Office for National Statistics

Article

Public service productivity: quarterly, UK, October to December 2018 (Experimental Statistics)

Experimental estimates for UK total public service productivity, inputs and output to provide a short-term, timely indicator of the future path of the annual productivity estimates.

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1 . Main points

- Compared with the same quarter in the previous year, productivity for total public services decreased by 0.5% in Quarter 4 (Oct to Dec) 2018; this is despite a relatively strong performance in the latest quarter.
- In Quarter 4 2018, public service productivity increased by 0.8% on the previous quarter, driven by unusually strong growth in output (1.3%); this exceeded positive inputs growth (0.5%) and resulted in growth in productivity.
- Taking 2018 as whole, annualised experimental estimates of quarterly productivity suggest a fall of 0.3% compared with 2017; compared with our National Statistic public service productivity figures, this suggests the first annual decline since 2010, due primarily to a sharp fall in mid-2018.
- These estimates are experimental, using a degree of estimation to deliver timelier estimates compared with our National Statistics, which are published with a two-year lag; the methodology used in these experimental quarterly estimates is explained in New nowcasting methods for more timely quarterly estimates of UK total public service productivity.

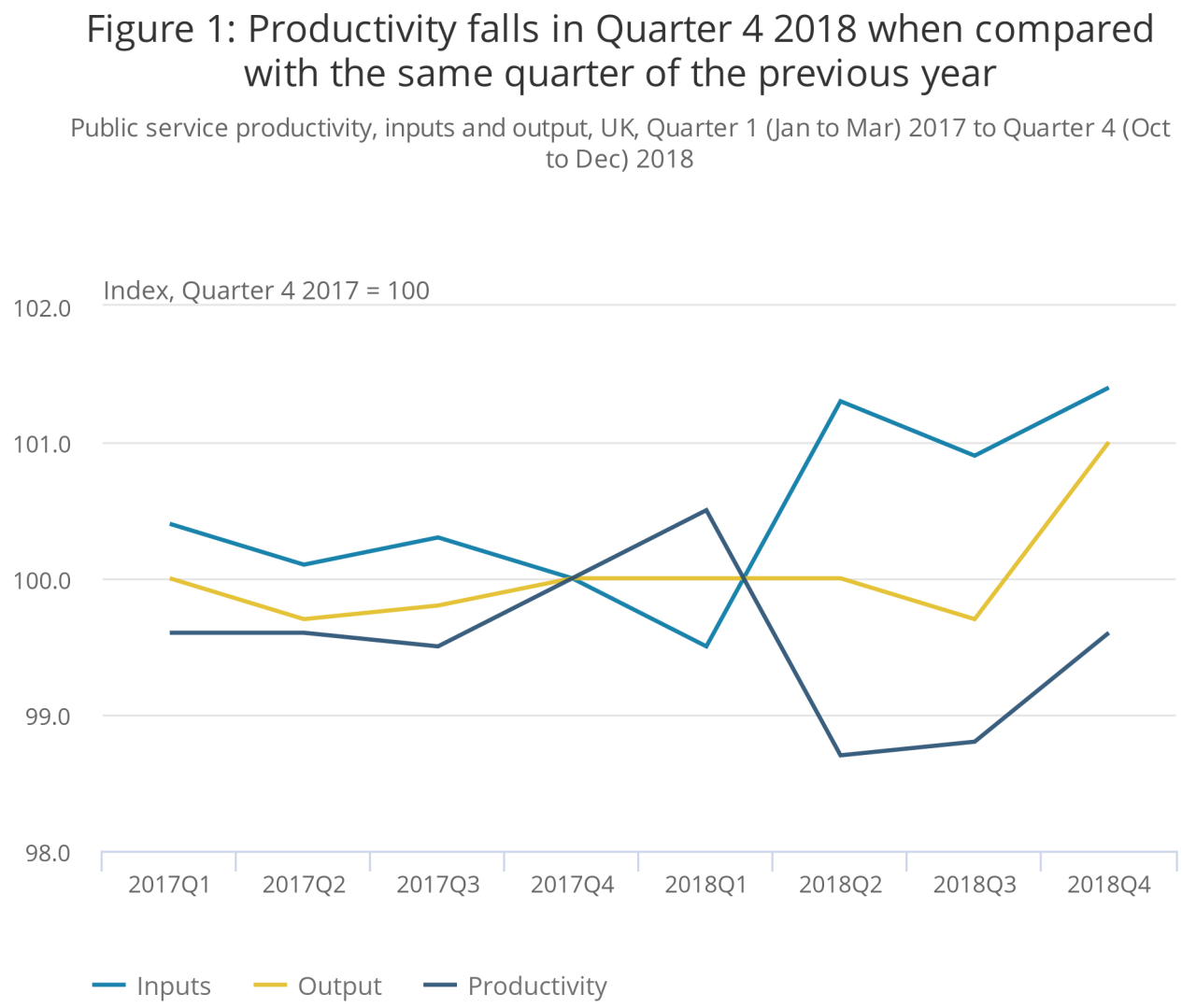
2 . Quarterly public service productivity increases as output rises

