

Labour Productivity QMI

Contact:
productivity@ons.gov.uk

Release date:
6 January 2017

Next release:
To be announced

Table of contents

1. [Methodology background](#)
2. [Important points about Labour Productivity data](#)
3. [Overview of the output](#)
4. [Output quality](#)
5. [About the output](#)
6. [How the output is created](#)
7. [Validation and quality assurance](#)
8. [Concepts and definitions](#)
9. [Other information](#)
10. [Sources for further information or advice](#)

1 . Methodology background

National Statistic	No
Survey name	
Frequency	Quarterly
How compiled	
Geographic coverage	UK, Regional
Sample size	
Last revised	6 January 2017

2 . Important points about Labour Productivity data

Labour productivity is useful in analysing the performance of the economy over a given period. In interpreting these statistics, users should keep the following points in mind:

- output per hour is our preferred measure of labour productivity
- the Regional Productivity Estimates produced as part of the Labour Productivity publication use nominal gross value added (GVA) as the numerator and not real GVA; these estimates are therefore nominal GVA per job and per hour worked
- there is a trade-off between level of disaggregation and reliability of productivity estimates; productivity estimates are published at a level of aggregation which ensures a sufficient level of quality
- Labour Productivity statistics are presented in an index form; as such inferences cannot be made about changes to the underlying level measures from which the statistics are produced
- interpretation of quarter-on-quarter changes in sections and sub-sections productivity series should be treated with caution.

3 . Overview of the output

This report relates to the quarterly [Labour Productivity](#) statistics, details of which can be found on the Labour Productivity webpage. Labour Productivity is defined as output per unit of labour input and effectively shows changes in output over time for the same amount of labour input. Our [Productivity Handbook](#) provides comprehensive information on our productivity framework and methods. A brief summary is also available on our website as a [guide to productivity measures](#). More general challenges to producing productivity statistics can be found in section 2.5.2 of the [OECD Productivity Manual](#). Labour Productivity statistics have been published by us since 1998, and the current methodological structure dates from 2001.

Labour Productivity statistics are derived by dividing measures of output by some measure of labour input. As such, the quality of these statistics reflects the quality of the source data. The output measures used in the productivity statistics are taken from the Quarterly National Accounts – gross value added (Output) estimates. These estimates are available as part of the GDP(O) Low-Level Aggregates. [Quality](#) information on the Quarterly National Accounts is published on our website.

The quality of labour input data reflects a lack of integration between the dual sources of household surveys (which collect data from workers) and business surveys (which collect data from employers). There can be large differences at the whole economy level between movements in labour input estimates from these two sources. [Notes](#) on reconciliation of these differences are available on our website. We operate dual methodologies for estimating employee jobs by industry from business survey data – Reporting Unit (RU) and Local Unit (LU) based approaches. These approaches produce substantially different results in terms of levels and rates of change. We publish LU-based estimates as “workforce jobs”, while the productivity estimates use RU-based estimates.

Subject to the above remarks on quality, estimates of output per hour are our preferred measure of Labour Productivity at the whole economy and industry level.

Quarter-on-quarter changes in Labour Productivity should be interpreted with caution, not least due to difficulties in ensuring consistency of seasonal adjustment between the numerator and denominator.

In interpreting trends in productivity, users need to take account of a range of factors including structural restrictions on labour adjustment, and the complex relationship between economic outputs and factor inputs. More information can be found in chapter 10 of the [OECD Productivity Manual](#).

The regional productivity estimates use nominal output and may be subject to unmeasured differences in regional prices.

4 . Output quality

This document provides a range of information that describes the quality of the data and details any points that should be noted when using the output.

We have developed [Guidelines for Measuring Statistical Quality](#); these are based upon the 5 European Statistical System (ESS) Quality Dimensions. This document addresses these quality dimensions and other important quality characteristics, which are:

- relevance
- timeliness and punctuality
- coherence and comparability
- accuracy
- output quality trade-offs
- assessment of user needs and perceptions
- accessibility and Clarity

More information is provided about these quality dimensions in later sections.

5 . About the output

In the following we look at each dimension of the quality of the production statistics in turn.

Relevance

(The degree to which statistical outputs meet users' needs.)

