

Article

# Introducing quarterly regional labour input metrics

A first look at the new experimental quarterly regional labour input metrics. Hours and jobs for the NUTS1 regions.

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# 1 . Background

Alongside estimates of quarterly labour productivity for the UK, the Office for National Statistics (ONS) produces annual estimates of labour productivity for the UK regions. These estimates – derived for the Nomenclature of Units for Territorial Statistics (NUTS1) regions – use annual estimates of gross value added (GVA) sourced from the [Regional Accounts](#), and annual estimates of labour input to calculate productivity.

In light of renewed interest in regional policy and following feedback from stakeholders, we will now produce the more detailed regional labour metrics used in this productivity calculation on a timelier basis. The first of these experimental estimates – which will detail productivity jobs and hours at the NUTS1 level on a quarterly basis – are published alongside this article, and will be updated in line with the labour productivity release. This improvement in timeliness – from publication around a year after the period to which the data refer to around 90 days – should enable more timely analysis of labour input at the regional level, and is part of a broader work-programme which we are carrying out in the area of [productivity](#). In the future, these data may support more detailed and timelier regional productivity metrics.

This note introduces these experimental data and provides some high-level analysis of regional labour input. The first section outlines the methodology that we use to estimate these series, which is very similar to that used for the UK labour metrics. The second section presents some of the main findings from these data. As with all of our productivity outputs, we welcome user views on the possible uses and usefulness of these data. These should be directed to our inbox: [Productivity@ons.gsi.gov.uk](mailto:Productivity@ons.gsi.gov.uk).

## 2 . Methodology

The process for calculating quarterly regional labour inputs broadly replicates that for the corresponding UK figures, with one key difference. As with the UK-level labour productivity system, various data sources are used to estimate numbers of jobs for employees, self-employed, government-supported training workers and Her Majesty's Forces (HMF):

- quarterly employee jobs are based on the same data sources as workforce jobs – the Short-Term Employment Survey (STES)
- quarterly self-employed jobs are derived from the Labour Force Survey (LFS) first and second jobs
- quarterly government-supported training jobs are derived from data sent by the Department for Work and Pensions (DWP)
- quarterly HMF jobs are taken from the Ministry of Defence (MOD) for the period since 2007 – prior to 2007, quarterly HMF jobs are derived from annual MOD data using a [modified Denton methodology](#); this process generates a consistent quarterly path through the annual observations

The difference between the headline UK and regional labour metrics lies in the approach to measuring employee jobs. Whereas our labour metrics for UK productivity use data from the Short-Term Employment Survey (STES) on a Reporting Unit (RU) basis, the regional labour metrics that we publish for productivity purposes – including those published alongside this release – use STES data on a Local Unit (LU) basis. More information on the [differences between these levels of the corporate hierarchy](#) and more information on the [Inter-Departmental Business Register \(IDBR\)](#) is available on our website.

Critically, the RU level of detail in this survey provides information about the classification of employees by industry at a level consistent with the measurement of UK output. This approach means that we can compare UK gross value added (GVA) by industry with UK employment by industry on a consistent basis, which is important for the measurement of productivity. The LU level of detail used in these regional data, by contrast, provides information about the classification of employees by industry on a basis which is consistent with estimates of regional GVA. The differences in labour metrics by industry that arise from these two compilation methods consequently reflect the need to ensure consistency between the measures of employment and GVA at the national and regional levels.

To estimate quarterly total hours worked, estimates of regional average hours are required for each type of job. Regional average hours are calculated using quarterly average actual hours worked for employees, self-employed and government-supported training workers derived from the LFS. In the absence of regional data, HMF average hours for each region are assumed to be equal to those for the UK as a whole. Average hours and jobs for each employment status (and for each respective region) are multiplied together to calculate total hours for each NUTS1 region.

The final steps ensure consistency between total jobs and hours by region and for those of the UK as a whole. Employee and self-employed jobs for each region are constrained to an estimate of total employee and self-employed jobs for the UK (taken from UK productivity jobs calculations). Total hours worked for each region are calculated and constrained to the published LFS UK total. Both of these constraints are applied to the non-seasonally adjusted data.

