

Article

Quarterly UK public service productivity (Experimental Statistics): April to June 2017

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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Release date:
6 October 2017

Next release:
5 January 2018

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1 . Main points

- These estimates are [experimental](#), using a degree of estimation to deliver timelier estimates compared with our [annual public service productivity](#) figures, which are published with a two-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 2 (Apr to June) 2017, productivity for total public services decreased by 0.5% relative to the previous quarter; this followed on from a 0.1% decrease in Quarter 1 (Jan to Mar) 2017.
- Comparing with the same quarter in the previous year, Quarter 2 2017 saw a decrease in productivity growth of 0.4%.
- In 2016, revised up from previous estimates, year-on-year productivity growth for total public services has increased by 0.9%, as year-on-year output growth of 1.1% exceeded inputs growth of 0.2%, leading to an increase in the ratio of output to inputs.
- Revised estimates show that year-on-year productivity growth was flat in 2015, as year-on-year inputs growth matched output growth at 0.6%.

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, volume measures are 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 of output use the number of activities performed and services delivered, which are weighted together using the relative cost of delivery. 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 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, providing a short-term timely indicator of the future path for the [annual estimates of total public service productivity](#), which are produced with a two-year lag.

Estimates of output, inputs and productivity up to 2014 are reported on an annual basis and use data from [our existing annual publication](#). This allows the entire time series to reflect the most comprehensive data and understanding of UK public service – chief amongst these being measures of output that reflect quality changes. After 2014, estimates in this article are presented on both a quarterly and annual basis¹, however, the quality of services provided is assumed not to have changed and remains constant throughout the period.

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 among the four quarters – reducing the impact these components have on volatility.

With the release of the next annual article on 5 January 2018, the quality adjusted series will extend up to 2015, incorporating the most comprehensive understanding and detail available as well as the latest estimate of quality adjustment. 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](#).

Notes for: Things you need to know about this release

1. Using annualised quarterly data.

3 . Quarterly public service productivity falls as growth in inputs outstrips growth in output

In Quarter 2 (Apr to June) 2017, total public service productivity decreased by 0.5% relative to the previous quarter, following a slight contraction of 0.1% in the first quarter of 2017. This was a change in the recent trend of quarterly productivity, where quarterly productivity was flat in 2015 and rising in 2016. As a result, productivity was 0.4% lower than in Quarter 2 2016.

Placing this in the context of a longer time series, Figure 1 combines the latest experimental quarterly estimates – covering Quarter 1 (Jan to Mar) 2015 to Quarter 2 2017 – with annual estimates for between 1997 and 2014, taken from our [Public service productivity estimates: total public service, UK: 2014](#) release. It suggests that, despite a decline in the last two quarters, the productivity of UK public services has been on an upwards trend for most of the last seven years. Between 2010 and 2016, total public service productivity is estimated to have increased by 3.2% – an average growth of 0.5% per year. This represents the longest sustained 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 2 (Apr to June) 2017

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Source: Office for National Statistics

Notes:

1. Estimates from 1997 to 2014 are based on the existing annual series.
2. Estimates from Quarter 1 2015 to Quarter 2 2017 are based on the experimental quarterly total public service productivity series.
3. Estimates for Quarter 1 2015 reflect the growth rate between annualised quarterly productivity for 2014 and Quarter 1 2015.
4. Estimates of productivity for the experimental period are indirectly seasonally adjusted, calculated using seasonally adjusted inputs and seasonally adjusted output.
5. Asterisks (*) and greyed out area reference periods were estimates are based on experimental methodology.