Labour Productivity series are published in index form (using a base year consistent with National Accounts) at the whole economy level, and by Standard Industrial Classification 2007 (SIC2007) for a number of sections and sub-sections, shown in the table on the following page. Productivity estimates for the mining and quarrying; electricity, gas, steam and air conditioning supply; and water supply, sewage, waste management and remediation activities are not published because their labour input and/or output estimates and deflators have been observed to vary extensively between periods and therefore need further development.

The regional nominal gross value added (NGVA) per job and per hour, broken down by regions, are published as indices (UK=100) on an annual basis. Unit wage cost estimates are available at the whole economy and manufacturing section levels. Market sector productivity estimates are based on the National Accounts definition of the market sector. The market sector gross value added (GVA) measure includes almost all market activity and excludes most non-market activity, in particular that of central government. The measure includes the output of public corporations.

For detailed information on what industry breakdowns are available for various labour productivity (and related) measures, please see [tables 1 and 2 in the Labour Productivity QMI Tables 1 and 2.pdf](#).

Productivity estimates are used by customers both within and outside the government. In combination with other economic indicators, productivity estimates help build a comprehensive picture of the UK economy. The main users and uses of the series include:

- HM Treasury (HMT) and Office for Budget Responsibility (OBR) – use assessment of trends in productivity growth to estimate the underlying trends in economic output, employment, and hence future growth and the capacity of the economy to support government spending. Quarterly Labour Productivity estimates are used to calculate the productivity performance of the UK over economic cycles. HM Treasury sets out the Government's strategy for raising productivity and is jointly responsible with the Department for Business Innovation and Skills for delivering improvement in productivity performance. The Office for Budget Responsibility was created in 2010 to provide independent and authoritative analysis of the UK's public finances.
- Bank of England (BoE) – use productivity analysis to understand actual and trend levels of output, which enables it to assess current and future inflationary pressures in the economy, which is essential for monetary policy.
- Department for Business, Energy, and Industrial Strategy (BEIS) – is responsible for improving national and regional productivity performance, for managing drivers of productivity growth (investment, innovation, skills, enterprise formation and competition) and for improving industry competitiveness in the market sector.
- The Scottish Government, Welsh Government and the Northern Ireland Department of Enterprise, Trade and Investment (DETINI) – these organisations are interested in assessing regional productivity measures compared to other regions within the UK as they affect regional living standards and welfare.
- Businesses – are interested in understanding the implications of productivity trends for the UK's economic outlook and therefore for economic policy. They also use industry level productivity estimates as a benchmark to compare their own productivity performance.
- Researchers and Academics – productivity analysis is often included in papers and presentations on the economic performance of the UK.
- International Agencies – the International Monetary Fund (IMF), Organisation for Economic Co-operation and Development (OECD) and Eurostat compare productivity levels across countries and provide some insight into why differences exist

Timeliness and punctuality

(Timeliness refers to the lapse of time between publication and the period to which the data refer. Punctuality refers to the gap between planned and actual publication dates.)

The Labour Productivity statistical bulletin is published around a week after the release of the Quarterly National Accounts, which is a key input to the Labour Productivity estimates. The Labour Productivity estimates are published with the following time lags:

Quarterly results: three months after the end of the reference period

Annual results: three months after the reference period

Regional results: 12 months after the reference period

For more details on related releases, the [UK National Statistics Publication Hub](#) is available online and provides 12 months' advance notice of release dates. In the unlikely event of a change to the pre-announced release schedule, public attention will be drawn to the change and the reasons for the change will be explained fully at the same time, as set out in the [Code of Practice for Official Statistics](#).

6 . How the output is created

As an overview, Labour Productivity estimates are derived by dividing measures of “output” by some measure of labour “input”. Most of the output measures used in the Labour Productivity statistical outputs are taken directly from the ONS National Accounts system, and are measures of real (inflation-adjusted) gross value added (GVA), for the whole economy, and sub-sectors of the economy for which productivity statistics are produced. However, no real regional GVA data are currently produced by ONS, so the numerator for these statistics is nominal (non inflation-adjusted) GVA, taken from the ONS Regional Accounts. Quarterly real GVA estimates are published by us in [Quarterly National Accounts](#) approximately 3 months after the end of the quarter to which they refer. Regional value added estimates are annual only, and are first published approximately one year after the year to which they refer.