Public service productivity growth has been volatile over 2018 (Figure 1). It increased by 0.8% in Quarter 4 (Oct to Dec) 2018 compared with the previous quarter, which is in contrast with the previous two quarters (which have been revised in this release). Productivity was flat in Quarter 3 (July to Sept) 2018, while it fell by 1.8% in Quarter 2 (Apr to June) 2018.

In general, because productivity is a long-term structural trend, we advise looking at changes in productivity between periods that are further apart, which can help to smooth any fluctuations in growth rates. The trend in 2018 is an example of why this is important. Compared with the same quarter in the previous year, productivity for total public services decreased by 0.5% in Quarter 4 2018. Over this period, inputs increased by 1.5% while output increased by less (1.0%), causing productivity to fall.

Figure 1: Productivity falls in Quarter 4 2018 when compared with the same quarter of the previous year

Public service productivity, inputs and output, UK, Quarter 1 (Jan to Mar) 2017 to Quarter 4 (Oct to Dec) 2018



Source: Office for National Statistics

Notes:

1. Data are from this experimental quarterly release.

2. Experimental quarterly estimates of productivity are indirectly seasonally adjusted, calculated using seasonally adjusted inputs and seasonally adjusted output.

Focusing on the quarter-on-quarter growth rate does, however, reveal some interesting features. Quarter 4 2018 saw the largest quarterly increase in productivity since Quarter 1 (Jan to Mar) 2015, driven by a historically large 1.3% increase in output this quarter. This is the largest quarterly increase in output since Quarter 2 2012. Inputs also increased in this quarter, rising by 0.5%, but because they grew at a slower rate than output, productivity rose.

Placing this in the context of a longer time series, Figure 2 combines the experimental quarterly data in this release, and the annualised versions of these for 2017 and 2018, with estimates between 1997 and 2016 taken from our latest annual Public service productivity: total, UK, 2016 release.

The latest annualised quarterly data suggest that 2018 saw the first annual fall in public service productivity since 2010, but this should be treated with caution until the more robust annual estimate for 2018 is available. In particular, the data in this release are not adjusted for changes in quality during the experimental period. Nonetheless, public service productivity is estimated to have increased by a total of 5.0% between 2010 and 2018 (an average of 0.6% per year).

Figure 2: Strong productivity growth in Quarter 4 2018, but still falling over the year

Total public service productivity, UK, 1997 to 2018

Source: Office for National Statistics

Notes:

1. Estimates from 1997 to 2016 are based on the latest annual public service productivity release.

2. Estimates from Quarter 1 2017 to Quarter 4 2018 (in grey) are the experimental quarterly estimates in this article, and are annualised (in orange) for 2017 and 2018.

