Office for National Statistics

Article

Sub-regional productivity: February 2015

Experimental statistics for 2 measures of labour productivity, GVA per hour worked and GVA per filled job, for the NUTS2 and NUTS3 sub-regions in the UK and Local Enterprise Partnerships in England. Typically, the sub-regions with the highest levels of productivity were found in London and the South East regions of England and Scotland. The lowest productivity levels were found in relatively rural or remote areas of the UK.

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1. Correction

Wednesday 20 May 2015 at 1400

Due to some small errors in allocating GVA data to the Local Enterprise Partnership (LEP) geography, the initial publication of this release in February 2015 included some errors in the data for LEPs. These errors have now been corrected. The main data revisions are for Tees Valley LEP and The Marches LEP. There are some additional very minor corrections for a further three LEPs, namely Lancashire, 'Derby, Derbyshire, Nottingham and Nottinghamshire', and 'Coventry and Warwickshire'. Data for NUTS geographies were not affected.

2. Key points

- Inner London had the highest productivity level among the 37 UK NUTS 2 subregions in 2013, with a GVA per hour worked 42% above the UK average. Among the 134 GB NUTS 3 subregions, Inner London West had the highest productivity level, 49% above the UK average
- Thames Valley Berkshire had the highest productivity level among the Local Enterprise Partnerships in England in 2013, with GVA per hour worked 33% above the UK average. This was higher than in the London LEP where productivity was 29% above the UK average
- Overall, the subregions with the highest levels of productivity in the UK are typically found in either the London or South East regions of England or in Scotland
- The lowest productivity levels are typically found in relatively rural or remote areas of the UK. The lowest productivity among UK NUTS 2 subregions was in Cornwall and Isles of Scilly and the lowest among UK NUTS 3 subregions was in Powys

3. Introduction

This article provides experimental statistics for two measures of labour productivity, GVA per hour worked and GVA per filled job. They are provided for the NUTS2 and NUTS3 subregions of the UK and, for the first time, for Local Enterprise Partnerships in England.

The data in this report measure labour productivity. Labour productivity measures the amount of output produced by a unit of labour input. A higher level of productivity means that a higher level of output is being produced per unit of labour input.

Productivity matters because increasing productivity is key to increasing economic growth. This follows from the fact that economic output can only be increased by either increasing the amount of inputs or by raising productivity. Increasing productivity is, therefore, an important aim for both national and local economies. As shown in the ‘Results’ sections in this report, there is currently a wide spatial divergence in levels of productivity between different subregions.

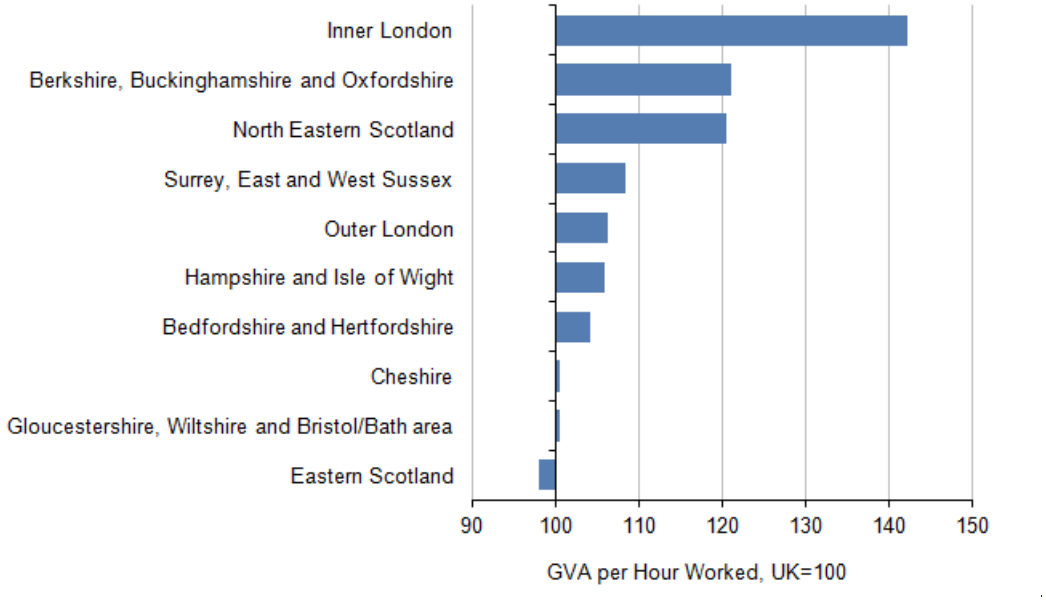
The preferred measure of labour productivity is GVA per hour worked, and the text in this article focuses on this measure. Data are also available in the reference tables for GVA per filled job.