Labour input is measured in 3 ways: by number of workers, filled jobs and hours worked. The number of workers is taken directly from the Labour Force Survey (LFS) and is currently available only at the whole economy level. The second labour input measure is a measure of jobs, known internally as Productivity Jobs. This measure is available by sub-sector and region, and is derived by summing numbers of employees, the self-employed and two smaller components, Her Majesty's Forces (HMF) and Government Supported Trainees (GST). These data come from 2 principal sources within ONS, Short Term Employment Survey (STES) data and LFS. The third measure of labour input is a measure of hours worked, known as Productivity Hours. Again these are available by sub-sector and by region. Productivity Hours are derived from estimates of average hours (derived in turn from the LFS micro-dataset) and Productivity Jobs. While the LFS is considered the preferred source of whole economy headcount figure, STES provides a more reliable industry breakdown of labour input.

Unit labour costs and unit wage costs are also published in the [Labour Productivity Statistical Bulletin](#). These series measure labour costs incurred in producing one unit of output. Although not a direct measure of productivity, an inverse relationship between these measures and productivity tends to be observed: the higher the productivity of a worker, the lower the cost of labour per unit of output, and vice versa. Experimental data published in the [Labour Productivity Statistical Bulletin](#) include market sector output per worker and output per hour. The methodology for producing these estimates is discussed in greater detail below.

Output Per Worker Estimates

The LFS (published as part of the Labour Market Statistical Bulletin) is an ONS survey of households that collects information about employment on a headcount basis. This labour input series and GVA at the whole economy level are used to derive the output per worker productivity series. Output per worker estimates are not currently published by industry as the LFS, in which individuals define for themselves the industries in which they work, are less reliable for detailed industry analysis compared to business surveys.

Output Per Job Estimates

Workforce jobs (WFJ) is a measure of the number and type of jobs in the workforce. It is comprised of employee, self employed, HM forces and government supported trainee (GST) job estimates. These data come from business surveys, the LFS and administrative data sources. As some employees have more than one job, WFJ measures differ from headcount or “worker” measures of participants in the labour market.

For the purposes of estimating productivity, the employee jobs component of WFJ is used on an RU basis, to achieve consistency with the measurement of output in the [National Accounts](#) (see discussion on LU and RU in the Concepts and definitions section). The employee job series is added to the self-employed, HM forces and GST series to create a WFJ series which is labeled “productivity jobs” to distinguish it from WFJ estimates published in the [Labour Market Statistical Bulletin](#) which are on a local unit basis. The components of the productivity jobs series are summed by industry as shown in the following equation and then scaled to the total UK LFS jobs.

Productivity jobs (industry i)=
Employee Jobs (industry i RU based)
+ Self Employed Jobs (industry i RU based)
+ HM Forces jobs (LFS)
+ GST jobs (LFS)

At the whole economy level and by selected sections and subsections GVA is divided by the jobs-based labour input series to derive the output per job productivity series.

Output Per Hour Estimates

To produce estimates of output per hour by industry, an input labour series based on the total actual hours worked is required. An employee hours and GST hours series is created by multiplying the productivity jobs series by average weekly hours worked, recorded by the LFS. HM Forces hours data are created in a similar way, however a fixed working week is used. Self-employed total hours data come directly from the LFS. The components of the productivity hours series are summed by industry as shown in the equation below and then scaled to total UK LFS hours.

Productivity jobs (industry i)=
Employee Jobs (industry i RU based) x Avg hours (industry i, LFS)
+ Self Employed Jobs (industry i RU based)
+ HM Forces jobs (LFS) x Fixed Avg hours
+ GST jobs (LFS) x Avg hours (GST, LFS)

At the whole economy level and by selected sections and subsections GVA is divided by the hours based labour input series to derive the output per hour productivity series.

Regional Productivity Estimates

An annual WFJ series by region is compiled from employee, self-employed, HM Forces and GST job estimates. Employee job estimates are on a local unit basis as regional splits on a reporting unit basis are not available. Great Britain HM Forces regional job splits are downloaded from the Ministry of Defence (MOD) website directly. The components of the jobs series are constrained to whole economy totals and summed by region. Regional NGVA is divided by the regional productivity jobs series to derive output per job regional NGVA per job.