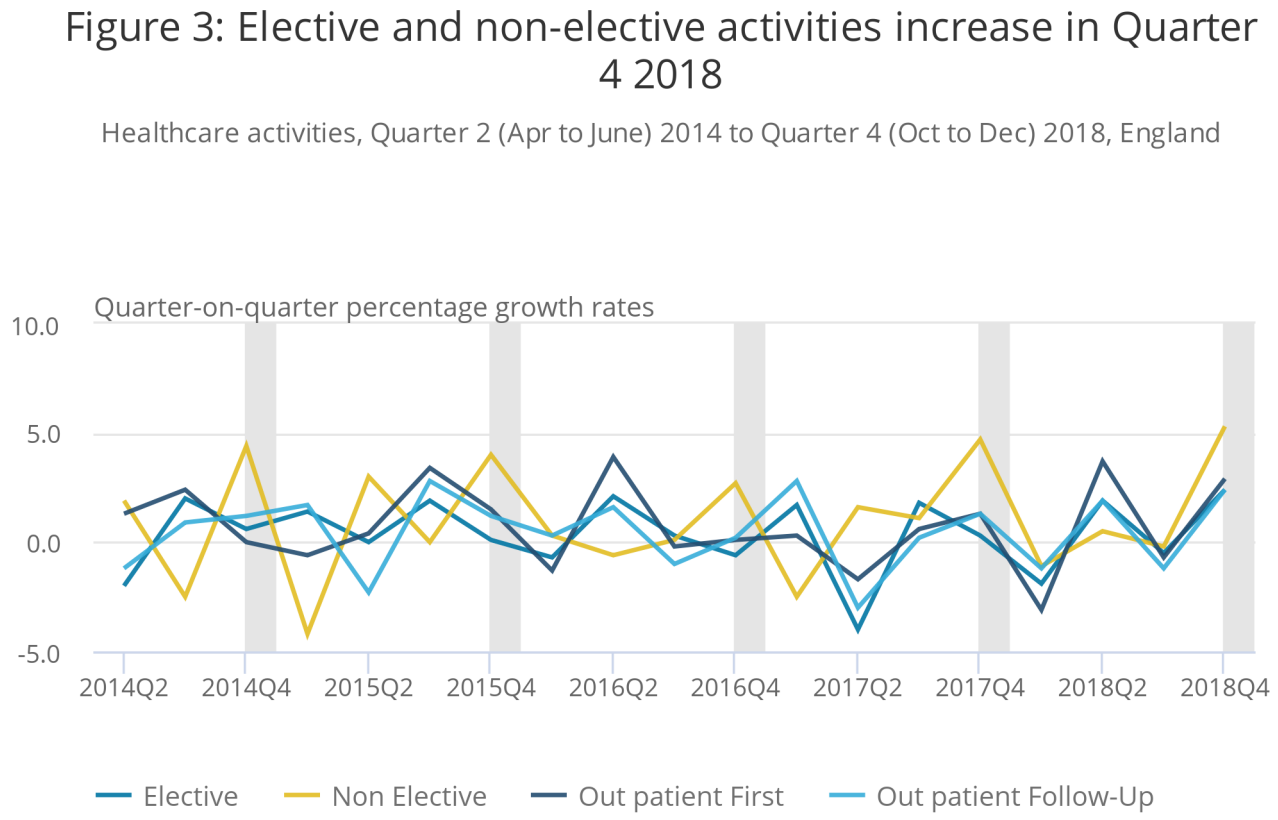
3. Estimates of productivity for the experimental period are indirectly seasonally adjusted, calculated using seasonally adjusted inputs and seasonally adjusted output.

3 . Healthcare drives increase in output and productivity in Quarter 4 2018

Healthcare is the largest service area included in public service productivity, representing around 37% of total public service expenditure. It is also one of the few service areas for which quarterly data are readily available. The large weight, and the availability of quarterly data, leads healthcare to often have notable effects on quarterly total public service productivity.

