Office for National Statistics

Article

Quarterly public service productivity (Experimental Statistics): Oct to Dec 2016

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.

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1 . Main points

- These estimates are experimental using a degree of estimation to deliver more timely estimates, compared with our annual public service productivity figures, which are published with a 2-year lag; the methodology used in these estimates is explained in New nowcasting methods for more timely quarterly estimates of UK total public service productivity.

- In Quarter 4 (Oct to Dec) 2016, productivity for total public services decreased by 0.1% relative to the previous quarter; this followed on from a 0.3% increase in Quarter 3 (July to Sept) 2016.

- Comparing with the same quarter in the previous year, Quarter 4 2016 saw an increase in productivity of 0.4%.

- In 2016, year-on-year productivity for total public services has increased by 0.4%, as year-on-year output growth of 0.8% exceeded input growth of 0.4%, leading to an increase in the ratio of output to inputs.

- Revised estimates for productivity growth in 2015 show a year-on-year increase of 0.3%.

2 . Things you need to know about this release

Productivity of public services is estimated by comparing growth in total output with growth in total inputs used. Productivity will increase when more output is being produced for each unit of input. Estimates of output, inputs and productivity are given both as growth rates between consecutive periods and as indices that show the cumulative trend over time.

Estimated growth rates of output and inputs for individual public services are aggregated by their relative share of total expenditure on public services (expenditure weight) to produce estimates of total public service output, inputs and productivity.

Inputs are composed of expenditure on labour, goods and services, and of consumption of fixed capital. They are adjusted for inflation using a suitable price index (deflator). Expenditure data used to estimate inputs growth are taken from the Quarterly National Accounts (QNA). Alternatively a volume measure is used where available, such as full-time equivalent for labour input.

The QNA also provides estimates of government output based on direct measures where they are available and indirect measures where they are not. Direct measures use the number of activities performed and services delivered, which are weighted together using the relative cost of delivery. Indirect measures of services assume that the volume of output is equal to the volume of inputs used to create them. This means productivity growth will always be zero where indirect measures are used.

This release presents experimental estimates for quarterly total public service productivity, inputs and output to provide a short-term, timely indicator of the future path for the annual estimates of total public service productivity, which are produced with a 2-year lag.

Trends in quarterly total public service output, inputs and productivity estimates are mostly determined by those 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 evenly among the 4 quarters – reducing the impact these components have on volatility.

Annual estimates for 2015 and 2016 are taken from annualised quarterly data and are comparable to the existing annual series over the period 1997 to 2014. Differences between the annual and quarterly experimental public service productivity estimates are a result of differences in the estimates of output and inputs. Further information on these differences can be found in New nowcasting methods for more timely quarterly estimates of UK total public service productivity.

3 . Public service productivity continues to increase in 2015 and 2016

Figure 1 shows the total public service productivity series, with growth up to 2014 taken from the existing annual series and growth rates after this taken from the quarterly experimental series.

In Quarter 4 (Oct to Dec) 2016, total public service productivity fell by 0.1% relative to the previous quarter. However, this follows on from increases in productivity of 0.3% in both of the 2 preceding quarters. As a result, annualised estimates of the experimental quarterly measure show productivity in 2016 increased by 0.4% year-on-year and follows on from annual growth of 0.3% in 2015.

This continues the general upwards trend in recent years of UK public service productivity, as shown in Figure 1. From 2010 to 2016, total public service productivity is estimated to have increased by 3.0%, or an annual average of 0.5% growth. This represents the longest period of growth in public service productivity since the start of the series in 1997.

