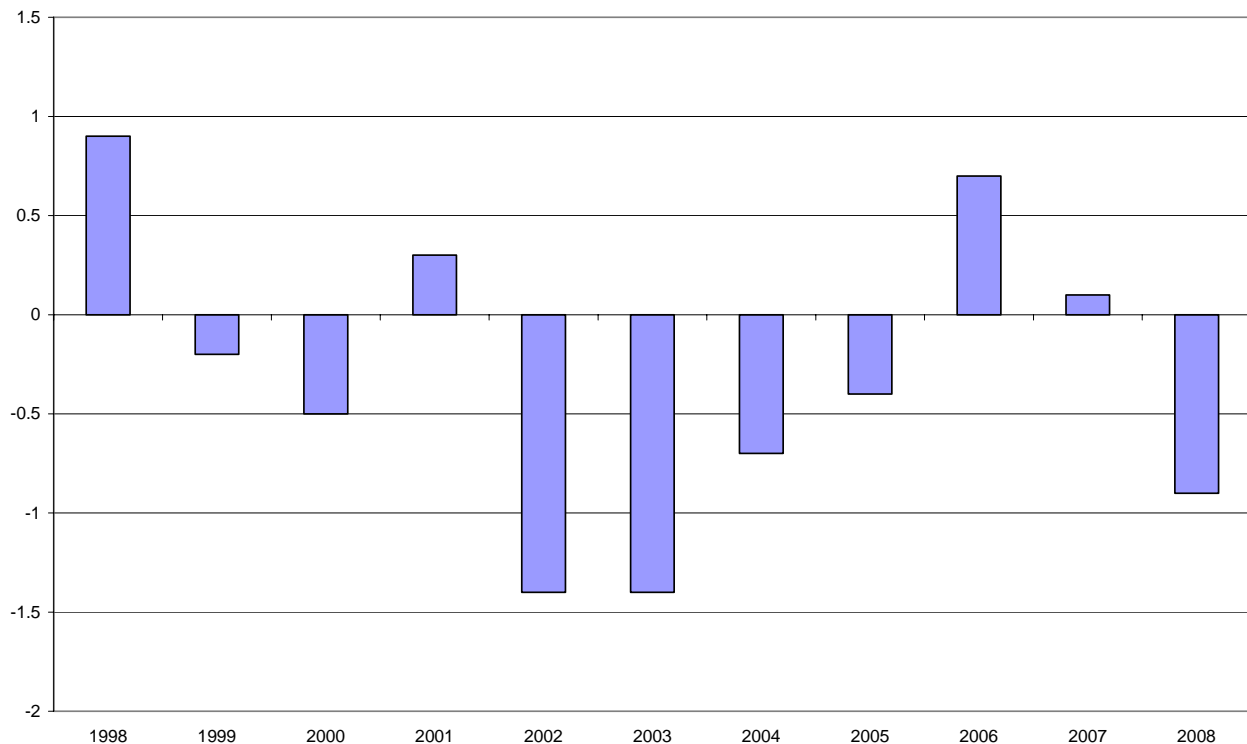
Figure 8 shows the year-on-year growth in overall productivity.

Key points to note are that:

- over the period 1997 to 2008, the total public service productivity index fell 3.3 per cent (see table 4.1, an average of 0.3 per cent a year)
- productivity fell most in 2002 and 2003, by 1.4 per cent in each year, and those were the years when inputs showed the fastest increases
- in 2006 productivity grew by 0.7 per cent and in 2007 by 0.1 per cent
- however in 2008 productivity fell by 0.9 per cent, as the rise in input growth outstripped the rise in output growth

Figure 8 Growth in total public service productivity, 1997–2008

United Kingdom
Percentages



Source: Office for National Statistics

How did productivity growth vary by service?

Table 4 shows the index of productivity for each service and for total public services. The last row of the table shows the annual growth rates over the whole period. For services where 'output=inputs' productivity change, by definition, is always zero.

Table 4 Total public service productivity estimates by service, 1997–2008

United Kingdom

Index numbers 1997=100 and mean annual percentage change

	Healthcare	Education	Adult social care	Social security administration	Children's social care	Public order & safety	Police	Defence	Other	Total
1997	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1998	99.5	101.7	101.7	103.3	113.4	105.8	100.0	100.0	100.0	100.9
1999	100.0	104.0	97.7	95.1	115.7	97.9	100.0	100.0	100.0	100.7
2000	99.5	104.1	96.6	88.9	123.7	90.8	100.0	100.0	100.0	100.2
2001	100.6	101.5	96.1	98.5	130.1	94.6	100.0	100.0	100.0	100.5
2002	98.6	99.3	95.3	97.3	128.4	88.2	100.0	100.0	100.0	99.1
2003	97.1	99.1	91.5	79.4	122.4	85.8	100.0	100.0	100.0	97.7
2004	97.1	97.5	89.4	88.5	116.4	79.6	100.0	100.0	100.0	97.1
2005	97.1	96.8	89.8	80.8	144.7	78.6	100.0	100.0	100.0	96.7
2006	98.6	96.5	90.8	93.6	107.9	80.6	100.0	100.0	100.0	97.4
2007	98.3	96.8	89.7	102.3	108.5	81.9	100.0	100.0	100.0	97.5
2008	97.7	95.7	84.7	107.0	101.9	81.4	100.0	100.0	100.0	96.7
Mean(%)	-0.2	-0.4	-1.5	0.6	0.2	-1.9	0.0	0.0	0.0	-0.3

Source: Office for National Statistics

Key points to note are that:

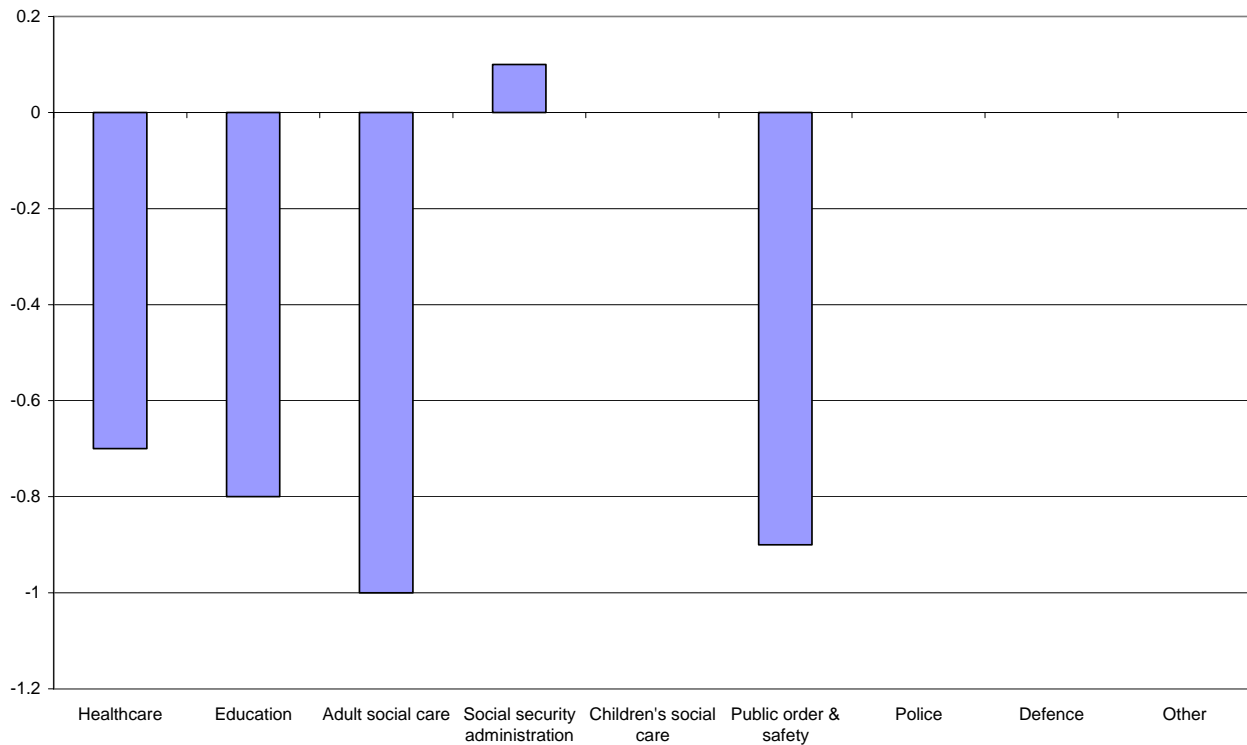
- productivity rose slightly in Children's Social Care, by 1.9 per cent, an annual average rise of 0.2 per cent, solely on the basis of what has happened in the looked-after children's sector, because the rest is indirectly measured and has a neutral effect on productivity
- productivity in Social Security Administration rose by 7 per cent over the period, an annual average rise of 0.6 per cent
- Healthcare productivity fell by 2.3 per cent, an annual average fall of 0.2 per cent
- Education productivity fell by 4.3 per cent, an annual average fall of 0.4 per cent
- Adult Social Care productivity fell by 15.3 per cent, an annual average fall of 1.5 per cent
- Public Order and Safety productivity fell by 18.6 per cent, an annual average fall of 1.9 per cent
- for Police, Defence and 'Other' services productivity was unchanged since 'output=inputs'

Contributions to growth

Figure 9 illustrates how much each service contributed to the total change in productivity between 1997 and 2008, taking account of both how much productivity in the service itself has changed and how important the service is in the total.

Figure 9 Contributions to growth in total public service productivity by service, 1997–2008

United Kingdom
Percentage points



Source: Office for National Statistics

In summary:

- Adult Social Care made the largest contribution, of 1.0 percentage points to the overall fall of 3.3 per cent, though this may reflect the fact that the measure is not quality adjusted
- Public Order and Safety contributed 0.9 percentage points. Again the existing measures in this area are relatively undeveloped and some of this fall may reflect the difficulties in constructing the output measures, as discussed in Section 5.4 below
- Education contributed a fall of 0.8 percentage points, more or less in line with its expenditure share
- Healthcare contributed 0.7 percentage points, less than in proportion to its share of expenditure, reflecting the fact that healthcare productivity has fallen less than the public service average
- Children's Social Care, using the new measure makes no difference to overall productivity
- Social Security Administration offsets the overall fall, by 0.1 percentage points. Its small share in spending offsets the rather larger percentage rise in productivity
- Police, Defence and Other all make no contribution to overall productivity change because, by definition, productivity in these areas cannot change

Comparison with the National Accounts Blue Book 2009

The estimates of output and input in this article are generally consistent with the Blue Book 2009. However there are some exceptions, particularly on the output side. The estimates of output are higher than the estimates in Blue Book. The major differences are:

- there is no quality adjustment for healthcare in the Blue Book, whereas this article includes a quality adjustment from 2001 which, on average, raises healthcare output growth by 0.4 percentage points a year
- the Blue Book has a multiplicative quality adjustment for Education, which increases output by 0.25 per cent a year, whereas this article uses an additive method which adds, on average, around 2.5 per cent a year to Education output
- the Blue Book 2009 does not include the experimental method for the output of Children's Social Care used in this article
- the Blue Book 2009 does not include the changes to the methods of measuring prisons and probation adopted here

Given that the output data in this article are higher than in Blue Book, the productivity estimates headlined in this article are higher than those implied by the Blue Book 2009.

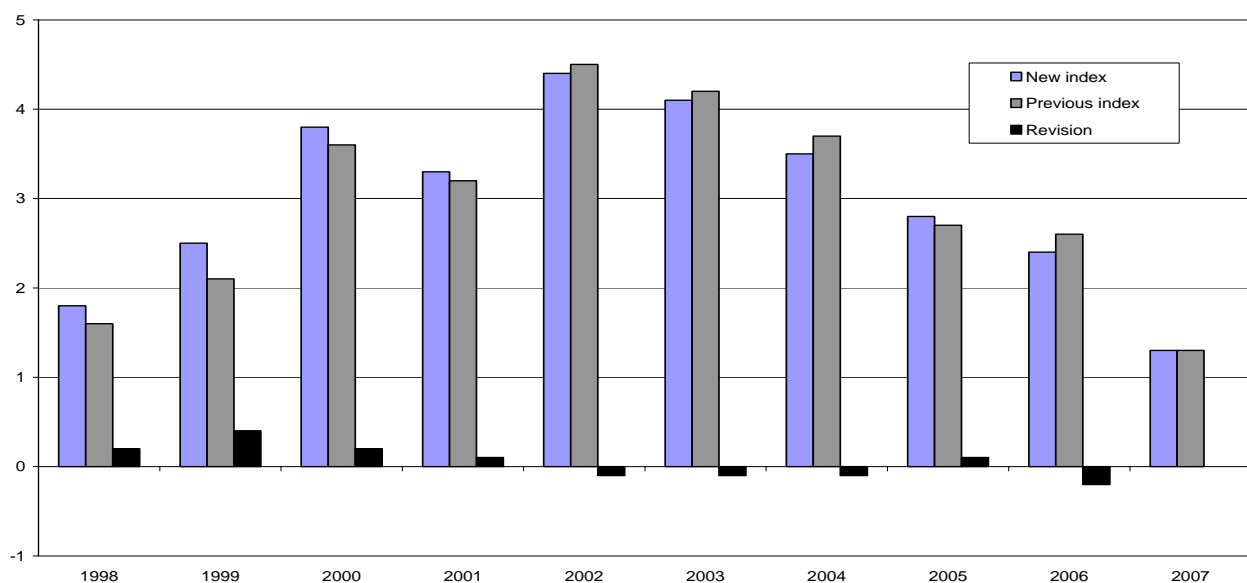
Revisions

Figure 10 shows the revisions to the output series since the article published last year (Phelps 2009). Overall the series has changed very little.

Figure 10 Total public service output indices comparison, 1997–2007

United Kingdom

Annual percentage change

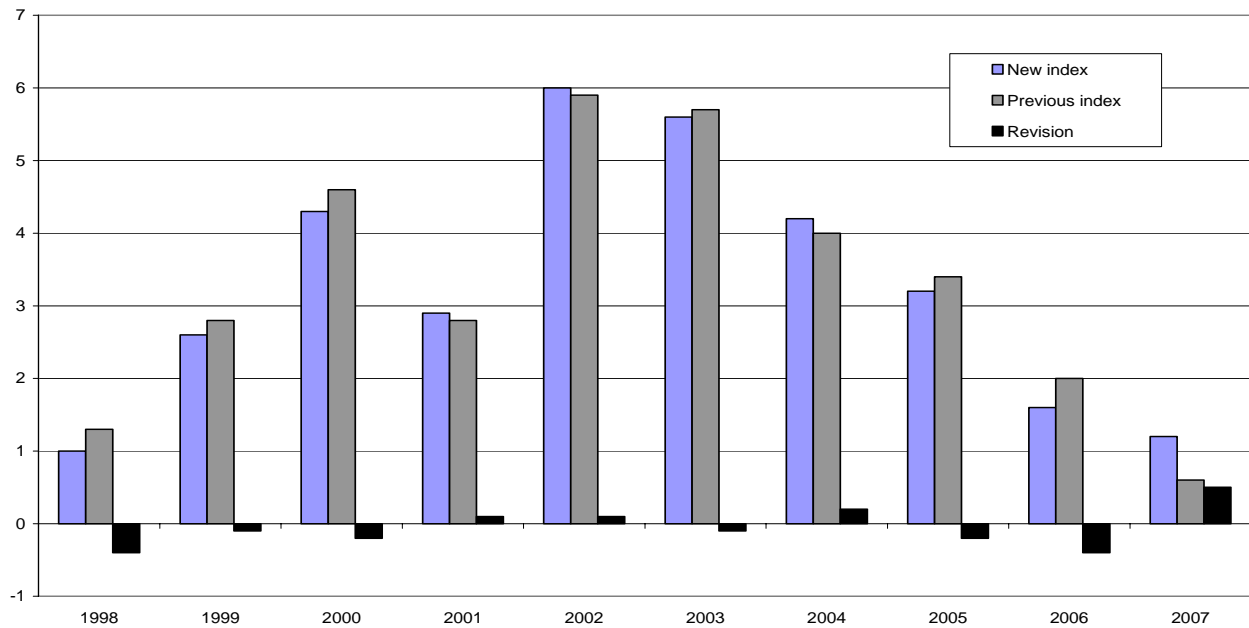


Source: Office for National Statistics

Figure 11 Total public service inputs indices comparison, 1997–2007

United Kingdom

Annual percentage change

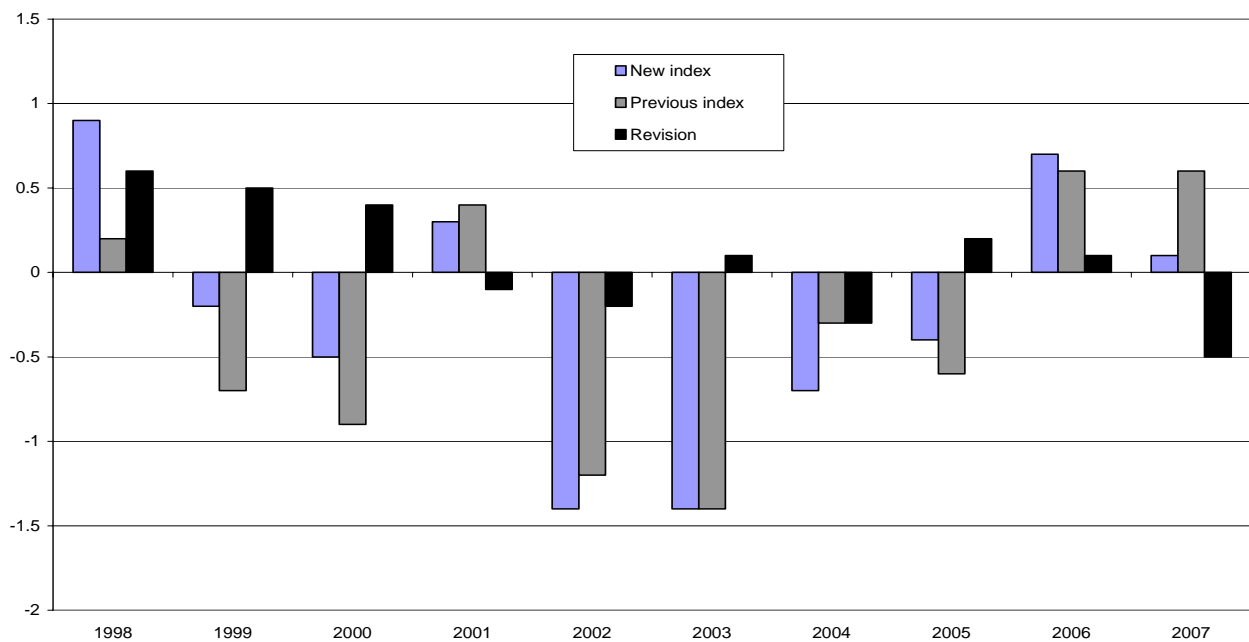


Source: Office for National Statistics

Figure 12 Total service productivity indices comparison, 1997–2007

United Kingdom

Annual percentage change



Source: Office for National Statistics

Figure 11 shows the revisions to the input index since last year's article. Inputs growth has been revised down slightly, largely because of revisions to the underlying expenditure series and to some of the deflators. The net effect of these changes on productivity is very small, see **Figure 12**.

Triangulation

As well as the estimates for public service productivity published in this article ONS also produces experimental statistics of multi-factor productivity (MFP) for the whole economy and for some broad industrial groupings. The most recent estimate are in Long and Franklin (2010). The broad industrial groupings include the group of industries classified as Sections L, M, and N (henceforth LMN): that is, public administration and defence (L), education (M) and health and social work (N). This grouping covers much, but not all of public sector production. Estimates of MFP for the UK for LMN between 1995 and 2008 show an annual average fall of 0.7 per cent, rather more than the estimate of a fall of 0.3 per cent a year for public service productivity presented in this article (see also Phelps 2010b).