Figure 3: Elective and non-elective activities increase in Quarter 4 2018

Healthcare activities, Quarter 2 (Apr to June) 2014 to Quarter 4 (Oct to Dec) 2018, England



Source: Office for National Statistics

Notes:

1. Quarters highlighted in grey represent Quarter 4 (Oct to Dec) of each calendar year.

2. Non-seasonally adjusted data.

Figure 3 compares the four activities with the largest weights and contribution to output growth in healthcare – elective inpatient care, non-elective inpatient care, and outpatient activities (split into first appointments and follow-up appointments). Elective inpatient and both outpatient categories are activities planned in advance, such as scheduled operations and consultations. Non-elective activities are unplanned and often urgent, such as admissions for illnesses and injuries. These data are consistent with estimates of government output in the quarterly national accounts (QNA), which uses NHS activity data.

Historically, growth in elective and outpatient care is weaker in Quarter 4 (Oct to Dec), while non-elective care increases. This may reflect the changing demands on the healthcare system over the winter months. Similarly, growth in non-elective care is usually weaker in the rest of the year, while elective care is stronger.

However, unusually, Quarter 4 2018 simultaneously saw all categories of inpatient and outpatient activities grow strongly (Figure 3). This caused healthcare output to grow at a higher rate than usual. While total public service inputs and outputs are seasonally adjusted for our quarterly measures of productivity, this unusual strength in Quarter 4 2018 drove productivity growth compared with the previous quarter.

4 . Annualised productivity falls in 2018 as inputs increase

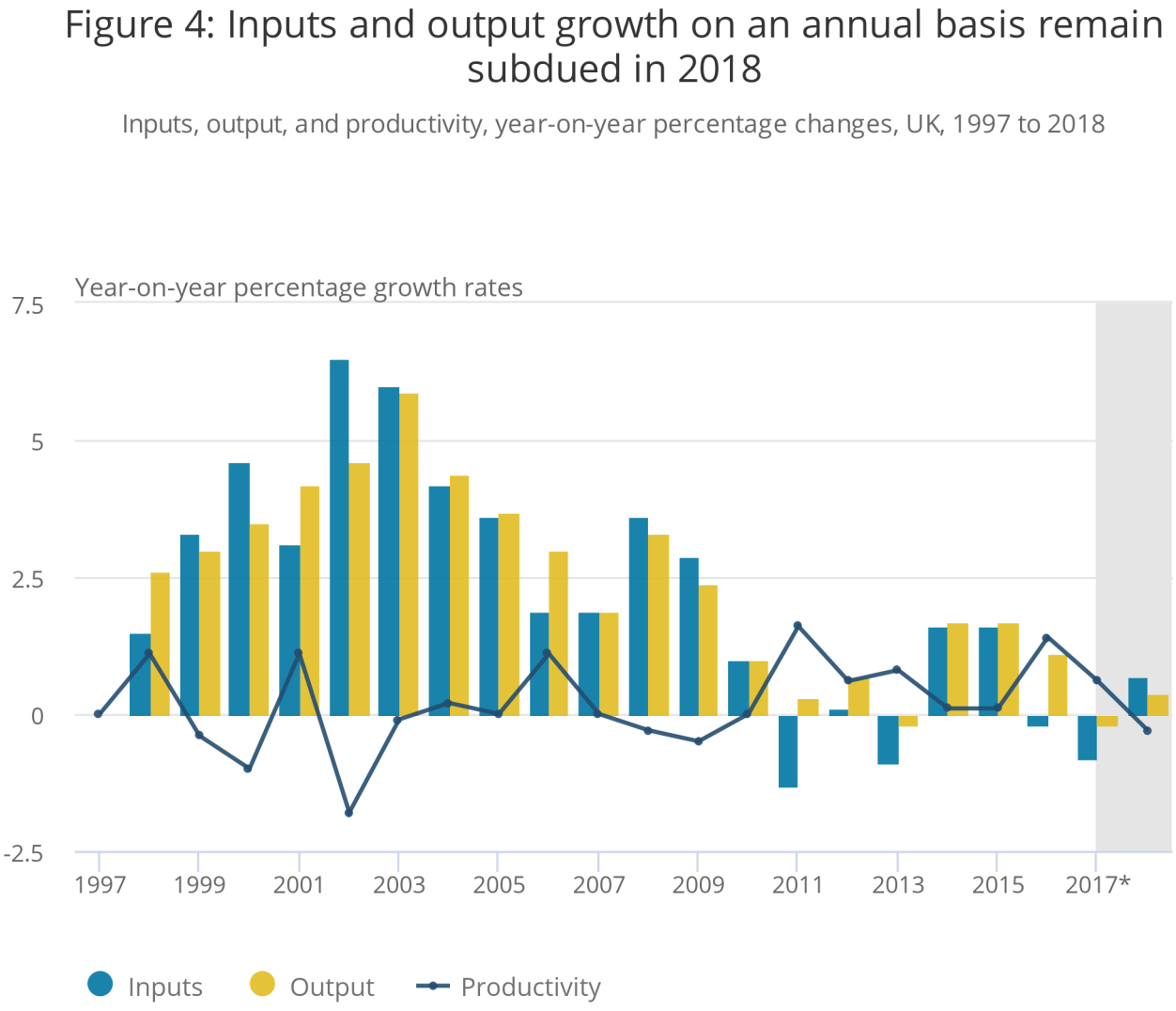
Figure 4 illustrates annual growth rates for inputs, output and productivity. The longer-term trend in both components from 1997 to 2016 are taken from the Public service productivity: total, UK, 2016 release, while annual growth rates after this are generated from the experimental quarterly series.

