Office for National Statistics

Statistical bulletin

Public service productivity, quarterly, UK: October to December 2023

UK total public service productivity, inputs and output to provide a short-term, timely indicator of annual productivity estimates. These are official statistics in development.

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Next release:
To be announced

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1 . Main points

- Public service productivity was estimated to be 2.3% lower in Quarter 4 (Oct to Dec) 2023 compared with the same quarter a year ago.
- Public service productivity fell by an estimated 1.0% in Quarter 4 2023 compared with Quarter 3 (July to Sept) 2023, its third consecutive quarterly decline.
- Public service productivity in Quarter 4 2023 is estimated to be 6.8% below its pre-coronavirus (COVID-19) pandemic peak (Quarter 4 2019) but has remained relatively stable since Quarter 2 (Apr to June) 2021 through the post-pandemic period.
- Annual estimates suggest that public service productivity showed no growth (0.0%) in 2023, following a partial “bounce-back” of 6.5% in 2021 and 3.0% in 2022 following the pandemic in 2020.

These are **official statistics in development**, and we advise caution when using the data. These estimates will be subject to revision as methods are redefined and more up-to-date data become available. Read more in **Section 10: Measuring the data**.

2 . About these estimates

This release presentsofficial statistics in development for total public service productivity, inputs and output. Including data that are consistent with our Quarterly national accounts bulletin, this quarterly release provides a short-term, timely indicator of the annualNational Statistics of total public service productivity. The quarterly estimates in this release are not quality adjusted.

Since the beginning of the Public services productivity review, the Office for National Statistics (ONS) has been working to review and improve how public service productivity is measured. The description of the first sets of improvements produced can be found in our Improved methods for total public service productivity: total, UK, 2021 article. These methodological improvements informed the annual National Statistics estimates of total public service productivity. Details on data and methods for the estimates presented in this release are described in Section 10: Measuring the data.

As mentioned in previous bulletins, comparing the latest estimates with pre-coronavirus (COVID-19) pandemic years should be done with caution, as the structure of inputs and output changed in response to the pandemic.

These estimates are not a measure of the productivity of an individual worker within the public sector but rather reflect the volume of services delivered to end-users relative to the volume of total inputs required to deliver these services. The measure is dominated by healthcare and education services because of their relative size.

In reading the following statistics, please consider that, unless stated otherwise, all growth rates reported in this release are indexed to the base year of 1997.

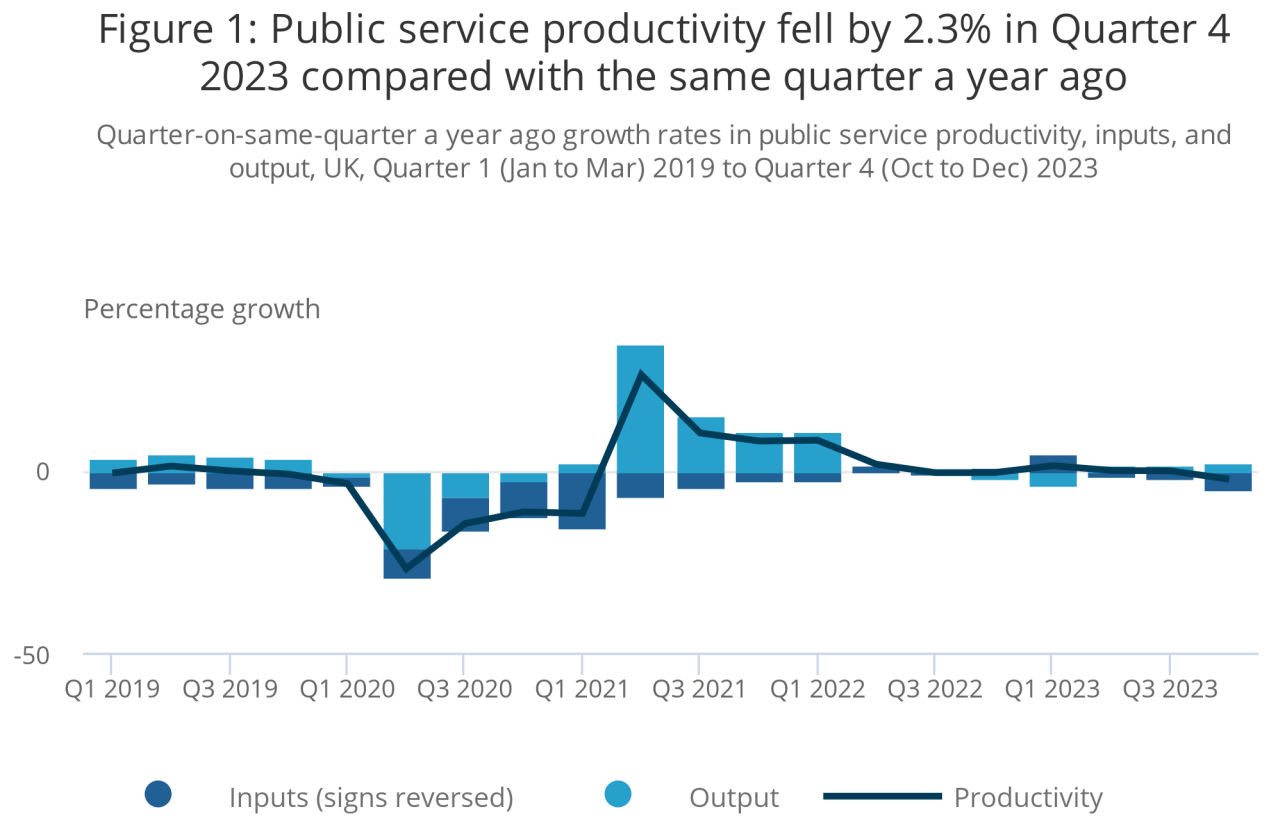
3 . Quarter-on-previous-year productivity estimates