However, the LMN productivity estimates differ in their construction from those presented in this article in several ways:

- LMN includes areas that are not covered by estimates in this article, such as private healthcare, private education and veterinary services
- the LMN estimates are based on National Accounts output data and therefore do not include the quality adjustments in this article
- the output of LMN is measured by value-added, whereas the output of publicly-funded services, because it is a component of final spending not an industrial grouping, is measured by gross output (value-added plus intermediate consumption)
- the input measure used in calculating LMN productivity is a weighted average of input of (quality-adjusted) labour and capital services. It excludes intermediate inputs, because it is a value-added measure not a gross output measure
- labour input in the LMN estimates is quality adjusted for skill and experience using qualifications and gender as proxies, following Eurostat conventions, whereas the estimates in this article quality adjust by distinguishing different types of job and weighting by the job specific labour costs
- the LMN estimates begin in 1995, not 1997

For all these reasons the estimates of productivity in this article are not directly comparable with those of LMN. Moreover it can be shown that value-added productivity growth moves proportionately more than gross output productivity growth, the concept measured in this article. Both the gross output MFP growth estimates for public service delivery of this article and the value-added MFP growth estimates for LMN show negative growth. The two sets of estimates are therefore broadly consistent with each other, given the differences in concept and coverage between the measures outlined above.

People also want to compare public sector performance against private sector performance. This is not easy to do. The best approximation to a definition of the private sector is the market sector, that subgroup of industries which sells its output at economically meaningful prices. Some of these industries do in fact provide public services, for example the independent treatment centres providing operations for the NHS. So there is some overlap in coverage between the market sector and the public service provision analysed in this article. More importantly, market sector MFP growth estimates are only available on a value-added basis, using labour inputs quality adjusted as with sectors LMN, described above. And value-added MFP measures, as noted above, move proportionately more than gross output measures. The issues in comparing different estimates of productivity produced by the Office for National Statistics are discussed further in Phelps (2010b).

What Long and Franklin (2010) shows is that market sector multifactor productivity growth grew by 1.0 per cent a year over the period 1995 to 2008. However not all sectors grew at the same rate. Sector OPQ had the largest fall in productivity, an annual average fall of 1.9 per cent. OPQ does include some public sector activities, including refuse collection and libraries and museums. But it also includes a substantial amount of market sector activity, such as hair-dressers, funeral services and laundry services, as well as culture and entertainment and sport (including television and films) and domestic service. OPQ therefore includes a lot of personal services, in which, because of their personal nature, it may be difficult to increase multi-factor productivity.

Two other sectors have also show negative multi-factor productivity growth over the period 1995 to 2008. These are section H, hotels and restaurants, and section K, real estate, renting and business activities, which includes estate agents, letting agents, consultancy, employment agencies and the like. These are all market sector, but also areas where personal service is important, which may make conventionally measured multi-factor productivity growth difficult to achieve. Multi-factor productivity fell by an annual average of 1.3 per cent in section H, and by 0.3 per cent in section K.

Conclusion

Over the whole period 1997 to 2008 total public service output has increased substantially. This largely reflects the increase in the volume of inputs, where growth was particularly high between 2002 and 2004. But the growth in inputs exceeded the growth in output, so over the whole period productivity has not recovered to its 1997 level.

After rising in 2006 and 2007 total public service productivity is estimated to have fallen in 2008. This was not because of a fall in output growth. Output growth in fact rose in 2008 compared to 2007. But input growth increased more.

Notes

1. In all tables and charts, mean refers to the geometric mean

2. The POS category consists of Fire, Courts, Probation and Prisons. Police has been separated, as its output is measured simply by its inputs.
3. The 'Other' category consists of General Public Services, Economic Affairs, Environmental Protection, Housing & Community Amenities and Recreation, Culture & Religion.
4. Higher Education also falls in the NPISH sector, but has more diverse sources of funding. Our estimates exclude Higher Education.
5. These indirect measures are not necessarily the same as measures of real spending, which are derived by dividing spending on an input by an overall price index (such as the GDP deflator or the Consumer Price Index).
6. The measure reported here is not the same as labour productivity growth, which only measures the growth in output per person (or person hour) employed. Output per person (or person hour) may increase because of increases in the amount of capital services or intermediate consumption per person (or person hour) or improvements in the quality of the labour input, rather than through improvements in efficiency. Moreover, since non-labour inputs typically grow rather than decline, growth in this multi-factor measure of productivity will usually be less than growth in labour productivity.

Contact

elmr@ons.gov.uk

References

Atkinson T (2005) 'Atkinson Review: Final Report: Measurement of government output and productivity for the National Accounts', Palgrave Macmillan: Basingstoke.

Baird A (2010) 'Measuring the Output of the Probation Service', Office for National Statistics, available at: www.statistics.gov.uk/cci/article.asp?ID=2454

Baird A and Rowlinson A (2010) 'Measuring the Output of the Prison Service', Office for National Statistics, available at: www.statistics.gov.uk/cci/article.asp?ID=2461

OECD (2001) 'Measuring Productivity', OECD Manual, available at: www.oecd.org/dataoecd/59/29/2352458.pdf

Long and Franklin (2010) 'Multi-factor productivity: estimates for 1994 to 2008', Economic & Labour Market Review, vol 4 no. 9 pp 67–72, available at www.statistics.gov.uk/cci/article.asp?ID=2576

Penaloza M, Wild R, Hardie M and Mills K (2010) 'Public Service Output, Input and Productivity: Healthcare', Office for National Statistics, available at: www.statistics.gov.uk/cci/article.asp?ID=2382

Phelps M and Munro F (2009) 'Total Public Service Output and Productivity', Office for National Statistics, available at: www.statistics.gov.uk/cci/article.asp?ID=2212

Phelps M (2010a) 'Measuring the Output of Children's Social Care: an alternative method for looked after children', Office for National Statistics; available at: www.statistics.gov.uk/cci/article.asp?ID=2476

Phelps M (2010b) 'Comparing the different estimates of productivity produced by the Office for National Statistics', Office for National Statistics; available at: www.statistics.gov.uk/cci/article.asp?ID=2391

Kamarudeen S (2010) 'Measuring Defence Labour', Office for National Statistics, available at: www.statistics.gov.uk/cci/article.asp?ID=2379

Wild R, Munro F and Ayoubkhani D (2009) 'Public Service Output, Input and Productivity: Education', Office for National Statistics, available at: www.statistics.gov.uk/cci/article.asp?ID=2327

Quality-adjusted labour input: new estimates for 1993 to 2008

Alex Turvey

HM Revenue & Customs (formerly Office for National Statistics)

Peter Goodridge

Imperial College London

Mark Franklin

Office for National Statistics

Summary

Quality-adjusted labour input (QALI) is a measure of labour input which takes account of the quality of the workforce as well as volume of hours worked. It provides a more complete picture of the input of labour to the production process than traditional measures, which focus only on the quantity of labour input, and is therefore more suitable for assessing productivity performance. Along with the volume index of capital services, QALI is a key input to multi-factor productivity and growth accounting analyses (see Long and Franklin 2010 for the latest estimates).

This article presents new estimates of QALI for 1993 to 2008, which are the result of significant development work since the previous release (Goodridge 2009). This includes a change to the compositional categories used in the quality-adjustment process, an expansion in industrial detail, and the presentation of a longer time series. This work also fed into the growth accounting dataset used in the NESTA Innovation Index, a joint ONS/Imperial College project to identify the contribution of innovation to economic growth (NESTA 2009).

Introduction

Standard labour productivity measures express growth in output with respect to the volume of labour input, either in terms of employment, jobs or hours worked. The implicit assumption underlying this approach is that labour is homogeneous, as it does not take into account the composition, or quality, of the workforce.

‘As a result an hour worked by a highly experienced surgeon and an hour worked by a newly hired teenager at a fast food restaurant are treated as equal amounts of labour’. OECD (2001)

However, labour is far from homogeneous, and the ‘value’ of an hour worked, or marginal productivity, varies significantly between workers. The quality-adjusted labour input (QALI) series attempts to address this, providing a measure which explicitly recognises the heterogeneity of labour by weighting the volume of hours worked according to the pay shares associated with certain characteristics – qualifications, age, gender and industry – which may be indicative of a worker’s quality.

QALI is therefore a conceptually stronger method for use in productivity and growth accounting analyses, and is a useful tool for assessing the evolution of human capital over time. It is used alongside experimental estimates of capital services (Wallis, Long and Turvey, 2010) to produce multi-factor productivity (MFP) estimates (Long and Franklin, 2010).

This article presents new estimates of QALI for 1993 to 2008. Data are presented for the whole economy, the market sector and for 10 industries.

Methodology

To perform the quality adjustment, hours worked are differentiated into n types of worker (h_1 to h_n) determined by their characteristics: age, educational attainment, industry and gender. The reasons for using these particular characteristics are explained in **Box 1**. The hours worked by these different worker types contribute to total labour input L through a function g .

$$L = g(h_1, h_2, \dots, h_n)$$

Economic theory states that in competitive markets with constant returns to scale, labour will be hired until its marginal cost (wage) equals its marginal revenue product, or marginal productivity. Therefore, when measuring labour input, using income data as a weight takes into account the relative productivity (or ‘quality’) of workers as well as the quantity of hours worked. The assumption that workers are paid their marginal product will hold true even if firms do not behave competitively in the labour market, and is only violated in the case of monopsony, where a firm has a degree of monopoly power in the purchase of labour.

Following the OECD (2001) recommended methodology, the growth in quality-adjusted hours is represented as a Tornqvist index:

$$\frac{\Delta L(t)}{L(t)} = \sum_i \left[\frac{w_i(t) + w_i(t-1)}{2} \right] \frac{\Delta h_i(t)}{h_i(t)}$$

where $w_i(t)$ is the share of total labour income paid to group i in period t , the weight used is the average of $w_i(t)$ and $w_i(t-1)$, and the income shares sum to one. The use of data from the current and previous period to weight the index is a feature of Tornqvist indices, making them more current, or representative, measures (Bell *et al* 2005). A more detailed discussion of index numbers can be found in Goodridge (2007).

Box 1 Labour characteristics

The choice of labour characteristics involves a trade-off between parsimony and data availability, and the objective of capturing significant developments in labour inputs to production. None of the following characteristics represent labour quality in and of themselves, but only as dimensions of the income-share weights.

Age

Age is included as a proxy for work experience. Although imperfect, as it takes no account of periods of unemployment or inactivity, the assumption is that older workers tend to be more productive due to their greater experience, and therefore receive greater compensation for their labour. Alternatively, it has been suggested that younger workers may be more dynamic and innovative than their older counterparts (Bell *et al* 2005). However, if this is true in some cases, then provided labour markets are competitive, these workers will be paid their marginal product and growth in hours will be weighted accordingly.

Gender

Gender is chosen because of the persistent pay differential that exists between males and females, even after holding other factors constant. Although not a driver of quality change itself, it may represent hidden characteristics such as an increased tendency to take career breaks or to fulfil part-time posts that are not as well paid. Therefore, this complements, or improves, the use of age as a proxy for work experience, as well as helping to explain the pay differential. However, if the pay differential instead reflects discrimination, then the assumption that workers are paid their marginal product is violated, resulting in hours growth being weighted incorrectly and the quality adjustment carrying a downward bias. This is a weakness of the model.

Education

This is measured as the highest qualification attained and used as a proxy for skills. Qualifications either act as a signal of ability to employers or they provide the knowledge for specific job requirements. This characteristic is the primary driver of the index. Due to the increasing prevalence of higher degrees and their growing association with higher pay, they are included as a stand-alone category.

Industry

Although primarily included for the observation of industry trends and the use of QALI in industry-level MFP, this category also helps capture inherent differences in skill and productivity that exist between industries. The industry categories chosen are broad partly because industry is self-reported in the LFS, leading to inaccuracy of response, and also because of small sample sizes for some sectors.

Data source

The Labour Force Survey (LFS) is a continuous household survey that covers approximately 53,000 households every quarter. It provides data on the volume of hours worked, and contains series for educational attainment, industry, gender and age, plus pay data, which are used to carry out the quality adjustment. Although the LFS became quarterly in 1992, questions about the respondent's income were not asked until 1993, so the QALI series begins in the first quarter of 1993.

Scaling

To improve consistency with the National Accounts and ONS headline productivity measures, various components of QALI are scaled to ONS aggregates. Specifically:

- gross weekly pay is scaled to National Accounts 'Compensation of Employees' (CoE)
- actual hours worked are scaled to productivity hours¹
- total jobs are scaled to productivity jobs

The first adjustment improves the consistency of the LFS-based data with National Accounts income measures. While the LFS only provides information on wages and salaries, CoE also includes bonuses and income-in-kind and, as such, is a more complete indicator of total remuneration. Additionally, as with other household surveys, LFS microdata include proxy responses, missing responses and inaccurate data. Respondents have particular difficulty recalling their pre-tax income or bonuses accurately; scaling the data helps overcome these issues. Scaling LFS jobs and hours data to the headline productivity jobs and hours series, which use superior business survey-based industry breakdowns, improves the accuracy of industry-level QALI estimates.

Data issues

Approximately 30 per cent of responses in the LFS dataset are proxy responses, given on someone else's behalf. In order to check that this does not cause bias in the estimation of QALI, the quality-adjustment of hours was carried out on personal responses only, and the relationship between adjusted and unadjusted hours remained the same. It was therefore decided to leave proxy responses in the data, since excluding them would create additional problems, such as a reduced sample size and grossing to population totals.

The inclusion of the self-employed poses an issue, as wages for the self-employed are not recorded in the LFS, or any other survey. This is because self-employed people remunerate themselves for a combination of labour and entrepreneurial effort, without distinguishing between the two. In producing QALI, the wages of employees with similar characteristics are used as an approximation for the labour income of the self-employed. This is likely to be an over-estimate (Turvey 2009), but the method used is the most appropriate for such a detailed dataset.

To measure labour's true input to production as accurately as possible, no restrictions have been placed on outliers such as workers that report very high or low responses on hours worked or income. Data on actual hours rather than usual hours are used because, conceptually, it is the former that needs to be measured if we want to measure the actual input of labour to production.

Changes since previous release

Due to constraints imposed by the sample size of the LFS, when performing the quality adjustment there is an inevitable trade-off between the different categories. In particular, a judgement needs to be made whether to prioritise the main compositional categories (education, age and gender) or focus on the industrial breakdown. The approach historically taken for QALI has been to prioritise the compositional breakdown, especially education, which has been found to be the main driver of the index in work by the ONS and the Bank of England (Bell *et al* 2005). In the previous QALI article (Goodridge 2009), the quality adjustment was carried out using eight education levels and six age groups; this meant results could only be produced for six broad industry groupings.

The adjustment groups used for this article do not represent a radical departure from previous work; education remains the principal driver of QALI, and so is still covered in detail. But after consultation with users and development of the series for its use in the Innovation Index (NESTA, 2009), greater emphasis has been placed on the industrial breakdown. Results are now available for 10 industries, to allow for more detailed industry-level multi-factor productivity (MFP) estimates. This has come at the expense of some compositional detail, with education and age being reduced to six and three groups, respectively. The compositional and industrial breakdowns used for the current and previous QALI estimates are summarised in **Table 1**.

In the case of education, merging the groups NVQ2, NVQ1 and 'other qualifications' is intended to reduce what is possibly an unnecessary level of detail, as there is little discernible difference in earnings amongst workers in these groups. The loss of detail on age is potentially more significant, as there is a greater pay differential observed across age ranges, especially between workers aged 16–19 and 20–29. However, this was judged a necessary sacrifice to increase the industrial coverage. The advantage of the new compositional breakdown is that it aligns QALI more closely with the 'Labour Services' series in the EU KLEMS database (see **Box 2**) and that produced by the Bank of England (Bell *et al* 2005). This development work also fed into the growth accounting dataset used in the NESTA Innovation Index, a joint ONS/Imperial College project to identify the contribution of innovation to economic growth (NESTA, 2009).

The other significant development for this release is the extension of the QALI time series. In the previous article (Goodridge 2009), results were only produced as far back as 1997, due to breaks in the LFS qualification variable. Since then, work has been undertaken to overcome this problem, linking together responses pre- and post-1997 to create a consistent data series for the education category. QALI is now produced as far back as 1993, which is the date from which questions about a respondent's income were first included in the LFS.

Table 1 **Current and previous adjustment categories**

Previous breakdown (Goodridge 2009)				
Education	Age	Gender	Industry	Industry description
Higher degree	16-19	Male	ABCE	Agriculture, hunting and forestry; fishing; mining and quarrying; utilities
NVQ5 (excluding higher degree)	20-29	Female	D	Manufacturing
NVQ4	30-39		F	Construction
NVQ3	40-49		GHI	Wholesale and retail trade; hotels and restaurants; transport, storage and communications
NVQ2	50-59		JK	Financial intermediation; real estate, renting and business activities
NVQ1	60+		LMNOPQ	Public administration and defence; education; health and social work; other social and personal services
Other qualifications				
No qualifications				
New breakdown				
Education	Age	Gender	Industry	Industry description
Higher degree	16-29	Male	ABCE	Agriculture, hunting and forestry; fishing; mining and quarrying; utilities
NVQ5 (excluding higher degree)	30-49	Female	D	Manufacturing
NVQ4	50+		F	Construction
NVQ3			G	Wholesale and retail trade
NVQ2, NVQ1 & other qualifications			H	Hotels and restaurants
No qualifications			I	Transport, storage and communications
			J	Financial intermediation
			K	Real estate, renting and business activities
			LMN	Public administration and defence; education; health and social work
			OPQ	Other social and personal services

Source: Goodridge (2009)

Box 2 The EU KLEMS project

The EU KLEMS project is an initiative to develop a database of comparable series relating to output, factor and intermediate inputs, and productivity growth for member states of the EU, plus the USA and Japan. The name is derived as an acronym of the inputs to production – capital (K), labour, energy, materials and services – to which growth in output is apportioned in the estimation of MFP. First released in 2007, the database contains a wide range of growth accounting series as far back as 1970, in current and constant prices and at a detailed level of industry.

The release of the research database marked the completion of the initial phase of the project. In the next phase, responsibility for maintaining the database is to be passed to Eurostat, with National Statistical Institutes such as ONS providing data updates. In advance of this, ONS recently completed a report (Dunn, Goodridge and Turvey, 2010) for Eurostat assessing the sources and methods used by the EU KLEMS consortium in the compilation of the original UK dataset, and transmitted a limited set of new and updated series.

One of the key recommendations of the report was to align the methodologies used to produce ONS QALI and its EU KLEMS equivalent, known as 'Labour Services'. The quality adjustment for Labour Services is currently based on 5 educational categories and 3 age ranges which match the new QALI breakdown, apart from the joint treatment of first and higher degrees. This is an area where the report advocates the EU KLEMS measure adopt the approach taken by QALI, as the high and rapidly increasing share in total compensation of workers with higher degrees relative to those with first degrees justifies the separate treatment of workers with a postgraduate degree.

The other area in which there is a continued divergence between the new QALI and current Labour Services series is the industry breakdown. Labour Services is produced for 15 industries, whereas QALI has been expanded only as far as 10 industries. This is due to the need for QALI to scale to industry-level productivity jobs and hours series, to improve the quality of estimates by making use of superior business survey-based aggregates, which partially overcome the inherent weakness in respondents reporting their own industry on the LFS. These headline productivity series are not available for all 15 industries used by EU KLEMS².

