Office for National Statistics

Statistical bulletin

Labour productivity, UK: April to June 2019

Output per hour, output per job and output per worker for the whole economy and a range of industries.

Table of contents

1 . Main points

- Labour productivity for Quarter 2 (Apr to June) 2019, as measured by output per hour, fell by 0.5% compared with the same quarter in the previous year; and followed two previous quarters of zero growth.

- Both services and manufacturing saw a fall in labour productivity growth of 0.8% and 1.9% respectively, compared with the same quarter in the previous year.

- There was no growth in output per job in Quarter 2 (Apr to June) 2019 compared with the same quarter in the previous year, as both gross value added (GVA) and the number of jobs grew by 1.3% over the same period.

- This release also incorporates data on gross value added from the latest Quarterly National Accounts which were consistent with the UK National Acconts, The Blue Book 2019 that will be released on 31 October 2019.

2 . Labour productivity growth compared with the same quarter a year ago

Labour productivity, as measured on an output per hour basis, fell by 0.5% compared with Quarter 2 (Apr to June) 2018. This follows two consecutive quarters of zero growth. There was no growth in output per job during the same period as both gross value added (GVA) and the number of jobs grew by 1.3%.

This sustained period of declining labour productivity represents a continuation of the UK's "productivity puzzle", with productivity since the economic downturn in 2008 growing more slowly than during the long period prior to downturn. Despite occasional periods of growth, this sustained general pattern of stagnation contrasts with patterns following previous UK economic downturns, when productivity initially fell, but subsequently recovered in a relatively sustained fashion whilst returning to the previous trend rate of growth. We will be presenting a summary of the puzzle and analysis that has been undertaken to explain this.

The puzzle is persistent in both productivity measures of output per hour and output per job. Figure 1 shows output per hour growth rates compared with the same quarter in the previous year, noting the 25th, 50th and 75th percentiles of growth. These percentiles indicate the percentage of observations where the growth rates of each quarter was beneath a specified point.

Comparing the two periods, the median average – 50th percentile – of the post-downturn period is just over a quarter of what it was during pre-downturn period. The weak growth means the performance of the pre-downturn 25th percentile is in broad alignment with the post-downturn 75th percentile. In other words, three-quarters of productivity output per hour growth since the downturn remains lower than the bottom quarter of productivity growth rates in the pre-downturn, illustrating the sustained nature of weak performance in the UK economy.

Noticeably in the post-downturn period, as shown by the 25th percentile, a quarter of output per hour growth rate estimates fell below negative 0.1%, when compared with the same quarter a year ago. These are broadly clustered in three time periods: Quarter 3 (July to Sept) 2008 to Quarter 3 2009, Quarter 2 2012 to Quarter 1 (Jan to Mar) 2013, and Quarter 1, Quarter 2 and Quarter 4 (Oct to Dec) 2014, along with Quarter 3 2018 and Quarter 2 2019. The appearance of these "mini-cycles" in the data is something we continue to explore.

In contrast, during the pre-downturn period Quarter 4 2004 was the only quarter to record negative productivity growth.

Figure 1: Output per hour fell by 0.5% from same quarter a year ago, following two consecutive quarters of no growth

Output per hour, quarter-on-same-quarter a year ago log growth rates, seasonally adjusted, Quarter 1 (Jan to Mar) 1998 to Quarter 2 (Apr to June) 2019, UK

Download the data

Notes:

1. Percentiles are measurements that indicate the percentage of observations beneath a specified point. The 25th percentile is the value below which 25% of the observations reside.

Figure 2 presents output per job growth rates compared with the same quarter in the previous year.

Since the downturn, a quarter of the recorded output per job quarter-on-year growth rates are less than 0.3% growth. Comparing the post-downturn median average with the pre-downturn counterpart has similar results to that found for output per hour, where output per job post-downturn median growth is just over a third of what it was in the pre-downturn period. Output per job delivers results that show the highest recorded growth rate for output per job in the post-downturn period is only 16% higher than the median of the pre-downturn period.