For users interested in a brief summary of the key results, the article is structured to include these summaries upfront. For those who wish to examine the data in more detail, the two sections ‘interpreting the data’ and ‘methodology’ both provide useful information to help users understand and get the most from the data that are available in the attached reference tables. An interactive map showing the data by NUTS3 subregions is also available.

4. Results by NUTS2 subregions

This section presents the main results of the labour productivity estimates for the 37 NUTS2 subregions of the UK, focusing on estimates of nominal GVA per hour worked. The data have been smoothed based on a weighted average of up to five years data (see methodology section for more information).

Figure 1: Nominal GVA per hour worked - highest ranking NUTS 2 subregions, 2013



Inner London showed the highest productivity level, with a GVA per hour worked 42% above the UK average. This was followed by Berkshire, Buckinghamshire and Oxfordshire and by North Eastern Scotland, both of which had productivity levels 21% above the UK average. Overall, only 9 of the 37 NUTS 2 subregions had productivity levels above the UK average.

Figure 2: Nominal GVA per hour worked - lowest ranking NUTS2 subregions, 2013

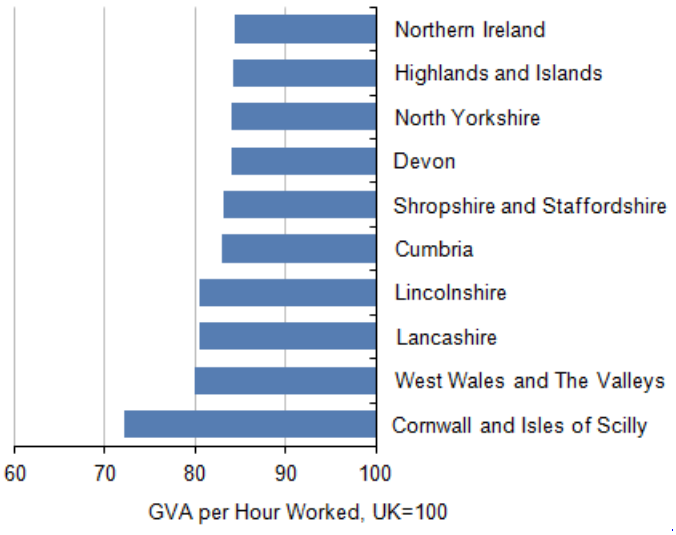
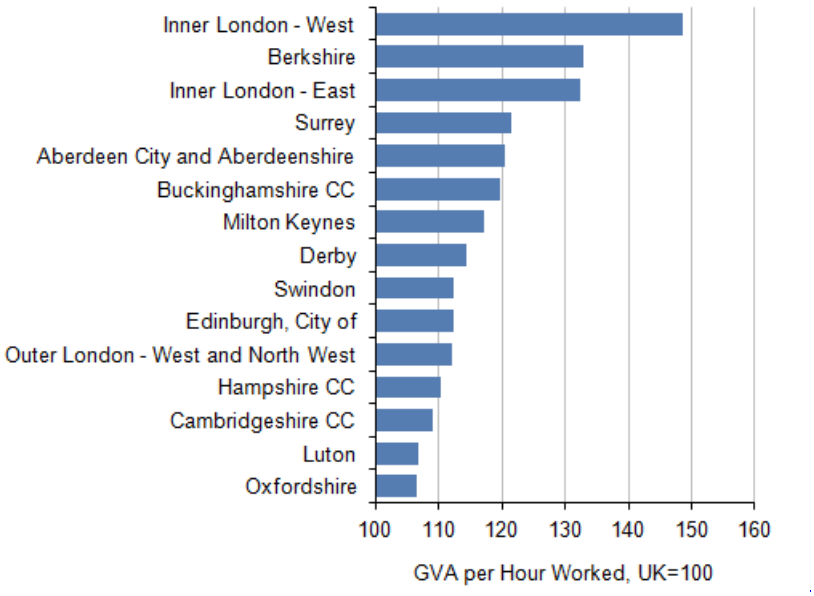