Since 2010, growth in inputs and output has been low compared with the pre-2010 norm. Inputs have increased by 0.7% since 2010 (an average of 0.1% per year), while outputs have risen by 5.7% (an average of 0.7% per year).

Productivity grew every year between 2010 and 2017, but is estimated to have fallen by 0.3% in 2018 – the first annual productivity decrease since 2010. It should be noted, however, that the quarterly estimates in this article, and the annual estimates derived from these, are not adjusted for quality. However, weak or negative annual growth is not unprecedented – for instance, productivity growth in 2014 and 2015 is close to zero despite quality adjustment.

Figure 4: Inputs and output growth on an annual basis remain subdued in 2018

Inputs, output, and productivity, year-on-year percentage changes, UK, 1997 to 2018



Source: Office for National Statistics

Notes:

1. Estimates from 1997 to 2016 are based on the latest annual public service productivity release.

2. Estimates for 2017 and 2018 are based on the experimental data in this release, using annualised quarterly data. These use different data sources, and do not adjust for quality.

The fall in productivity in 2018, in contrast to recent years, may be due to methodological differences between the annualised experimental quarterly data in this release, and the National Statistics annual estimates. The National Statistics include quality adjustments based on the method described in the Atkinson Review (2005; PDF, 1.07 MB). The experimental quarterly series hold the quality adjustment constant, at the level of the latest National Statistic release (that is, with a lag of two years).

If the quality of public services has changed over the past two years, then this additional value would alter the output series in the experimental period, and so change the growth rate of productivity. This is the first time the annualised experimental data have shown negative growth since we began publishing these Experimental Statistics, so, on the basis of this caveat, they should be treated cautiously.

Quality adjustment has contributed an additional 0.4 percentage points on average per year to output growth between 1998 and 2016 in our National Statistic annual publication, and 0.1 percentage points on average since 2010. If this trend in quality improvements continues or accelerates in 2018, a future National Statistics annual release would indicate a more neutral productivity picture for 2018. However, if the quality adjustment is weaker than in recent years, the decline in 2018 would be larger.

5 . What’s changed in this release?