However, the differences between the 25th and 75th percentiles during the post-downturn periods is 1.0 percentage points, compared with the pre-downturn periods of 1.2 percentage points and the "mini-cycles" in the output per hour data are not so easily observable, given there are far fewer instances of negative growth in these data.

Figure 2: Output per job was unchanged from the same quarter a year ago, following four quarters of positive growth

Output per job, quarter-on-same-quarter a year ago log growth rates, seasonally adjusted, Quarter 1 (Jan to Mar) 1998 to Quarter 2 (Apr to June) 2019, UK

Download the data

Notes:

1. Percentiles are measurements that indicate the percentage of observations beneath a specified point. The 25th percentile is the value below which 25% of the observations reside.

Figure 3 breaks down the growth in productivity in Quarter 2 (Apr to June 2019) compared with the same quarter a year ago into contributions from different industry groupings and an "allocation effect" due to changes in the share of output and labour in each grouping. All else being equal, stronger productivity growth in any given industry, or a movement of output and labour towards higher productivity industries, will tend to increase aggregate productivity growth, while the opposite effects would reduce it.
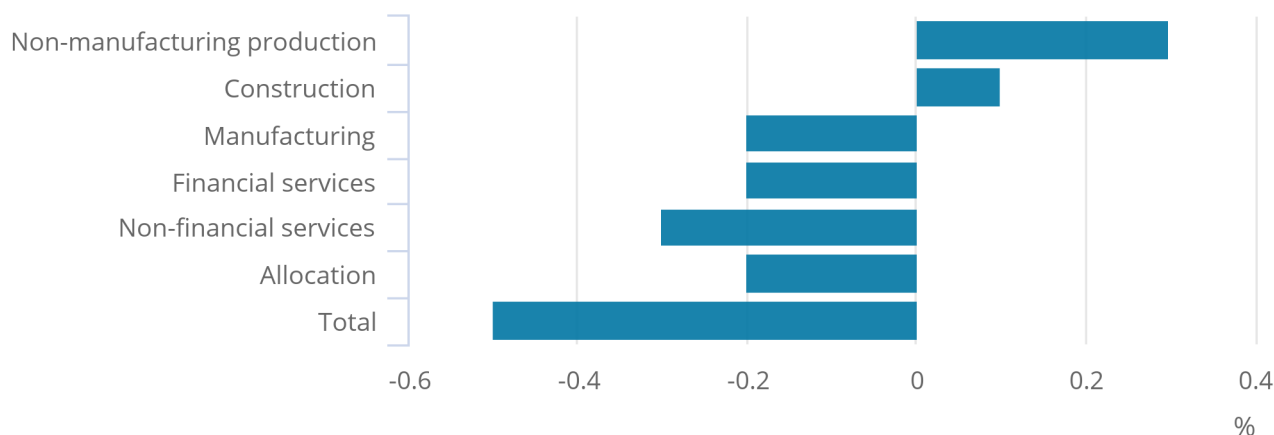
Non-manufacturing production and construction were the only positive contributors to productivity growth over this period, while all other industry groups had negative contributions to the whole economy growth, with non-financial services showing the largest negative growth of all industry groups at 0.3%. Although negative for the period as a whole, the allocation effect was initially positive following the downturn, but became negative in recent years.

Figure 3: Positive contributions to productivity growth from non-manufacturing and construction were outpaced by negative growth in all other industries

Contributions to growth of whole economy output per hour, quarter-on-same-quarter a year ago percentage change, seasonally adjusted, Quarter 2 (Apr to June) 2019 compared to same quarter a year ago

Figure 3: Positive contributions to productivity growth from non-manufacturing and construction were outpaced by negative growth in all other industries

Contributions to growth of whole economy output per hour, quarter-on-same-quarter a year ago percentage change, seasonally adjusted, Quarter 2 (Apr to June) 2019 compared to same quarter a year ago

Source: Office for National Statistics

Notes:

1. Non-manufacturing production refers to: agriculture, forestry and fishing; mining and quarrying; electricity, gas, steam and air-conditioning supply; and water supply, sewerage, waste management and remediation activities.