Because changes in productivity typically represent medium to long-term structural trends, we advise looking at changes over a longer period. This helps to smooth any short-term fluctuations. Comparing the present quarter with the same quarter a year previous provides a yearly point estimate of productivity and is, therefore, a better indication of trend.

Productivity for total UK public services was estimated to be 2.3% lower in Quarter 4 (Oct to Dec) 2023 compared with the same quarter a year ago. Over this period, inputs increased by 4.8% while output increased by 2.4%.

Figure 1: Public service productivity fell by 2.3% in Quarter 4 2023 compared with the same quarter a year ago

Quarter-on-same-quarter a year ago growth rates in public service productivity, inputs, and output, UK, Quarter 1 (Jan to Mar) 2019 to Quarter 4 (Oct to Dec) 2023



Source: Public service productivity from the Office for National Statistics

Notes:

1. Official statistics in development quarterly estimates of productivity are calculated using seasonally adjusted inputs and seasonally adjusted output.

2. This chart inverts the growth rates of inputs.

Please note that our public service productivity estimates are subject to revisions because of improvements to source data and methodology.

4 . Quarter-on-quarter productivity estimates

Productivity for total public services was estimated to be around 1.0% lower in Quarter 4 (Oct to Dec) 2023 compared with the previous quarter. This is because inputs growth exceeded output growth (1.2% and 0.1%, respectively).

Inputs increased on the quarter for all service areas, however, output fell for healthcare and education, the two largest areas by expenditure share (approximately 55% combined).

Healthcare inputs, specifically the intermediate consumption (IC) component, was the main driver of total inputs growth. This is a result of both the magnitude of growth of IC inputs (4.6% growth in the quarter) and the relative share of healthcare in total public services expenditure (around 39%).

Both inputs and output volumes increased on the quarter for:

- social protection
- justice and fire

All three areas with only output volumes increased on the quarter, that is:

