

Article

Quarterly UK public service productivity (Experimental Statistics): January to March 2018

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 saw an increase of 1.1% in Quarter 1 (Jan to Mar) 2018.
- In Quarter 1 2018 public service productivity increased by 0.5% on the previous quarter; output grew by 0.2% with inputs decreasing by 0.4%.
- Implementing improved data and methods from quarterly national accounts consistent with Blue Book 2018, to be published on the 31 July 2018, have led to a number of revisions to the historic series.
- In 2017, revisions have led year-on-year productivity for total public services to decrease by 0.6%, as year-on-year inputs grew by 0.5% and output fell by 0.1%, leading to a decrease in the ratio of output to inputs.
- These estimates are [experimental](#), using a degree of estimation to deliver timelier estimates compared with our [national public service productivity](#) figures, which are published with a two-year lag; the methodology used in these experimental estimates is explained in [New nowcasting methods for more timely quarterly estimates of UK total public service productivity](#).

2 . Things you need to know about this release

Productivity of public services is estimated by comparing growth in total output with growth in the total inputs used. Productivity will increase when more output is being produced for each unit of inputs. Estimates of inputs, output and productivity are given both as growth rates between consecutive periods and as indices showing the cumulative trend of productivity 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 labour, goods and services, and consumption of fixed capital. For some labour inputs, direct quantity measures, such as full-time equivalent, can be observed and are used to observe growth in the quantity of inputs. For other areas of labour, all areas of goods and services and consumption of fixed capital, the quantity of inputs are not directly available. In these cases, the quantity 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 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 their 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 total public service productivity, inputs and output, providing a short-term timely indicator of the future path for the [national estimates of total public service productivity](#), which are produced with a two-year lag.

Estimates of output, inputs and productivity up to 2015 are reported on an annual basis and use data from [Public service productivity estimates: total public service, UK: 2015](#). 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 2015, estimates in this article are presented on both a quarterly and annual basis ¹, however, we assume the quality of services provided has not changed and remains constant throughout the period. Further information is available in the [Quality Methodology and Information report](#).

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.

Differences between the national and 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 rises as inputs fall and output grows

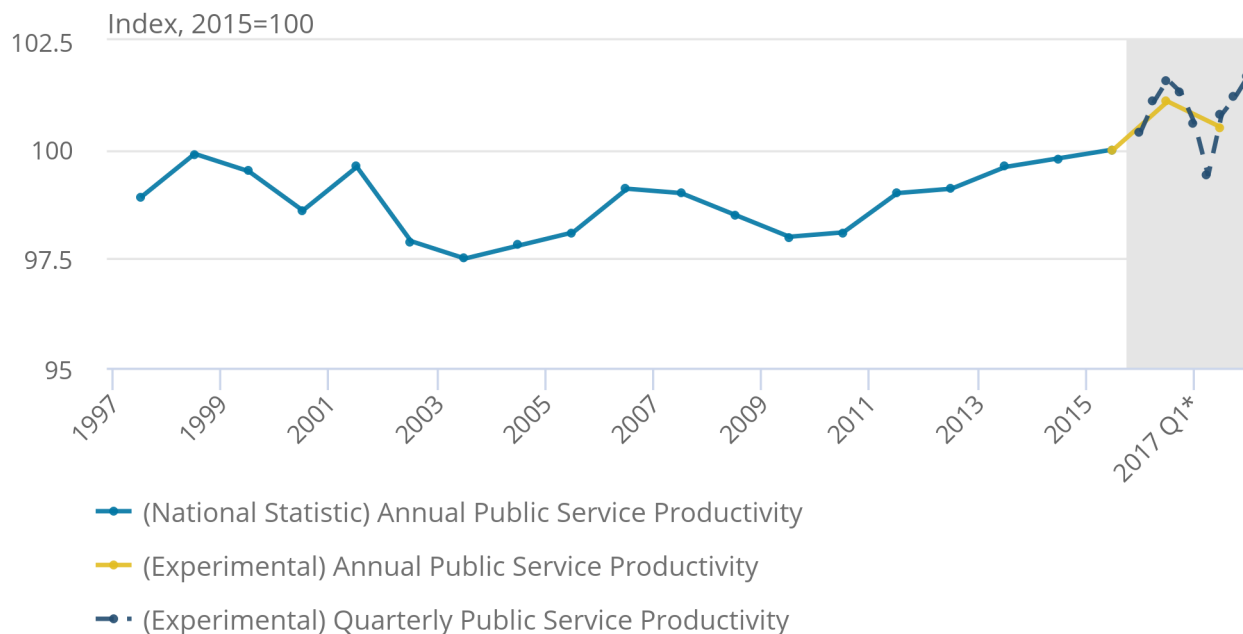
In Quarter 1 (Jan to Mar) 2018, total public service productivity increased by 0.5% relative to the previous quarter, following an increase of 0.3% in Quarter 4 (Oct to Dec) 2017. As a result of the latest quarterly growth, productivity has exceeded its previous quarterly peak, which occurred in Quarter 3 (July to Sept) 2016.