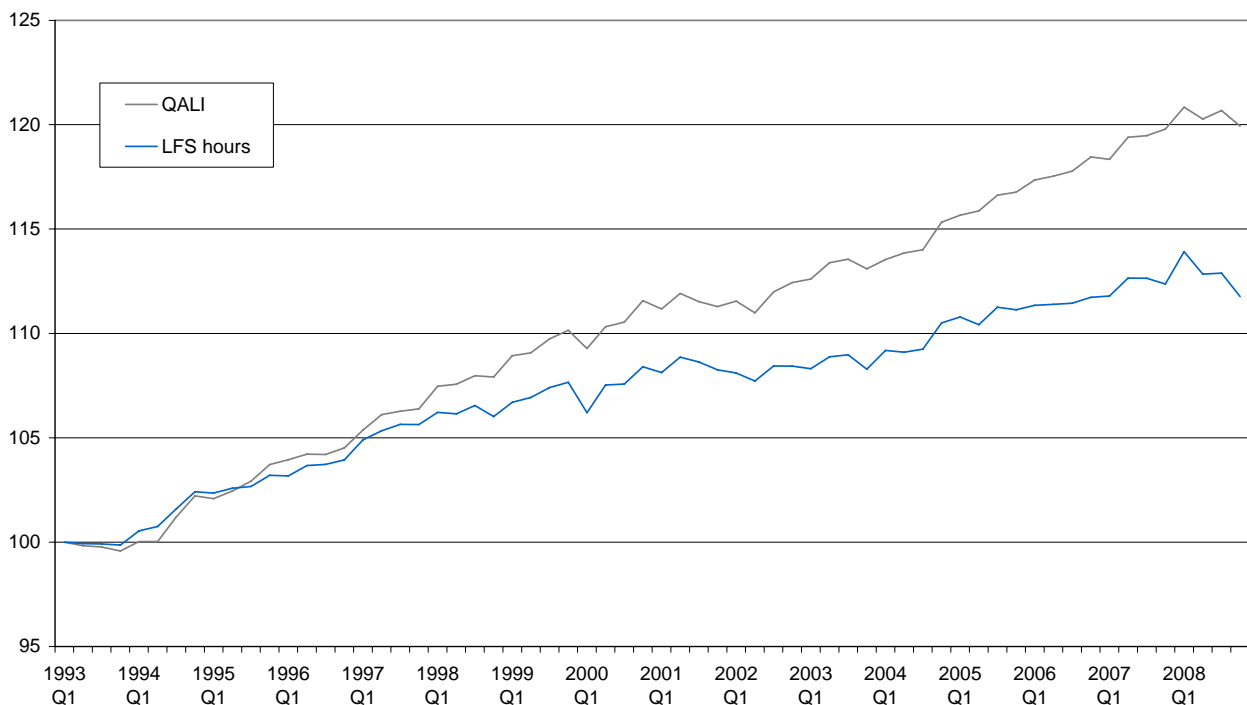
Previous QALI data produced by the Bank of England (Bell *et al* 2005) and the EU KLEMS consortium (2007a, 2007b) have shown that it is possible to extend the series back further (as far as 1970 in the case of EU KLEMS) using data from the General Household Survey. However, the data quality is considerably lower prior to 1993, and figures can only be produced on an annual basis, so only the 'headline' quarterly series is presented here. But an extended QALI series, to be used for research purposes, has been supplied to Eurostat by ONS for inclusion in the next release of the EU KLEMS database.

Results

Figure 1 compares an index of whole economy QALI with a series of unadjusted hours worked from the LFS, which is used in the production of headline labour productivity series. The difference between the two represents the quality adjustment, known as ‘labour composition’. As can be seen, QALI has been growing faster than LFS hours throughout almost the entire period, reflecting a consistent positive contribution from labour composition. This divergence has continued even as both series declined in 2008, with the greater fall in LFS hours – and commensurate increase in labour composition – suggesting lower-skilled workers suffered proportionately more than those with high skills as the economy entered recession.

Figure 1 QALI and hours: whole economy

Indices (1993 Q1 = 100)



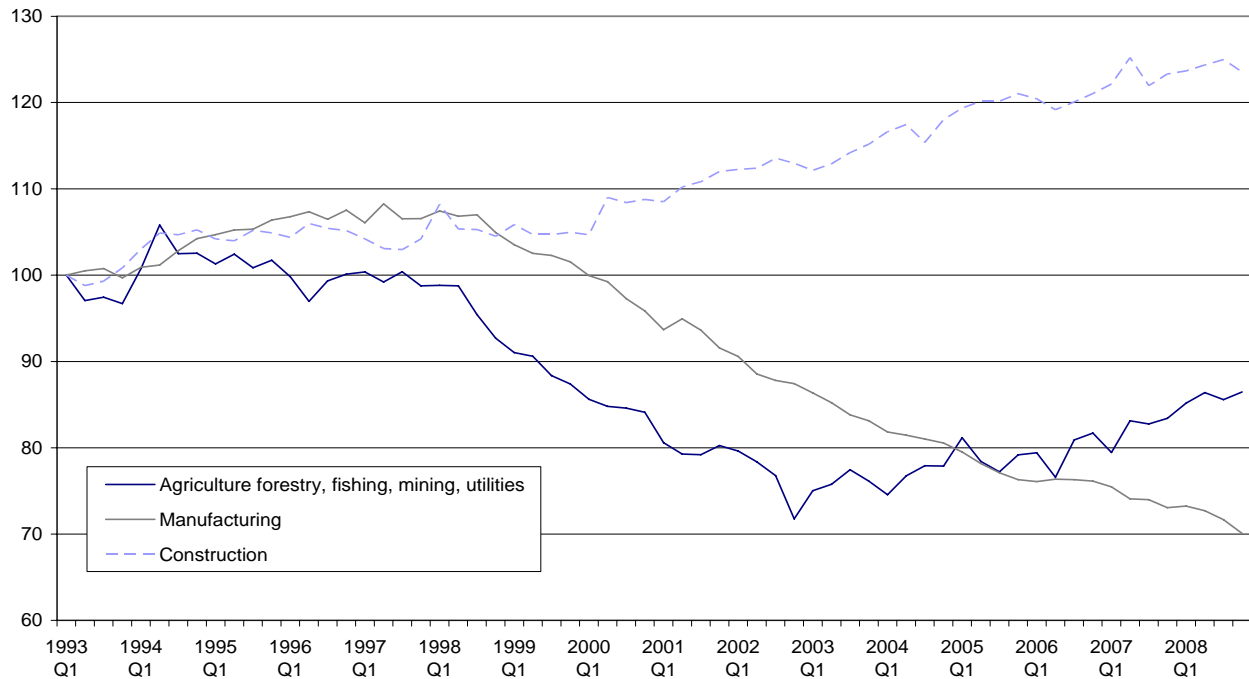
Source: LFS and authors' calculations

Figures 2, 3, 4 and 5 show results for the 10 industries outlined in Table 1. In each case, QALI is broken down into its constituent parts, namely hours (part (a) of each Figure) and labour composition (part (b) of each Figure), representing the quantity and quality dimensions respectively.

Amongst the production industries³ (Figures 2a and 2b), construction has experienced the fastest growth in hours but the slowest growth in labour composition. This may reflect limited scope to substitute towards higher skilled workers in the construction sector. In the manufacturing sector, by contrast, labour input in terms of hours has fallen dramatically since 1998, while labour composition has shown strong and consistent growth, accounting for around nine percentage points over the period.

Figure 2a Production industries: hours

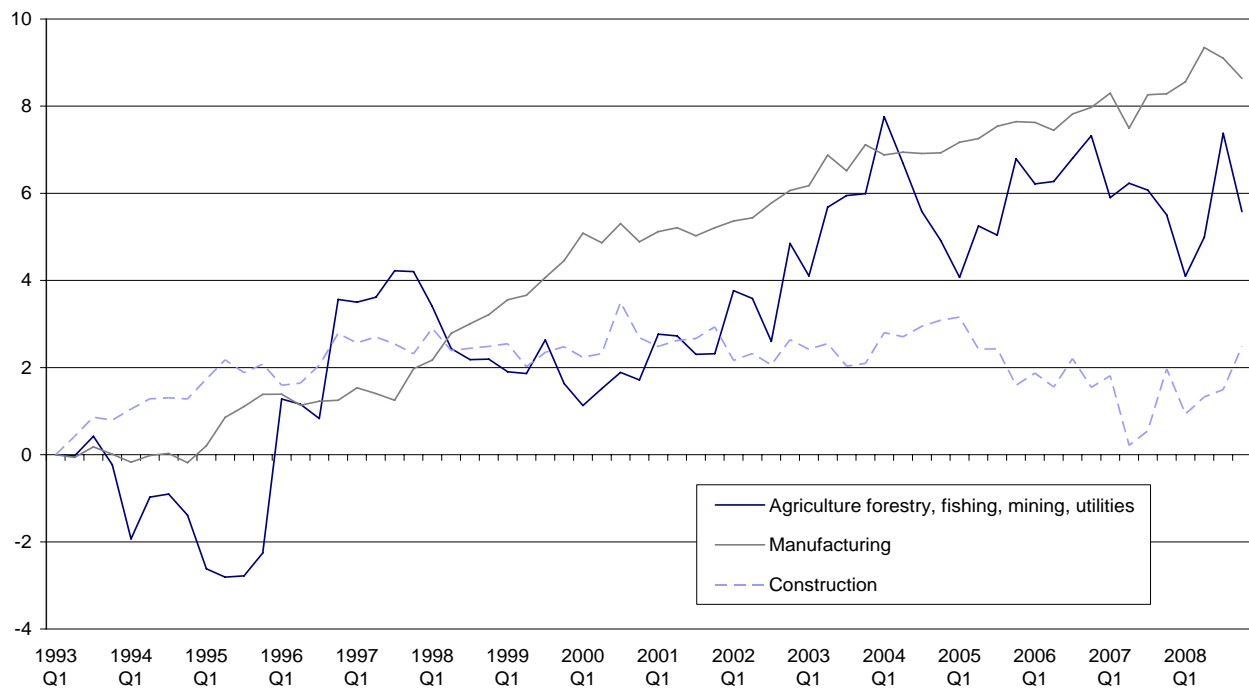
Indices (1993 Q1=100)



Source: LFS and authors' calculations

Figure 2b Production industries: labour composition

Index points



Source: LFS and authors' calculations

QALI in hotels and restaurants grew by almost 50 per cent between the first quarter of 1993 and the fourth quarter of 2008 (Figures 3a and 3b). Around two-thirds of this increase reflects increased hours and around one-third reflects labour composition. However, the improvement in labour composition is a relatively recent phenomenon. For most of the time up to late 2005 the quality adjustment was in fact negative, indicating a weakening skill profile in the industry relative to the base period.

Labour composition grew more consistently in industries G and I (wholesale and retail trade and transport, storage and communications), with the former exhibiting the larger increase in both quality and quantity of labour input.

The results for industries J and K (financial intermediation and business services) are particularly striking (Figures 4a and 4b). Relative to the first quarter of 1993, QALI has grown faster in business services than any other industry; despite a recent decline, it was two-thirds higher in 2008 Q4. This principally reflects increased hours as the volume of labour supply increased to meet demand, with only a modest contribution from labour composition. Meanwhile, financial intermediation experienced the strongest growth in labour composition, around 23 percentage points, as the sector attracted many highly-skilled workers during a period of very strong growth.

Industries LMN and OPQ (public administration, education and health and other personal and social services) both exhibit strong growth in the quality and quantity of labour input between 1993 and 2008 (Figures 5a and 5b). 'Other services' experienced the second-highest growth in QALI, and its increase in labour composition was only slightly below that of financial intermediation. The industry does, however, remain small relative to the financial sector.

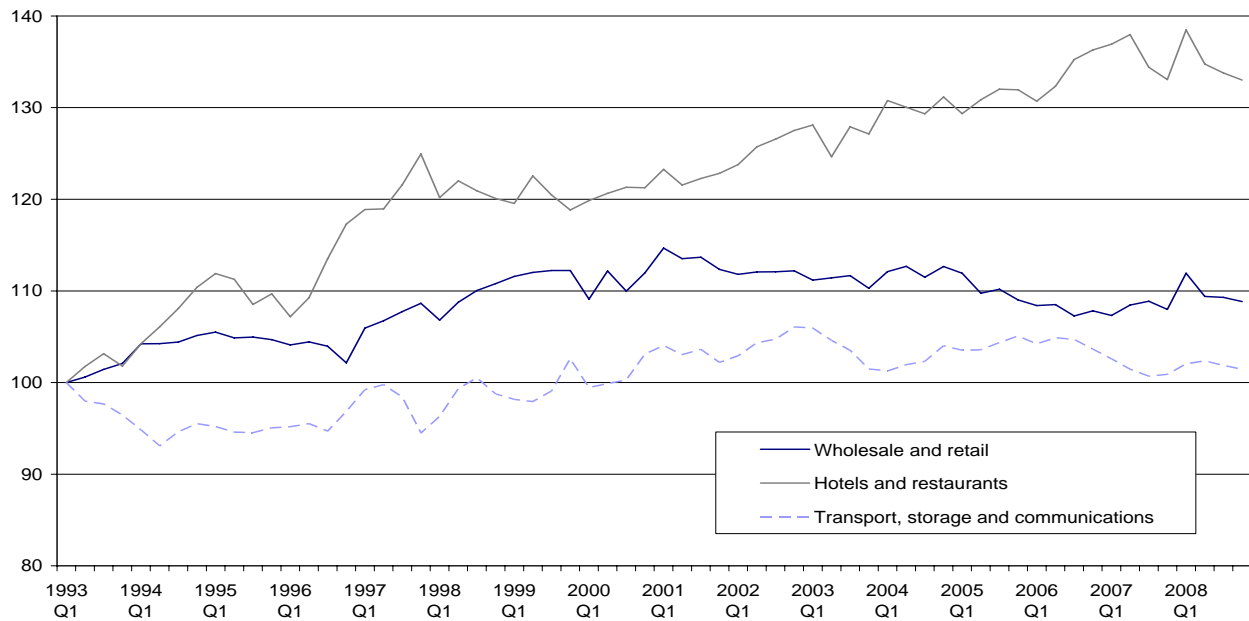
Figures 6a and 6b present indices of hours and labour composition for the market sector. These series begin in the first quarter of 1994, the earliest date the variables used to filter out non-market sector responses can be found in the LFS. Figures 6a and 6b also include corresponding data for the whole economy, which have been rebased to 1994 Q1 for ease of comparison.

Over the whole period, movements in unadjusted hours have been similar for the market sector and whole economy, which is unsurprising given the large overlap between the two. Prior to 2001, hours grew faster in the market sector, although the two series have converged since 2003. Labour composition has grown consistently faster for the whole economy, particularly from 2004. This ties in with the strong performance shown by industry LMN (a crude approximation of the public sector), which had above-average growth in QALI and labour composition over the same period.

Figure 7 shows estimates of QALI by highest qualification. Due to space constraints, unadjusted hours and labour composition are not presented here. However, hours closely track the QALI series, as the remaining quality adjustments of age, gender and industry have only a small effect once education is separated out.

Figure 3a Wholesale and retail; hotels and restaurants; transport, storage and communications: hours

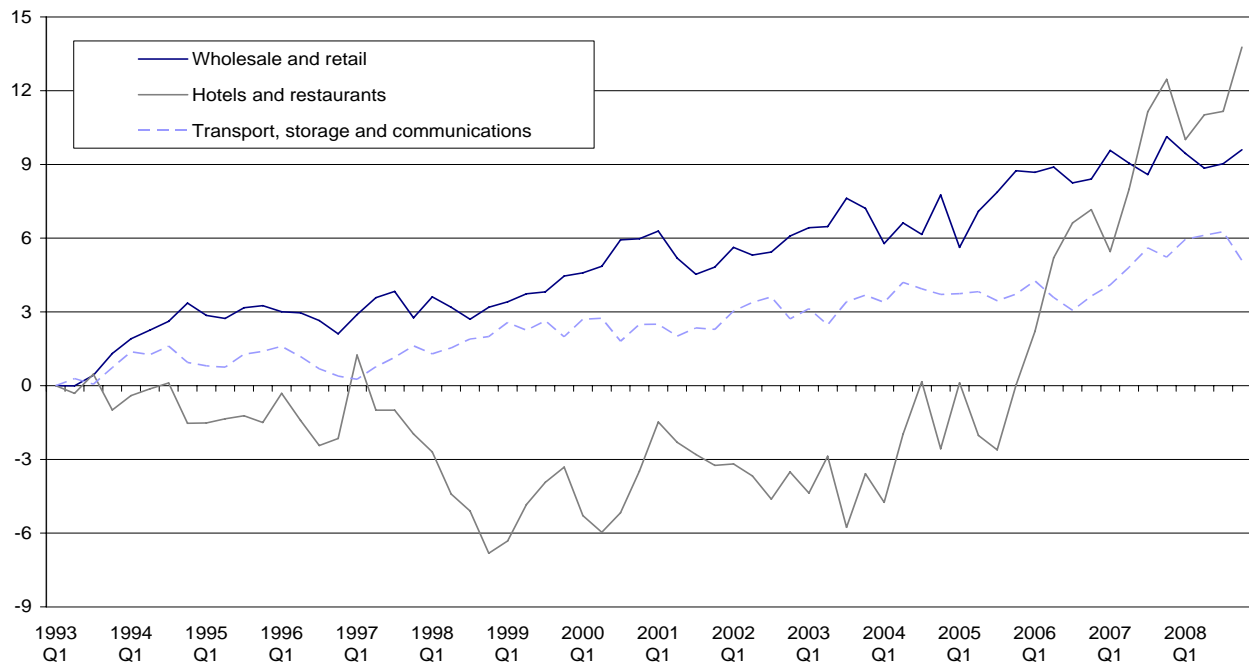
Indices (1993 Q1=100)



Source: LFS and authors' calculations

Figure 3b Wholesale and retail; hotels and restaurants; transport, storage and communications: labour composition