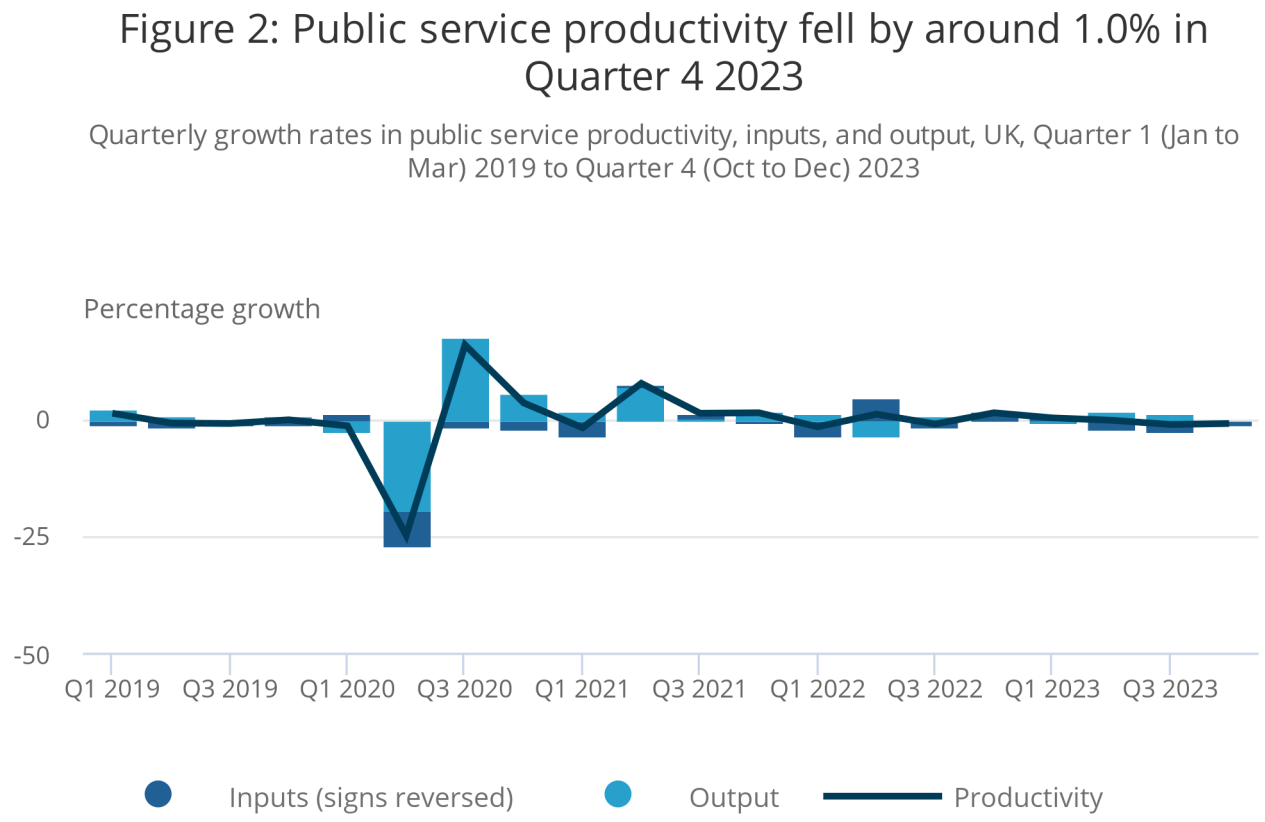
- military defence
- central government "other"
- local government "other"

Military defence, central and local government service areas all currently adopt an "output-equals-inputs" convention (for more information, see our Sources and methods for public service productivity estimates methodology). This convention assumes that the volume of inputs used to create the volume of output is equal when input cannot be directly measured. Hence estimated productivity is constant by assumption.

Quarterly estimates should also be interpreted with caution because of the volatile nature of quarterly inputs estimation.

Figure 2: Public service productivity fell by around 1.0% in Quarter 4 2023

Quarterly growth rates in public service productivity, inputs, and output, UK, Quarter 1 (Jan to Mar) 2019 to Quarter 4 (Oct to Dec) 2023



Source: Public service productivity from the Office for National Statistics

Notes:

1. Official statistics in development quarterly estimates of productivity are calculated using seasonally adjusted inputs and seasonally adjusted output.
2. This chart inverts the growth rates of inputs.