A number of revisions have been implemented to the quarterly experimental series since the previous release, published on 9 January 2019. Revisions include changes to the underlying source data as well as minor methodological changes. Changes include:

- the availability of data for all four quarters of 2018 has allowed the quarterly data to be revised to better reflect the annual path; this affects data back to Quarter 1 (Jan to Mar) 2018
- minor revisions within the quarterly national accounts occurred back to Quarter 1 2018, affecting estimates of both inputs and output
- minor revisions in direct measures of labour inputs occurred back to Quarter 2 (Apr to June) 2018
- minor revisions to some price deflators back to Quarter 1 2014
- we have reviewed the seasonal adjustment process and found it to be appropriate; this has not led to any revisions

These changes mean that growth in productivity and its components – inputs and output – have been revised slightly since our last publication of these statistics. The impacts are illustrated in Figure 5.

Figure 5: Productivity saw large revisions in 2018, and minor revisions in 2017

Productivity revisions, UK, Quarter 1 (Jan to Mar) 2017 to Quarter 4 (Oct to Dec) 2018

Source: Office for National Statistics

Notes:

1. All estimates are based on experimental quarterly total public service productivity.
2. Estimates of productivity are indirectly seasonally adjusted, calculated using seasonally adjusted inputs and seasonally adjusted output.
3. “Previous” refers to estimates included in the publication on 9 January 2019.

Every quarter since Quarter 1 2017 has undergone revisions in this release. While earlier quarters experienced relatively minor revisions, the more recent quarters experienced more significant changes.

The largest revisions in 2018 can be attributed to the application of benchmarking to the quarterly series. This release is the first time we have had data for all four quarters of 2018. Attaining data for all four quarters allows a better picture of the year as a whole to be formed, allowing revisions to provide a more accurate figure. This can lead to relatively large revisions at the start of the calendar year, as seen for Quarter 1 2018.

Most revisions reflect either the adoption of new statistical techniques, or the incorporation of new information, which allows the statistical error of previous estimates to be reduced.

Public service productivity estimates operate an open revisions policy. This means that new data or methods can be incorporated at any time and will be implemented for the entire time series. Revisions to estimates of productivity growth in recent periods are common, as new data improve the estimates. Analysis carried out in Historical revisions analysis of quarterly UK public service productivity (Experimental Statistics) and nowcast evaluation suggests that previous preliminary estimates of quarterly UK public service productivity, inputs and output did not systematically under- or overestimate the growth rate relative to the later estimates.

6 . Background to public service productivity measurement

Productivity is calculated by dividing output by the respective inputs used to produce it. Productivity will, therefore, increase when more output is being produced for each unit of inputs used. Estimates of inputs, output and productivity are given both as growth rates between consecutive periods and as indices, showing the cumulative trend over time.

For total UK public services, estimates of output and inputs are made up of aggregated series for individual public services, weighted together by their relative share of total expenditure on public services (expenditure weight). Inputs are composed of labour, goods and services, and consumption of fixed capital. For some labour inputs, direct quantity measures, such as full-time equivalents (FTEs), can be observed and are used to measure growth in the quantity of inputs. For other areas of labour, and all areas of goods and services and consumption of fixed capital, the quantity of inputs are not directly available. In these cases, the quantities of inputs are estimated by taking associated expenditure data and adjusting for inflation using a suitable price index (deflator). Expenditure data, used to estimate most inputs growth, are taken from the quarterly national accounts (QNA).

The QNA also provide estimates of government output, based on direct measures where they are available and indirect measures where they are not. Direct measures of output use the number of activities performed and services delivered, which are weighted together using their relative cost of delivery; this process is called a Cost-Weighted Activity Index. Indirect measures of service output assume that the volume of output is equal to the volume of inputs used to create them. This is referred to as the “output-equals-inputs” convention and means that productivity growth will always be zero where indirect measures are used.