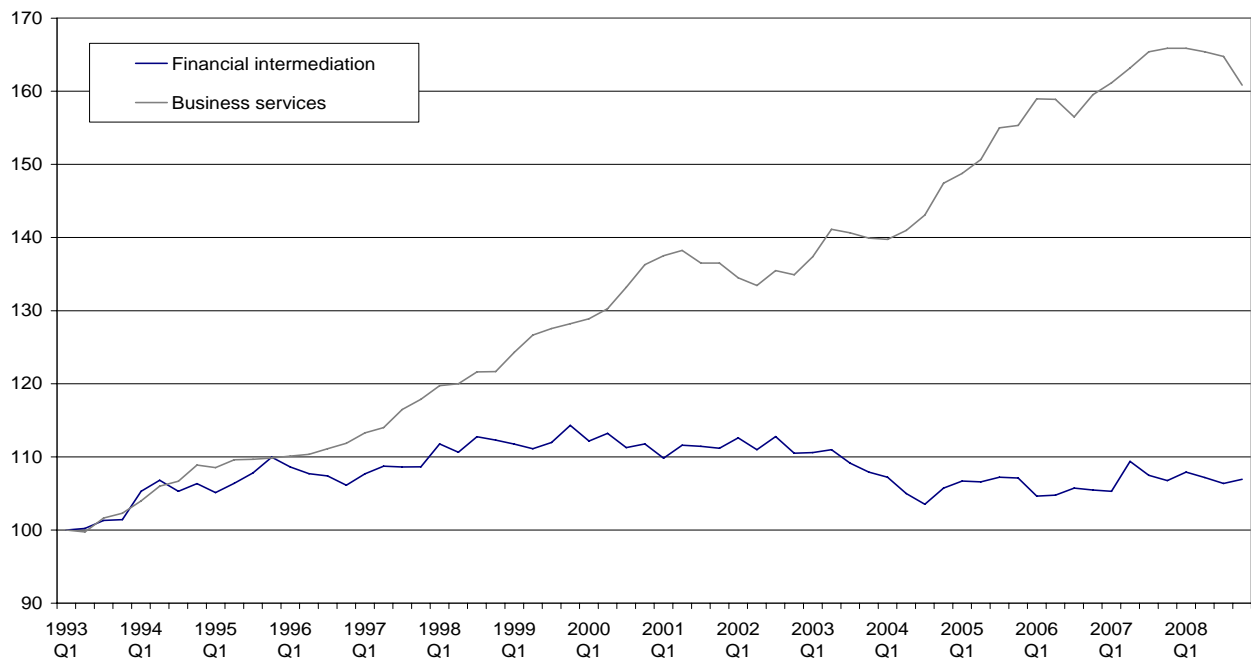
Index points



Source: LFS and authors' calculations

Figure 4a Finance and business services: hours

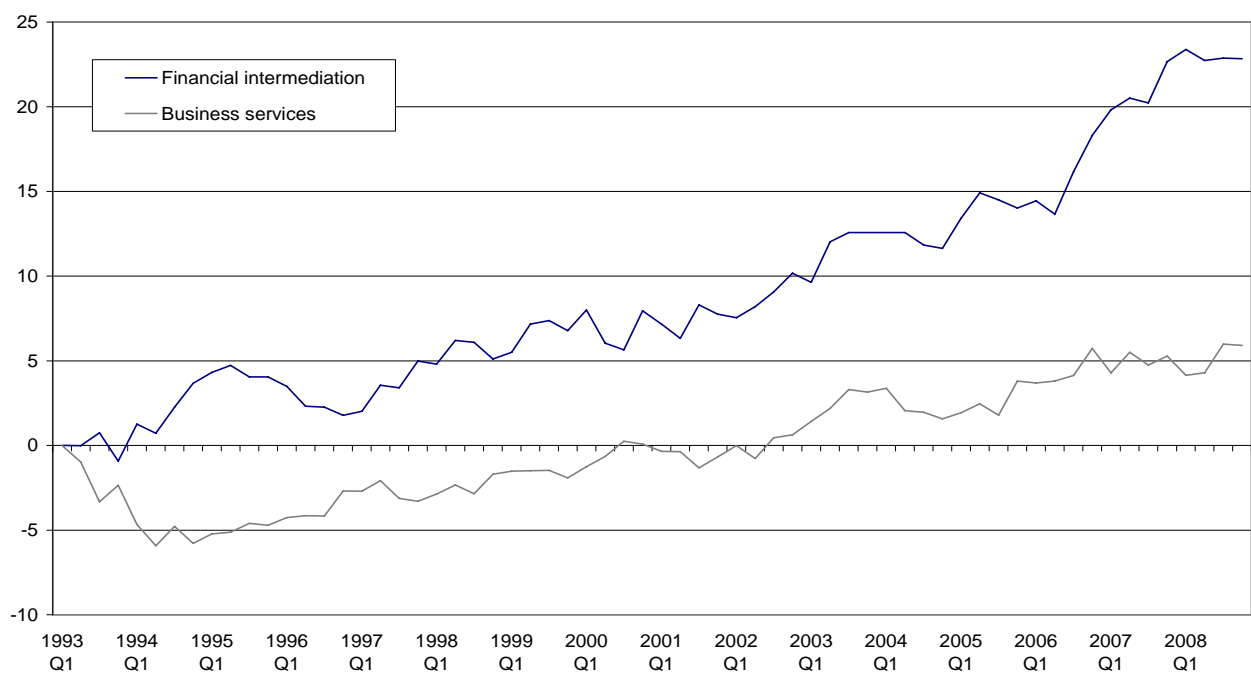
Indices (1993 Q1=100)



Source: LFS and authors' calculations

Figure 4b Finance and business services: labour composition

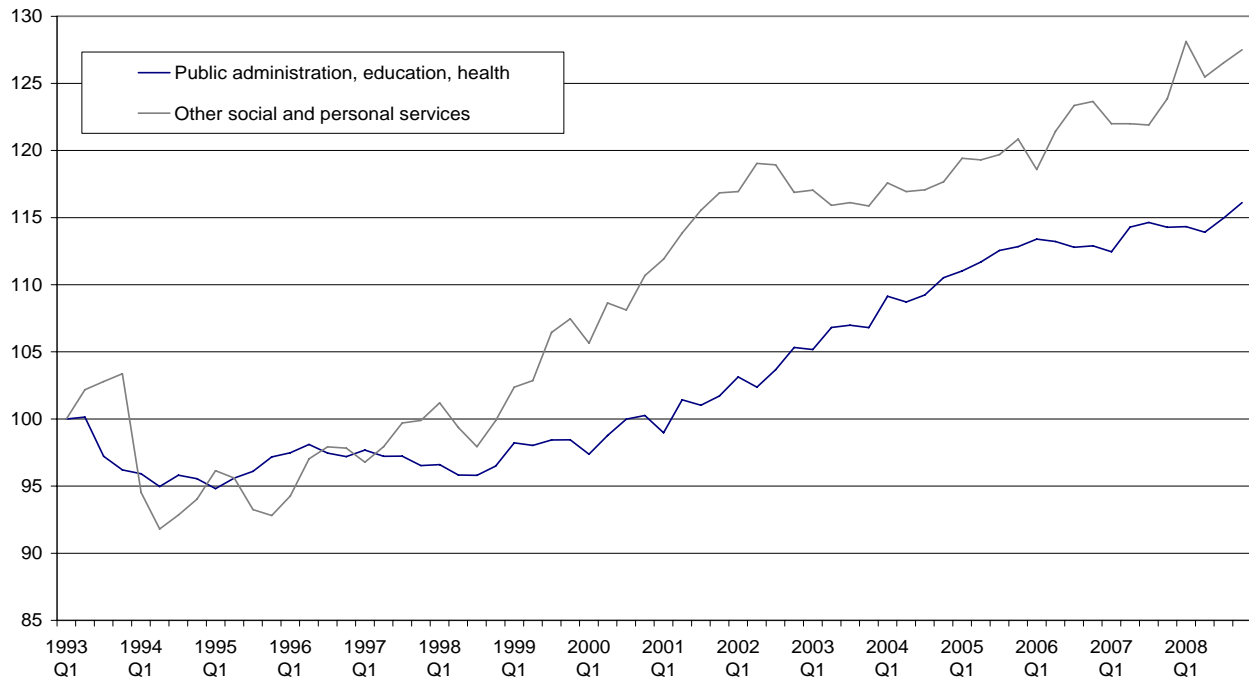
Index points



Source: LFS and authors' calculations

Figure 5a Public and other services: hours

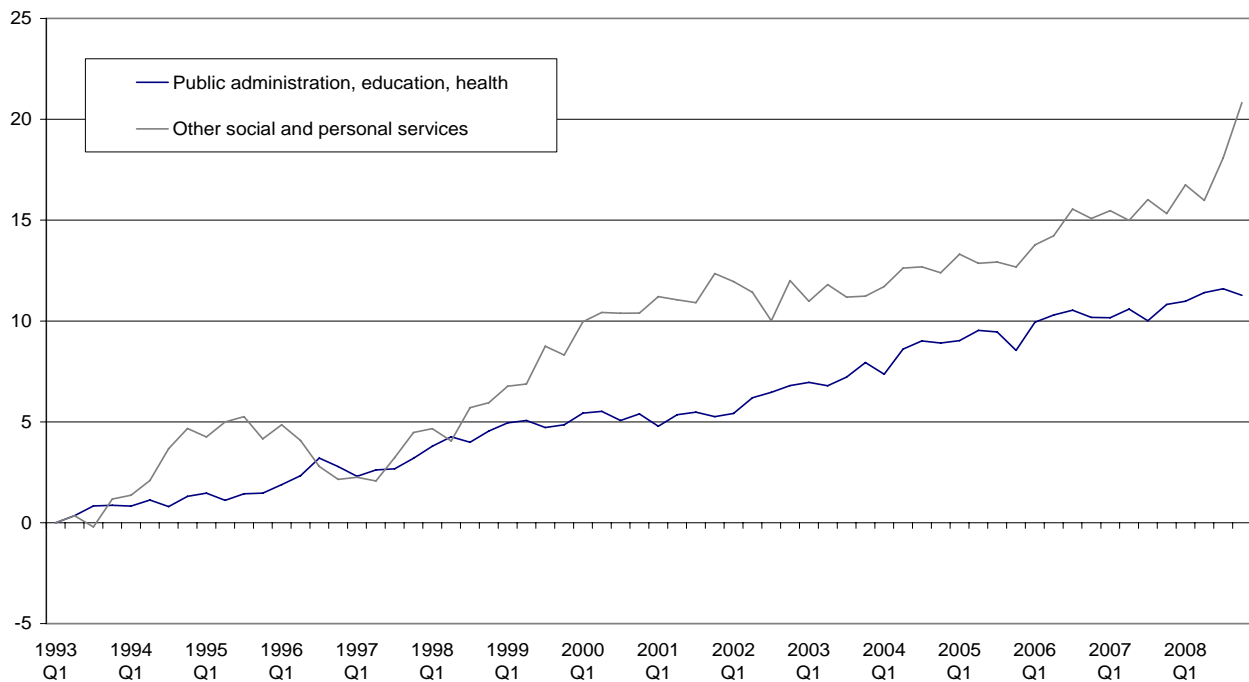
Indices (1993 Q1=100)



Source: LFS and authors' calculations

Figure 5b Public and other services: labour composition

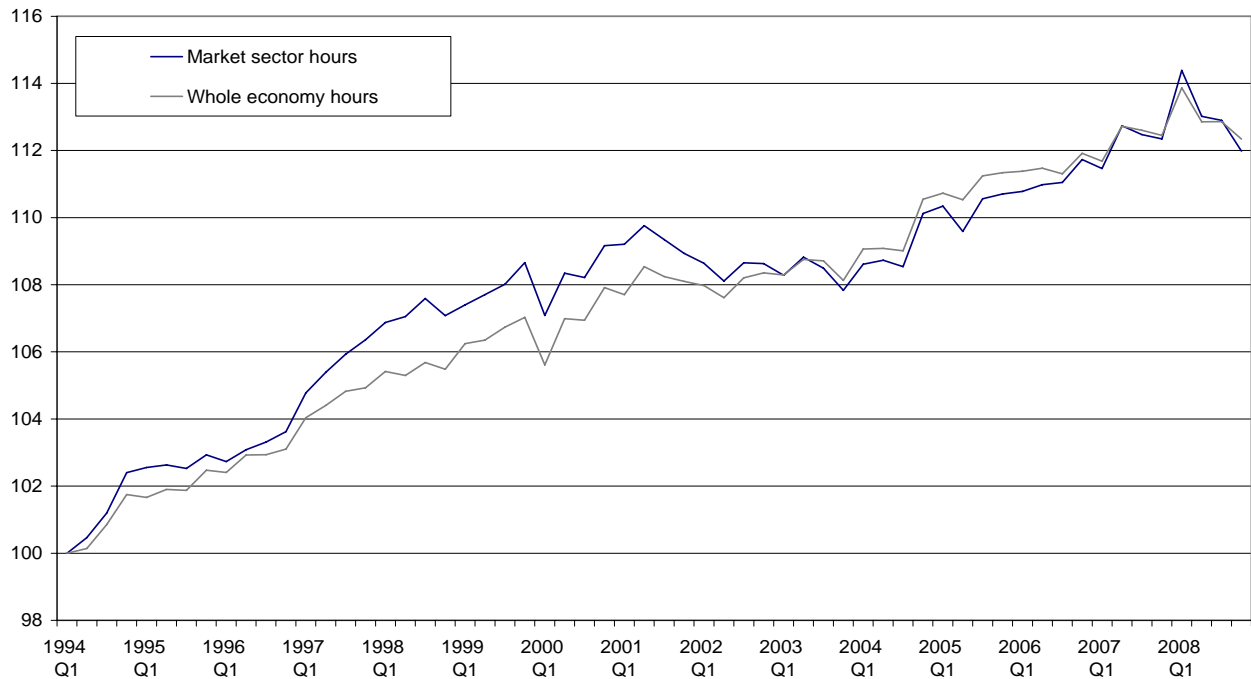
Index points



Source: LFS and authors' calculations

Figure 6a Market sector and whole economy: hours

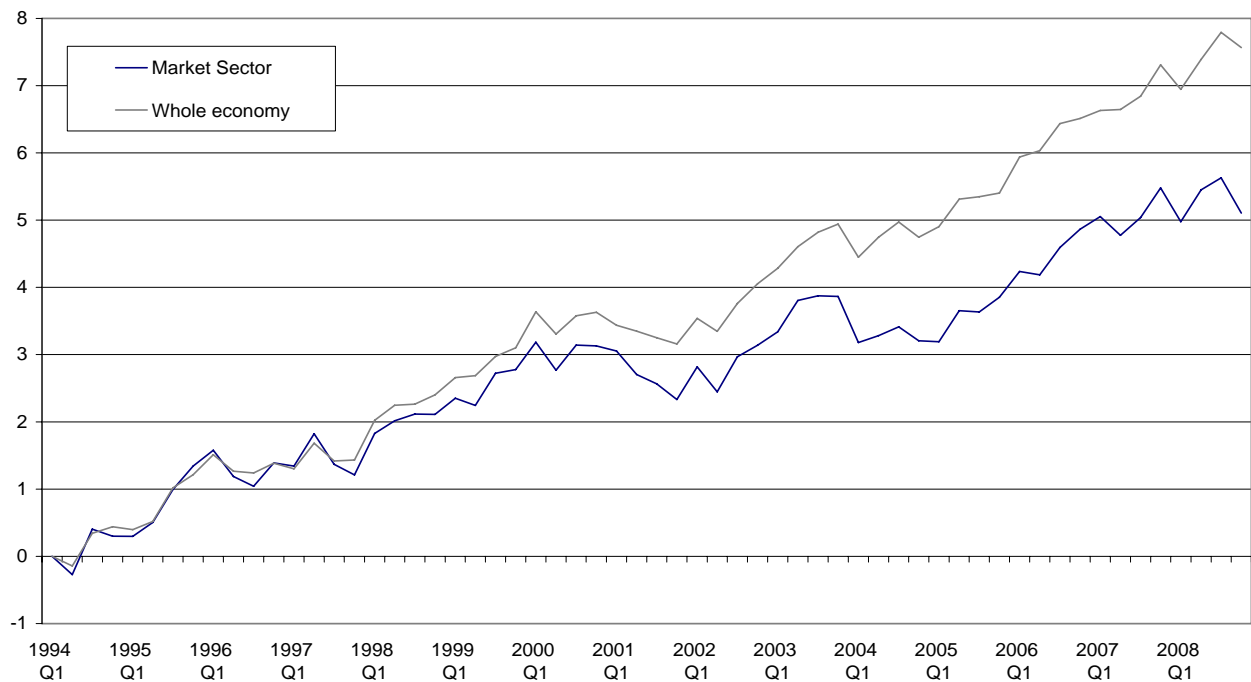
Indices (1993 Q1=100)



Source: LFS and authors' calculations

Figure 6b Market sector and whole economy: labour composition

Index points



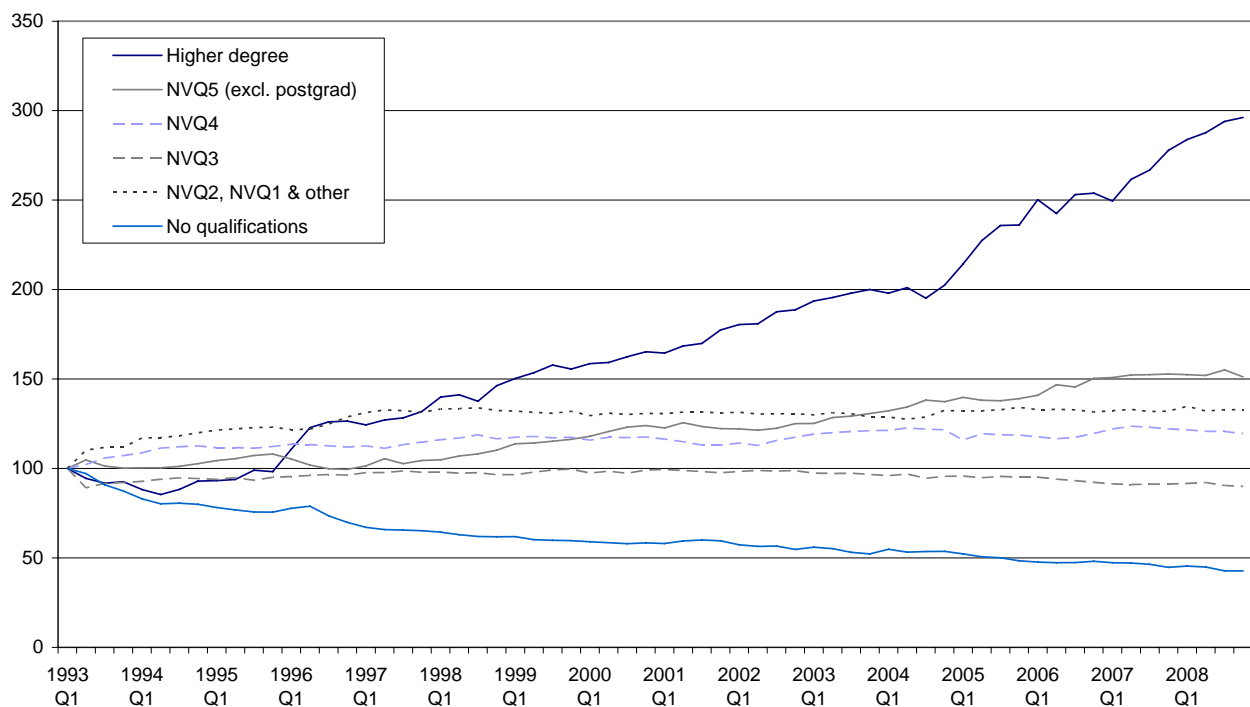
Source: LFS and authors' calculations

Growth in QALI has been most significant for the highest qualification levels, especially those with higher degrees, while the sharpest decline was in the 'no qualifications' category. The reason for these findings is the growth in qualifications attained (and corresponding fall in the share of the workforce with no qualifications), which has improved the skill profile of total hours worked over the period.

As education is the principal driver of QALI, it can thus be assumed that the trends displayed in Figure 7 are driving the whole economy and industry-level series. At the macro level, improving skills (as measured by qualifications) explain growth in labour composition, as well as QALI; and the industries which have performed strongest in this regard are those which have seen the greatest shift in labour input from low- to high-skill.