Figure 2 shows the NUTS 2 regions with the lowest labour productivity levels. Each has productivity at least 15% below the UK average. In general, the places with the lowest productivity levels tend to be the more rural areas of the country. The lowest productivity levels are found in Cornwall and Isles of Scilly.

5. Results by NUTS 3 subregions

This section presents the results of the labour productivity estimates for the 134 NUTS3 subregions of Great Britain[1], focusing on the data for nominal GVA per hour worked, which is the preferred subregional labour productivity measure. The data have been smoothed based on a weighted moving average of up to five years data (see methodology section for more information). An interactive map showing the smoothed data by NUTS3 subregions is also available.

Figure 3: Nominal GVA per hour worked - highest ranking NUTS3 subregions, 2013



Inner London West had the highest productivity levels among NUTS 3 subregions, with GVA per hour worked 49% above the UK average. This is followed by Berkshire and by Inner London East with labour productivity 33% and 32% above the UK average respectively.

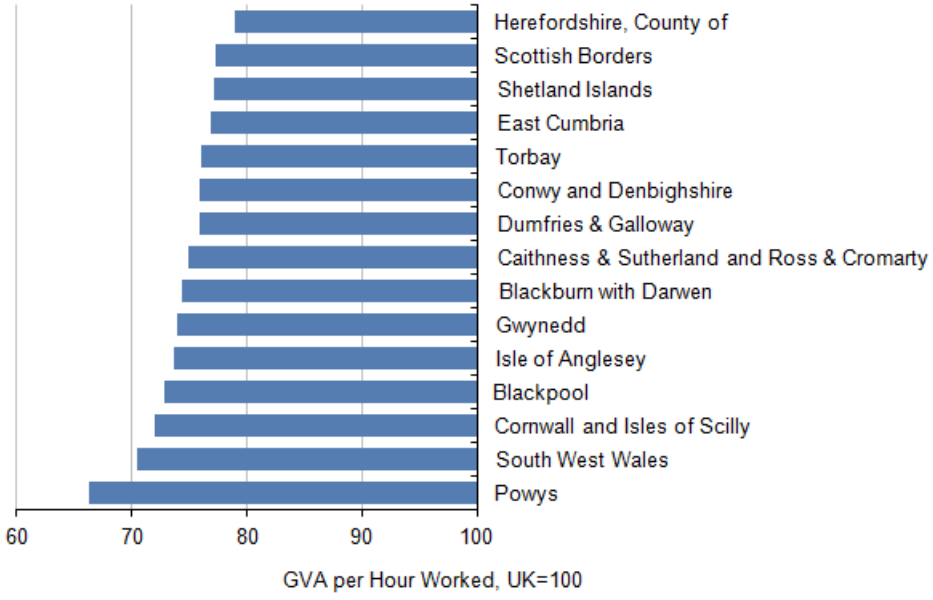
In Scotland, Aberdeen City and Aberdeenshire and City of Edinburgh both had productivity levels above the UK average. Otherwise, all the NUTS 3 subregions in Figure 3 are in the Greater South East of England with the exception of Derby (East Midlands) and Swindon (South West).