This growth continues from a strong end to 2017 for quarterly public service productivity, with quarterly growth being 1.4% for Quarter 3 2017 and 0.3% for Quarter 4 2017. Despite this strong growth, the negative growth in the first and second quarters of 2017 means that productivity decreased by 0.6% in 2017 when compared with 2016. This marks the first contraction in annual total public service productivity since 2009.

Placing this in the context of a longer time series, Figure 1 combines the latest annualised experimental series for 2016 and 2017 – with estimates between 1997 and 2015, taken from our [Public service productivity estimates: total public service, UK: 2015](#) release. It shows that, between 2010 and 2017, total public service productivity increased by 2.4% – an average growth of 0.3% per year.

Figure 1: Total UK public service productivity, 1997 to Quarter 1 (Jan to Mar) 2018

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Source: Office for National Statistics

Notes:

1. Estimates from 1997 to 2015 are based on the existing annual series.
2. Annual estimates from 2016 to 2017 are based on the annualised experimental series. These series are displayed in the third quarter of the year.
3. Estimates from Quarter 1 2016 to Quarter 1 2018 are based on the experimental quarterly total public service productivity series.
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 show where estimates are based on experimental methodology.

Figure 1 also includes the quarterly series — covering Quarter 1 2016 to Quarter 1 2018 — which provides an indication of the quarterly path in the most recent periods. This suggests that, while maintaining an upwards trend, growth in public service productivity has experienced some noticeable volatility.

Table 1 breaks down the experimental quarterly productivity estimate into the underlying changes in inputs and output of total public services.

Table 1: Experimental quarterly growths of inputs, output and productivity, Quarter 1 (Jan to Mar) 2016 to Quarter 1 (Jan to Mar) 2018, UK

Quarters	Inputs	Output	Productivity
2016 Q1 (Jan to Mar)	0.4	0.3	-0.1
2016 Q2 (Apr to June)	-0.4	0.2	0.6
2016 Q3 (Jul to Sept)	-0.6	-0.1	0.5
2016 Q4 (Oct to Dec)	0.2	0	-0.2
2017 Q1 (Jan to Mar)	0.5	-0.3	-0.7
2017 Q2 (Apr to June)	1.1	0	-1.1
2017 Q3 (Jul to Sept)	-1.3	0.1	1.4
2017 Q4 (Oct to Dec)	0.1	0.4	0.3
2018 Q1 (Jan to Mar)	-0.4	0.2	0.5

Source: Office for National Statistics

Note:

1. Output growth minus inputs growth does not always equal productivity growth, due to rounding.

2. Units = % growth

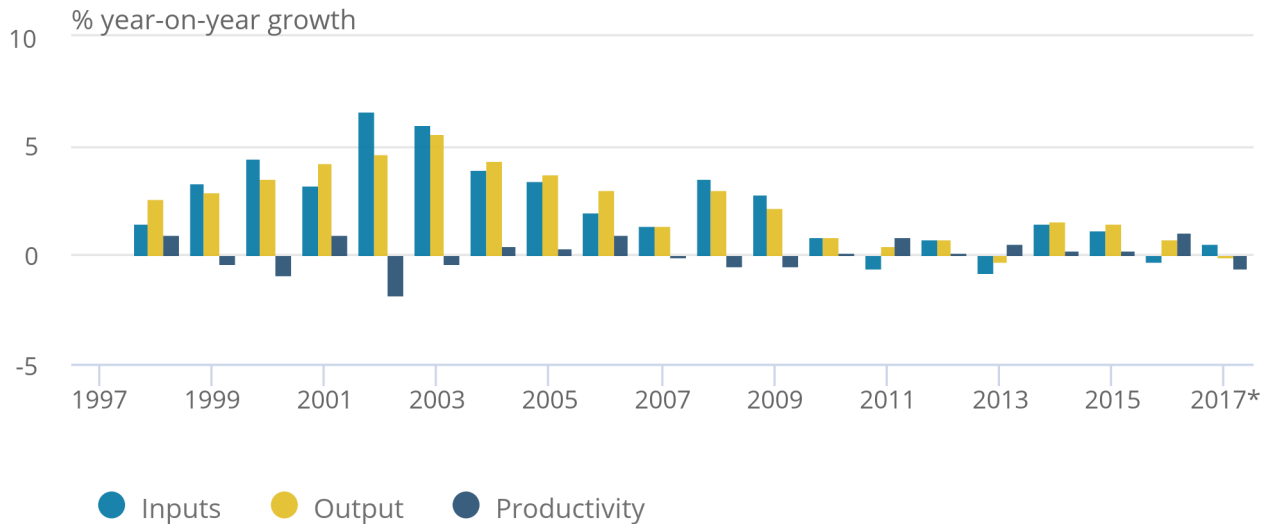
Table 1 shows that the latest increase in quarterly productivity of 0.5% was driven mainly by a 0.4% decrease in inputs, with output growing 0.2%. This quarter sees inputs return as the main driver behind productivity change. This paired with modest growth in output, mean that public services are producing a greater amount of output with a lower level of inputs, causing productivity to increase. This is the third consecutive quarter in which inputs have experienced weak growth or contractions.

When looking at 2017 as a whole and decomposing productivity growth into the underlying changes in inputs and output, Figure 2 shows that the contraction in public service productivity was driven by growth of 0.5% in inputs over the year, whilst output fell by 0.1% for the year, relative to the previous year. This caused overall productivity to fall by 0.6%, compared with 2016.

Figure 2 also illustrates the longer-term trend in both components since 1997, with growth up to 2015 taken from the [Public service productivity estimates: total public service, UK: 2015](#) and growth rates after this taken from the experimental series. Both output and inputs growth have been weaker and volatile in recent periods, leading to variability in productivity growth. Taking each series from 2010 to 2017, inputs have grown by 2.2% (an average of 0.3% per year) while output has risen by 4.6% (an average of 0.7% per year).

Figure 2: Growth in total UK public service inputs, output and productivity, 1997 to 2017

Figure 2: Growth in total UK public service inputs, output and productivity, 1997 to 2017



Source: Office for National Statistics

Notes:

1. Estimates from 1997 to 2015 are based on the existing annual series.
2. Estimates from 2016 to 2017 are based on the experimental total public service productivity series.
3. Estimates of productivity for the experimental period are indirectly seasonally adjusted, calculated using seasonally adjusted inputs and seasonally adjusted output.
4. Asterisks (*) reference periods show where 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”. In this context, error 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 6 April 2018](#), a number of revisions have been incorporated to the quarterly experimental series, including:

- revisions to source data as a result of changes introduced into the national accounts through Blue Book 2018
- minor revisions in some price deflators

The changes resulting from Blue Book 2018 reflect improvements made to the data and methods used in national accounts. Amongst other things, they cover improvements to the calculation of figures for funded public sector employee pensions in the financial corporations sector – where the employer or “pension manager” is in local government or central government. These changes reflect improvements as defined in the European System of Accounts 2010: ESA 2010. Further information on these revisions as well as their impact can be found in the [National Accounts articles: Impact of Blue Book 2018 changes on current price gross domestic product estimates, 1997 to 2016](#).

In previous estimates, quarterly intermediate consumption for healthcare services had been deflated using forecasts of historic data. Recently this has been improved by using a mixture of nowcasted data and observed data where this is consistent with the previous methodology used in preparing the deflator for healthcare intermediate consumption.