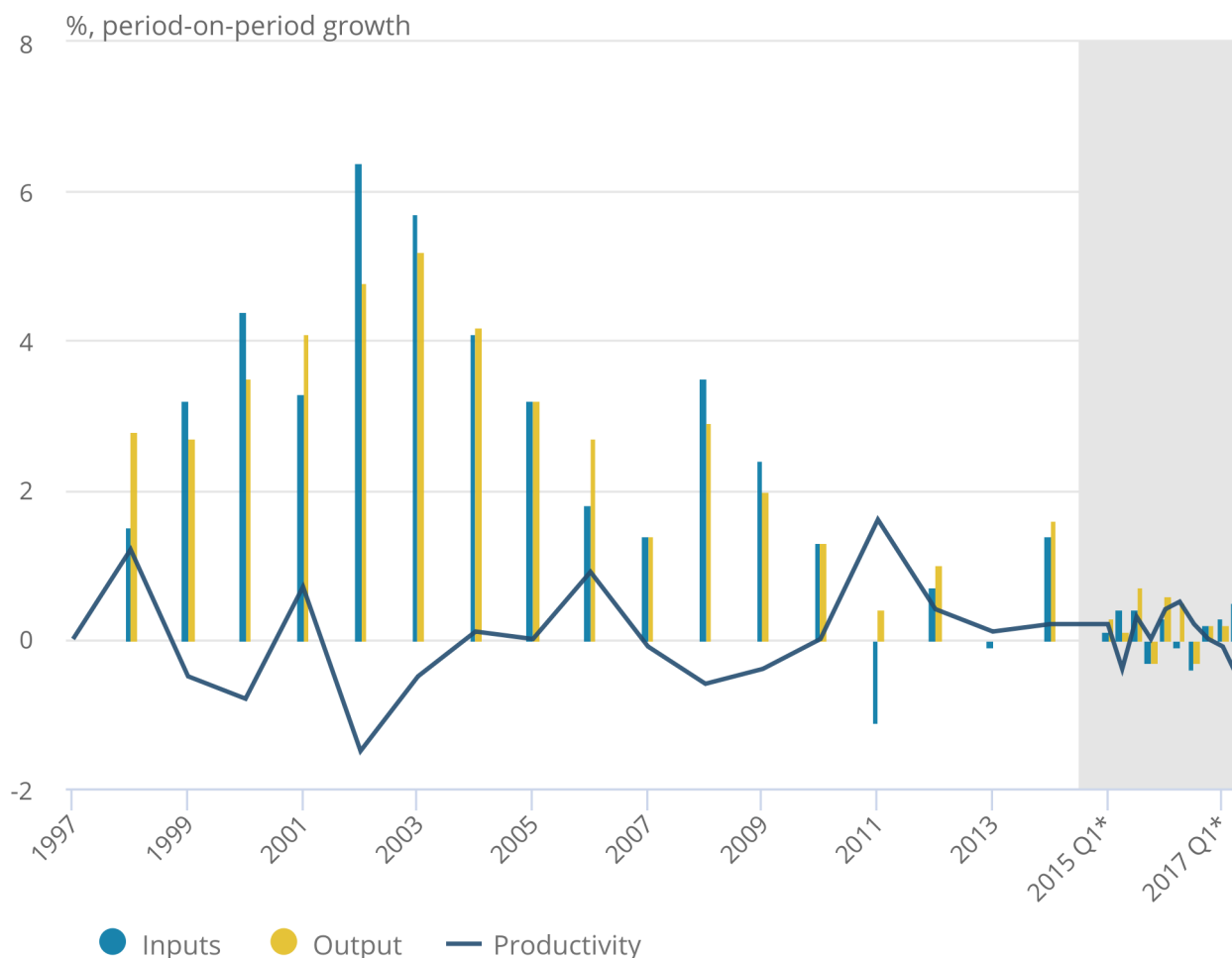
Figure 2 breaks down the productivity estimate into the underlying changes in inputs and output of total public services.

It shows that the latest contraction in quarterly productivity growth was driven by a 0.5% increase in inputs, as output remained flat. This meant that there was a decrease in the ratio of output to inputs, leading to a decrease in productivity.

Figure 2 also illustrates the longer-term trend, showing the change in both components since 1997, with growth up to 2014 taken from the [existing annual series](#) and growth rates after this taken from the quarterly experimental series. While inputs have continued to increase for most of the last seven years, growth in output has been larger and therefore driven an increase in productivity. Taking each series from 2010 to 2016, inputs have grown by 1.6% (an average of 0.3% per year) while output has risen by 4.9% – an average of 0.8% per year.

Figure 2: Growth in total UK public service inputs, output and productivity, 1997 to Quarter 2 (Apr to June) 2017

Figure 2: Growth in total UK public service inputs, output and productivity, 1997 to Quarter 2 (Apr to June) 2017



Source: Office for National Statistics

Notes:

1. Estimates from 1997 to 2014 are based on the existing annual series.
2. Estimates from Quarter 1 2015 to Quarter 2 2017 are based on the experimental quarterly total public service productivity series.
3. Estimates for Quarter 1 2015 reflect the growth rate for inputs and output between annualised quarterly estimates for 2014 and Quarter 1 2015
4. Estimates of inputs and output for the experimental period are directly seasonally adjusted.
5. Asterisks (*) and greyed out area reference periods were estimates are based on experimental methodology.

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 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.