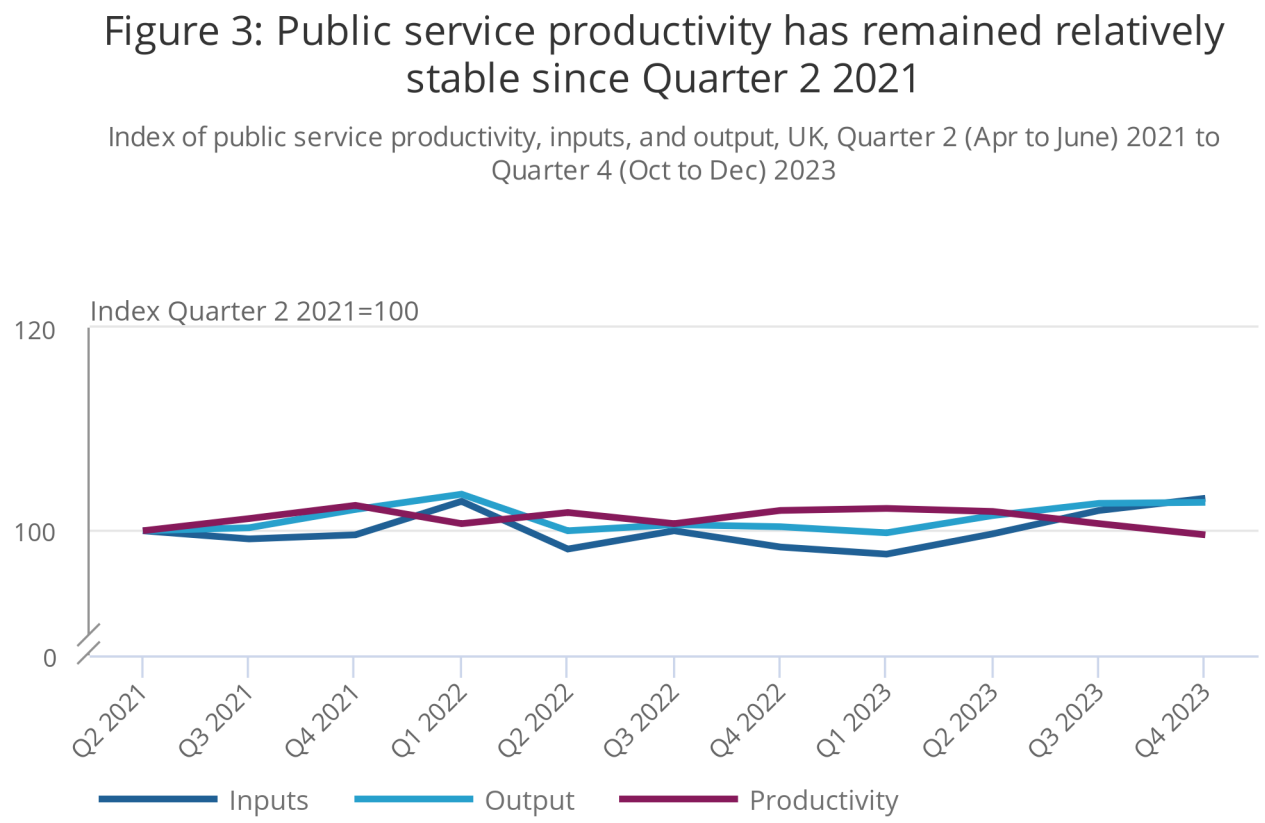
5 . Post-coronavirus estimates

As seen in our previous public service productivity bulletin, public service productivity levels have remained relatively stable since Quarter 2 (Apr to June) 2021. Over this period, inputs grew by 3.2%, while output grew by 2.8%, leading to a fall in productivity of 0.4%.

This period of stability follows a large fall in productivity during the months affected by the coronavirus (COVID-19) pandemic. Our estimates show that between Quarter 4 (Oct to Dec) 2019 and Quarter 4 2023, productivity decreased by 6.8%.

Figure 3: Public service productivity has remained relatively stable since Quarter 2 2021

Index of public service productivity, inputs, and output, UK, Quarter 2 (Apr to June) 2021 to Quarter 4 (Oct to Dec) 2023



Source: Public service productivity from the Office for National Statistics

Notes:

1. Official statistics in development quarterly estimates of productivity are calculated using seasonally adjusted inputs and seasonally adjusted output.

6 . Annual estimates

Productivity, inputs, and output in an annual context over a longer period as seen in Figure 4 combines our annual estimates from our total public service productivity publication between 1997 and 2021, with data from our official statistics in development from 2022 onwards. This is the first release that includes the annualised quarterly estimate for 2023. The official statistics in development are not adjusted by quality. Information on the method for the annualised quarterly estimates are described in Section 10: Measuring the data.