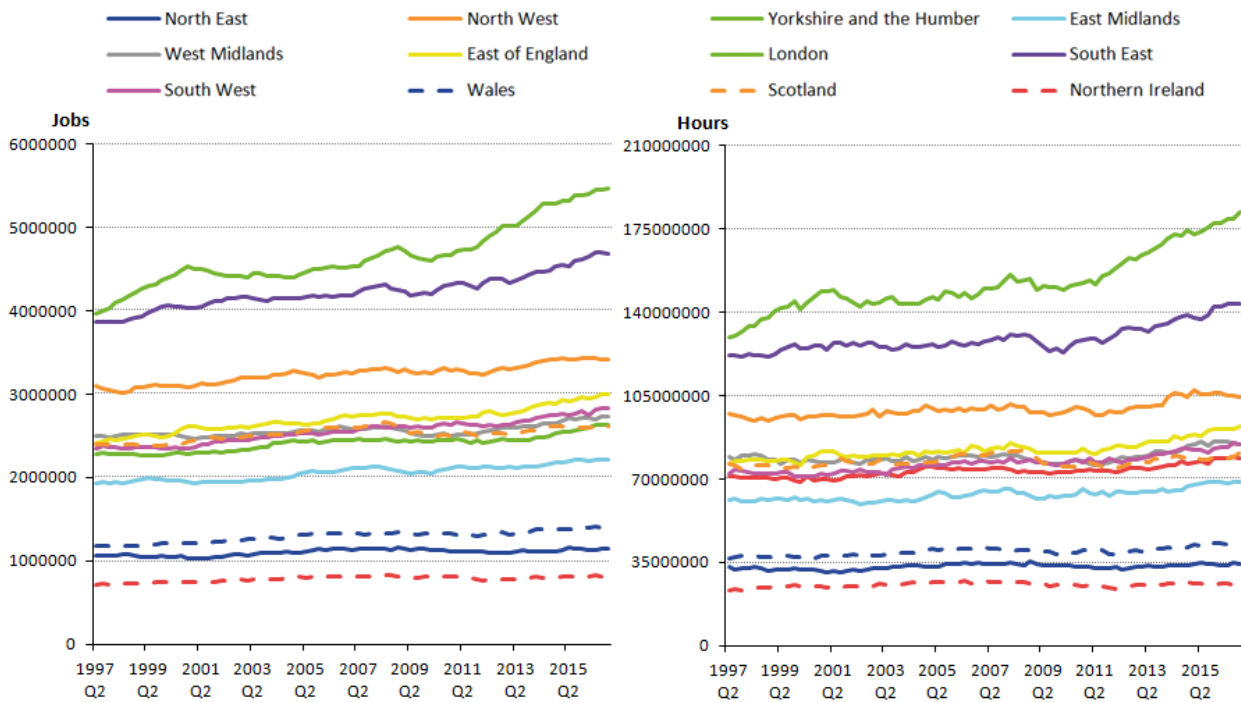
Total jobs and hours for each region are subsequently seasonally adjusted, and the resulting hours for each region are constrained to the seasonally adjusted total hours estimate for the UK. This procedure of constraint and seasonal adjustment replicates the process undertaken in producing industry estimates for both UK productivity jobs and hours, respectively. It also ensures that the hours worked in each region aggregate to total UK hours as published from the LFS. Users with a particular interest in differences in the seasonality of labour input in different regions are invited to examine the non-seasonally adjusted regional series.

### **3 . Main findings**

Applying this methodology yields trends in labour input – productivity jobs and hours – across the UK regions measured on a consistent basis with the UK totals used in the calculation of national labour productivity. Figure 1 shows levels of productivity jobs (Panel A) and hours (Panel B) for the NUTS1 regions over the past two decades. The two panels are strikingly similar: indicating that regions with relatively large (small) numbers of jobs tend to have relatively high (low) total hours. London has the largest number of total jobs and hours worked over this period – reflecting both its relatively large population and the strength of commuting patterns from surrounding regions. The South East has the second-largest quantity of labour input over this period averaging around 14% of jobs and hours, while Northern Ireland and the North East have relatively fewer jobs and hours averaging around 3% and 4% respectively.