Figure 7 QALI: by highest qualification

Indices (1993 Q1=100)



Source: LFS and authors' calculations

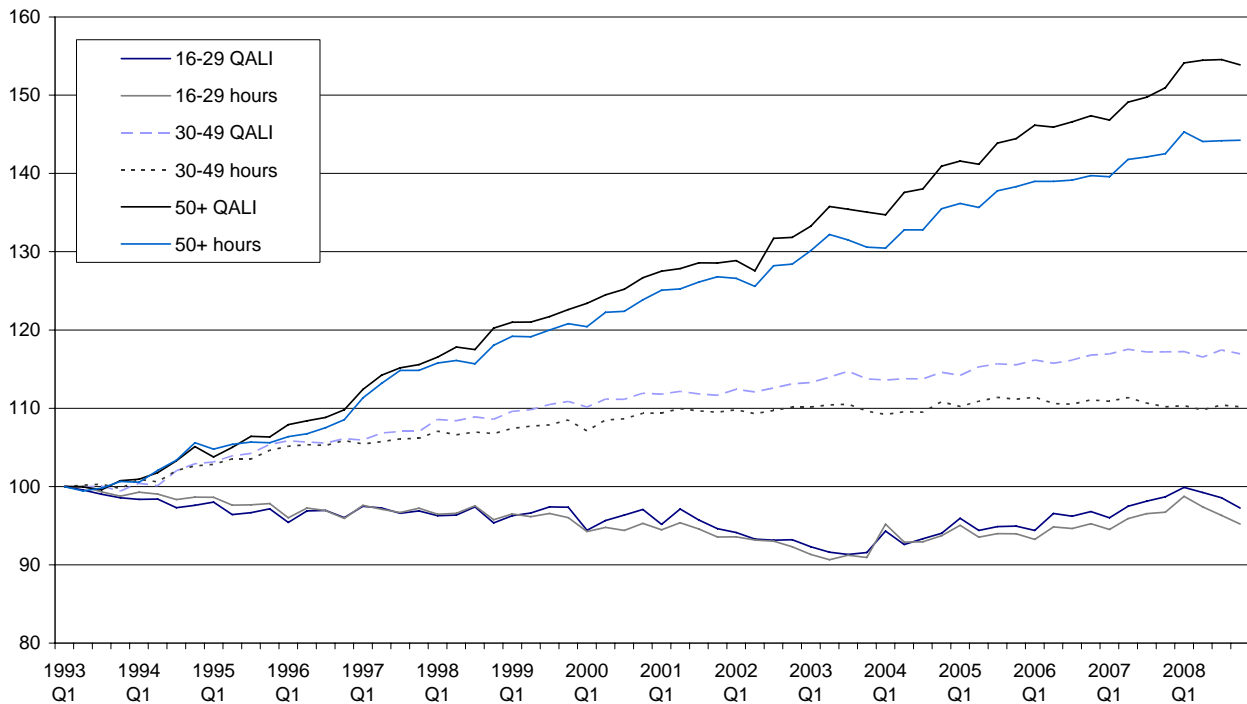
Figure 8 presents indices of QALI and unadjusted hours by age group. A striking result is observed for the over 50 group, amongst whom QALI increased by half over the period. The volume of hours worked in this age range also increased strongly, possibly reflecting increased labour-force participation amongst over-50s.

The quality and quantity of labour input increased steadily for workers aged 30–49, but declined for those aged between 16 and 29. The result for younger workers may be caused by a propensity for young people to spend longer in full-time education before entering the labour force, although this is not obviously supported by increasing labour composition. It is notable also that, in the first three quarters of the recession which began in 2008 Q2, declining labour input can be clearly

observed for 16 to 29 year-olds but not for the other groups, suggesting the early phase of the downturn had a disproportionately large effect on the young. This is consistent with the idea of firms hoarding their more skilled/experienced workers and shedding the least experienced, with the latter having a lower marginal product.

Figure 8 QALI: by age group

Indices (1993 Q1=100)



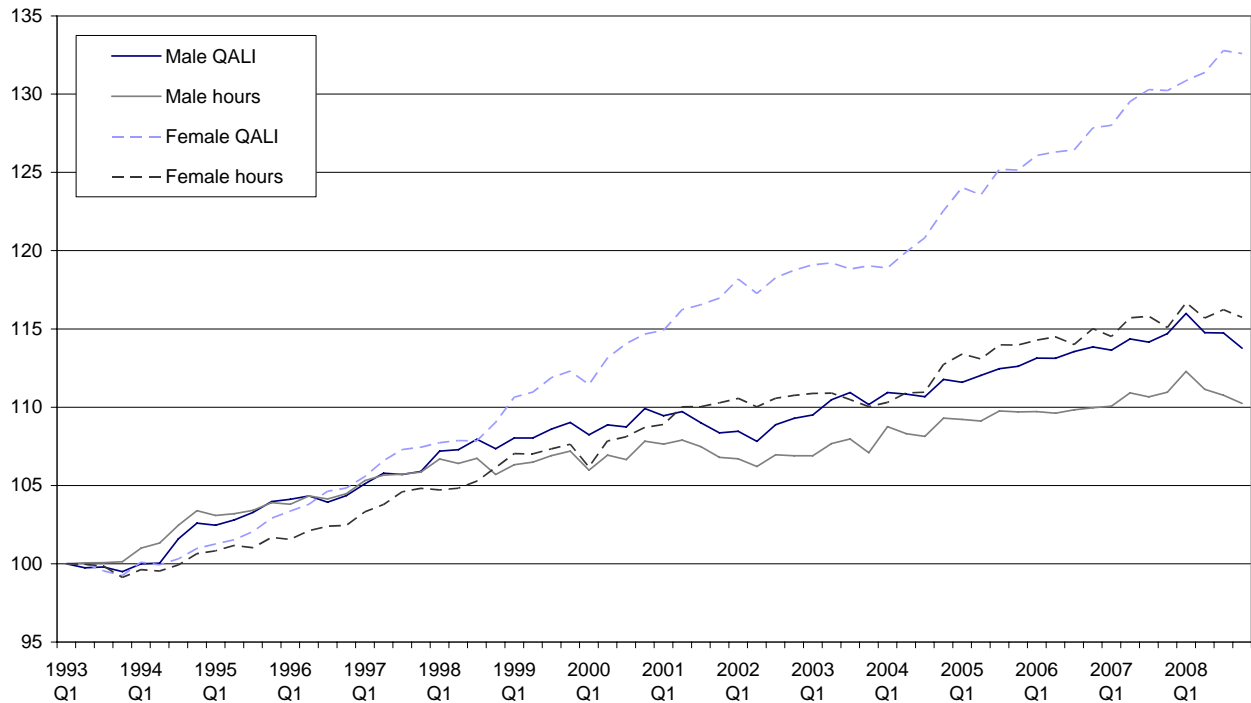
Source: LFS and authors' calculations

Lastly, **Figure 9** compares estimates of QALI and unadjusted hours for males and females. While growth in the volume of hours worked was slightly higher for females, a far bigger differential is observed for QALI, and thus labour composition. This is most likely being driven by rapidly improving educational attainment for female participants in the labour market relative to male participants.

It is also possible that it picks up some effects of equal pay legislation mandating a convergence between male and female compensation. To the extent that it shows the existence (but weakening) of discrimination in the labour market, it is demonstrating the weakness of using pay as a proxy for marginal productivity.

Figure 9 QALI: by sex

Indices (1993 Q1=100)



Source: LFS and authors' calculations

Conclusion

This article has presented new estimates of quality-adjusted labour input, resulting from significant development work since the previous release. The adjustment categories have been changed to achieve greater consistency with the EU KLEMS 'Labour Services' measure, and permit the production of a more detailed industry breakdown, with results now available for 10 industries. The time series has been extended back to 1993, and now incorporates a full economic cycle.

Making explicit adjustment for the quality of the workforce has the effect of increasing estimated labour input to the production process. The magnitude of the quality adjustment, or labour composition, has been increasing over time. The observed impact tends to be greatest in service industries, with financial intermediation exhibiting the largest increase in labour composition, while growth in QALI itself was highest in business services.

Within adjustment groups, the trend has been towards growth in hours worked by those with undergraduate and postgraduate qualifications at the expense of workers with little or no qualification, and those over 50 compared to the young. Lastly, growth in both QALI and labour composition has been far stronger for women than for men over the period studied.

Notes

1. Productivity hours and jobs are series used in the calculation of headline ONS labour productivity measures published in quarterly Statistical Bulletins. They provide the best measures of labour input for productivity purposes as they are produced using more reliable industry breakdowns, from both short-term and annual business surveys, which are constrained to LFS aggregates.
2. Further detail on EU KLEMS methodology, and research data produced on a KLEMS growth accounting basis, can be found at www.euklems.com
3. Strictly speaking, the production industries are only C, D and E (mining and quarrying; manufacturing; and electricity, gas and water generation). The indices for A to F are presented together for convenience.

Further information

Links to articles and data for experimental quality-adjusted labour input are available at www.statistics.gov.uk/statbase/product.asp?vlnk=14206

Links to articles and data for experimental multi-factor productivity are available at www.statistics.gov.uk/statbase/product.asp?vlnk=14901

Acknowledgements

The authors wish to thank Richard Jones and Katy Long for their help in producing this article.

Contact

elmr@ons.gov.uk

References

Bell V, Burriel-Llombart P and Jones J (2005) 'A quality-adjusted labour input series for the United Kingdom (1975-2002)', Bank of England Working Paper No. 280

Dunn R, Goodridge P and Turvey A (2010) 'Evaluation of EU KLEMS analytical database – Labour Accounts and Intermediate Inputs'. Report compiled for Eurostat

EU KLEMS (2007a) 'EU KLEMS Growth and Productivity Accounts, Part 1: Methodology'

EU KLEMS (2007b) 'EU KLEMS Growth and Productivity Accounts, Part 2: Sources by Country'

Goodridge P (2009) 'Quality-adjusted labour input: estimates for 1997 to 2007', *Economic and Labour Market Review* 3(1), pp 62-66 and at www.statistics.gov.uk/cci/article.asp?ID=2102

Goodridge P (2007) 'Methods Explained: Index Numbers', *Economic and Labour Market Review* 1(3), pp 54-57 and at www.statistics.gov.uk/cci/article.asp?ID=1743

Long K and Franklin M (2010) 'Multi-factor productivity: estimates for 1994 to 2008', *Economic & Labour Market Review* 4(9), pp 67–72, available at www.statistics.gov.uk/cci/article.asp?ID=2576

NESTA (2009) The Innovation Index, available at www.nesta.org.uk/publications/reports/assets/features/the_innovation_index

Organisation for Economic Co-operation and Development (2001) 'Measuring Productivity – OECD Manual'.

Turvey A (2009) 'Developing a unit labour costs indicator for the UK', *Economic and Labour Market Review* 3(6), pp 51-56 and at www.statistics.gov.uk/cci/article.asp?id=2218

Wallis G, Long K and Turvey A (2010) 'Volume of capital services: annual estimates for 1950 to 2008 and new quarterly series'. Available at www.statistics.gov.uk/cci/article.asp?ID=2477

Volume of capital services: annual estimates for 1950 to 2008 and new quarterly series

Gavin Wallis
HM Treasury

Katy Long
Cambridge Econometrics (formerly Office for National Statistics)

Alex Turvey
HMRC (formerly Office for National Statistics)

Summary

Capital services are the flow of services into the production of output that are generated by the capital stock, as opposed to the stock of capital itself. As such, capital services are the measure of capital input that is more suitable for analysing and modelling productivity (see Long and Franklin 2010 for new estimates of multi-factor productivity). This article presents experimental capital services estimates for 1950 to 2008. New estimates for 2008 are presented in this article with earlier years updated to incorporate revisions throughout the time series. Revisions are caused primarily by balancing revisions to the constant price plant and machinery series and new data on computer hardware investment. In addition, this article presents for the first time an experimental quarterly series of capital services growth for the whole economy.

Introduction

In order to enhance the understanding of the UK's productivity performance, a framework is needed to analyse the relationship between the inputs and outputs of production. Accurate measurement of capital and labour inputs, the key factors of production, is essential for the accurate measurement of productivity.

Capital services estimates weight together the growth of the net stock of assets with weights that reflect the relative productivity of the different assets. These weights are calculated using estimates of rental prices. This is in contrast to the capital stock estimates in the UK National Accounts, which use asset purchase prices as weights. This weighting difference is important in understanding the distinction between the two measures of capital. The capital stock estimates in

the National Accounts are wealth estimates of the capital whereas capital services are a flow measure that reflects the input of capital into production. It is for this reason that capital services are more suitable for analysing and modelling productivity. A capital asset generates a stream of services that spans more than one accounting period. Capital services measure the actual contribution of the capital stock of assets to the production process in a given year.

This article presents new capital services estimates for 2008 along with revised estimates for 1950 to 2007. An accompanying article (see Turvey, Goodridge and Franklin, 2010) presents experimental quality-adjusted labour input (QALI) estimates for the UK for 1997 to 2008. Together with capital services these form the inputs into the multi-factor productivity (MFP) estimates that are published annually by ONS (see Long and Franklin, 2010).

Estimation methodology

The methodology used to estimate capital services is described in detail in Wallis (2005), Wallis (2009) and in *The ONS Productivity Handbook* (ONS 2007). Wallis and Turvey (2009) describe some recent changes to the methodology. No changes to the methodology have been made this time. The methodology for estimating a quarterly series is described in a later section.

The four main stages in the estimation of capital services can be summarised as:

- using the Perpetual Inventory Method (PIM) to calculate a net stock series from a history of constant price investment series
- pricing the services from each asset using an estimated rental for each asset
- generating weights, using the estimated rentals and net stock series, which reflect the input of each asset into production; and
- combining the net stock growth using the estimated weights to give capital services growth estimates

Data

The data used to estimate capital services are the same as those underpinning the UK National Accounts capital stock estimates and are consistent with *Blue Book 2009*. The data set consists of a long time series of annual constant price investment flows, classified by industry, their respective life length means (used to calculate depreciation rates) and price deflators.

The asset breakdown of the available investment series in the National Accounts is:

- buildings (excluding dwellings)
- copyright and license costs
- mineral exploration
- own-account software
- plant and machinery including computer hardware and purchased software

- vehicles

For estimating capital services it is important that both computer hardware and purchased software are given specific treatment as separate assets. This is because their prices relative to other assets have fallen rapidly over time and their economic lives tend to be much shorter than other types of plant and machinery.

In order to treat computer hardware and purchased software as separate assets, they have to be separated from investment in plant and machinery and the associated price deflators have to be adjusted to account for this. It should be noted that, although an appropriate life length is used for computer hardware in the National Accounts (currently assumed to be five years), the capital stock estimates for plant and machinery do not separately deflate computer hardware.

Purchased software is currently treated as part of plant and machinery in the National Accounts; it is not separately deflated and is subject to the general life length for all plant and machinery. However, a series for investment in purchased software is available internally at the ONS and is an updated version of the series published in Chamberlin, Clayton and Farooqui (2007).

Capital services estimates

This section presents capital services estimates for the whole economy, for the market sector, for the non-oil sector, by eight asset types and by a 57 industry breakdown, consistent with the most recent industry breakdown of gross fixed capital formation in the supply-use tables.

For most asset classes, estimates are available for the period 1950 to 2008. The full set of data cannot be presented in this article, but is available at www.statistics.gov.uk/statbase/product.asp?vlnk=14205

Figure 1 shows annual growth in capital services for the whole economy. A large degree of cyclicity is exhibited with periods of modest growth coinciding with UK recessions (1973 to 1975, 1979 to 1982, the early 1990s). It should be noted that these estimates only pick-up the start of the recession that started in 2008, and do not reflect the large fall in business investment seen in the UK in 2009. In 2008, capital services grew by 3.2 per cent, down from a revised figure of 4.2 per cent in 2007. This represents a strong slowdown in growth but growth of 3.2 per cent is not weak by historical standards, being around the average growth rate over 1950 to 2008 (3.3 per cent). Although total fixed investment (excluding dwellings) fell by around 1.5 per cent in 2008, growth of capital services remained positive. This is because despite investment falling it remained above the level of depreciation meaning that net capital stock still grew in 2008.

Figure 1 also shows annual growth in the capital stock, net of depreciation, as published in the UK National Accounts. The series is the growth in total net stock excluding dwellings, since dwellings are not modelled as part of the productive capital stock. Although measuring different concepts, the close fit of the two series is not surprising given they are based on the same underlying data sources.

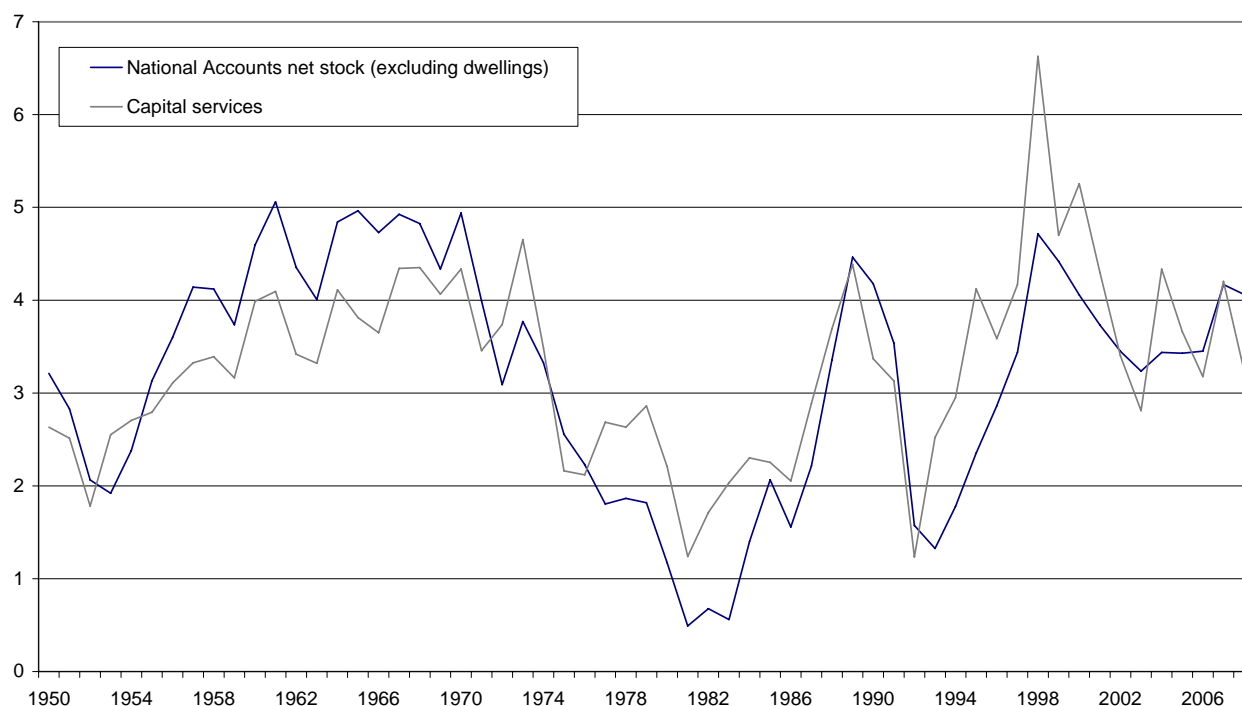
The differences in these two series can be attributed to three main factors:

- the weighting of net stock growth by rental prices in the capital services estimates as opposed to weighting by asset prices in the National Accounts estimates
- the separate treatment of computer hardware, purchased software and own-account software for capital services; and,
- the use of a geometric depreciation rate when constructing the capital services estimates instead of an arithmetic depreciation rate

National Accounts net stock is estimated to have grown by 4.1 per cent in 2008, only slightly slower than growth of 4.2 per cent in 2007. This highlights how the differences between the two series can be particularly important during periods of recession or strong investment growth.