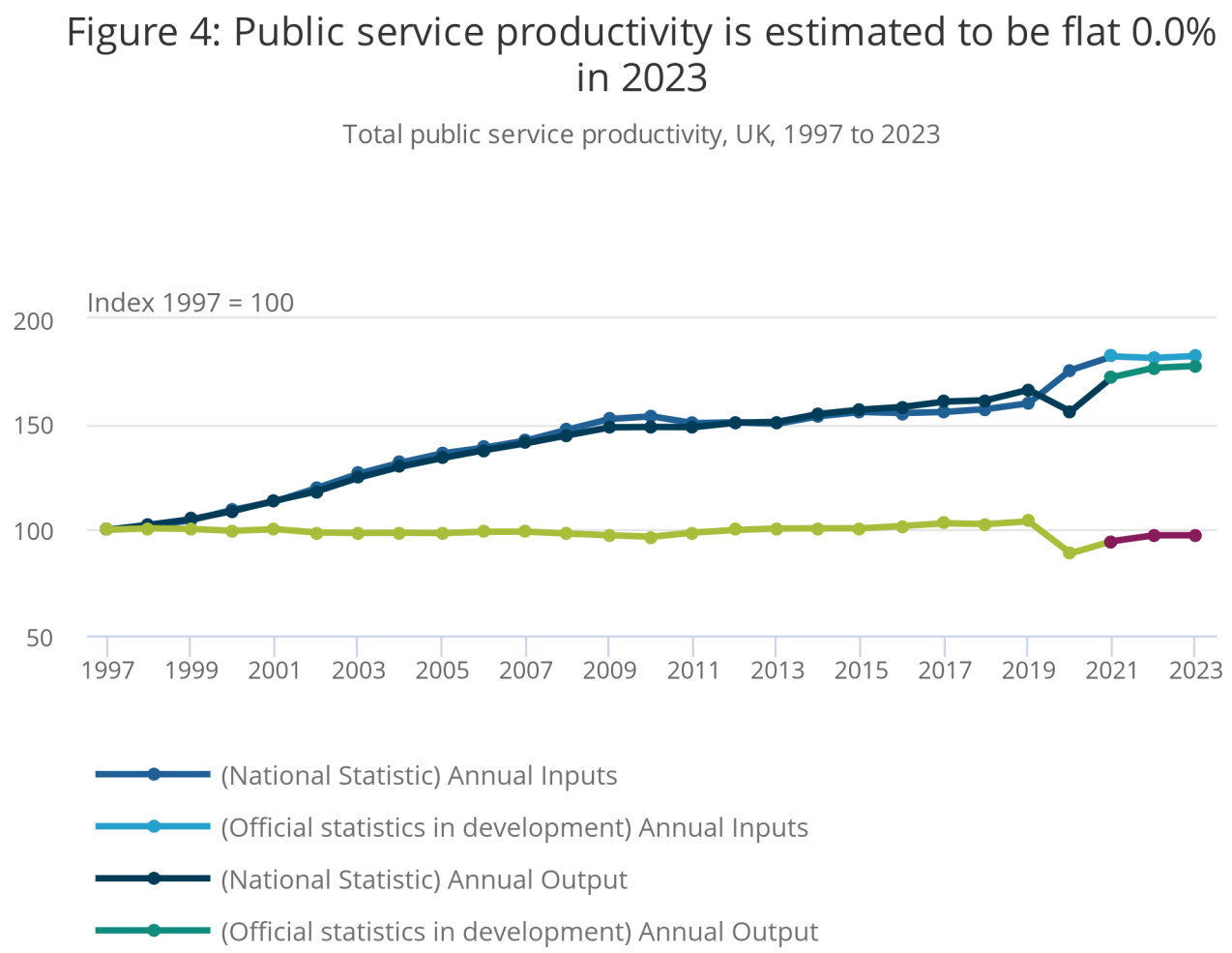
Estimates from our official statistics in development suggest that annual total public service productivity showed no growth (0.0%) in 2023, with inputs and output volumes each increasing by 0.5% compared with 2022.

Public service productivity is estimated to have increased in 2021 and 2022 by 6.5% and 3.0%, respectively. In 2021 and 2022, output grew faster than inputs, because fewer restrictions were present compared with the previous year. Most of the activities cancelled during the coronavirus (COVID-19) pandemic were slowly reintroduced, including non-urgent healthcare treatments, activities in courts and tribunals, and pupils returning to attend lessons in schools. In addition, new services such as NHS Test and Trace, and COVID-19 vaccinations were introduced.