**Figure 1: Jobs (a) and hours (b)**

NUTS1 regions

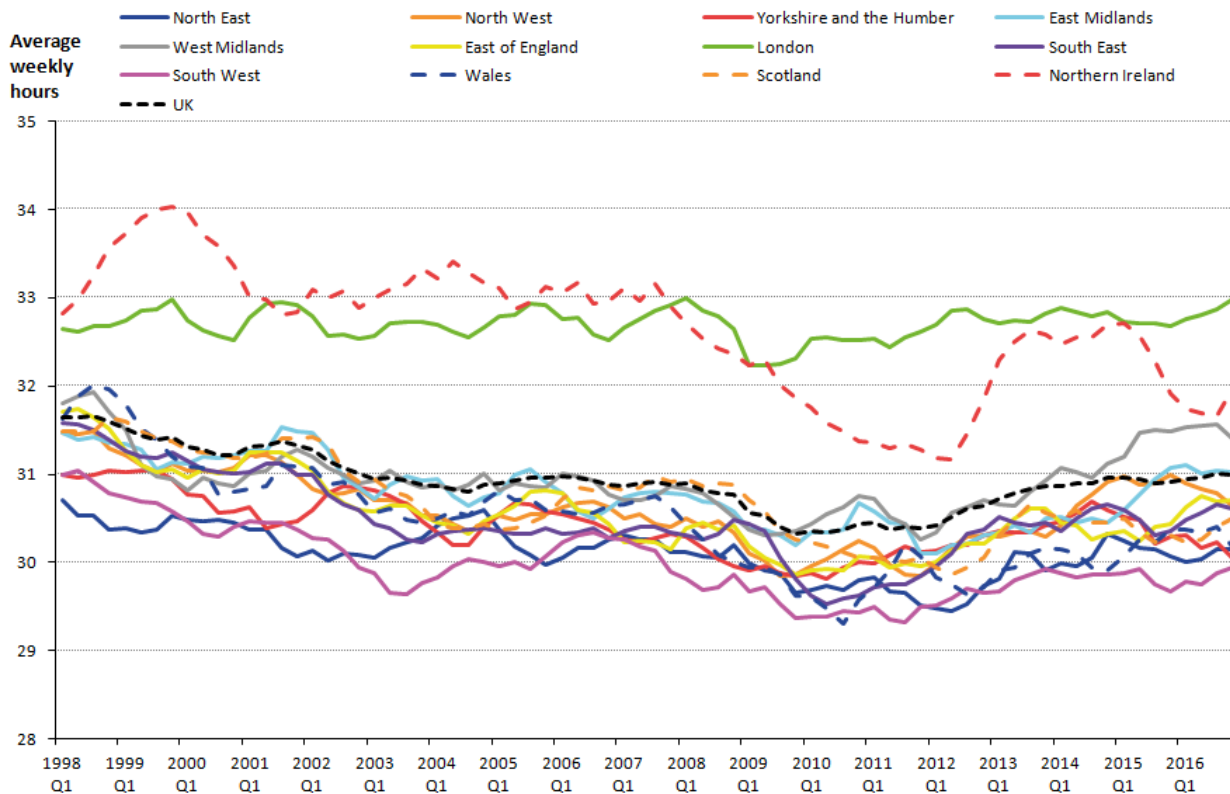


These two metrics also suggest that labour input has risen across a majority of UK regions over this period, although to different extents. London and the South East exhibit the clearest upwards trends between 1998 and 2016, but the number of jobs also rose by 20.4% in the East of England, and by 19.4% in the South West. On this measure, labour input growth has been weakest in the North East, where the number of jobs has risen by just 6.5%. The upwards trend over the whole of this period is also apparent in a number of regions in terms of the total hours worked measure, as is the common moderation in hours and jobs during the economic downturn. This reflects both a contraction in the number of jobs in many regions, and a fall in the average hours of those remaining jobs during 2008 and 2009.