Figure 1 Annual growth in capital services

Percentages



Source: Office for National Statistics

Revisions since previous release

Revisions to capital services estimates since Wallis and Turvey (2009) arise from revisions to the source data series. The primary source of revisions can be attributed to:

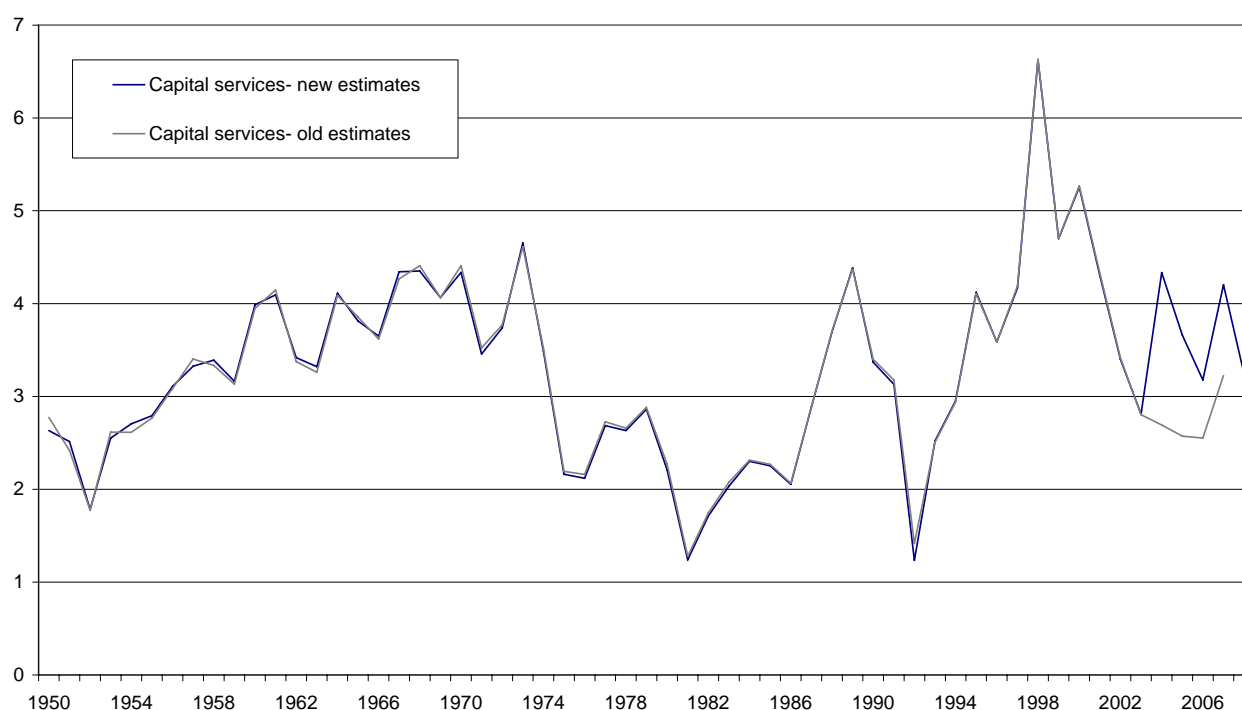
- balancing revisions to the constant price plant and machinery investment series from 2004 onwards
- new data for 2005 onwards, from the supply-use tables, for the proportion of total plant and machinery investment that is computer hardware

Figure 2 shows the new estimates of whole economy capital services growth against the previously published estimates. The growth in the updated series closely tracks that of the old estimates until 2004 onwards which was the open window for revisions in the 2009 *Blue Book*. Balancing adjustments to the constant price investment series for plant and machinery post 2003 are the primary driver of revisions to the capital services estimates. (Figure 6 shows revisions to plant and machinery capital services growth.)

The second main source of revisions to whole economy capital services growth comes from the availability of new data from 2005 onwards, from the supply–use tables, for the proportion of total plant and machinery investment that is computer hardware. The effect has been to increase capital services growth in 2005 but reduce it in 2006 and 2007, all else being equal.

Figure 2 Annual growth in capital services: new and previous estimates

Percentages



Source: Office for National Statistics

Market sector and non–oil capital services

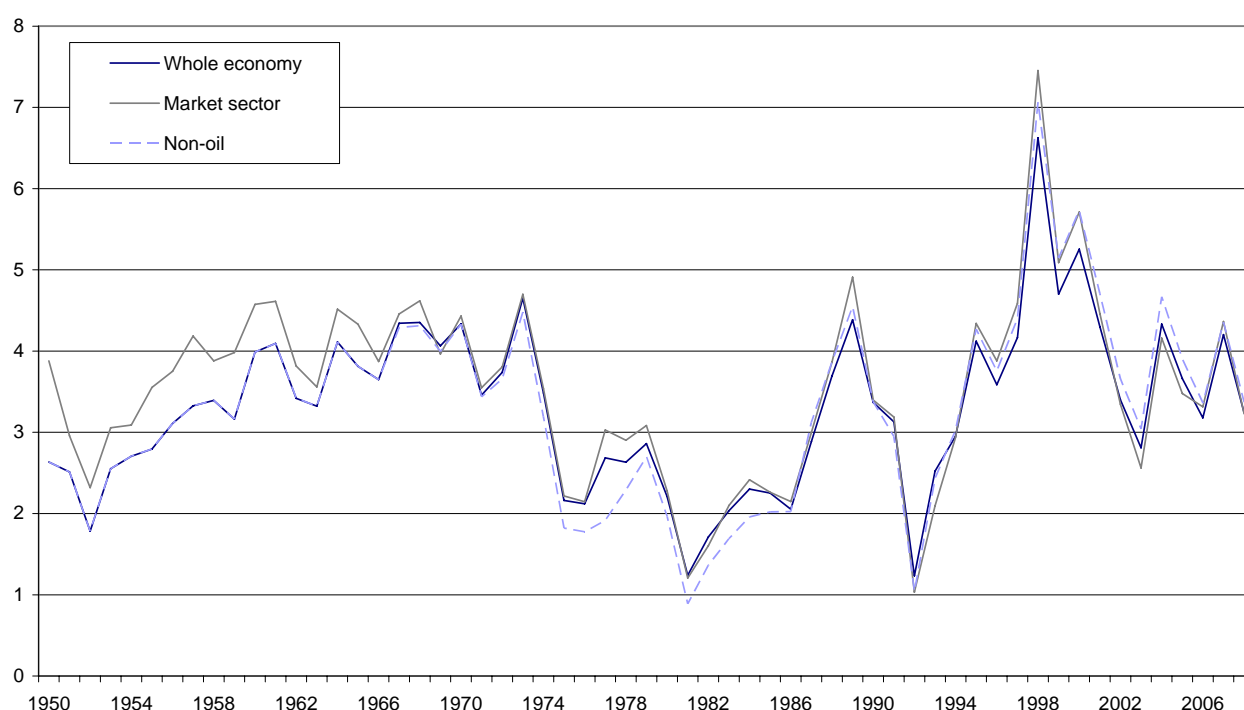
Productivity and other macroeconomic analyses often focus on the market sector rather than the whole economy. The measurement of the market sector is of importance to policy makers as the market sector better reflects the balance of demand and supply pressures of the UK economy. The market sector definition is also used in growth accounting analysis, and when estimating and analysing business cycles. In response to user needs, ONS began publishing experimental estimates of market sector productivity in 2007 and market sector capital services were published for the first time in Wallis (2007).

Macroeconomic analysts are often interested in examining the non-oil sector, as output from the oil sector is considered to have little direct impact on the sustainable level of employment and non-oil economic activity. HM Treasury use measures of non-oil output in analysis of UK trend growth.

Figure 3 plots the annual growth rates in capital services for the market sector, non-oil sector and the whole economy. The market sector here is consistent with the definition of the National Accounts market sector GVA measure, making it suitable for use in market sector growth accounting analysis. Market sector capital services have been growing on average faster than for the whole economy during the period, averaging 3.5 per cent annual growth since 1950 compared with 3.3 per cent for the whole economy. The divergence in the mid-1990s is due to the market sector investing more heavily in ICT assets than the non-market sector. Between 2002 and 2005 annual growth in whole economy capital services exceeded that of the market sector. This coincides with a period of increased government investment in capital projects. In 2008 market sector capital services grew by 3.5 per cent compared to whole economy capital services growth of 3.4 per cent.

Figure 3 Annual growth in whole economy, market sector and non-oil capital services

Percentages



Source: Office for National Statistics

The growth rates of non-oil and whole economy capital services follow each other closely for much of the period, reflecting the small size of assets in the oil and gas extraction industry relative to total UK assets. The divergence in the growth rates between 1975 and 1985 is due to large capital investment in the oil and gas extraction industry as new oil reserves were found in the mid-1970s. These high levels of investment contributed to fast capital services growth in the industry over the

period. Recently, growth in non–oil capital services has been slightly higher than for whole economy capital services, as oil and gas reserves in the North Sea decline.

Capital services by asset type

Figure 4 shows annual growth in capital services for buildings (excluding dwellings), plant and machinery (excluding computer hardware and purchased software) and vehicles. Growth in capital services of ICT assets are shown in **Figure 5**. Some of the more interesting analytical points to note from Figure 4 are:

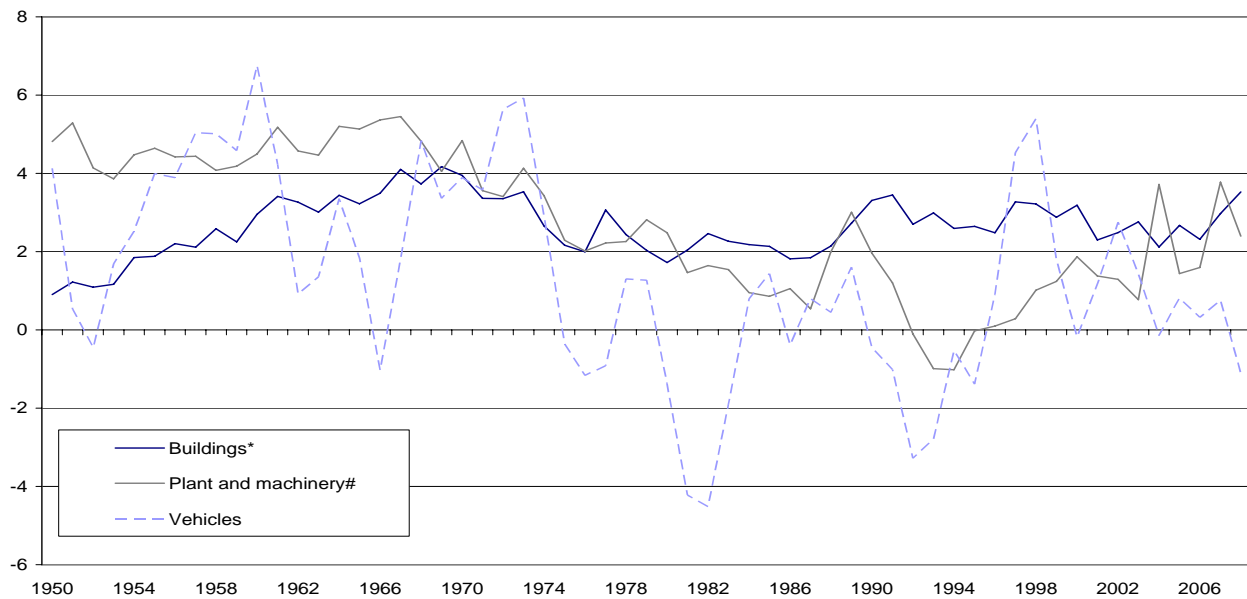
- growth in capital services from buildings is relatively stable in comparison with the growth in capital services for other asset types
- growth in capital services from vehicles is the most volatile, exhibiting a high degree of pro–cyclicality
- the 1950s and 1960s saw strong and relatively stable growth in capital services for all assets for which data are available
- for all assets there is a downturn in capital services growth from the mid–1970s, driven by a fall in the net stock of capital in many industries over this period
- capital services growth rates were negative for plant and machinery and vehicles during the recession in the early 1990s; and
- capital services from vehicles fell in 2008 while capital services continued to grow from buildings and plant and machinery

Figure 5 shows the volume of capital services from computer hardware, own–account software and purchased software relative to the volume of whole economy capital services, with all series rebased so that 1987 equals 100. The volume index of computer hardware increases to almost 4,800 in 2008, while the volume index of whole economy capital services (all assets) increases to just over 200 by 2008. For purchased software, the volume index has increased to over 1,000 in 2008. This is an important factor in explaining the divergence seen in Figure 1 between the wealth-based National Accounts measures of net stock and capital services. The reason that the growth in capital services from computer hardware and purchased software is not driving up whole economy capital services more is that these two assets still only account for about a 10 per cent share of profits (see Table 4). Growth in own–account software capital services is much less pronounced as, although investment in own–account software has increased quite rapidly, the deflator has not fallen as it has for computer hardware and purchased software. The reason for this is that the deflator is based on the average wage index of software-related employees whose wage has increased over the period.

Given that the revisions observed to whole economy capital services growth are very much asset-specific, it is useful to present the revisions to those particular assets which have driven the revisions to the whole economy measure. **Figure 6** illustrates the revisions to growth in plant and machinery capital services, excluding computer hardware and purchased software. From 2004 onwards the new estimates of plant and machinery capital services growth exceeds that of the old estimates. This can be attributed to balancing adjustments made to the constant price plant and machinery investment series.

Figure 4 Annual growth in capital services: by asset type

Percentages



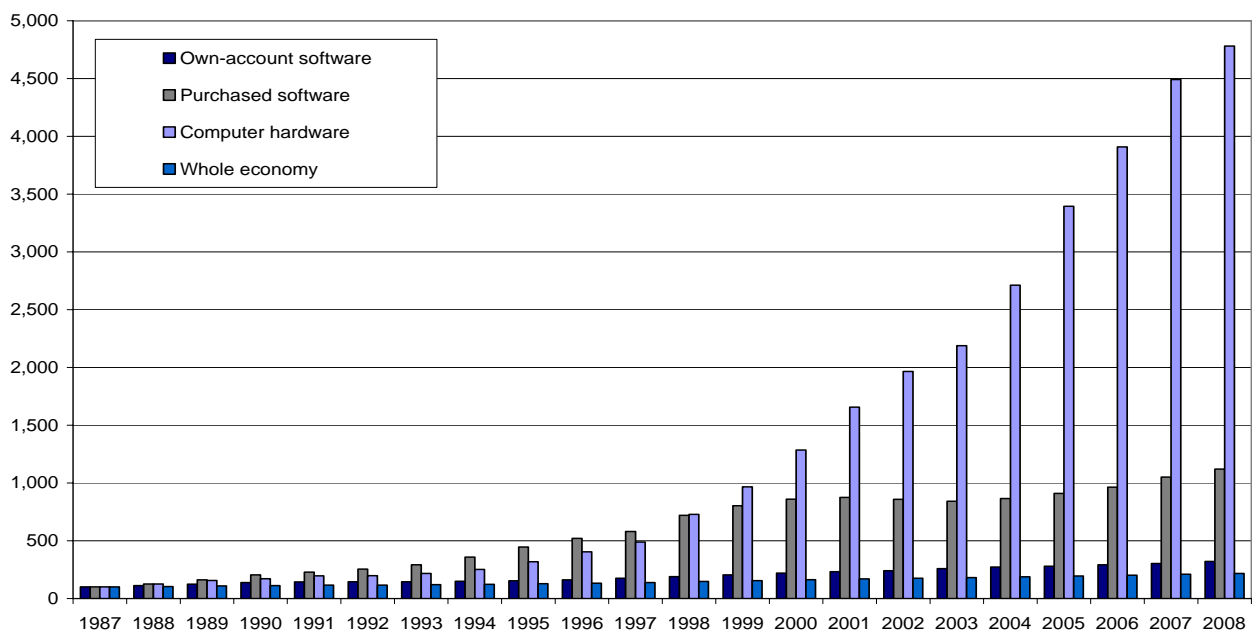
* Excluding dwellings

Excluding computer hardware and purchased software

Source: Office for National Statistics

Figure 5 Volume index of whole economy capital services: computer hardware, own-account software and purchased software

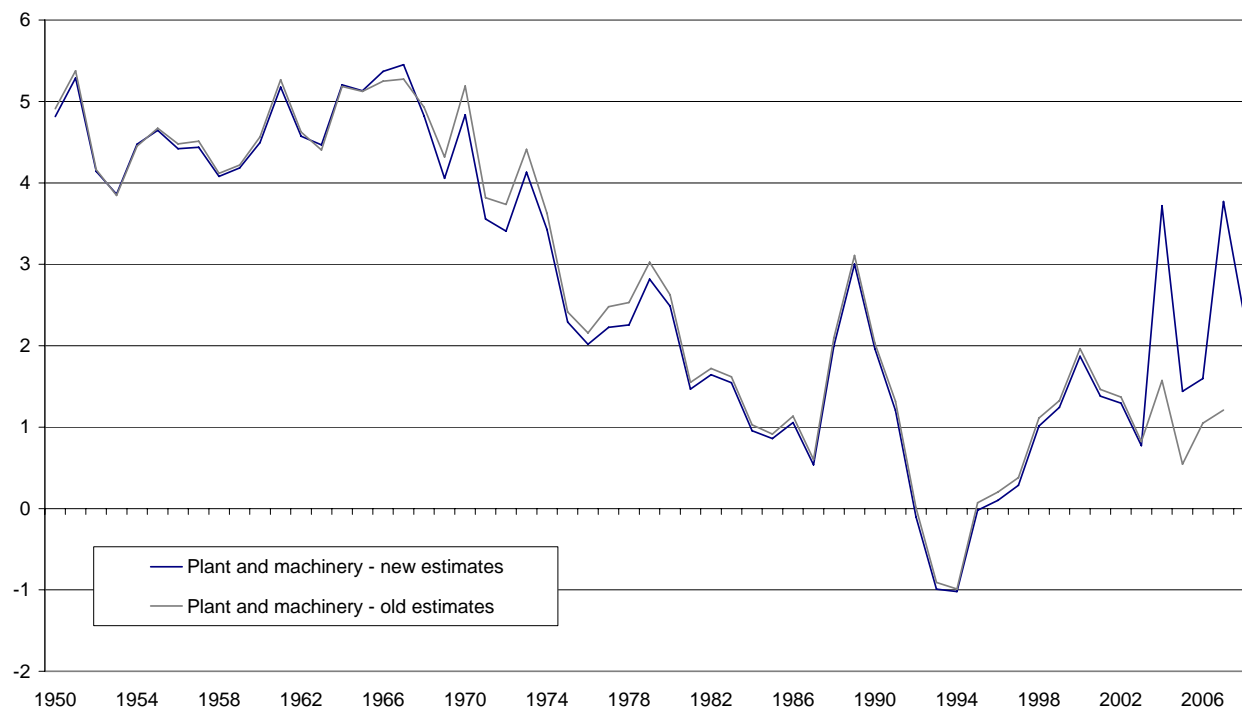
Indices
(1987=100)



Source: Office for National Statistics

Figure 6 Annual growth in capital services for plant and machinery: new and previous estimates

Percentages



Source: Office for National Statistics

Capital services by industry

Capital services estimates are produced at a 57-industry level, consistent with the most recent supply–use analysis. **Table 1** shows growth in capital services for 2007 and 2008 and for comparison purposes average annual growth for selected periods. The periods chosen are the most recent complete economic cycles. Also included are estimates for aggregate production and aggregate service industries as well as medians and 25th and 75th percentiles. GVA growth for the production and service sectors is shown for comparison.