The regional labour input series based on total hours worked, includes estimates of regional employee hours and GST hours, which are created by multiplying the jobs series by LFS regional based average hours. The HM Forces hours series is created in a similar way, however the HM Forces jobs series is multiplied by a fixed average hours figure. Self-employed hours data come directly from the LFS. The components of the hours series are constrained to whole economy totals and summed by region. Regional NGVA is divided by the regional productivity hours series to derive output per hour regional NGVA per hour.

Market Sector Productivity Estimates

Market sector workers are calculated by taking LFS workers less public sector workers plus public corporation workers. In addition, an adjustment is made to account for the exclusion of English Further Education Corporations and Sixth Form Colleges from 2012 Quarter 2 (Apr to June) onward. Market sector hours are then calculated by multiplying the workers series with average hours for the market sector from the LFS. These labour input series are used to calculate output per worker and output per hour using real (inflation adjusted) GVA for the market sector.

Unit Labour Cost and Unit Wage Cost Estimates

Unit labour costs reflect the full labour costs, including social security and pension contributions paid by employers, which is incurred in the production of a unit of output. Unit wage costs are a narrower measure, excluding non-wage labour costs. The Labour Productivity statistical bulletin publishes whole economy unit labour costs and unit wage costs, as well as unit wage costs for the manufacturing industry.

For the whole economy, unit labour costs are the ratio of total labour costs per employee to output per worker. Unit wage costs on the other hand refer to the ratio of wages and salaries per employee to output per worker. To measure unit wage costs for the manufacturing industry, Average Weekly Earnings (AWE) for manufacturing is divided by manufacturing output per job.

Following a methodology review, revised whole economy unit labour cost and unit wage cost estimates were implemented in the Quarter 2 (Apr to June) Labour Productivity bulletin of October 2011. Details of the methodology review and its impact can be found in an article by Appleton (2011): [Revised methodology for unit wage costs and unit labour costs: explanation and impact](#).

Statistical Disclosure

Productivity estimates are derived under the Statistics of Trade Act 1947. This Act imposes restrictions on the way that data collected in surveys may be used. This ensures that information attributable to an individual organisation is not disclosed in any publication. The [National Statistics Code of Practice](#), and specifically the Protocol on Data Access and Confidentiality set out principles for how we protect data from being disclosed. The Protocol includes a guarantee to survey respondents that "no statistics will be produced that are likely to identify an individual unless specifically agreed with them". More information can be found on our [Statistical Disclosure Control Methodology](#) page.

7 . Validation and quality assurance

Accuracy

(The degree of closeness between an estimate and the true value.)

As a derived statistic, the accuracy of the productivity estimates is determined by the accuracy of the output and labour input data sets. The reliance on multiple data sources can make it difficult to achieve consistency. Gross value added (GVA) estimates are published on a reporting unit basis while labour market statistics are published on a local unit basis. Where possible the labour market statistics used to create the labour input series are reconciled to a reporting unit basis to achieve consistency with the output series.

Revisions to the productivity estimates are made in line with revisions to the output and labour input data sets. Revisions to National Accounts data occur as new data become available and are normally at their largest for the first 2 years after publication. Labour Force Survey (LFS) estimates are subject to revisions generated by mid-year population estimates and every 10 years they are revised to census totals. Workforce jobs estimates are revised annually when employee jobs are benchmarked to estimates from Business Register Employment Survey (BRES).

Coherence and comparability

(Coherence is the degree to which data that are derived from different sources or methods, but refer to the same topic, are similar. Comparability is the degree to which data can be compared over time and domain for example, geographic level.)

Labour Productivity time series data cover the UK whole economy and industry sections and subsections using the [SIC2007](#). From October 2011, productivity estimates are classified according to SIC2007, previously SIC2003. Time series data available under the new industrial classification has been listed in Table 2 above.

Although [international comparisons](#) of productivity are informative and widely used, there are a number of issues with regard to measurement and comparability. The main problem lies in the difference in concepts and measurement practice across countries, although most countries follow the UN System of National Accounts (SNA08).