3 . Analysis of output per hour in services and manufacturing

Services output per hour, compared with the same period a year ago, fell by 0.8% in the latest quarter (Quarter 2 (Apr to June) 2019), with hours worked growing faster than gross value added (GVA) at 2.5% and 1.7% respectively. During the same period, manufacturing labour productivity fell by 1.9%, with hours worked growing 0.6% in contrast to GVA which fell by 1.3%.

Compared with the previous quarter, output per hour in services and manufacturing both fell by 0.3% and 1.6% respectively.

Figures 4 and 5 show the quarter-on-year log growth rates of output per hour and its components for services and manufacturing since Quarter 3 (July to Sept) 2009. During this period, output per hour for services has generally shown moderate growth, with GVA usually growing slightly faster than hours worked.

Figure 4: Services productivity growth fell 0.8% as hours worked grew faster than gross value added (GVA)

Services output per hour, quarter-on-same-quarter a year ago log growth rates, seasonally adjusted, Quarter 3 (July to Sept) 2009 to Quarter 2 (Apr to June) 2019, UK

Figure 4: Services productivity growth fell 0.8% as hours worked grew faster than gross value added (GVA)

Services output per hour, quarter-on-same-quarter a year ago log growth rates, seasonally adjusted, Quarter 3 (July to Sept) 2009 to Quarter 2 (Apr to June) 2019, UK
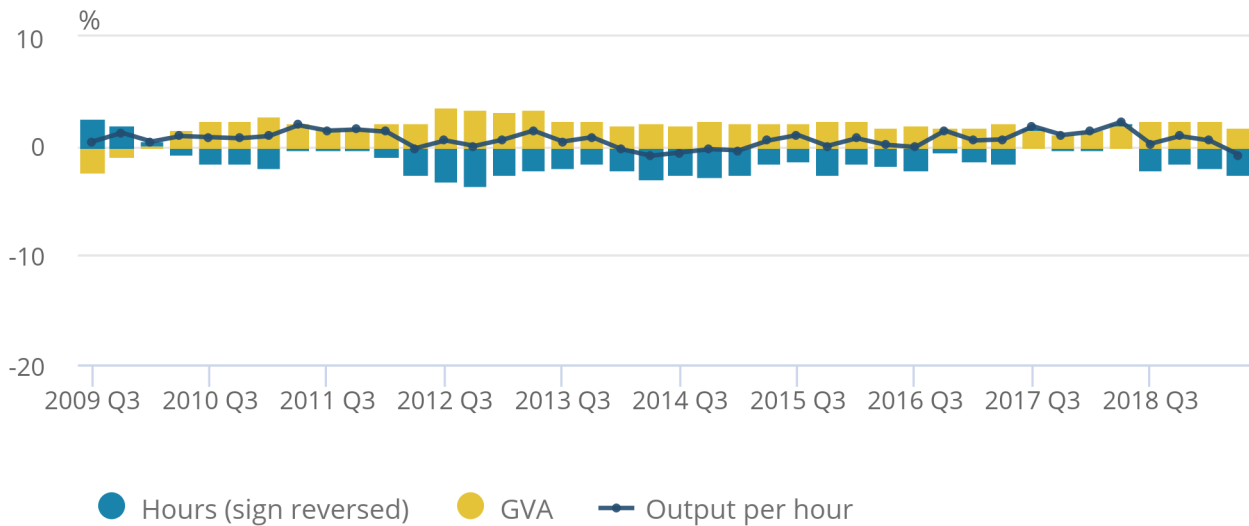
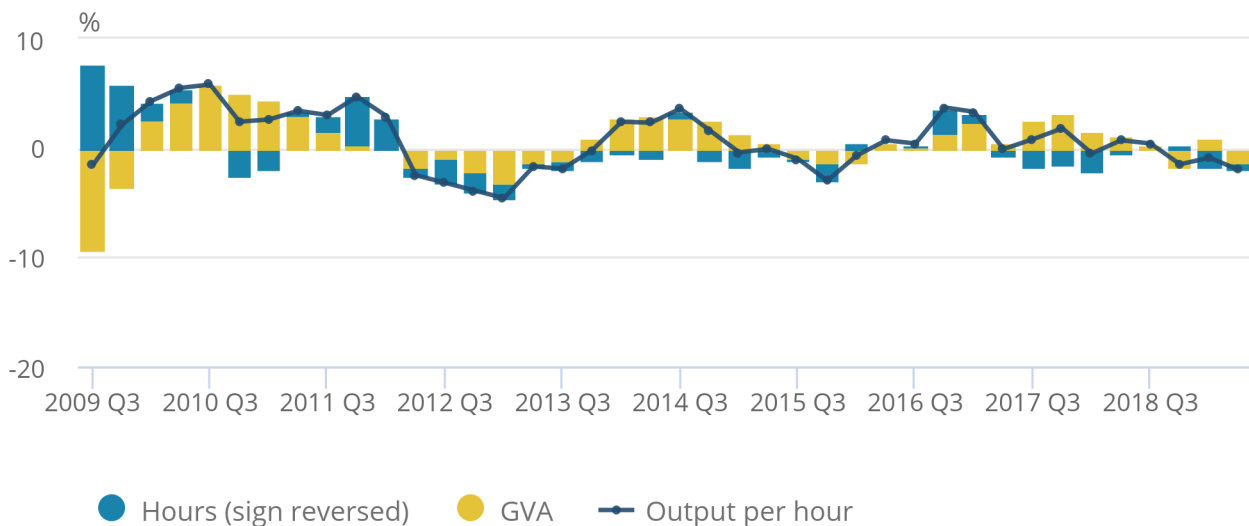**Source: Office for National Statistics**