It should be noted that the very high productivity level in Inner London leads to a skewed distribution of productivity levels across the UK, such that relatively few subregions have productivity levels above the UK (mean) average. In fact, in 2013, just 24 out of 134 NUTS3 subregions across England, Scotland and Wales had a GVA per hour worked above the UK average.

Given the skewed nature of the distribution, it is worth considering how the productivity level of the mid-ranking (median) subregion compares with the UK average. In 2013, the two subregions occupying the middle positions in the productivity ranking of the NUTS3 subregions were Thurrock and Bradford, each with a GVA per hour worked of 90% the UK average; that is, a productivity level that was 10% below the UK mean average.

Figure 4 shows the NUTS 3 subregions with the lowest labour productivity. They are typically, but not always, in relatively rural or remote areas of the UK, for example Powys, South West Wales and Cornwall and Isles of Scilly. All the NUTS 3 subregions shown in Figure 4 have productivity levels at least 20% below the UK average.

Figure 4: Nominal GVA per hour worked - lowest ranking NUTS3 subregions, 2013



Notes for results by NUTS 3 subregions

1. GVA per hour NUTS3 data for Northern Ireland are not available. Data are available for GVA per job filled.

6. Results by local enterprise partnership

Local enterprise partnerships (LEPs) are partnerships in England between local authorities and businesses. They were created in 2011 and their role is to help shape local economic priorities and undertake activities to drive local economic growth and the creation of jobs. There are 39 LEPs. Every local authority in England belongs to at least one LEP. However, some local authorities belong to more than one LEP.