7 . Quality and methodology

Due to recent developments to our processes, we are currently revising the Quality and Methodology Information (QMI) report for this release. We intend to publish an updated QMI report later this calendar year, along with a range of other useful materials for users of these statistics on the sources and methods we use, and the interpretation of the statistics.

This release presents experimental estimates for total public service productivity, inputs and output, providing a short-term timely indicator of the future path for the National Statistic estimates of total public service productivity, which are produced with a two-year lag.

Trends in quarterly total public service output, inputs and productivity estimates are mostly determined by the largest service areas where quarterly data are readily available, for example, healthcare. A large proportion of activity data used to estimate the volume of output are annual data. This has subsequently been converted to a quarterly series – split among the four quarters – reducing the impact these components have on volatility.

Estimates of output, inputs and productivity up to 2016 are reported on an annual basis and use data from Public service productivity: total, UK, 2016. This allows the entire time series to reflect the most comprehensive data, leading to a fuller understanding of UK public services. Crucially, the measures of output reflect quality changes for years up to 2016. After 2016, estimates in this article are presented on both a quarterly and annualised basis, however, we assume the quality of services provided has not changed and remains constant throughout the period. Further information about the annual, National Statistic release is available in the Public service productivity: total, UK QMI report.

Differences between the National Statistic and experimental releases and information on data sources for quarterly total public service productivity can be found in New nowcasting methods for more timely quarterly estimates of UK total public service productivity. This article highlights methods and caveats for producing the quarterly growth estimates and they should be referenced when reporting on specific quarterly movements. This is especially the case for the latest quarters, which are more liable to be subject to revisions.

Feedback on the use of these estimates and suggestions for improvements will be essential for the future development of timely estimates for public service productivity. All questions and feedback can be sent via email to productivity@ons.gov.uk.

8 . Links to related statistics

- Productivity economic commentary: October to December 2018 draws together the main findings from official statistics and analysis of UK productivity to present a summary of recent developments (published 5 April 2019).

- Labour productivity, UK: October to December 2018 contains the latest estimates of labour productivity for the whole economy, the UK regions at NUTS1 level and a range of industries, together with estimates of unit labour costs (published 5 April 2019).

- Multi-factor productivity estimates: Experimental estimates to October to December 2018 presents quarterly estimates of multi-factor productivity (MFP), capital services and quality-adjusted labour input (QALI), including a range of industry breakdowns and analysis (published 5 April 2019).

- A simple guide to multi-factor productivity explains the concept and measurement of multi-factor productivity through simple stylised examples (published 5 October 2018).

- Quarterly UK public service productivity (Experimental Statistics): October to December 2018 contains the latest experimental estimates for quarterly UK total public service productivity, inputs and output (published 5 April 2019).

- Public service productivity: total, UK, 2016 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 (published 9 January 2019).

- Public service productivity: healthcare, UK, 2016 presents updated estimates of output, inputs and productivity for public service healthcare in the UK between 1995 and 2015, and new estimates for 2016 (published 9 January 2019).

- Public service productivity: healthcare, England: financial year ending 2017 presents estimates of output, inputs and productivity for public service healthcare in England on a financial year basis up to FYE 2017 (published 9 January 2019).

- Productivity development plan: 2018 to 2020 builds on recent improvements to our productivity statistics and looks at introducing new outputs, further improving our productivity statistics and consolidating our improvements to date (published 6 July 2018).

- Region by industry labour productivity presents annual productivity estimates for 16 industries in Standard Industrial Classification 2007 section groups for each of the NUTS1 regions for 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 (published 6 February 2019).

- Regional and sub-regional productivity in the UK, 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 (published 6 February 2019).

- Improving estimates of Labour Productivity and International Comparisons discusses recent OECD 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 (published 9 January 2019).

- How productive is your business? is an interactive tool which aids businesses to calculate their productivity and compare their performance to other businesses in Great Britain (published 6 July 2018).

9 . Authors

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