Output per hour in manufacturing has been more volatile, with periods of negative as well as positive productivity growth, and with GVA and hours often growing in different directions so that GVA growth and sign-reversed growth in hours worked appear on the same side of the horizontal axis in Figure 5.

Figure 5: Manufacturing output per hour fell1.9% as hours worked grew by 0.6%, in contrast to gross value added (GVA) which fell by 1.3%

Manufacturing output per hour, quarter-on-same-quarter a year ago log growth rates, seasonally adjusted, Quarter 3 (July to Sept) 2009 to Quarter 2 (Apr to June) 2019, UK

Figure 5: Manufacturing output per hour fell1.9% as hours worked grew by 0.6%, in contrast to gross value added (GVA) which fell by 1.3%

Manufacturing output per hour, quarter-on-same-quarter a year ago log growth rates, seasonally adjusted, Quarter 3 (July to Sept) 2009 to Quarter 2 (Apr to June) 2019, UK

Source: Office for National Statistics

4 . Labour productivity data

[Labour Productivity Tables 1 to 8 and R1](#)

Dataset | Released 8 October 2019

LPROD01: Estimates of main productivity metrics, corresponding to tables from the PDF version of the statistical bulletin, UK.

[Productivity jobs, productivity hours, market sector workers, market sector hours](#)

Dataset | Released 8 October 2019

Underlying labour inputs behind the labour productivity estimates by industry and industrial sector as defined by the Standard Industrial Classification (SIC), UK. Contains statistics of productivity jobs, productivity hours, market sector workers and total market sector workers. These statistics are key intermediates in producing output per worker and output per hour statistics.

[Breakdown of contributions, whole economy and sectors](#)

Dataset | Released 8 October 2019

Provides estimates of contributions to labour productivity (measured as output per hour using the Generalised Exactly Additive Decomposition (GEAD) methodology as described in Tang and Wang (2004), UK. Contains data on total worked hours, gross value added (GVA) estimates, output per hour series and prices deflators. Includes disaggregated by sector. Also contains quarter-on-quarter or quarter-to-same-quarter last year and annual formats for selected outputs.

[Labour productivity by industry division](#)

Dataset | Released 8 October 2019

Contains the statistics for productivity hours, output per hour and output per hour at current prices. Productivity hours measures the whole economy and sectoral hours worked. Output per hour equals GVA divided by productivity hours in an index format. Output per hour at current prices are displayed in pounds sterling. Experimental Statistics, UK.