The calculation of total regional productivity jobs and hours also enables analysis of how average hours worked vary across the different regions of the UK. Figure 2 shows the result of dividing total hours (Figure 1, Panel B) by the number of productivity jobs (Figure 1, Panel A) on a four-quarter moving average basis. These measures of average hours – which smooth some of the volatility evident in the hours series shown in Panel B of Figure 1 – show that a majority of UK regions record an average of between 30 and 31 hours per job per week over the last year. Two regions have historically had considerably higher average hours per job – London and Northern Ireland – while average hours worked in the West Midlands have also had a distinctive path in recent years. Jobs in the South West and Yorkshire and the Humber have recorded some of the lowest average hours worked over much of this period. More analysis of these differences in average weekly hours by region is available in the [productivity bulletin](#) published alongside this article.

**Figure 2: Average weekly hours**

Four-quarter rolling average, NUTS 1 regions

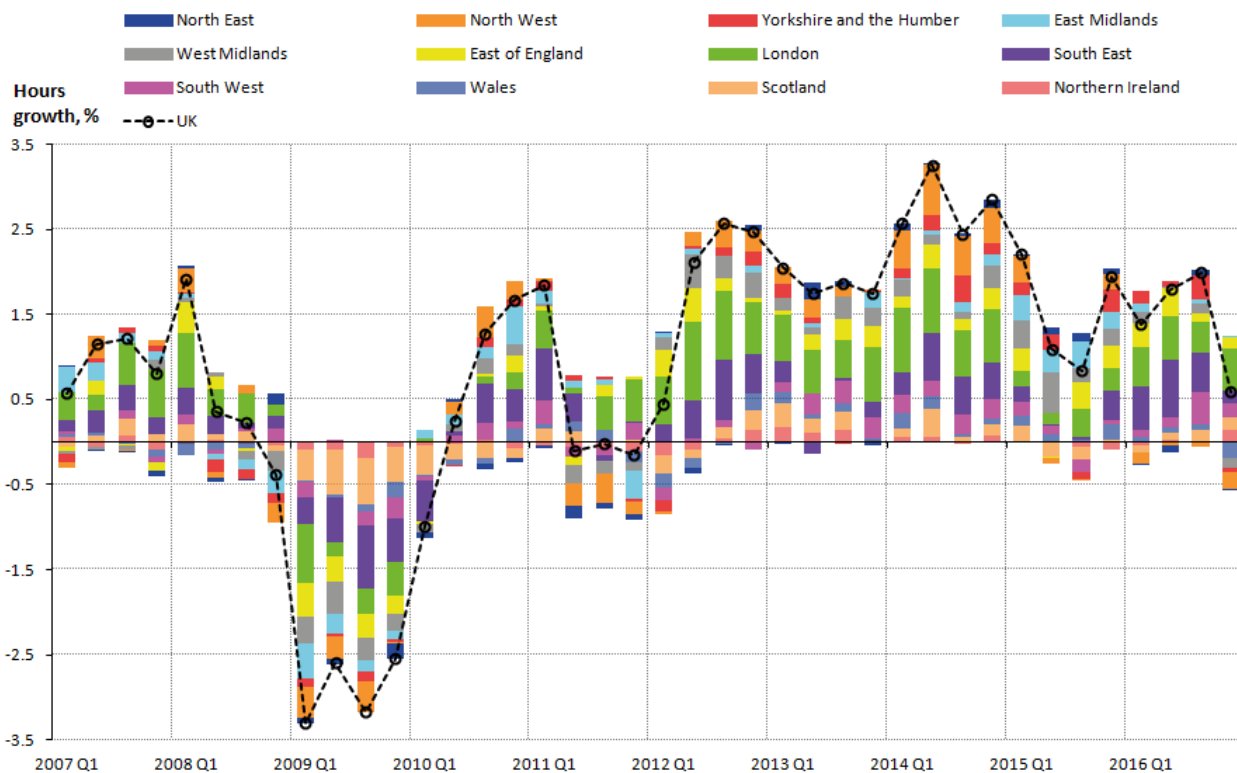


Despite the relative volatility of these average hours series, there are some common inter-regional trends evident over the last two decades. Average hours per job displayed a similar downward trend for the majority of the regions since between 1998 and early 2007 – immediately before the economic downturn. The extent of this fall varied between regions, from the North East with a 0.8% fall in average hours, to the East of England with a 4.3% fall between 1998 and 2007. London is the only exception, which has experienced average hours growth of 0.7% over the period. Following the downturn the majority of regions experienced a recovery in average hours, with East and West Midlands showing the strongest recoveries of 1.5% and 2.9% respectively between 2008 and 2016. Northern Ireland, Scotland and the North East are the exceptions having all experienced a further fall in average hours post-downturn, although this masks some variation over the period.