Figure 5: Nominal GVA per hour worked - highest ranking LEPs, 2013

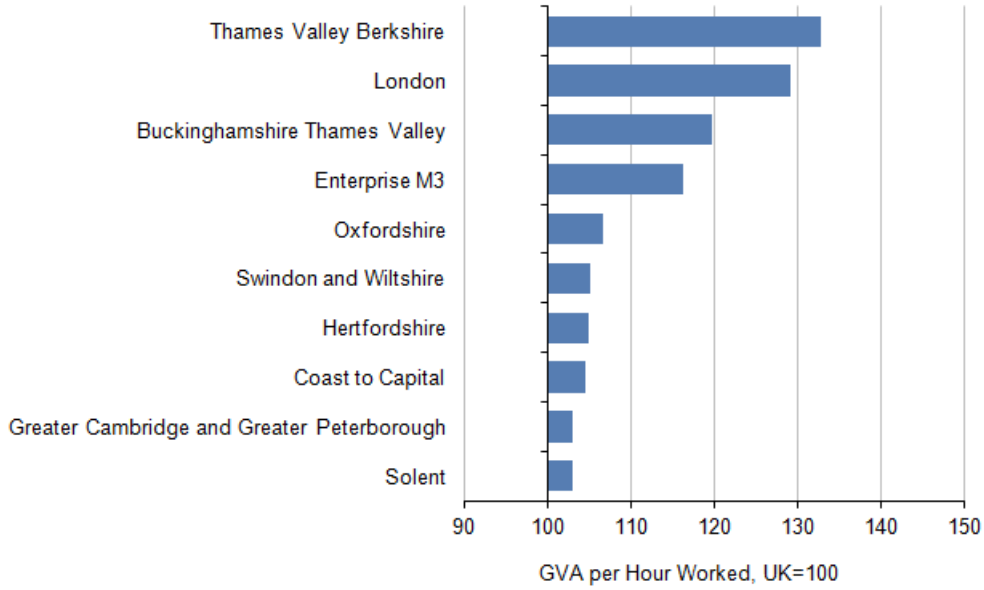


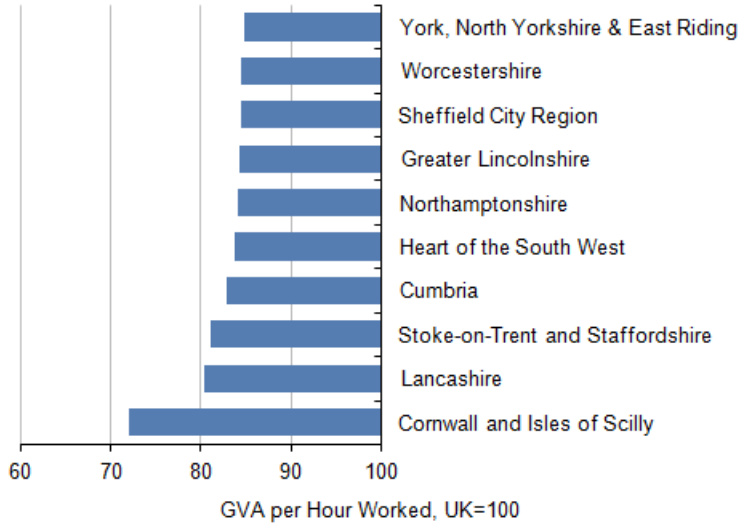
Figure 5 shows the Local Enterprise Partnerships with the highest labour productivity levels in 2013. Thames Valley Berkshire was the LEP with the highest productivity, 33% above the UK average. As discussed in the ONS publication, GVA for Local Enterprise Partnerships 1997 to 2013, Thames Valley Berkshire has a specialism in the 'Information and Communication' sector of the UK economy with this sector accounting for 23% of its GVA in 2012 (compared with less than 11% in all other LEPs) and this is likely to be a factor behind its strong productivity performance. Elsewhere, London ranked second among the LEPs with productivity 29% above the UK average.

It is notable that all ten of the LEPs shown in Figure 5 are located within the regions of the South of England (East of England, South East, South West and London). In total there were thirteen LEPs with GVA per hour worked above the UK average. These being the ten listed in Figure 5 plus South East Midlands, West of England, and Cheshire and Warrington LEPs.

In the city based LEPs of the North of England, such as Liverpool City Region, Greater Manchester, Greater Birmingham and Solihull, and Leeds City Region productivity was around 8-11% below the UK average in 2013. In Sheffield City Region it was lower at 16% below the UK average.

The ten LEPs with the lowest GVA per hour worked are shown in Figure 6. Each had GVA per hour worked at least 15% below the UK average. Cornwall and Isles of Scilly had the lowest productivity followed by a number of LEPs in the North West of England, namely Lancashire, Stoke-on-Trent and Staffordshire and Cumbria.

Figure 6: Nominal GVA per hour worked - lowest ranking LEPs, 2013



7. Interpreting the data

This section discusses some useful information that may be of help for users wishing to utilise and interpret the data in this release including the accompanying reference tables. In particular, it examines:

1. The differences, in terms of analysing economic performance, between the labour productivity data in this release and GVA per head data.

2. The differences between the two labour productivity measures included in this release, namely GVA per hour worked and GVA per filled job

3. Using the data in this release for time series analysis.

Users may also find it useful to examine the ‘methodology’ section which provides further details on the smoothing process, geographies, data revisions and consistency with other ONS productivity data.

Comparison of labour market productivity measures and GVA per head

GVA per head has historically been, and often still is, used as a catch-all indicator of a subregion's economic performance. However, there are some significant drawbacks to using GVA per head in this manner which are discussed below. Therefore, it is considered better to use a suite of different indicators, including the productivity measures published in this article, when assessing the economic performance of regions and subregions.

GVA per head is calculated as the simple ratio of economic activity in a region divided by the number of people living in that region. At first sight, GVA per head appears to be an appropriate indicator of productivity as it compares the output of a region (GVA) with an input (population). However, there are two main limitations in this measure that makes GVA per head unsuitable as a regional productivity measure. Firstly, by including all the residential population and not just those who are in employment, the denominator includes residents who are not directly contributing to GVA. GVA per head is therefore impacted by the share of children, pensioners and others not economically active within a subregion. Secondly, the GVA per head is dividing a workplace-based numerator (GVA) by a residence-based denominator (residential population). This means that this measure does not account for people commuting into and out of a region.