Interesting points to note from Table 1 are:

- growth in capital services in many production industries was sharply negative in 2007 and 2008, continuing the trend over the last complete economic cycle. Prominent examples include Office machinery & computers, Radio, TV & communication equipment, and Other manufacturing
- capital services growth has generally been more robust in 2007 and 2008 across the service sector, although growth has slowed sharply in Wholesale distribution and Computer services; and
- in a small number of industries, including Other transport equipment, Electricity & gas, Financial intermediation and Education, capital services grew more rapidly in 2007 and 2008 than over the last complete economic cycle

Table 1 **Average annual growth rates in capital services: by industry**

Percentages

	1972–1978	1978–1986	1986–1997	1997–2006	2007	2008
Agriculture	1.6	0.3	2.0	-0.8	0.3	1.1
Forestry	1.5	2.6	2.5	-2.4	-1.5	1.5
Fishing	3.9	-6.1	-6.7	-6.0	-5.0	-5.3
Coal extraction	2.5	3.0	-4.3	-4.3	-2.2	-2.0
Oil & gas extraction	31.4	8.0	2.0	-2.6	0.5	0.1
Other mining & quarrying	1.2	-1.8	-1.6	-1.2	-0.9	-1.9
Food products & beverages	3.8	1.7	1.7	1.0	0.1	-0.4
Tobacco products	3.2	1.2	0.4	-0.9	-3.3	-3.8
Textiles	0.2	-2.0	-0.4	-2.6	-2.6	-1.9
Wearing apparel & fur products	1.3	-1.1	-0.4	-2.4	-4.0	-3.8
Leather goods & footwear	22.4	23.7	6.9	-3.8	-4.6	-3.4
Wood & wood products	4.3	-2.3	-0.2	0.6	0.6	-1.7
Pulp, paper & paper products	34.7	24.1	15.5	1.9	-3.9	-2.4
Printing & publishing	3.5	1.8	2.5	0.9	-2.8	-4.1
Coke, refined petroleum & nuclear fuel	-0.8	2.7	1.5	-2.2	-6.1	-3.6
Chemicals & chemical products	2.3	1.4	2.8	0.9	1.7	1.0
Rubber & plastic products	3.1	1.7	4.1	0.0	-1.7	-2.0
Other non-metallic mineral products	6.2	7.0	2.2	0.9	1.6	1.0
Basic metals	2.0	-3.6	-1.3	-2.1	-2.7	-2.3
Metal products	2.1	-0.4	1.8	1.4	0.1	0.9
Machinery & equipment	3.1	0.1	1.4	-0.9	-1.8	-0.4
Office machinery & computers	4.8	8.0	9.3	-1.1	-8.6	-4.5
Electrical machinery	3.1	-1.1	1.5	-1.7	-3.6	-1.0
Radio, TV & communication equipment	30.5	24.7	10.4	-3.6	-5.8	-5.9
Medical & precision instruments	5.0	3.0	9.6	4.6	-0.8	-2.4
Motor vehicles	2.3	3.1	3.1	0.5	-0.3	-0.3
Other transport equipment	0.9	1.4	-0.1	4.4	8.0	9.2
Other manufacturing	2.9	0.5	4.5	2.7	-1.8	-4.4
Recycling	-42.3	10.9	0.8	6.3	23.6	20.2
Electricity & gas	-0.4	0.3	-0.4	-0.4	0.8	1.2
Water	0.7	0.9	8.6	7.1	6.1	6.6
Construction	2.5	-0.3	2.0	7.1	5.8	2.5
All production	2.7	1.5	1.6	-0.2	0.1	0.3
25th percentile	1.4	-0.3	-0.1	-2.3	-3.4	-3.4
50th percentile	2.7	1.4	1.9	-0.6	-1.6	-1.8

75th percentile	4.0	3.0	3.4	1.1	0.5	1.0
Production industries GVA	2.1	1.0	1.8	0.0	0.3	-3.1
Motor vehicle distribution & repairs, fuel	16.5	19.3	7.2	11.6	6.4	3.8
Wholesale distribution	4.6	3.5	5.4	4.0	1.4	-0.1
Retail distribution	5.5	4.1	5.0	7.8	7.4	5.5
Hotels & restaurants	4.7	4.3	5.5	8.0	7.4	6.7
Land transport & transport via pipelines	1.0	0.0	0.4	1.5	1.4	0.8
Water transport	-0.3	-9.2	0.3	0.9	-8.1	-4.5
Air transport	1.2	1.2	4.4	10.4	3.4	6.9
Ancillary transport services	1.8	3.2	6.3	10.2	7.3	8.3
Post & telecommunications	3.8	-0.2	4.7	8.4	3.9	3.5
Financial intermediation	6.2	6.3	7.9	4.2	8.2	5.4
Insurance & pension funds	11.1	9.2	7.6	1.9	1.2	0.1
Auxiliary financial services	14.5	18.0	14.5	17.4	13.0	13.7
Real estate activities	3.6	2.7	5.8	5.7	5.9	6.4
Renting of machinery etc	15.6	10.9	8.1	7.9	7.6	-2.0
Computer services	22.7	23.2	24.5	26.1	22.0	2.7
Research and development	12.7	15.9	18.9	8.3	10.1	4.4
Other business services	10.5	10.3	12.8	12.3	8.4	6.0
Public administration & defence	2.0	2.1	2.8	2.6	2.1	2.0
Education	2.5	0.7	1.4	5.5	7.1	7.7
Health and social work	6.3	5.1	4.7	4.6	2.5	1.2
Sewage & sanitary services	6.8	4.0	1.4	5.6	3.4	3.9
Membership organisations	23.0	18.6	4.4	8.8	0.5	3.4
Recreational services	5.1	5.5	6.2	9.3	10.2	10.0
Other service activities	15.1	19.2	6.3	6.8	1.6	-0.8
All services	3.4	2.7	4.5	6.7	6.0	4.5
25th percentile	3.3	2.6	4.4	4.5	2.0	1.1
50th percentile	5.9	4.7	5.6	7.9	6.1	3.8
75th percentile	13.1	12.1	7.7	9.5	7.8	6.5
Service industries GVA	2.1	2.3	2.8	3.8	3.5	1.4

Source: Office for National Statistics

An alternative industrial breakdown of capital services is presented in **Table 2**. This breakdown differs from that in Wallis and Turvey (2009) because the industry breakdown of the associated quality adjusted labour series has been expanded (see Turvey, Goodridge and Franklin 2010). The multifactor productivity release (Long and Franklin 2010) is also presented based on this expanded industry breakdown.

Interesting points to note from Table 2 are:

- the average annual growth rate of capital services for agriculture, hunting and forestry, fishing, mining and quarrying, electricity, gas and water supply has declined over the entire period, turning negative over the last complete business cycle
- manufacturing is the only industry on this breakdown where the growth in capital services has been negative since the last complete cycle
- the average annual growth rate of capital services for hotels and restaurants has nearly doubled over the entire period, from almost 5 per cent in the 1972-1978 economic cycle to 8 per cent for the most recent complete economic cycle; and
- in all periods other than 1978-1986, the average annual growth rate of capital services is higher for the real estate, renting and business activities than any other industrial group

Table 2 Average annual growth rates in capital services: by broad industry

Percentages

	1972 – 1978	1978 – 1986	1986 – 1997	1997– 2006	2007	2008
Agriculture, Hunting and Forestry, Fishing, Mining and Quarrying, Electricity, Gas and Water Supply	2.8	2.0	0.8	-0.8	1.0	1.2
Manufacturing	2.5	1.0	2.3	0.2	-0.7	-0.5
Construction	2.5	-0.3	2.0	7.1	5.8	2.5
Wholesale and Retail Trade: Repair of Motor Vehicles, Motorcycles and Personal Household Goods	5.2	4.2	5.3	6.8	5.7	3.9
Hotels and Restaurants	4.7	4.3	5.5	8.0	7.4	6.7
Transport, Storage and Communication	1.5	-1.0	2.8	6.5	3.7	4.2
Financial Intermediation	7.2	7.3	8.3	4.9	6.4	4.8
Real Estate, Renting and Business Activities	7.8	6.9	8.8	10.8	9.9	3.9
Public Administration and Defence: Compulsory Social Security, Education, Health and Social Work	2.4	1.9	2.6	3.5	3.1	3.1
Other Community, Social and Personal Services Activities, Private Households with Employed Persons, Extra-Territorial Organisations and Bodies	5.5	5.3	4.7	8.1	7.5	7.7

Source: Office for National Statistics

Profit shares

The weight of each asset or industry in calculating whole economy capital services is the share of gross operating surplus attributable to each asset or to each industry. These are usually referred to as profit shares. Profit shares can be volatile from year to year so, except for the last two years available, are shown in **Table 3** as average shares over selected periods.

Table 3 Profit shares: by asset, average income

Percentages

	1950s	1960s	1970s	1972 – 1978	1978 – 1986	1986 – 1997	1997 – 2006	2007	2008
Buildings	53.3	45.1	35.8	42.8	42.4	44.3	34.8	46.7	50.1
Computer hardware	0.0	0.0	0.0	0.0	1.0	6.4	8.4	7.2	6.8
Copyright and licence costs	0.0	0.0	0.5	0.5	0.6	0.8	1.2	1.2	1.2
Mineral exploration	0.1	0.3	0.8	0.8	1.2	1.3	0.6	0.3	0.3
Plant and machinery	34.1	41.8	47.5	41.6	39.7	31.5	35.0	26.9	24.0
Own account software	0.0	0.0	0.8	0.8	1.5	3.1	5.1	5.3	5.6
Purchased software	0.0	0.0	1.2	1.1	1.9	3.3	5.4	4.7	4.9
Vehicles	12.4	12.8	13.5	12.4	11.6	9.3	9.5	7.8	7.0

Source: Office for National Statistics

Table 3 shows that the composition of profit shares has changed substantially since the 1950s. More recently, the share of buildings has increased from around 35 per cent in the last full economic cycle to 47–50 per cent in 2007 and 2008. By contrast, the profit share of plant and machinery has declined from 35 per cent over the last full economic cycle to around 25 per cent in 2007 and 2008. The profit share of vehicles has also declined in 2007 and 2008 compared with the last full economic cycle.

Of most interest is the rise of the profit share of computer hardware and software combined, which, although still a relatively small proportion compared to buildings and plant and machinery, has risen from zero in the 1960s to 17 per cent in the most recent cycle. The profit share of computer hardware increased rapidly in the 1980s, 1990s and the early part of this century, culminating in an average share of 8 per cent in the latest economic cycle. Likewise, the profit shares for own-account and purchased software have steadily increased from the 1970s, both reaching an average of around 5 per cent in the latest economic cycle. In 2007 and 2008 the profit shares of computer hardware and purchased software have fallen slightly compared to the previous economic cycle while the share of own-account software has continued to increase.

Table 4 presents the average profit shares by broad industry for the last four complete economic cycles and for 2007 and 2008.

Interesting points to note from Table 4 are:

- the average profit share of construction has remained relatively stable throughout the period at around 1 to 2 per cent
- the average profit share of manufacturing, although large, has declined over the period from approximately 26 per cent in the 1972–1978 economic cycle to 20 per cent in the most recent complete economic cycle
- the average profit share of real estate, renting and business activities has more than tripled over the period from approximately 4 to 12 per cent

- the impact of the recession, which started in 2008, appears to be limited to manufacturing and government related sectors, with the profit share of manufacturing falling by around 1 per cent in 2008 and the share of 'Other Community, Social...' increasing by around 1 per cent

Table 4 **Profit shares: by broad industry, average share**

Percentages

	1972 – 1978	1978 – 1986	1986 – 1997	1997 – 2006	2007	2008
Agriculture, Hunting and Forestry, Fishing, Mining and Quarrying, Electricity, Gas and Water Supply	19.6	19.5	18.1	15.2	13.1	13.2
Manufacturing	25.8	23.7	20.4	20.3	17.2	16.1
Construction	1.9	1.8	1.3	1.5	1.7	1.7
Wholesale and Retail Trade: Repair of Motor Vehicles, Motorcycles and Personal Household Goods	6.9	7.0	8.0	9.2	10.0	10.4
Hotels and Restaurants	1.7	1.8	1.9	2.3	3.2	3.2
Transport, Storage and Communication	16.8	13.6	12.1	13.9	14.7	14.7
Financial Intermediation	3.6	4.0	5.8	5.6	5.8	5.8
Real Estate, Renting and Business Activities	3.9	5.8	8.4	12.1	13.7	13.8
Public Administration and Defence: Compulsory Social Security, Education, Health and Social Work	16.8	18.5	18.9	14.0	12.2	11.9
Other Community, Social and Personal Services Activities, Private Households with Employed Persons, Extra-Territorial Organisations and Bodies	3.1	4.3	5.1	5.9	8.3	9.2

Source: Office for National Statistics

Quarterly estimates

As part of continuous developments to capital services estimates and in response to user demands, an experimental quarterly series has been produced for the first time. This series requires further work and users should note the quality constraints of the series when using it for analysis. Users are advised to use the quarter on same quarter a year ago series rather than the quarter on previous quarter series.

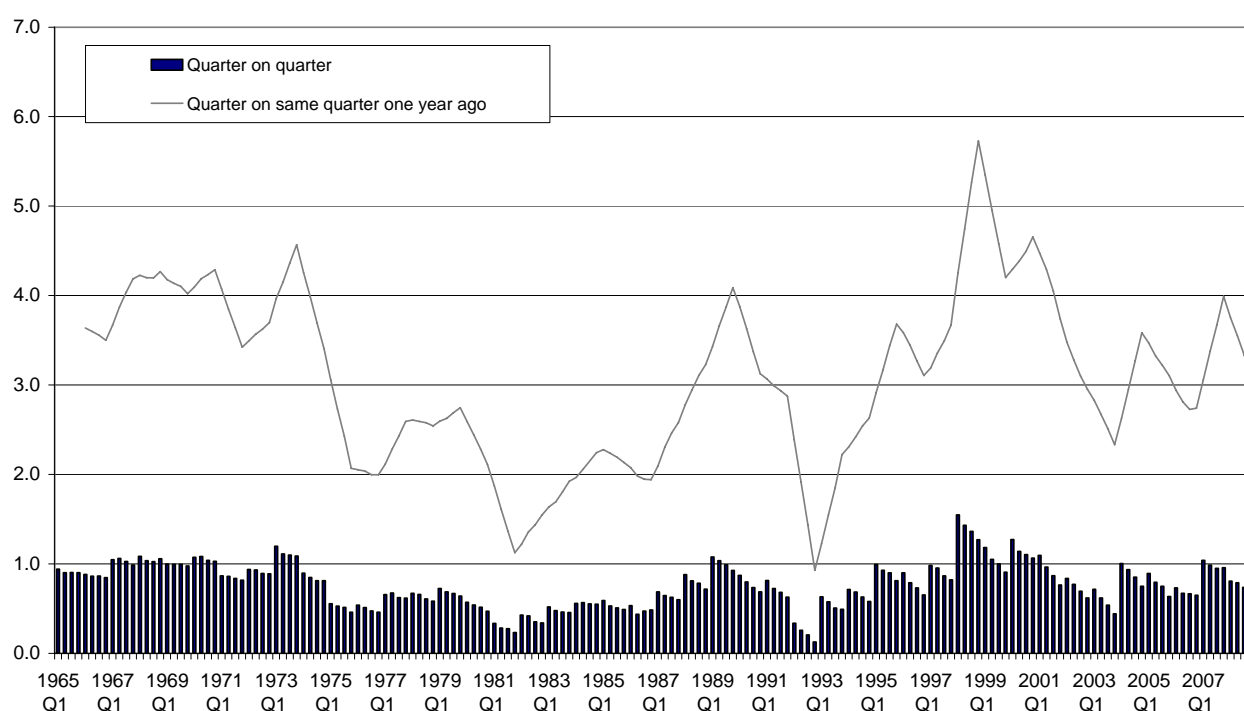
A lack of detailed quarterly investment series means that the method adopted for producing the annual estimates cannot be implemented on a quarterly basis. Instead a quarterly series is approximated using the available annual data together with information on the quarterly path of whole economy investment available from table F of the *Quarterly National Accounts*. The asset specific quarterly investment series available from this release are used to calculate quarterly net stock series. Quarterly capital services growth is then calculated in the standard way, as described in detail in Wallis (2005), Wallis (2009) and in *The ONS Productivity Handbook* (ONS 2007). Annual weights are used in this calculation due to being limited to annual rental series. The series

covers the period 1965 Q1 to 2008 Q4. Further work is planned to further develop these estimates and also to produce a more timely estimate using the latest available quarterly investment series.

Figure 7 shows the quarterly capital services estimates for the whole economy. Both quarter on previous quarter and quarter on same quarter a year ago series are shown. The latter series looks very similar to the annual growth series in Figure 1. This is because the methodology constrains the quarterly growth series to the annual estimates. The quarterly series is more volatile and occasionally displays jumps or falls between Q4 and Q1. This is a result of constraining growth to the annual net stock series.

Figure 7 Quarterly growth in whole economy capital services

Percentages



Source: Office for National Statistics

Conclusion

Capital services are the measure of capital input that is most suitable for analysing and modelling productivity. This article has presented experimental estimates of the capital services growth for the UK as a whole, for the market sector, for the non-oil sector, by eight asset types and by detailed industry. An experimental quarterly series has been produced for the first time. The estimates presented here have been revised since the previous release due to revisions to the source data. However, the main observation continues to be the high growth in capital services from computer hardware and purchased software and much stronger growth in the services industries than in the production industries over recent years. There has also been a clear shift in the profit share from other assets to ICT assets and also from production industries to services industries.

The impact of the recession, which began in 2008, has yet to appear strongly in the capital services data. Investment fell in 2008 but whole economy capital services still grew by 3.2 per cent. This was a decrease from the revised figure for 2007 and below the average of 4.3 per cent during the most recent complete economic cycle but is comparable to the long-run series average.

Further information

Links to articles and data for experimental capital services are available at www.statistics.gov.uk/statbase/product.asp?vlnk=14205

Links to articles and data for experimental multi-factor productivity are available at www.statistics.gov.uk/statbase/product.asp?vlnk=14901

Contact

elmr@ons.gsi.gov.uk

References

Chamberlin G, Clayton T and Farooqui S (2007) 'New measures of UK private sector software investment', *Economic & Labour Market Review* 1(5), pp 17–28 and at www.statistics.gov.uk/cc/article.asp?id=1798

Hall R E and Jorgenson D W (1967) 'Tax Policy and Investment Behaviour', *American Economic Review* Vol. 57, No. 3, pp 391–414

HMT (2008) *Evidence on the economic cycle*, available at www.hm-treasury.gov.uk/d/pbr08_economiccycle_712.pdf

Hulten C R and Wykoff F C (1981a) 'The estimate of economic depreciation using vintage asset prices'. *Journal of Econometrics* Vol. 57, pp 367–96.

Hulten C R and Wykoff F C (1981b) 'The measurement of economic depreciation', In Hulten C R (Ed), *Depreciation, inflation and the taxation of income from capital*. The Urban Institute Press.

Jorgenson D W (1963) 'Capital Theory and Investment Behaviour', *American Economic Review* Vol. 53, No. 2, pp 247–59.

Jorgenson D W and Griliches Z (1967) 'The explanation of productivity change', *Review of Economic Studies* Vol. 34, No. 3, pp 249–83.

Long K and Franklin M (2010) 'Multi-factor productivity: estimates for 1994 to 2008', *Economic & Labour Market Review* 4(9), pp 67–72, available at www.statistics.gov.uk/cc/article.asp?ID=2576

Office for Economic Co-operation and Development (2001) *Measuring Productivity* - OECD Manual.

Office for Economic Co-operation and Development (2001b) *Measuring Capital* - OECD Manual.