These new data also enable analysis of how different regions have contributed to changes in labour input at the UK level. Figure 3 shows how total UK hours worked has changed between the pre-downturn peak of output (in Quarter 1 (Jan to Mar) 2008) and more recent periods, as well as the contributions of different NUTS1 regions. It shows that all regions experienced a fall in the number of hours worked during the economic downturn – as all regions contributed to the fall of labour input between the start of 2008 and its trough in 2010. London, the South East and Scotland provided the largest negative cumulative contributions during this period – although this partly reflects the relative size of their labour markets. Although, it is interesting to note that both Scotland and the South East experienced above average falls in hours between Quarter 1 2008 and Quarter 1 2010; hence their large negative cumulative contributions are a result of both their larger labour markets and their above-average hours reductions.

**Figure 3: Contributions of each region to whole economy hours growth**

**NUTS1 regions**



While the fall in labour input was fairly broadly based across the UK regions, these metrics suggest that the recovery has been relatively unbalanced. As shown in Figure 3, between the trough in hours at the start of 2010 and the return to the pre-downturn peak in early 2013, much of the growth in hours was a result of growth in London, which added 1.7 of the 4.5 percentage points growth between these two periods. Total hours in the South East also reattained their pre-downturn level during this period. However, for a majority of UK regions, labour input remained below its Quarter 1 2008 level.

Although this initial recovery in labour input may have been concentrated in London and the South East, Figure 3 also indicates that the growth in labour input since the start of 2013 has involved a majority of regions. The pace of total hours growth over this period has been striking: in the decade prior to the downturn, total hours grew at a compound average annual rate of 0.7%. Since Quarter 1 2013, by contrast, total hours have grown at a much more rapid rate – close to 2.0% per year on the same basis. As shown in Figure 3, much of this growth remains a consequence of the strong labour markets in London and the South East, although only Scotland and Northern Ireland have total hours below their pre-downturn levels in the most recent periods.

**Comparisons with other data sources**

These data are one source of jobs by region, and we produce other sources to which it can be compared. We also produce this labour metric through three other major sources: workforce jobs (WFJ), Business Register and Employment Survey (BRES) and Labour Force Survey (LFS). These data sources compare as shown in Table 1.

**Table 1: Sources of jobs and employment data at the regional level**

<b>Data source</b>	<b>Employment statuses contained</b>	<b>Seasonally adjusted (SA) / non-seasonally adjusted (NSA)</b>	<b>Workplace /residency basis</b>
<b>WFJ</b>	Employee, self-employed, Her Majesty's Forces and government-supported trainees	SA	Workplace
<b>BRES</b>	Employees plus the number of working owners (who are registered for VAT or PAYE schemes)	(Annual)	Workplace
<b>LFS</b>	Employee, self-employed, Her Majesty's Forces, unpaid family workers, and government-supported trainees	SA	Residency (workplace available on NOMIS)
<b>Productivity jobs</b>	Employee, self-employed, Her Majesty's Forces and government-supported trainees	SA	Workplace