[Labour productivity: revisions triangles](#)

Dataset | Released 8 October 2019

Revisions triangles for the main labour productivity variables. Data present the first estimates of chosen statistics used in the labour productivity publication against later revised estimates. Includes output per worker, output per job and output per hour, first estimates and revisions.

[Labour productivity time series](#)

Time series | Released 8 October 2019

PRDY: Quarterly output per hour, output per job and output per worker for the whole UK economy and a range of industries.

[Quarterly regional productivity hours and jobs (NUTS1)](#)

Dataset | Released 8 October 2019

Quarterly UK productivity hours and jobs for the Nomenclature of Units for Territorial Statistics: NUTS1 regions. Seasonally adjusted and non-seasonally adjusted experimental statistics, UK.

5 . Glossary

Labour productivity

Labour productivity is calculated by dividing output by labour input.

Labour inputs

Labour inputs in this release are measured in terms of workers, jobs ("productivity jobs") and hours worked ("productivity hours").

Output

Output refers to gross value added (GVA), which is an estimate of the volume of goods and services produced by an industry, and in aggregate for the UK.

6 . Measuring the data

The measure of output used in these statistics is the chained volume (real) measure of gross value added (GVA) at basic prices.

Labour input measures used in this bulletin are known as "productivity jobs" and "productivity hours". Productivity jobs differ from the workforce jobs (WFJ) estimates, published in Table 6 of our Labour market overview, in three ways:

- to achieve consistency with the measurement of GVA, the employee component of productivity jobs is derived on a reporting unit basis, whereas the employee component of the WFJ estimates is on a local unit basis

- productivity jobs are scaled so industries sum to total Labour Force Survey (LFS) jobs – note that this constraint is applied in non-seasonally adjusted terms; the nature of the seasonal adjustment process means that the sum of seasonally adjusted productivity jobs and hours by industry can differ slightly from the seasonally adjusted LFS totals

- productivity jobs are calendar quarter average estimates, whereas WFJ estimates are provided for the last month of each quarter

Productivity hours are derived by multiplying employee and self-employed jobs at an industry level (before seasonal adjustment) by average actual hours worked from the LFS at an industry level. Results are scaled so industries sum to total unadjusted LFS hours and then seasonally adjusted.

Industry estimates of average hours derived in this process differ from published estimates (found in Table HOUR03 in the Labour market overview release), as the HOUR03 estimates are calculated by allocating all hours worked to the industry of main employment, whereas the productivity hours system takes account of hours worked in first and second jobs by industry.

Labour productivity is then derived using growth rates for GVA and labour inputs in line with the following equation:

$$\Delta Labour \ \mathrm{Pr}\, oductivity = \Delta \left(\frac{Output\,in\,Gross\,Value\,Added\,(GVA)\,terms}{Labour\,Inputs(hours, wor\ker s\,or\,jobs)} \right) \approx \Delta GVA - \Delta Labour\,Input$$

Presentation of growth rates in log percentage changes

In this release charts and associated text measure growth in terms of percentage log changes and we will continue to use this presentation in future releases. The datasets will still contain the percentage growth rates and these statistics hold the National Statistics status.

For typical rates of change for labour productivity and labour inputs, this change will not make much difference to the result. For example, a 2.0% percentage change translates to a 1.98% log change. We are adopting the approach because a log change between two observations has the same numerical value regardless of which observation is the starting point. This is not true for a percentage change. In the following example, log changes are substantially different from percentage changes.

In a series that starts at 7, doubles to 14, then halves back to 7, the log change from 7 to 14 is 69%, and the log change from 14 to 7 is negative 69%. But the percentage change from 7 to 14 is 100%, while the percentage change from 14 to 7 is negative 50%. The log change reflects the fact that the second change reverses the first (and so has the same value) while the percentage change series appears to be very different in the first period compared with the second.

This approach is the same as that used by the Office for National Statistics (ONS) to compile multi-factor productivity.