Figure 1: Total UK public service productivity, 1997 to Quarter 4 (Oct to Dec) 2016
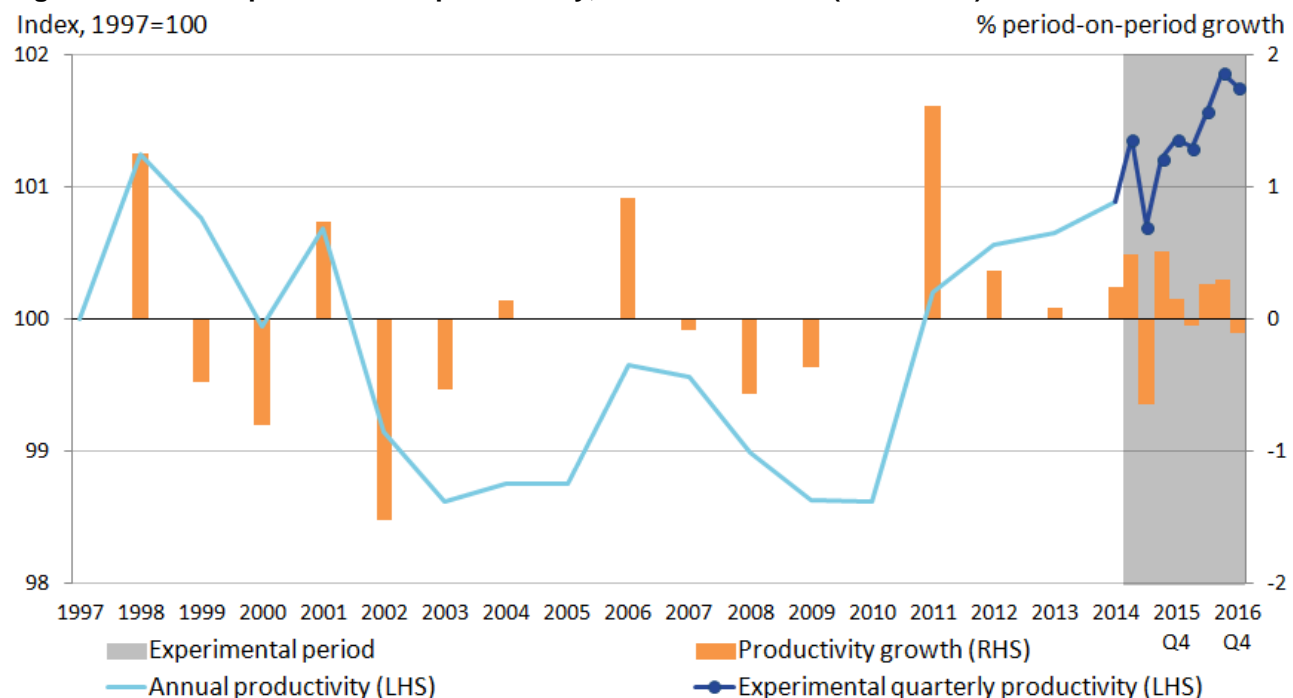

Figure 2 breaks down the productivity estimate into the underlying changes in inputs and output of total public services.

It shows that the latest fall in quarterly productivity was driven by a 0.1% increase in inputs with output remaining flat over the same period. This meant that there was a decrease in the ratio of output to inputs, leading to a decrease in productivity.

However, over 2016 as a whole, output growth of 0.8% exceeded inputs growth of 0.4%, leading to an increase in productivity of 0.4%. This is similarly the case in 2015, with output growth of 1.3% greater than input growth of 1.0%, leading to an increase in productivity of 0.3%.