For these reasons, GVA per hour worked and GVA per filled job are the most appropriate measure of regional and subregional productivity. These measures only count the input of those who are directly employed in the production process (rather than the whole population) and additionally, they provide a workplace-based labour input denominator to match the workplace-based GVA numerator, thus fully accounting for the impacts of commuting.

The differences in the results between subregional labour productivity and GVA per head can be quite large. This is particularly the case for subregions that have large commuting flows such as Inner London. In such cases use of GVA per head can give an unrealistic picture of the subregions relative economic performance.

Difference between GVA per hour worked and GVA per filled job

GVA per hour worked and GVA per filled job can both be used as measures of labour productivity, but these two measures are different. GVA per hour worked apportions GVA to the total hours worked by the workforce in the subregion; GVA per filled job apportions GVA to the number of jobs in the subregion.

There will be some small differences between the results for the two measures. This occurs because the average of hours worked per job varies from subregion to subregion as a result of differences in labour market structure and working patterns. For example, a subregion with high levels of part-time employment will tend to have lower average hours worked per job.

GVA per filled job does not take into consideration regional labour market structures or different working patterns, such as the mix of part-time and full-time workers, home workers and job shares. For this reason, GVA per hour worked is a more comprehensive indicator of labour productivity and the preferred measure at sub national level.

Note that GVA per hour worked data are currently available for the period 2004-2013 and GVA per filled job data are available for the period 2002-2012.

Time series trend analysis

Data presented in this publication cover a period of up to 10 years and, subject to the caveats detailed below, it is possible to look at the variation in the data over a period of time.

Choice of smoothed or unsmoothed data

Caution is needed when carrying out a change over time analysis of the subregional productivity data. Particularly for NUTS3 data, there is volatility in the data that arises from the smaller survey samples inherent within estimates for smaller geographic areas. It is for this reason that smoothed subregional productivity data is presented in this article. The smoothed data reduce the volatility by using weighted data from up to five years in producing the estimate for each year.

When using this smoothed data for time-series analysis, examining a particular year-on-year change does not really make sense, because each year’s data are already a weighted average of a number of different years. Therefore, to examine a year-on-year change, for example from 2012 to 2013, the only suitable method would be to use the unsmoothed data that are available in the accompanying reference tables.

However, because of the volatility of the data, this year-on-year change may well be due to the volatility arising from the sample errors, as opposed to a ‘true’ change in the data. Furthermore, in the absence of confidence intervals for the subregional productivity data, it is very difficult to determine which actually the case is.

In view of this, time series analysis of the subregional productivity data is better done over a longer period of time. Trends over a longer period of time are less likely to be the result of the volatility around any single year estimate and more likely to be showing a change in the economic performance of the subregion. Such a trend should show up in the smoothed data, as well as the unsmoothed data, so using the smoothed data is appropriate when considering the trend over the full data time series.

Interpreting data in index form

When looking at changes over time, it is also important to keep in mind that the productivity data in this article are presented as indices rather than the actual GVA per hour worked or GVA per filled job. The productivity index shows how well a subregion has performed compared with the rest of the UK, that is, the UK average (100). Therefore, a decrease in the productivity index number of a subregion does not necessarily mean that the subregion's productivity has decreased in actual terms; it rather means that the subregion has performed relatively worse than the rest of the UK over the period. In other words, its actual productivity level may have improved, but at a slower rate than the UK overall, thus declining relative to the UK=100 index. Similarly, an increase in the productivity index number means that the subregion has performed better than the rest of the UK. Data on actual GVA per hour worked or GVA per filled job is available in the reference tables for users wishing to examine the data directly.

8. Methodology

Key points

- The subregional productivity data in this article have been compiled to be consistent with the regional productivity data published in the ONS Labour Productivity Statistical Bulletin on the 24 December 2014
- Both regional and subregional productivity measures are produced by ONS on a nominal basis only. In other words, there is no separation of volume and price in the final output. As such, different levels of nominal productivity across different subregions will be impacted by any difference in prices between these subregions, in addition to differences in production volumes per input
- Data accompanying this article are based on the NUTS geographical classification that came into use on 1 January 2012. The LEPs data is based on the latest boundaries as of February 2015. Please see the geography note below for more details of the boundaries used for Solent LEP and Enterprise M3 LEP

Consistency with regional productivity data

Regional productivity data are published by ONS in the 'Productivity Measures by Region' table, which is included in the quarterly Labour Productivity Statistical Bulletin. This regional table includes two productivity measures; GVA per filled job and GVA per hour worked. The subregional productivity data have been compiled to be consistent with the data in this regional table.