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 [latest release, published on 5 July 2017](#), a number of revisions have been incorporated to the quarterly experimental series, including:

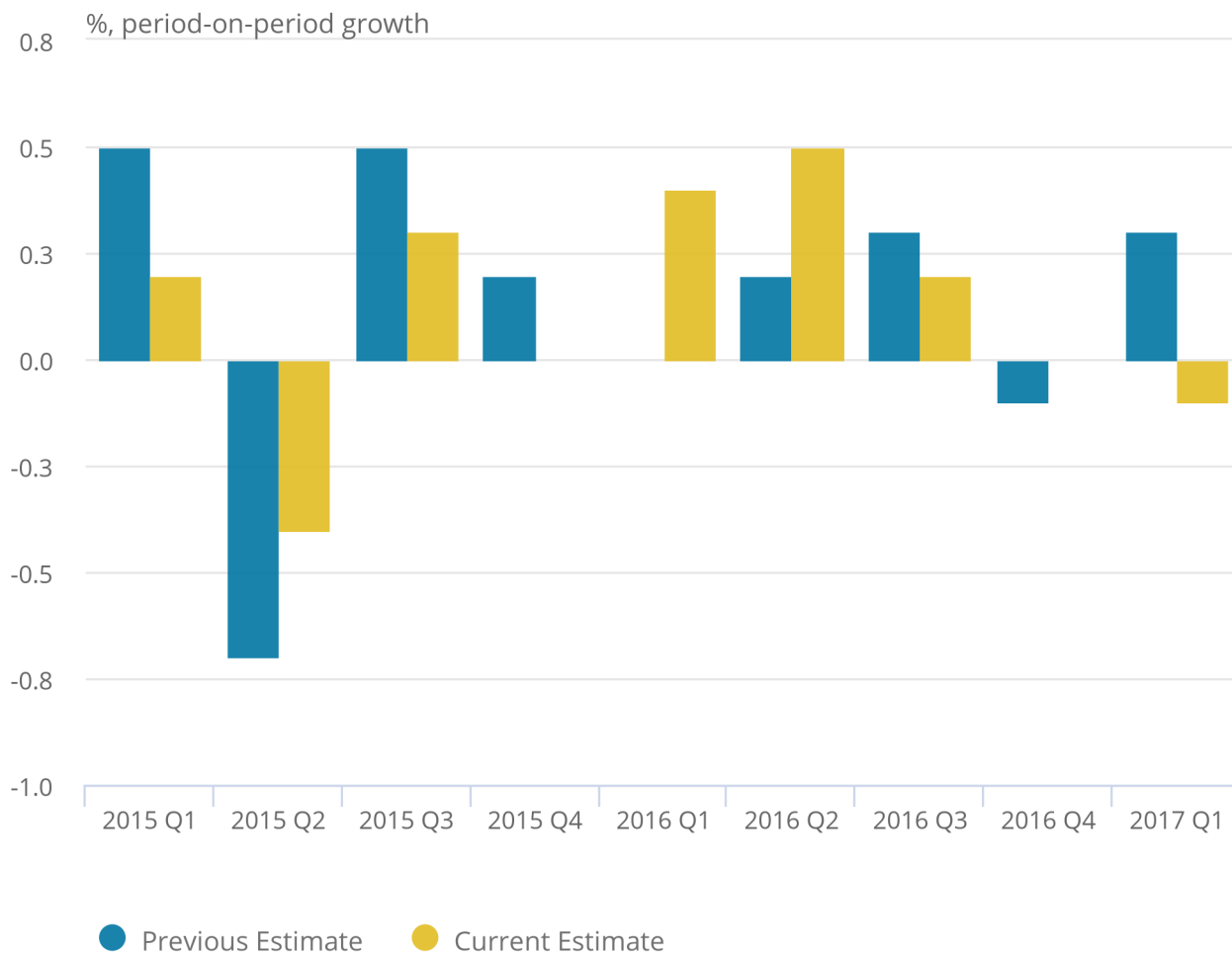
- minor revisions in some price deflators
- minor revisions in direct measures of labour input
- revisions due to the incorporation of regular end-of-financial year returns, containing more comprehensive data, into the national accounts
- revisions to source data as a result of changes introduced into the national accounts through Blue Book 2017, this includes: new methodology to improve the [alignment of public sector finances and national accounts](#); a change in the base year from 2013 to 2014 and general [national accounts methodology changes](#)

These changes mean that productivity and its subsequent components – inputs and output – have experienced revisions from previous estimates over the experimental period. Growth in the annualised estimate of productivity for 2015 has been revised down from 0.3% to 0.0%. This was driven by output growing slower than previously estimated, being revised down from 1.3% to 0.6%. The impact of this revision was partially offset by a downward revision to growth in public service inputs, down from 1.0% to 0.6%. The estimate for annual productivity growth for 2016 has also experienced a revision from previous estimates, revised up from 0.4% to 0.9%. This was driven by a combination of a downward revision in inputs growth (from 0.4% to 0.2%) and an upward revision in the growth of output (from 0.8% to 1.1%)

Figure 3 summarises the revisions to the period-on-period growth rates of productivity on a quarterly basis from Quarter 1 (Jan to Mar) 2015 to Quarter 1 2017.