Figure 2: Total UK public service inputs and output, 1997 to Quarter 4 (Oct to Dec) 2016
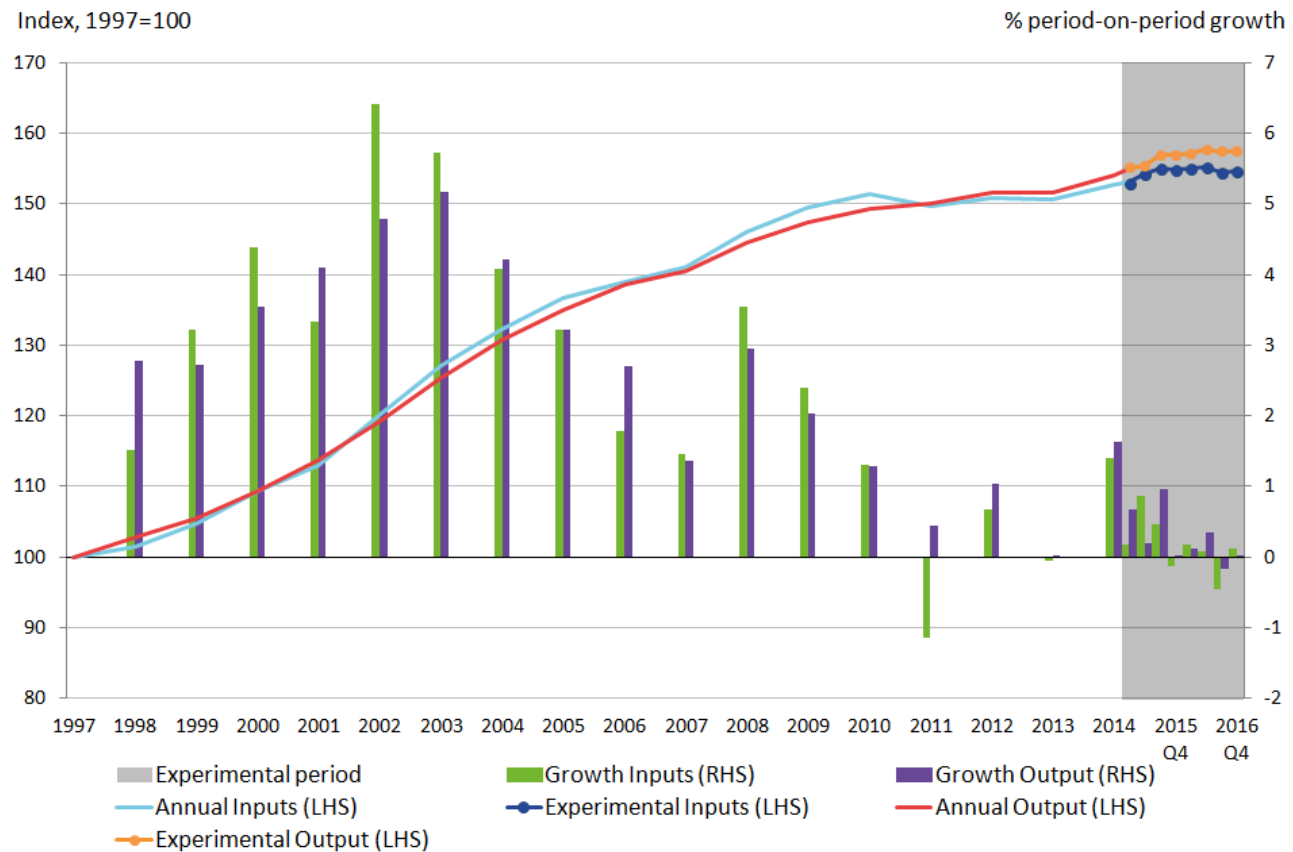
Further information on data sources for quarterly total public service productivity can be found in the Quality and Methodology Information report and in New nowcasting methods for more timely quarterly estimates of UK total public service productivity. These articles highlight methods and caveats for producing the quarter-on-quarter 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.

4 . What's changed in this release?

All estimates, by definition, are subject to statistical "error", but in this context the word refers to the uncertainty inherent in any process or calculation that uses sampling, estimation or modelling. 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.

Compared with the previous edition published on 6 January 2017, a number of revisions have been incorporated to the quarterly experimental series, including:

- revisions within the Quarterly National Accounts (QNA) back to Quarter 1 (Jan to Mar) 2015

- use of alternative price indices to deflate intermediate consumption

- the use of direct quarterly measures of labour input

- changes to the way we aggregate services together for inputs

- changes in the method of seasonal adjustment for output

To break this down further Figure 3 shows the effect of these changes on the average quarter-on-quarter growth rate of inputs, output and productivity from Quarter 1 (Jan to Mar) 2015 to Quarter 3 (July to Sept) 2016. The biggest change is a decrease in the estimates for average input growth for the period, revised downwards from an average 0.27% to 0.16%. As a result of this slower input growth, average productivity growth has increased for the period, revised up from 0.01% to 0.08%. Average output growth was revised down slightly from 0.28% to 0.24%, largely as a consequence of revisions in the QNA for 2016, offsetting some of the decrease in input growth. More detailed quarterly information on these revisions can be found in the dataset of this release.