While quality adjustment had a negative impact on our final productivity estimate for 2021, there is no quality adjustment applied to our 2022 and 2023 estimates.

Figure 4: Public service productivity is estimated to be flat 0.0% in 2023

Total public service productivity, UK, 1997 to 2023



Source: Public service productivity from the Office for National Statistics

Notes:

1. Estimates for 2022 and 2023 are official statistics in development and have not been quality adjusted.
2. Estimates from 1997 to 2021 are National Statistics.

Output estimates for 2022 and 2023 use data on changes in the quantity of various services delivered, but do not include data on changes in the relative quality of these services. Data including quality adjustment for 2022 will be published with a two-year lag, as many of these quality factors require data collected with a lag.

While the estimates in Figure 4 annualise the quarterly series for 2022 and 2023, the estimates published in our public service productivity, UK: 1997 to 2022 article are based on the experimental nowcast approach, which the Office for National Statistics (ONS) first released in November 2023. The nowcasting approach differs from the quarterly by using different data sources and methodology. The experimental nowcast measures published in November 2023 continue to be under methodological review and subject to improvement and revision.

These official statistics in development estimates for 2022 and 2023 should be treated with caution as they are not quality adjusted, and our total public service productivity annual estimates are not yet available for these years.

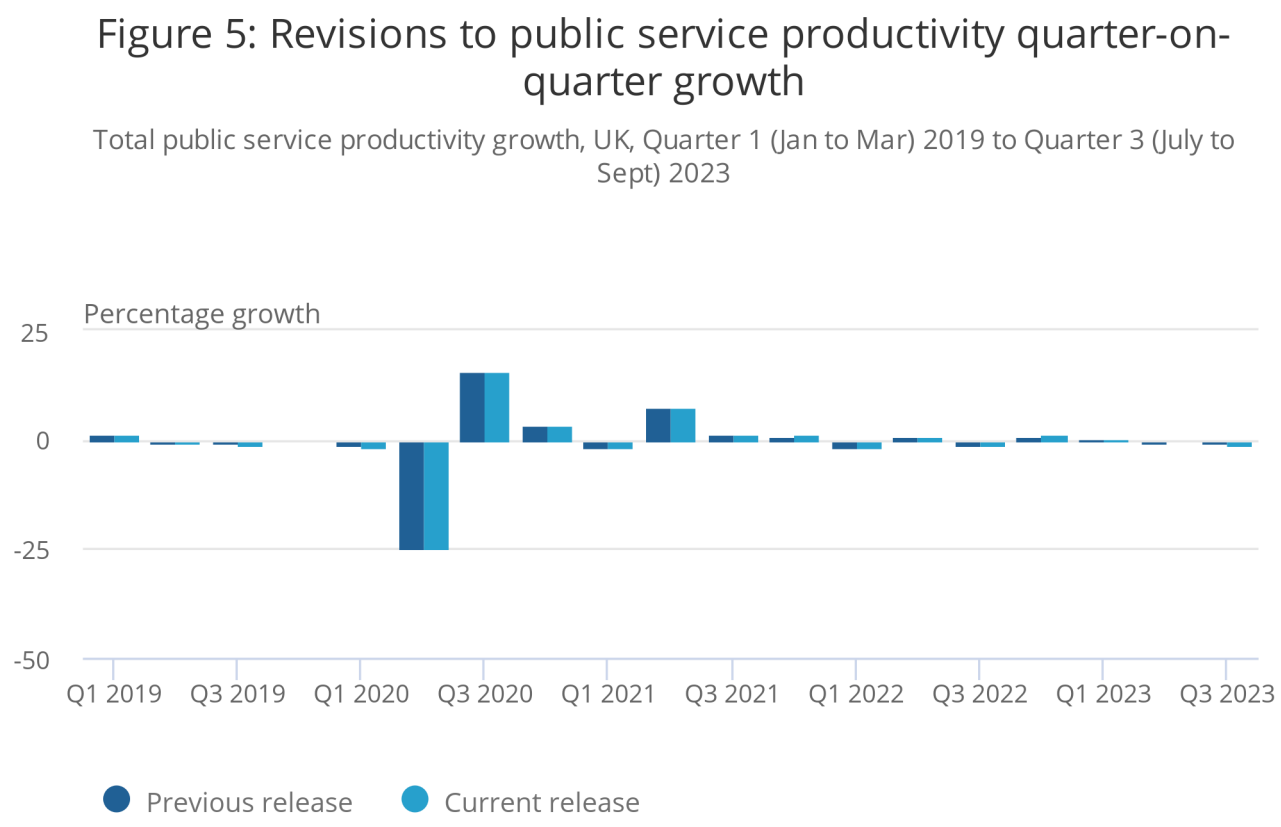
7 . Revisions to public service productivity estimates

In line with the National Accounts revisions policy, all time periods in the dataset are open for revision.