Revisions

This release reflects revisions to jobs and hours data since 2019 Quarter 1 (Jan to Mar) resulting from revised data inputs of the Short-Term Employment Survey (STES) published on 10 September 2019. Estimates of quarterly regional productivity hours and jobs (NUTS1) have been revised to reflect new Ministry of Defense (MoD) data replacing values that were previously estimated.

This release also incorporates data on gross value added from the latest Quarterly National Accounts that were consistent with the UK National Accounts, The Blue Book 2019 that will be released on 31 October 2019. All periods therefore have been subject to revision, in line with the National Accounts Revisions Policy.

Seasonal adjustment affects all periods where seasonal adjustment is applied.

This research note provides further information on the, sources of revisions to labour productivity estimates.

7 . Strength and limitations

This release reports labour productivity estimates for Quarter 2 (Apr to June) 2019 for the whole economy. Productivity is important as it is considered to be a driver of long-run changes in average living standards.

The output statistics in this release are consistent with the latest Quarterly national accounts published on 30 September 2019. Note that productivity in this release does not refer to gross domestic product (GDP) per person , which is a measure that includes people who are not in employment.

The labour input measures used in this release are consistent with the latest labour market statistics as described further in the quality and methodology section of this bulletin.

Unless otherwise stated all figures are seasonally adjusted.

Following extensive improvements introduced into the national accounts as part of Blue Book 2019, further time is needed to quality assure some of the upcoming productivity statistics. To ensure both the quality of the outputs and to provide a full explanation of any revisions, we have made the decision to delay publication of Unit labour costs, which include the section unit labour cost dataset and the Productivity economic commentary. These will be published on 20 November 2019. We apologise for any inconvenience.

Quality and methodology

The [Labour productivity Quality and Methodology Information report](#) contains important information on:

- the strengths and limitations of the data and how they compare with related data

- uses and users of the data

- how the output was created

- the quality of the output including accuracy of the data

8 . You may also be interested in

Multi-factor productivity estimates: Experimental estimates April to June 2019
Article | Released 8 October 2019
Growth accounting estimates for the UK market sector and 10 industry groups.

Quarterly UK public service productivity (Experimental Statistics): April to June 2019
Article | Released 8 October 2019
Contains the latest experimental estimates for quarterly UK total public service productivity, inputs and output.

Industry by region estimates of labour productivity: 2017
Article | Released 6 February 2019
Annual productivity estimates for 16 industries in Standard Industrial Classification 2007 section groups for each of the NUTS1 regions from 1997 to 2017. It compares annual productivity growth by region, as output per hour, relative to the UK and explains how manufacturing and services have grown across the regions.

Regional and sub-regional productivity in the UK
Article | Released 6 February 2019
Estimates for measures of labour productivity using a balanced gross value added (GVA) approach for NUTS1, NUTS2 and NUTS3 sub-regions of the UK, selected city regions and English local enterprise partnerships (LEPs) up to 2017. Estimates are in both real and nominal terms.

Improving estimates of labour productivity and international comparisons
Article | Released 9 January 2019
Discusses recent Organisation for Economic Co-operation and Development findings showing that the methodologies, data sources and adjustments used to estimate the number of persons, jobs and hours worked varied significantly across countries, and explores these differences and the impact on our ICP.

A simple guide to multi-factor productivity
Article | Released 5 October 2018
Explains the concept and measurement of multi-factor productivity through simple stylised examples.

Analysis of compositional changes in hours worked in the UK
Article | Released 7 August 2019
Analysis of the changes in the UK labour composition during and after the economic downturn, and international comparison over the last five years.

Public service productivity: total, UK, 2016
Article | Released 9 January 2019
Presents updated measures of output, inputs and productivity for public services in the UK between 1997 and 2015, in addition to new estimates for 2016.

Public service productivity: healthcare, UK, 2016
Article | Released 9 January 2019
Presents updated estimates of output, inputs and productivity for public service healthcare in the UK between 1995 and 2015, and new estimates for 2016.

How productive is your business?
Article | Released 6 July 2018
An interactive tool that helps businesses to calculate their productivity and compare their performance with other businesses in Great Britain.