Figure 3: Current and previous average quarter-on-quarter growth for inputs, output and productivity, Quarter 1 (Jan to Mar) 2015 to Quarter 3 (July to Sept) 2016
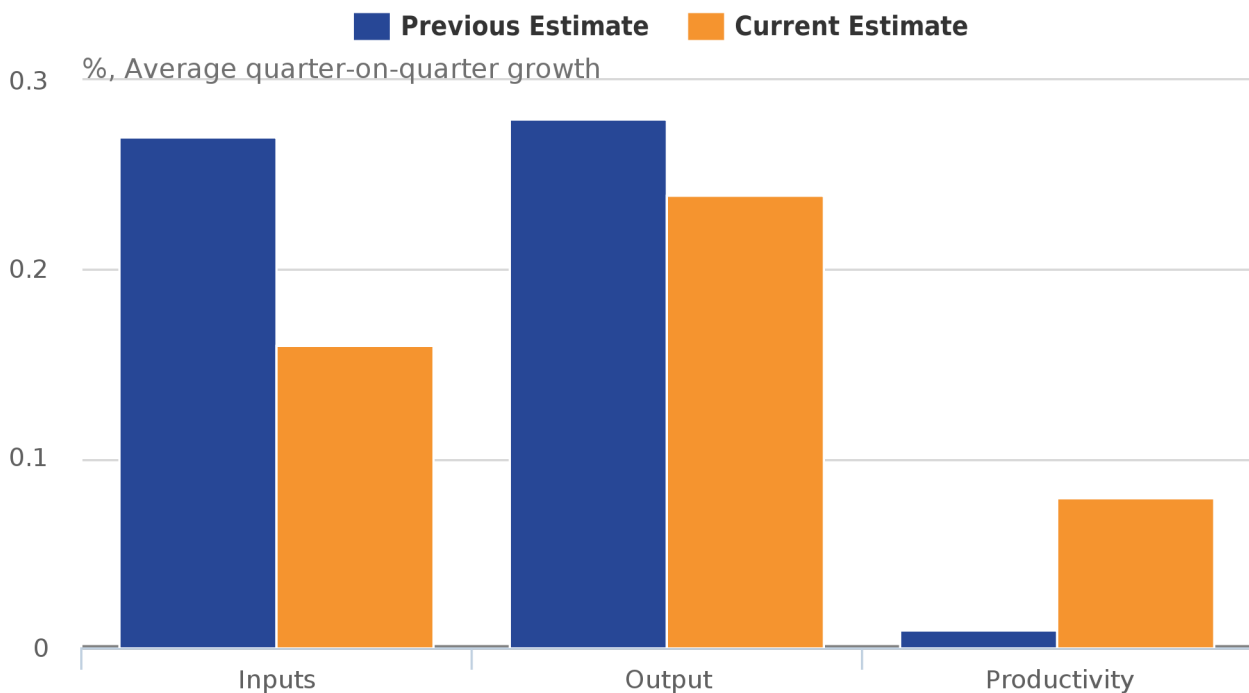
Source: Office for National Statistics

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 outputs.

As a result, productivity in 2015 increased by 0.3%, this is revised upwards from the previous estimate of a decrease of 0.3%. This was as a result of decreased estimates for inputs, with inputs growth in 2015 revised downwards from 1.7% to 1.0%, with annualised output growth for 2015 unchanged.

The purpose of these changes is to better reflect the methods used in the existing annual series and allows for greater comparability with the short-term, quarterly estimates.

Changes to the input and productivity series are partly as a result of changes to the way we aggregate services together for inputs. We now aggregate services on an annual basis and then benchmark the quarterly experimental series to the annual estimates for the same period. This also changes the annual experimental estimates for inputs, which were previously taken as annualised estimates of the quarterly series. This ensures the methods used to calculate the experimental measure are consistent with the annual series, and are comparable to the methods of aggregation used within the QNA to calculate output.

New estimates of the volume of labour input have been included in this edition. This is a direct measure using full-time equivalent measures from public sector employment for service areas where outputs are directly measured. This brings experimental measures of labour input closer to the annual series and the recommendations of the Atkinson Review.

We have also reviewed and changed the price indices used to deflate expenditure on goods and services. Previously the deflators used for the experimental estimate were based on weighted combinations of Producer Price Indices and Service Producer Price Indices. However, following a review of the deflators and weights we have made changes to bring the deflators used in line with the annual article. This utilises public service reported data to construct quarterly deflators for service areas where suitable estimates are available. For other service areas the Implied GDP deflator is used.

There are also revisions to the quarterly output series, as seasonal adjustment is now carried out at a more aggregated level, in line with the method for the input series. This changes the quarter-on-quarter growth rates for output but has no impact on annual growth rates. Finally there are changes to both the output and inputs series as a result of QNA revisions back to Quarter 1 (Jan to Mar) 2015.

5 . Future developments

This article presents updated experimental quarterly total public service productivity, inputs and output series, aiming to provide a more timely indicator of the likely trend in the existing annual series. These estimates are based on different sources from those used to estimate annual total public service productivity. The sources used here contain less detail and necessarily involve a greater degree of estimation than annual estimates produced later. As a result, they are not replacements for the annual estimates, and are merely intended to provide a more timely estimate for the more recent period. We aim to assess the impact of these differences and to address issues such as quality adjustment, direct measures, the treatment of annual data and service level breakdown in future work.

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 feedback is welcome and can be sent to sam.turnock@ons.gsi.gov.uk.

6 . Authors

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7 . 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.

8 . Quality and methodology

The Quarterly public service productivity estimates: Total public services Quality and Methodology Information document contains important information on:

- the strengths and limitations of the data and how it compares with related data

- users and uses of the data

- how the output was created

- the quality of the output including the accuracy of the data