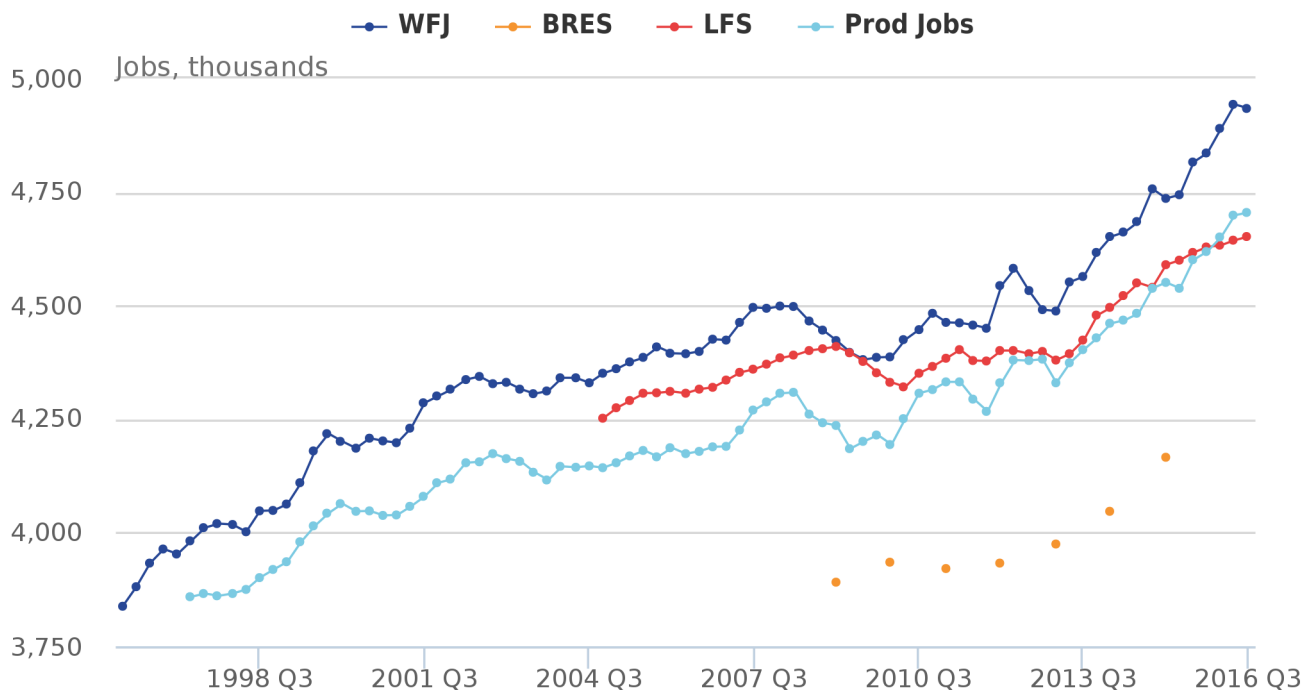
**Source: Office for National Statistics**

There are three important differences between the sources outlined. First, BRES is a measure of only employees and working owners, as such there is a substantial level difference between BRES and the other three series for each period and region. Second, all of the sources with the exception of the LFS are on a workplace basis; this means that in regions with high flows of workers across regional borders there is potential for the LFS to exhibit trends that depart to some extent from the other three sources. Finally, WFJ and BRES allow for third and fourth employee jobs, whereas the LFS allows only for first and second jobs. Productivity jobs allows for third and fourth jobs at the regional level but not the UK level – as it benchmarks to what we regard as the best measure of total jobs from the LFS, but utilises the superior data on the split of employee jobs across regions from WFJ. This final difference is reflected in each region with WFJ broadly at a higher level than the other sources.

Though the methodologies for each of these sources differ, the broad trends for each region across time are similar. Taking the South East as an example (Figure 4), each source shows growth in jobs over the period as a whole with a fall following the economic downturn and a recovery shortly after. The aforementioned differences between the series can be easily identified in Figure 4, with BRES at a lower level than the rest, WFJ the highest series in each period, and the LFS deviating somewhat from the other sources more recently. In the South East particularly, the post-downturn trend in LFS jobs has deviated substantially from that in WFJ and productivity jobs, potentially reflecting the difference between residency-based jobs (LFS) and workplace based jobs (WFJ). On both the WFJ and productivity jobs measure jobs growth between the post-downturn low in Quarter 2 (Apr to June) 2009 and Quarter 2 2016 was around 12%, while the LFS measure shows only 5.6% jobs growth over the period.

**Figure 4: Comparing productivity jobs to alternative data sources**

South East



Source: Office for National Statistics

## Uses for these data and next steps

The development of quarterly labour input metrics for the UK NUTS1 regions should enable users to do timelier and more detailed analysis than previously, using a set of metrics compiled in a consistent manner with those used for UK labour productivity. In particular, these data support more detailed investigation of trends in labour input at a regional level, using information about the jobs and hours worked in each UK NUTS1 region. As these are the data which underpin the UK's regional labour productivity metrics at the NUTS1 level, they offer users a chance to better understand these data. In the future – as we make advances in the measurement of gross value added (GVA) at the regional level – we anticipate that these data will enable more timely estimates of regional labour productivity. The [Economic Statistics and Analysis Strategy](#) plans for the publication of quarterly GDP figures for English regions by 2018. This would enable the publication of corresponding productivity figures from a similar date, subject to user feedback.