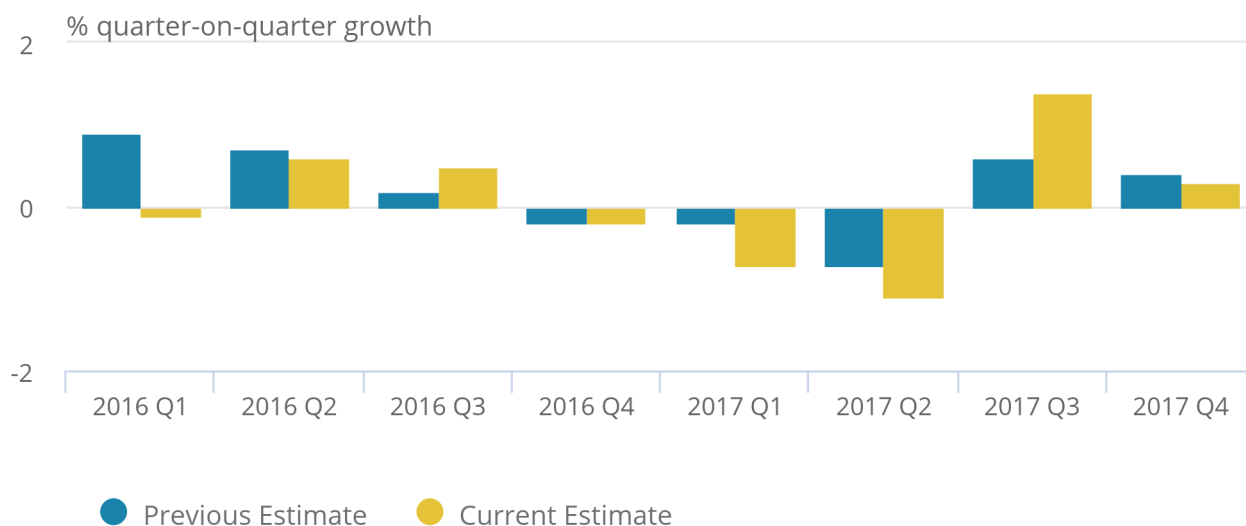
Current estimates of productivity suggest a weaker 2016 than previously reported with slower growth in the first two quarters of 2016, as both inputs and output were revised. Alongside this, downward revisions to productivity growth were seen at the beginning of 2017 (a combination of inputs being revised up and output revised down), total public service productivity in Quarter 3 (July to Sept) 2017 saw a large revision, now estimated to be 1.4%, previously estimated as 0.6%. This was solely due to revisions to inputs leading to the estimate falling from a 0.6% reduction to a 1.3% decrease, with output remaining 0.1%. Quarter 4 (Oct to Dec) 2017 saw a slight downwards revision in productivity, from 0.4% to 0.3%, with inputs being revised up slightly. Figure 3 summarises these revisions, presenting previous and current estimates of the quarter-on-quarter productivity growth between Quarter 1 (Jan to Mar) 2016 and Quarter 4 2017.

Figure 3: Previous and current estimates of quarter-on-quarter public service productivity growth rate

UK, Quarter 1 (Jan to Mar) 2016 to Quarter 4 (Oct to Dec) 2017

Figure 3: Previous and current estimates of quarter-on-quarter public service productivity growth rate

UK, Quarter 1 (Jan to Mar) 2016 to Quarter 4 (Oct to Dec) 2017



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.

5 . Future developments

This article presents updated experimental 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 the annual estimates, which are produced later using less provisional data. As a result, they are not replacements for the annual estimates and are merely intended to provide a timelier estimate for the more recent periods. 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 via email to productivity@ons.gov.uk.

6 . Authors

Mark Grundy and Piotr Pawelek, Office for National Statistics.

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 they compare 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

- [Productivity economic commentary: January to March 2018](#): an article drawing together the main findings from official statistics and analysis of UK productivity to present a summary of recent developments (published 6 July 2018).
- [Labour productivity, UK: January to March 2018](#): 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 July 2018).
- [Quarterly UK public service productivity \(Experimental Statistics\): January to March 2018](#): contains the latest experimental estimates for quarterly UK total public service productivity, inputs and output (published 6 July 2018).
- [Total public service productivity: understanding inputs](#): presents an investigation into estimates of total UK public services inputs looking into expenditure, volume and implied deflators on a total and input component basis (published 6 July 2018).
- [Historical revisions analysis of quarterly UK public service productivity \(Experimental Statistics\) and nowcast evaluation](#): examines the reliability of preliminary estimates for experimental quarterly UK public service productivity over time, using revision analysis techniques (published 6 July 2018).
- [Productivity development plan: 2018 to 2020](#): this development plan 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)
- [UK trade in goods and productivity: new findings](#): this article describes a new dataset developed by ONS, which includes information from both the Annual Business Survey and HM Revenue and Customs' trade in goods declarations. It shows a strong association between trader status and productivity, highlighting the prevalence of trading behaviour across different types of business (published 6 July 2018).
- [How productive is your business](#): this is an interactive tool that helps businesses to calculate their productivity and compare their performance with other businesses in Great Britain (published 6 July 2018).