OECD Productivity Estimates

The [OECD](#) compiles productivity statistics for its member countries to monitor economic performance, to analyse labour and product market rigidities, and as an input to its econometric model forecasting. Productivity measures published by the OECD include labour and multi-factor productivity (MFP) measures at whole economy and industry level for 19 OECD countries. The productivity measures are constructed with a view to maximising comparability and consistency across countries. As a result, OECD productivity estimates for the UK can differ from our data. For analysis of individual countries, national productivity data will often be the preferred source.

Regional Accounts

In addition to regional NGVA per job and NGVA per hour series, there is also the related measure of NGVA per head. Output per head is first published as part of the [Regional Accounts](#) and then republished in the quarterly labour productivity release. While the series is constructed in the same form as a productivity measure, it is not usually considered as one. General variations in the population structure, such as the proportion of the resident population in the workforce and commuting workers, mean that regional productivity estimates per head can match output unevenly with those producing it, making them unsuitable for regional comparisons.

Experimental Multi-Factor Productivity Estimates

As part of our productivity strategy the inputs required for [Multi-Factor Productivity](#) (MFP) analysis have been developed. These are [Quality-Adjusted Labour Input \(QALI\)](#) and [Volume Index of Capital Services \(VICS\)](#). QALI is considered to be an improved measure of labour's input into production as it explicitly recognises variations in the skill level of the workforce over time. The MFP estimates and growth accounting analysis are published annually on our website.

Public Service Productivity

We publish a range of [Public Service Productivity](#) measures and related articles which discuss and present data on the productivity performance of key public services. Unlike the market sector output, government output is not traded in the market but is provided either free of charge at the point of delivery, or at a nominal price which is not intended to cover the cost of production. The lack of a market environment makes it difficult to measure the output of the public service. Rather than setting output equal to the deflated expenditure used to produce it, which assumes that productivity is constant over time, the UK Centre for the Measurement of Government Activity (UKCeMGA) has introduced direct methods for certain components, in particular health and education. These estimates are on a gross output not a value-added basis. They should not be compared with either value-added MFP or any Labour Productivity estimates. The best approximation to a public/private productivity comparison from published ONS figures is to compare the [experimental value-added MFP figures](#) for the market sector, with value-added MFP figures for those industry groups that cover most public production and provision of public services.

Non-market sector productivity may be implied by differences between whole economy and market sector GVA measures, however these calculations are sensitive to the continuing use of input measures as proxies for output in areas of the government sector.

For further information on the types of productivity measures we produce please see the article [Comparing different estimates of productivity produced by the Office for National Statistics](#) by M. Phelps.

8 . Concepts and definitions

(Concepts and definitions describe the legislation governing the output and a description of the classifications used in the output.)

Annex B of the [Council Regulation \(EC\) No. 1165/98](#) regarding short-term statistics includes variable 220 - Hours Worked, as a required deliverable from member states. These Hours Worked series are part of the quarterly deliverables of the Labour Productivity and Development branch and are part of the Productivity Hours system.

Labour Productivity estimates are derived statistics, meaning they use other published data. The ONS National Accounts output data are governed by the conventions of the European System of Accounts 1995 (ESA95).

The definitions and concepts of the Labour Productivity statistics are compliant with relevant sections of the [OECD Productivity Manual](#), and the [ONS Productivity Handbook](#).

Enterprise Structure in ONS Surveys

The term "enterprise" is used by us to describe the structure of a company. Individual workplaces are known as "local units" and a group of local units under common ownership is called the "enterprise". Reporting units are the parts of enterprises that return data to us. While the majority of reporting units and enterprises are the same, larger enterprises have been split into reporting units to make the reporting easier.

For most of the business surveys we run, forms are sent to the reporting unit rather than local units, in other words, to the head office rather than individual workplaces. This enables us to gather information on a greater proportion of total business activity than would be possible by sending forms to a selection of local units. But it has the disadvantage that it is difficult to make regional estimates – for instance all the employment of, say, a chain of shops would be reported as being concentrated at the site of the head office.

Further differences between reporting unit and local unit data can be seen in the industry coding. Take, for example, a reporting unit with 3 cake shops and one bakery, each employing 5 people. The local unit analysis would put 15 employees in the retail sector and 5 employees in the manufacturing sector. But the reporting unit series puts all 20 people into the sector with the majority activity, in this case, retailing. Detailed industry figures compiled using the local unit approach will therefore be different from industry figures using the reporting unit approach, although the totals will be the same at the whole economy level.