Office for National Statistics (2007) *The ONS Productivity Handbook: A Statistical Overview and Guide* at www.statistics.gov.uk/about/data/guides/productivity/default.asp

Oulton N and Srinivasan S (2003) 'Capital stocks, capital services, and depreciation: an integrated framework', *Bank of England Working Paper* No. 192 and at www.bankofengland.co.uk/publications/workingpapers/wp192.pdf

Turvey A, Goodridge P and Franklin M (2010) 'Quality-adjusted labour input: estimates for 1993 to 2008' available at www.statistics.gov.uk/ccf/article.asp?ID=2479

Wallis G (2005) 'Estimates of the volume of capital services', *Economic Trends* 624, pp 42–51 and at www.statistics.gov.uk/ccf/article.asp?id=1297

Wallis G (2007) 'Volume of capital services: estimates for 1950 to 2005', *Economic & Labour Market Review* 1(7), pp 39–47 and at www.statistics.gov.uk/ccf/article.asp?id=1827

Wallis G and Turvey A (2009) 'Volume of capital services: estimates from 1950 to 2007', *Economic & Labour Market Review* 3(1), pp 53–61 and at www.statistics.gov.uk/ccf/article.asp?ID=2105

Wallis G (2009) 'Capital Services Growth in the UK: 1950 to 2006', *Oxford Bulletin of Economics and Statistics*, vol. 71, no. 6, pp. 799- 819.

Key time series

1. National Accounts aggregates

Last updated 28/09/10

Seasonally adjusted									
£ million				Indices (2006 = 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
2008	1,445,580	1,295,663	108.8	109.5	104.3	102.6	102.7	106.0	106.6
2009	1,392,634	1,255,192	104.8	106.0	98.9	97.5	97.8	107.5	108.4
2008 Q1	362,002	322,934	109.0	109.1	107.1	103.8	104.0	105.0	104.9
2008 Q2	363,264	323,679	109.4	109.4	105.2	103.5	103.7	105.6	105.5
2008 Q3	361,466	325,041	108.8	109.8	103.8	102.6	102.6	106.1	107.1
2008 Q4	358,848	324,009	108.1	109.5	100.9	100.5	100.5	107.5	108.9
2009 Q1	349,324	316,469	105.2	106.9	99.8	98.1	98.3	107.2	108.8
2009 Q2	344,359	310,982	103.7	105.1	97.0	97.4	97.6	106.5	107.7
2009 Q3	347,372	312,536	104.6	105.6	98.9	97.1	97.4	107.7	108.4
2009 Q4	351,579	315,205	105.9	106.5	100.1	97.4	97.9	108.7	108.8
2010 Q1	359,302	320,301	108.2	108.2	98.4	97.9	98.2	110.6	110.3
2010 Q2	364,148	324,552	109.7	109.7	100.8	99.0	99.3	110.8	110.4
Percentage change, quarter on corresponding quarter of previous year									
			IHYO	ABML ⁴	YBGO ⁴	IHYR	ABMM ⁴	IHYU	ABML/ABMM ⁴
2008 Q1	4.8	5.2	4.8	5.2	4.8	1.9	2.0	2.9	3.1
2008 Q2	3.9	3.9	3.9	3.9	2.1	1.0	1.1	2.9	2.8
2008 Q3	2.4	3.4	2.4	3.4	0.3	-0.4	-0.6	2.9	4.0
2008 Q4	0.5	1.6	0.5	1.6	-5.2	-2.7	-2.8	3.3	4.6
2009 Q1	-3.5	-2.0	-3.5	-2.0	-6.9	-5.5	-5.5	2.1	3.7
2009 Q2	-5.2	-3.9	-5.2	-3.9	-7.8	-6.0	-5.9	0.8	2.1
2009 Q3	-3.9	-3.8	-3.9	-3.8	-4.8	-5.4	-5.0	1.6	1.3
2009 Q4	-2.0	-2.7	-2.0	-2.7	-0.9	-3.0	-2.6	1.0	-0.1
2010 Q1	2.9	1.2	2.9	1.2	-1.4	-0.3	-0.1	3.1	1.4
2010 Q2	5.7	4.4	5.7	4.4	3.9	1.7	1.8	4.0	2.5

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. Derived from these identification (CDID) codes.

2. Gross Domestic Product: by category of expenditure

Last updated 28/09/10

£ million, chained volume measures, reference year 2006, seasonally adjusted

Domestic expenditure on goods and services at market prices												
Final consumption expenditure				Gross capital formation								
	Households	Non-profit institutions ¹	General government	Gross fixed capital formation	Changes in inventories ²	Acquisitions less disposals of valuables	Total	Exports of goods and services	Gross final expenditure	less Imports of goods and services	Statistical discrepancy (expenditure)	Gross domestic product at market prices
	ABJR	HAYO	NMRY	NPQT	CAFU	NPJR	YBIM	IKBK	ABMG	IKBL	GIXS	ABMI
2008	842,174	32,338	293,464	232,777	130	1,290	1,402,173	372,104	1,774,277	411,138	0	1,363,139
2009	813,791	31,764	296,287	197,548	-15,416	1,222	1,325,195	330,809	1,656,004	360,749	-96	1,295,159
2008 Q1	213,214	8,292	72,104	59,619	3,228	206	356,664	93,858	450,522	105,712	0	344,809
2008 Q2	211,525	8,183	73,334	59,779	872	440	354,134	94,284	448,418	104,550	0	343,868
2008 Q3	210,330	8,018	73,473	57,254	645	367	350,088	93,918	444,005	103,226	0	340,780
2008 Q4	207,105	7,845	74,553	56,125	-4,615	277	341,287	90,044	431,332	97,650	0	333,682
2009 Q1	204,245	8,045	74,078	51,404	-4,454	420	333,737	82,533	416,271	90,373	-5	325,893
2009 Q2	202,770	7,956	74,129	48,578	-3,501	239	330,171	81,266	411,437	88,079	-15	323,343
2009 Q3	202,531	7,888	73,776	49,288	-4,139	212	329,556	82,002	411,558	89,138	-29	322,391
2009 Q4	204,245	7,875	74,304	48,278	-3,322	351	331,731	85,008	416,738	93,159	-47	323,532
2010 Q1	204,219	7,825	74,792	49,664	-1,112	267	335,654	84,416	420,070	94,992	-96	324,982
2010 Q2	205,585	7,878	75,545	50,352	88	375	339,824	86,328	426,152	97,269	-114	328,769
Percentage change, quarter on corresponding quarter of previous year												
2008 Q1	2.9	0.1	0.8	-1.9			1.8	3.7	2.2	3.1		1.9
2008 Q2	1.4	-1.5	1.9	-1.4			1.2	2.7	1.5	3.1		1.0
2008 Q3	0.1	-4.1	1.2	-6.0			-1.3	0.5	-0.9	-2.5		-0.4
2008 Q4	-2.1	-6.9	2.5	-10.5			-4.4	-2.7	-4.1	-8.4		-2.7
2009 Q1	-4.2	-3.0	2.7	-13.8			-6.4	-12.1	-7.6	-14.5		-5.5
2009 Q2	-4.1	-2.8	1.1	-18.7			-6.8	-13.8	-8.2	-15.8		-6.0
2009 Q3	-3.7	-1.6	0.4	-13.9			-5.9	-12.7	-7.3	-13.6		-5.4
2009 Q4	-1.4	0.4	-0.3	-14.0			-2.8	-5.6	-3.4	-4.6		-3.0
2010 Q1	0.0	-2.7	1.0	-3.4			0.6	2.3	0.9	5.1		-0.3
2010 Q2	1.4	-1.0	1.9	3.7			2.9	6.2	3.6	10.4		1.7

Notes

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

3. Labour Market summary

Last updated 15/09/10

United Kingdom (thousands) seasonally adjusted

LFS household population ¹			Headline indicators					
			Employment		Unemployment		Inactivity	
			Level	Rate ²	Level	Rate ³	Level	Rate ⁴
All aged 16 & over	All aged 16 to 64	All aged 16 & over	All aged 16 to 64	All aged 16 & over	All aged 16 to 64	All aged 16 & over	All aged 16 to 64	
People	MGSL	LF2O	MGRZ	LF24	MGSC	MG SX	LF2M	LF2S
May–Jul 2008	49,070	39,579	29,503	72.8	1,717	5.5	9,065	22.9
May–Jul 2009	49,450	39,803	28,857	70.7	2,472	7.9	9,233	23.2
Aug–Oct 2009	49,548	39,854	28,906	70.6	2,485	7.9	9,248	23.2
Nov–Jan 2010	49,646	39,905	28,861	70.4	2,443	7.8	9,396	23.5
Feb–Apr 2010	49,744	39,955	28,872	70.3	2,475	7.9	9,422	23.6
May–Jul 2010	49,842	40,006	29,158	70.7	2,467	7.8	9,264	23.2
Change on quarter	98	51	286	0.4	-8	-0.1	-158	-0.4
Change on quarter %	0.2	0.1	1.0		-0.3		-1.7	
Change on year	393	204	301	0.1	-5	-0.1	31	0.0
Change on year %	0.8	0.5	1.0		-0.2		0.3	
Men	MGSM	YBTG	MGSA	MGSV	MGSD	MG SY	YBSO	YBTM
May–Jul 2008	23,890	19,689	15,935	78.7	1,011	6.0	3,199	16.2
May–Jul 2009	24,093	19,803	15,435	75.7	1,529	9.0	3,294	16.6
Aug–Oct 2009	24,148	19,830	15,408	75.4	1,535	9.1	3,360	16.9
Nov–Jan 2010	24,202	19,858	15,355	75.0	1,505	8.9	3,476	17.5
Feb–Apr 2010	24,257	19,885	15,389	75.0	1,511	8.9	3,468	17.4
May–Jul 2010	24,311	19,912	15,610	75.8	1,452	8.5	3,375	17.0
Change on quarter	55	27	221	0.8	-58	-0.4	-93	-0.5
Change on quarter %	0.2	0.1	1.4		-3.8		-2.7	
Change on year	218	109	175	0.1	-77	-0.5	81	0.3
Change on year %	0.9	0.5	1.1		-5.0		2.5	
Women	MGSN	LF2P	MG SB	LF25	MG SE	MG SZ	LF2N	LF2T
May–Jul 2008	25,180	19,890	13,568	67.0	707	4.9	5,866	29.5
May–Jul 2009	25,357	19,999	13,422	65.6	942	6.6	5,939	29.7
Aug–Oct 2009	25,400	20,023	13,497	65.9	950	6.6	5,888	29.4
Nov–Jan 2010	25,444	20,047	13,506	65.8	938	6.5	5,920	29.5
Feb–Apr 2010	25,487	20,071	13,483	65.6	964	6.7	5,954	29.7
May–Jul 2010	25,531	20,095	13,548	65.7	1,015	7.0	5,888	29.3
Change on quarter	44	24	65	0.1	50	0.3	-66	-0.4
Change on quarter %	0.2	0.1	0.5		5.2		-1.1	
Change on year	174	95	126	0.1	72	0.4	-50	-0.4
Change on year %	0.7	0.5	0.9		7.7		-0.8	

Notes

1. The Labour Force Survey (LFS) is a survey of the population of private households, student halls of residence and NHS accommodation.
2. The headline employment rate is the number of people aged 16 to 64 in employment divided by the population aged 16 to 64.
3. The headline unemployment rate is the number of unemployed people (aged 16+) divided by the economically active population (aged 16+). The economically active population is defined as those in employment plus those who are unemployed.
4. The headline inactivity rate is the number of people aged 16 to 64 divided by the population aged 16 to 64.

Note on headline employment, unemployment and inactivity rates

The headline employment and inactivity rates are based on the population aged 16 to 64 but the headline unemployment rate is based on the economically active population aged 16 and over. The employment and inactivity rates for those aged 16 and over are affected by the inclusion of the retired population in the denominators and are therefore less meaningful than the rates for those aged from 16 to 64. However, for the unemployment rate for those aged 16 and over, no such effect occurs as the denominator for the unemployment rate is the economically active population which only includes people in work or actively seeking and able to work.

Note on headline employment, unemployment and inactivity levels

The headline employment and unemployment levels are for those aged 16 and over; they measure all people in work or actively seeking and able to work. However, the headline inactivity level is for those aged 16 to 64. The inactivity level for those aged 16 and over is less meaningful as it includes elderly people who have retired from the labour force.

4. Prices

Last updated 15/09/10

Percentage change over 12 months, Not seasonally adjusted										
	Consumer prices						Producer prices			
	Consumer prices index (CPI)			Retail prices index (RPI)			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	EL2S	EAD6	CZBH	CDKQ	CBZX	PLLU ³	PLLv ^{3,4}	RNNK ^{3,4}	RNNQ ^{3,4}
2009 Jan	3.0	4.5	4.1	0.1	2.4	3.4	3.5	4.0	1.7	10.8
2009 Feb	3.2	4.6	4.2	0.0	2.5	3.5	3.0	3.7	0.8	8.9
2009 Mar	2.9	4.3	3.9	-0.4	2.2	3.2	2.0	3.2	-0.4	7.5
2009 Apr	2.3	3.8	3.4	-1.2	1.7	2.7	1.3	2.5	-5.8	2.6
2009 May	2.2	3.6	3.3	-1.1	1.6	2.6	-0.3	1.2	-8.8	0.2
2009 Jun	1.8	3.1	2.9	-1.6	1.0	1.9	-1.0	0.3	-12.0	-2.9
2009 Jul	1.8	3.1	2.8	-1.4	1.2	2.1	-1.3	0.2	-12.2	-3.4
2009 Aug	1.6	2.9	2.7	-1.3	1.4	2.3	-0.3	0.8	-7.7	-2.1
2009 Sep	1.1	2.2	2.1	-1.4	1.3	2.0	0.4	1.3	-6.2	-1.2
2009 Oct	1.5	2.6	2.5	-0.8	1.9	2.8	1.8	2.1	0.5	0.9
2009 Nov	1.9	3.0	2.9	0.3	2.7	3.5	2.9	2.0	4.2	0.8
2009 Dec	2.9	2.8	2.6	2.4	3.8	3.8	3.5	2.5	7.4	1.1
2010 Jan	3.5	1.9	1.7	3.7	4.6	3.3	3.8	2.6	7.7	1.4
2010 Feb	3.0	1.4	1.2	3.7	4.2	2.9	4.2	3.0	7.8	2.4
2010 Mar	3.4	1.8	1.6	4.4	4.8	3.5	5.0	3.7	10.5	4.4
2010 Apr	3.7	2.0	1.9	5.3	5.4	3.9	5.9	4.5	12.8	6.3
2010 May	3.4	1.7	1.6	5.1	5.1	3.8	5.5	4.4	11.7	7.2
2010 Jun	3.2	1.6	1.5	5.0	5.0	3.8	5.1	5.0	10.6	7.1
2010 Jul	3.1	1.4	1.3	4.8	4.8	3.5	5.0	4.7	10.8	7.6
2010 Aug	3.1	1.4	1.3	4.7	4.7	3.4	4.7	4.6	8.1	6.4

Notes

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.

4 These derived series replace those previously shown.

Notes to tables

Identification (CDID) codes

The four-letter identification code at the top of each data column is the ONS reference for this series of data on our time series database. Please quote the relevant code if you contact us requiring any further information 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 as shown. Although figures may be given in unrounded form to facilitate the calculation of percentage changes, rates of change etc by users, 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 (less than half the final digit shown)
P	provisional
—	break in series
R	revised
r	series revised from indicated entry onwards

Labour market statistics 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 force summary table

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

Weblink: www.statistics.gov.uk/elmr/10_10/data_page.asp

Title	Frequency of update
1. UK economic accounts	
Weblink: www.statistics.gov.uk/10_10/1.asp	
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 Index of Services	M
2. Selected labour market statistics	
Weblink: www.statistics.gov.uk/10_10/2.asp	
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 weekly earnings - total pay	M
2.16A Average weekly earnings - bonus pay	M
2.17 Average weekly earnings - regular pay	M
2.18 Productivity and unit wage costs	M
2.19 Regional labour market summary	M
2.20 International comparisons	M
2.21 Labour disputes	M
2.22 Vacancies by size of enterprise	M
2.23 Vacancies by industry	M
2.24 Redundancies: levels and rates	M
2.25 Redundancies: by industry	Q
2.27 Employment levels by country of birth and nationality	M
2.28 Working age employment rates by country of birth and nationality	Q
2.29 Lone parent claimants of Jobseekers Allowance by age of youngest child	M
2.30 Key out of work benefits	M
2.31 Production industry employee jobs	M
2.32 Public sector employment by industry	Q

3. Prices

Weblink: www.statistics.gov.uk/10_10/3.asp

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

4. Selected output and demand indicators

Weblink: www.statistics.gov.uk/10_10/4.asp

4.01 Output of the production industries	M
4.02 Construction output	M
4.03 Construction new orders	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 Retail sales and credit business	M

5. Selected financial statistics

Weblink: www.statistics.gov.uk/10_10/5.asp

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 MFI lending to UK residents	M
5.08 Interest rates and yields	M
5.09 A selection of asset prices	M

6. Further labour market statistics

Weblink: www.statistics.gov.uk/10_10/6.asp

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 Workforce jobs by industry	M
6.05 Employee jobs by industry	Q
6.06 Workforce 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 (discontinued Q4 2007)	Q
6.12 Average Earnings Index by industry: excluding and including bonuses	M
6.13 Average Earnings Index: effect of bonus payments by industry	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 and unemployment	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 Annual

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.nomis.web
- Labour Force Survey tables are available from www.statistics.gov.uk/statbase/Product.asp?vlnk=11771
- Annual Survey of Hours and Earnings data are available from www.statistics.gov.uk/StatBase/Product.asp?vlnk=13101

Recent articles

April 2010

- Labour Force Survey unemployment and benefits durations
- Disability, education and training
- CPI and RPI: the 2010 basket of goods and services
- Incorporating derivatives data in the National Accounts and Balance of Payments
- Civil Service Statistics 2009: A focus on gross annual earnings
- Plans for Blue Book 2010
- Services Producer Price Indices (experimental) – Fourth quarter 2009

May 2010

- Recent developments in the household saving ratio
- Comparing different estimates of productivity produced by the Office for National Statistics
- Labour productivity measures from the ABI: 1998 to 2007
- The economic impact of tourism across regions and nations of the UK
- Regional economic indicators with a focus on gross disposable household income

June 2010

- Disadvantaged groups in the labour market
- The UK's international investment position
- Regional gross value added
- Labour disputes in 2009
- The recording of financial intermediation services within sector accounts
- Healthcare productivity
- Methods explained: Real time data

July 2010

- Characteristics of the underemployed and overemployed in the UK
- Explaining the difference between unemployment and the claimant count
- The changing face of public sector employment 1999–2009
- The effects of taxes and benefits on household income, 2008/09
- SOC2010: revision of the Standard Occupational Classification
- Measures of economic activity and their implications for societal well-being

- Measuring investment in intangible assets in the UK: results from a new survey
- Developments in Services Producer Price Indices
- Services Producer Price Indices – First quarter 2010

August 2010

- Impact of the recession on households
- The labour market in the 1980s, 1990s and 2008/09 recessions
- Employment in the 2008–2009 recession
- Unemployment and inactivity in the 2008–2009 recession
- Output and expenditure in the last three UK recessions
- The global recession and its impact on tourists' spending in the UK
- Regional economic indicators: A focus of regional gross value added using shift–share analysis

September 2010

- Total reward: pay and pension contributions in the private and public sectors
- There's more to life than GDP but how can we measure it?
- Explaining exits from unemployment in the UK, 2006–09
- The relationship between hours worked in the UK and the economy
- Regional Gross Disposable Household Income
- Multi–factor productivity: estimates for 1994 to 2008
- Revisions to Workforce Jobs

Future articles

List is provisional and subject to change

- Measurement of human capital
- Human capital and wellbeing
- Enhancing the coverage of financial sector activity
- Financial statistics for policy – an update
- Measuring the green economy
- Standard Industrial Classification 2007 update
- The rise of China and its impact on UK trade
- Regional Gross Valued Added
- On–call workers in the labour market
- Small and medium enterprises