The publication of these experimental series – which, subject to user feedback, will be on a quarterly basis – forms part of a wider work-programme which we have been pursuing in the area of productivity. It is our intention to develop these statistics further in coming quarters, with the aim of publishing a set of annual, regional labour input metrics by broad industry category. These experimental statistics should enable further and more granular analysis of [productivity](#) by region and industry.

## 4 . Links to related statistics

5 April 2017: [UK productivity introduction: Oct to Dec 2016](#) draws together the headlines of the productivity releases into a single release, providing additional analysis of our productivity statistics.

5 April 2017: [Labour productivity: Oct to Dec 2016](#) contains the latest estimates of labour productivity for the whole economy and a range of industries, together with estimates of unit labour costs.



5 April 2017: [International comparisons of UK productivity \(ICP\), final estimates: 2015](#) presents an international comparison of labour productivity across the G7 nations, in terms of growth in GDP per hour and GDP per worker.

5 April 2017: [Multi-factor productivity estimates: Experimental estimates to 2015](#) decomposes output growth into the contributions that can be accounted for by labour and capital inputs. The contribution of labour is further decomposed into quantity (hours worked) and quality dimensions.

5 April 2017: [Labour productivity measures from the Annual Business Survey, 2006 to 2015](#) presents an analysis of detailed productivity trends and distributions among businesses in the UK from 2006 to 2015, using firm-level data from the Annual Business Survey (ABS).

5 April 2017: [Quarterly public service productivity \(experimental statistics\): Oct to Dec 2016](#) presents experimental estimates for quarterly UK total public service productivity, inputs and output to provide a short-term, timely indicator of the future path of the annual productivity estimates.

5 April 2017: [Introducing quarterly regional labour input metrics](#) provides first look at the new experimental quarterly regional labour input metrics. Hours and jobs for the NUTS1 regions.

5 April 2017: [Exploring labour productivity in rural and urban areas in Great Britain](#) investigates differences in rural and urban labour productivity in Great Britain using firm-level microdata analysis of the business economy.

5 April 2017: [An initial assessment of regional management practices](#) presents analysis of a small sample of single-site British manufacturing businesses from the Management Practice Survey pilot, and finds no evidence of regional variation in management practices.

6 January 2017: [Regional and sub-regional productivity in the UK: Jan 2017](#) provides statistics for several measures of labour productivity. Statistics are provided for the NUTS1, NUTS2 and NUTS3 subregions of the UK, and for selected UK city regions.

6 January 2017: [Regional firm-level productivity analysis for the non-financial business economy: Jan 2017](#) provides experimental analysis on the sources of regional differences in labour productivity in the non-financial business economy in Great Britain.

6 January 2017: [Volume index of UK capital services \(experimental\): estimates to 2015](#) provide estimates of the contribution of the capital stock to production in the economy, split by asset and industry.

6 January 2017: [Management practices and productivity for manufacturing businesses in Great Britain: experimental estimates for 2015](#) is a secondary paper analysing the relationship between management practices and productivity, following the release of initial results in October.

6 January 2017: [Public service productivity estimates: total public service, UK: 2014](#) presents updated measures of output, inputs and productivity for public services in the UK between 1997 and 2013, in addition to new estimates for 2014. Includes service area breakdown, as well as impact of quality adjustment and latest revisions.

6 January 2017: [Public service productivity estimates: healthcare, 2014](#) presents updated estimates of output, inputs and productivity for public service healthcare in the UK between 1995 and 2013, and new estimates for 2014.

6 October 2016: [Quality adjusted labour input: UK estimates to 2015](#) includes estimates of changes in the number of hours supplied in the UK economy adjusted for changes in the quality of the labour supply.

6 October 2016: [Measuring output in the Information Communication and Telecommunications industries: 2016](#) presents initial findings from a review of data sources and methods used in estimating output of the information communication and telecommunications industries, with a focus on the telecommunications industry.