9 . Other information

Output quality trade-offs

(Trade-offs are the extent to which different dimensions of quality are balanced against each other.)

As stated in the section on Validation and Quality Assurance, Labour Productivity statistics are derived statistics as they are produced from other published statistics. The accuracy of the productivity estimates depends on the accuracy of the input datasets. Likewise, the extent of revisions to productivity statistics relies on the extent of revisions of the input datasets that is, output data from National Accounts and labour input data. National Accounts output data are revised more frequently than the labour input data, as more information becomes available. The [National Accounts Revisions Statement](#) provides more information about revisions to National Accounts data. The quarterly Labour Productivity bulletin includes a section on revisions in the background notes, with a revisions table which compares first published estimates with equivalent estimates 3 years later.

To ensure timeliness, a UK productivity flash estimate is produced alongside labour market statistics for each quarter, using the preliminary estimate of GDP and whole-economy hours and workers to produce whole-economy output per hour and output per worker. More detailed labour productivity statistics are published the week following the publication of Quarterly National Accounts. This is usually 3 months after the quarter to which they relate.

In order to maintain reliability of the productivity statistics, estimates are published at appropriate levels of aggregation and frequency. Productivity statistics are published for the production sector (sections B-E) and for manufacturing (section C), but not separately for sections B, D and E. Labour productivity statistics for agriculture, forestry and fishing industry (section A) and Construction (section F) are published on an annual basis, rather than quarterly. There is therefore a balance between the level of detail and frequency of publication and the quality of the statistics published.

Assessment of user needs and perceptions

(The processes for finding out about uses and users, and their views on the statistical products.)

The Labour Productivity and Development branch is responsible for producing the Labour Productivity statistics. The branch maintains a productivity mailbox (productivity@ons.gov.uk), which is an important means of engagement with productivity users. Through this medium and wider communication we have created a user group list, which is used to consult with our users. Main users were engaged during the ONS Work Programme consultation in November 2010.

Reviewing communication from users sent to the productivity inbox (productivity@ons.gov.uk), the most common request is for additional data, such as longer time series of published series, additional detail by industry, and data on the intermediate series used to calculate the published estimates.

We also receive a flow of queries from users, for example on why a particular published series has behaved in a particular way, or why an estimate has changed from a previously published value. We also receive queries on the future timing of productivity releases.

As part of our user engagement strategy and at the request of main users, the Productivity branch held a productivity statistics user group workshop in February 2012. The aims of the workshop were to re-launch the user group, to discuss recent developments in productivity measurements, gauge user requirements and establish a generally accepted medium and frequency for user interaction. Notes from the user group workshop are available on the [Productivity Measures Guidance and Methodology](#).

10 . Sources for further information or advice

Accessibility and clarity

(Accessibility is the ease with which users are able to access the data, also reflecting the format in which the data are available and the availability of supporting information. Clarity refers to the quality and sufficiency of the release details, illustrations and accompanying advice.)

Labour Productivity series are published on our website and in the quarterly [Labour Productivity Statistical Bulletin](#) . Each month the main productivity series are also published in the [Labour Market Statistical Bulletin](#).

The Productivity Statistical Bulletin and productivity time series data are available to download free of charge from the National Statistics Website.

The [ONS Productivity Handbook](#) provides information on how all productivity measures are sourced and formulated.

Further information and analysis can be obtained from the productivity team by phoning 01633 455619 or emailing productivity@ons.gov.uk. Our recommended format for accessible content is a combination of HTML webpages for narrative, charts and graphs, with data being provided in usable formats such as CSV and Excel. Our website also offers users the option to download the narrative in PDF format. In some instances other software may be used, or may be available on request. Available formats for content published on our website but not produced by us, or referenced on our website but stored elsewhere, may vary. For further information please refer to the contact details at the beginning of this document.

For information regarding conditions of access to data, please refer to the links below:

- [Terms and conditions \(for data on the website\)](#)
- [Accessibility](#)

In addition to this Quality and Methodology Information, quality information relevant to each release is available in the relevant [Statistical Bulletin](#).