Figure 3: Previous and current estimates of period-on-period public service productivity growth rate, Quarter 1 (Jan to Mar) 2015 to Quarter 1 2017

Figure 3: Previous and current estimates of period-on-period public service productivity growth rate, Quarter 1 (Jan to Mar) 2015 to Quarter 1 2017



Source: Office for National Statistics

Source: Office for National Statistics

Notes:

1. Estimates for Quarter 1 2015 reflect the growth rate for productivity between annualised quarterly estimates for 2014 and Quarter 1 2015.
2. All estimates are based on experimental quarterly total public service productivity.
3. Estimates of productivity are indirectly seasonally adjusted, calculated using seasonally adjusted inputs and seasonally adjusted output

5 . Future developments

This article presents updated experimental quarterly total public service productivity, inputs and output series, aiming to provide a timelier 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 timelier 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 fred.foxton@ons.gsi.gov.uk.

6 . Authors

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7 . Quality and methodology

The [Quarterly public service productivity estimates: Total public services Quality and Methodology Information](#) report 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

8 . Links to related statistics

The following publications on the topic of productivity are also available:

- [UK productivity introduction: Apr to June 2017](#) draws together the headlines of the productivity releases into a single release, providing additional analysis of our productivity statistics (published 6 Oct 2017).
- [Labour productivity: April to June 2017](#) contains the latest estimates of labour productivity for the whole economy and a range of industries, together with estimates of unit labour costs (published 6 Oct 2017).
- [Quarterly UK public service productivity \(experimental statistics\): April to June 2017](#) contains the latest experimental estimates for quarterly UK total public service productivity, inputs and output (published 6 Oct 2017).
- [International comparisons of UK productivity \(ICP\), first estimates: 2016](#) presents an international comparison of labour productivity across the G7 nations, in terms of growth in GDP per hour and GDP per worker (published 6 Oct 2017).

- [International comparisons of labour productivity by industry: 2014](#) uses new production-side PPPs to present estimates of labour productivity for 29 European countries across 10 industries on a GVA per hour worked basis (published 6 Oct 2017).
- [Quality adjusted labour input: UK estimates to 2016](#) presents updated estimates of quality adjusted labour input (QALI) for the whole economy and for the market sector (published 6 Oct 2017).
- [Foreign direct investment and labour productivity: a micro-data perspective: 2012 to 2015](#) examines the composition of firms with foreign direct investment (FDI) in Great Britain between 2012 and 2015, and their productivity outcomes compared with firms with no FDI relationships (published 6 Oct 2017).
- [Quality adjustment of public service criminal justice system output: experimental method: 1997 to 2014](#) presents new methodologies to capture changes in quality of outputs of the criminal justice system, expanding ONS's coverage of quality adjustment for public service output (published 6 Oct 2017).
- [Introducing industry-by-region labour metrics and productivity](#) presents new, experimental industry-by-region productivity metrics; this includes measures of hours worked, jobs, and accompanying productivity measures for the SIC letter industries in the NUTS1 regions (published 5 July 2017).
- [Introducing division level labour productivity estimates](#) provides an overview of new and experimental estimates of labour productivity at the two-digit SIC industry level for the UK and provides some initial analysis demonstrating trends in the data (published 5 July 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 sub-regions of the UK and for selected UK city regions (published 6 January 2017).
- [Understanding firms in the bottom 10% of the labour productivity distribution in Great Britain: "the laggards", 2003 to 2015](#) examines the characteristics of businesses in the bottom 10% of the labour productivity distribution in terms of their size, age, industry and location, between 2003 and 2015 (published 5 July 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 (published 5 April 2017).
- [Developing new measures of infrastructure investment: July 2017](#) is the first in a series of papers on infrastructure statistics, focusing on definitional and data challenges in measuring infrastructure investment (published 5 July 2017).
- [Volume index of UK capital services \(experimental\): estimates to 2015](#) provides estimates of the contribution of capital inputs to production in the market sector, split by asset and industry (published 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 (published 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 (published 6 January 2017).