The estimates published in our previous bulletin, and the revised estimates on public service productivity, following the changes mentioned in Section 10: Measuring the data, are shown in Figure 5.

Figure 5: Revisions to public service productivity quarter-on-quarter growth

Total public service productivity growth, UK, Quarter 1 (Jan to Mar) 2019 to Quarter 3 (July to Sept) 2023



Source: Public service productivity from the Office for National Statistics

For more detailed information on revisions to productivity, inputs, and output, please see Table 4 in our accompanying dataset.

8 . Public service productivity: quarterly, UK, October to December 2023 data

Public service productivity: quarterly, UK, October to December 2023
Dataset | Released 3 May 2024
Official statistics in development on UK public service productivity. Includes estimates of inputs, output, productivity, and revisions compared with estimates from the previous quarter.

9 . Glossary

Deflator

A price index used to remove inflation effects from current price estimates of expenditure to provide a volume estimate.

Direct output measurement

Using a cost-weighted activity index to estimate the non-quality adjusted output of a service provided, such as the number of students in state schools, adjusted for attendance to produce an estimate of total hours of schooling delivered each year. Differs from indirect output measurement, where output is assumed equal to inputs.

Intermediate inputs

Also referred to as “goods and services”, or “intermediate consumption” (the national accounts term). Intermediate inputs include goods and services used up in the provision of a public service, such as utilities, energy, professional services, and medical supplies, among others.

Nowcast

The nowcasts are a product of the observed annualised quarterly series in 2021 and 2022 and the relationship between the observed annual series and annualised quarterly series in 1997 to 2019 (excluding 2020 because of the impact of the coronavirus (COVID-19) pandemic). They are produced using an experimental, dynamic regression approach (an extension of autoregressive integrated moving average (ARIMA) modelling). In this method annualised quarterly data are used as predictors of the unavailable annual data.

Public services

These are services delivered by or paid for by government (central or local). If paid for by the government, they may be delivered by a private body – for example, the provision of nursery places by the private sector, where these places were funded by the government.

Quality adjustment

A statistical estimate of the change in the quality of a public service, using an appropriate metric, such as safety in prisons as part of the public order and safety adjustment.

Service area

The way we refer to the breakdown of public services into seven areas, closely following SIC codes.

Standard Industrial Classification (SIC)

The industrial classification applied to the collection and publication of a wide range of economic statistics.

10 . Measuring the data

Data sources

Different sources and methods are used to produce the official statistics in development quarterly statistics and the National Statistics.

This release uses expenditure data from quarterly UK National Accounts, split into seven categories:

- healthcare
- education
- social protection
- justice and fire
- military defence
- central government services
- local government services

Data sources and methods differ from the annual publication, depending on data availability and appropriateness on a quarterly or annual basis. For example, some inputs measures that are available on an annual basis as direct measures are not available on a quarterly basis. These missing quarterly direct input measures may only be obtainable using indirect measures (deflated expenditure).

The National Statistic also uses different deflators to those used in this release to estimate those volumes of inputs. As such, estimates are not directly comparable between the quarterly and annual publications.

This release does not provide adjustments for the quality in public service output whereas the National Statistic does for some public output.

Estimates of productivity, inputs and output up to 2021 are reported on an annual basis and use data from our Public service productivity, total, UK: 2021 article. Further information about the annual National Statistics release can be found in our Public service productivity: total, UK, QMI.

Official statistics in development estimates differ from the annual estimates, as described in Section 9 of our Sources and methods for public service productivity estimates. Importantly, official statistics in development estimates do not apply quality adjustments.

Revisions

These estimates reflect the revisions included in the GDP quarterly national accounts, UK: October to December 2023.

Measuring public service productivity

Productivity is calculated by dividing output by the respective inputs used to produce it. Therefore, productivity will 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.