This requires ensuring that the subregional measures of GVA, jobs and hours are all consistent with the regional totals. The methodology is therefore concerned with how best to apportion the regional totals to the subregional areas. The approach taken is as follows:

GVA

Since December 2013, regional GVA data have only been published by ONS as unsmoothed data. Previously, both smoothed (headline) GVA or unsmoothed GVA had been produced. Regional (NUTS1) productivity calculations use the unsmoothed workplace based GVA series, to be consistent with the labour input series used, which are both unsmoothed and workplace based. The aim in the subregional productivity calculations is to apportion out, to NUTS2 and NUTS3 subregions, the NUTS1 GVA series used in the regional productivity estimates, that is, the unsmoothed workplace based GVA at current basic prices series.

Jobs

At the regional level, GVA per filled job is calculated using a 'Productivity Jobs' series as the denominator. This is compiled from four components; employee jobs, self employed jobs, government supported trainees (GST) and members of Her Majesty's Forces. For consistency purposes, the regional 'Productivity Jobs' series is benchmarked to the national 'Productivity Jobs' series, on a quarterly basis. To produce annual totals for regional Productivity Jobs, an average of the four quarters in the year is taken.

For subregional geographies, the 'Total Jobs' data series is used to apportion regional productivity jobs to NUTS2 and NUTS3 subregions. This Total Jobs measure is a workplace based measure of jobs that ONS produces mainly for use in calculating job densities at regional and subregional level. Total jobs data comprise employees (from the Business Register Employment Survey), self-employment jobs (from the Annual Population Survey), government-supported trainees (from Department for Education and Department for Work and Pensions) and HM Forces (from Ministry of Defence).

The total jobs series is used to calculate the proportions of regional jobs within each subregion for each year. These results are then used to apportion the regional 'productivity jobs' data series to the subregional level.

Hours

At the national and regional level, GVA per hour worked data are calculated using a 'Productivity Hours' series as the denominator. These data are calculated quarterly, based mostly on the LFS, and an annual total is constructed as the average of the four quarters in the calendar year.

At subregional level, only annual productivity data are being produced. Therefore, the Annual Population Survey (APS) is used rather than the Labour Force Survey as it has a larger sample size [1]. The process involves calculating total hours for each subregion as the sum of employee hours, self employment hours, hours worked in government training schemes and hours worked by HM Forces.

Employee hours are calculated by using the APS to estimate, for each subregion, the average hours worked per employee job by industry. These industry average hours are then multiplied by the number of employee jobs for each industry in each subregion. For the period from 2008 onwards, the number of employee jobs by industry is derived from the Business Register and Employment Survey (BRES). Prior to that, employee jobs by industry were derived from the Annual Business Inquiry (ABI)[2]. Self employment hours are calculated from the APS. For government training schemes and HM Forces, the regional totals are allocated to subregions based on each subregion's share of regional employee plus self employment hours, as calculated in the previous stage.

Adding together the sum of employee hours, self employment hours, hours worked in government training schemes and hours worked by HM Forces provides a total hours estimate for each subregion. Once calculated these NUTS2 and NUTS3 subregional data are then constrained regionally to the NUTS1 'Productivity Hours' data to ensure consistency with regional productivity data.

Smoothing

Unsmoothed time series data at small geographies such as NUTS2 and NUTS3 tend to show volatility, created by sampling and non-sampling errors. Therefore, a five year weighted average has been used to remove this volatility and produce a smoothed time-series. The results presented in this article are based on the smoothed subregional productivity data series. It should be noted that when calculating the subregional productivity data, unsmoothed data has been used at all times. The smoothing process has only been applied to the final results. For any users who would like to make use of the unsmoothed results, this data are included in the data section of this publication.

Geographies

Subregional productivity data are produced in this article for the NUTS2 and NUTS3 geographies. Nomenclature of Units for Territorial Statistics (NUTS) is a geography developed by the European Union to allow comparison of regional and subregional data across the EU-28 member states. A number of ONS regional and subregional outputs are produced based on the NUTS geography. These include regional and subregional GVA. These GVA data are an input in the calculation of subregional productivity. Each NUTS3 subregion covers the same area as either a single local authority or a combination of two or more adjacent local authorities. The data accompanying this article are based on the NUTS geographical classification that came into use on 1 January 2012.

Local enterprise partnerships (LEPs) are partnerships in England between local authorities and businesses. They were created in 2011 and their role is to help shape local economic priorities and undertake activities to drive local economic growth and the creation of jobs. There are 39 LEPs. Every local authority in England belongs to at least one LEP. However, some local authorities belong to more than one LEP.

In this report, the LEP boundaries used have been an amalgamation of one or more local authorities. In other words, for each local authority associated with a LEP, data covering the whole of that local authority are included within the LEP data.

There are two cases where the working boundaries of a LEP cut through existing local authority boundaries. These are Enterprise M3 and Solent LEPs. Providing GVA data for LEP boundaries that do not follow local authority boundaries is currently not possible. Therefore, for statistical purposes within this release, both Enterprise M3 LEP and Solent LEP are each assumed to include the full extent of the local authorities of New Forest, Test Valley, Winchester and East Hampshire within their boundaries.

Revisions

Data in this release are based on regional GVA data together with productivity jobs and productivity hours data. Each are subject to revisions. These revisions feed into the published subregional productivity data and therefore data have been revised in this publication in comparison to the article published in March 2014.

The regional GVA statistics have been subject to revisions in light of revised National Accounts Blue Book data. In Blue Book 2014, the totals for national GVA by industry were revised as far back as 1997 and included methodological changes to meet the European Commission definition of Gross National Income and the new European System of Accounts (ESA2010). These changes led to larger than usual revisions in the regional estimates, which are constrained to sum to the national figures. More information about these changes can be found in the ‘Recent Methodological Changes’ section of the Regional GVA (I) bulletin.

Sub-regional productivity jobs and hours data have been revised to be consistent with revisions applied to regional and national productivity jobs and hours data that occurred following a census (2011) based reweighting of the Labour Force Survey.

Timeliness

The latest GVA per hour worked data available are for 2013 and the latest GVA per job data available are for 2012. The timeliness of the data is determined by the release calendar of the subregional GVA data, the total jobs data and the Annual Population Survey from which the hours worked are extracted. An update of the GVA per job filled data to include 2013 will be added to this release in the summer. Subregional GVA data for 2014 will be available in December 2015 and an update to this article will follow shortly afterwards.

Future Developments

A project is underway to develop estimates of real regional and subregional GVA growth using a production approach with experimental data recently published. The development of such estimates will lead to an improvement in the quality of the regional and subregional productivity data that ONS is able to produce. This is because it allows for a separation of volume and price in the final outputs. This is not possible when calculating productivity using regional and subregional GVA calculated using the income approach. For the moment, however, the GVA(P) data is only experimental and therefore the calculations of subregional productivity continue to use the Regional GVA (I) data, which are National Statistics.

Notes for methodology

1. For 2005, it was not possible to use APS data, therefore LFS data was used – with the average taken of the four LFS surveys carried out in 2005.

2. BRES data is used for 2008 onwards based on the 2007 UK Standard Industrial Classification (SIC 2007). For data up to 2007, the ABI is used and this is based on the 1992 UK Standard Industrial Classification (SIC 1992).

9. Background notes

1. Details of the policy governing the release of new data are available by visiting www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html or from the Media Relations Office email: media.relations@ons.gsi.gov.uk