Official statistics in development quarterly estimates of productivity are seasonally adjusted. In official statistics, it is common for the time series to have regular, repeating, predictable variation (for example, the increase in retail sales in December). To help users interpret the series, national statistical institutes use a statistical method called seasonal adjustment to remove these effects. We use the X11 algorithm in the X-13ARIMA-SEATS software to perform seasonal adjustment.

Time series experts in the Office for National Statistics (ONS) review the seasonal adjustment each year. This includes checking for the impact of outliers. For the public sector productivity series, the coronavirus (COVID-19) pandemic period has been closely analysed for such outliers. The outliers are only included if they are judged by a time series expert to improve the seasonal adjustment. This judgement will include consideration of the charts, statistical tests and diagnostics. For the pandemic period, some series have additive outliers used to take account of the impact, while others have used level shifts. The annual seasonal adjustment reviews are conducted by time series experts, and all work is independently quality assured by another time series expert before leaving the team.

For total UK public services, estimates of inputs are made up of aggregated series for individual public services, weighted together by their relative share of total expenditure on public services in current price (expenditure weight). Inputs are composed of labour, goods and services, social transfers in kind, and consumption of fixed capital. Output reflects the total of the general government final consumption expenditure (GGFCE).

Expenditure data, used to estimate most inputs growth, are taken from our Gross domestic product(GDP) quarterly national accounts, UK: October to December 2023. The quarterly national accounts also provide estimates of government output, based on direct measures where they are available and indirect measures where they are not.

The productivity annualised estimates described in Section 6: Annual estimates are derived from non-seasonally adjusted inputs and output. These total inputs and output are an aggregation of the service areas, weighted by their relative expenditure share.

Public service productivity is measured differently to labour productivity and multi-factor productivity and is not directly comparable. It reflects the volume of services delivered to end users relative to the volume of total inputs (which comprise of labour, intermediate consumption, and capital). The measure is dominated by healthcare and education services because of their relative size.

The estimates are not a measure of the productivity or efficiency of an individual worker within the public sector. For instance, while children within school received fewer hours of education at the start of the pandemic, a teacher may still have had to undertake additional work to modify lesson plans for remote learning. Public service productivity within this statistic only focuses on the education received by end-users, or the healthcare services received by end-users, rather than the productivity of an individual teacher or an individual nurse to deliver a discrete task.

Similarly, the resource required to deliver some services within the NHS may have increased because of additional restrictions, such as the use of personal protective equipment, but the overall volume of NHS services may still have declined.

Public service productivity uses the expenditure of public services, which defines general government final consumption expenditure (GGFCE). While including services where employees are central or local government, it also includes publicly funded private providers. This differs from the public sector which extends to include public corporations but exclude publicly funded private providers to avoid double-counting.

These estimates should be considered a first estimate on public service productivity. The Office for National Statistics (ONS), together with HM Treasury and other government departments, will continue to develop and improve its methods, which may lead to revisions of these preliminary estimates.

11 . Related links

GDP quarterly national accounts, UK: October to December 2023
Bulletin | Released 28 March 2024
Revised quarterly estimate of gross domestic product (GDP) for the UK. Uses additional data to provide a more precise indication of economic growth than the first estimate.

Public service productivity: total, UK, 2021
Article | Released 26 March 2024
Updated measures of output, inputs and productivity for UK public services between 1997 and 2021: service area breakdown, quality adjustment, latest revisions.

Public service productivity, healthcare, England: financial year ending 2022
Article | Released 29 March 2024
Estimates of output, inputs and productivity for public service healthcare in England.

Improved methods for total public service productivity: total, UK, 2021
Methodology | Last revised 8 March 2024
Explaining data and methodological improvements to education and healthcare inputs, output and quality adjustment, used in the upcoming public service productivity article

Public service productivity, UK: 1997 to 2022
Article | Released 17 November 2023
An overview of UK annual public service productivity between 1997 and 2020, and a new experimental measure for the path of annual UK public service productivity in 2021 and 2022.

Productivity flash estimate and overview, UK: October to December 2023 and July to September 2023
Article | Released 15 February 2024
Productivity flash estimates for Quarter 4 (Oct to Dec) 2023, based on the GDP first quarterly estimate and labour market statistics, and productivity overview for Quarter 3 (July to Sept) 2023.

12 . Cite this article

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