Office for National Statistics

Article

Public service productivity: total, UK, 2020

Updated measures of output, inputs and productivity for UK public services between 1997 and 2020: service area breakdown, quality adjustment, latest revisions.

Contact:
Sara Zella
productivity@ons.gov.uk
+44 1633 455759

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1 . Main points

- Quality-adjusted UK public service productivity fell by 15.2% in 2020, largely because of the effect of the coronavirus (COVID-19) pandemic, after a small decline in the previous year.
- Total quality-adjusted output fell by 7.4% in 2020, as the pandemic caused a delay to some public service activities and changes to the delivery of others.
- Total inputs grew by 9.2% in 2020, with additional resourcing required to respond to the pandemic.
- Healthcare and education were the main contributors to the fall in productivity (down 23.0% and 26.1% respectively): healthcare output fell by 6.6%, while inputs rose considerably (21.2%); education output fell considerably (26.4%) because of the impact of remote learning and student absences, while inputs remained roughly steady (down 0.4%).

The estimates are not labour productivity for the public service. The estimates presented in this article were affected by the coronavirus (COVID-19) pandemic, which led to significant methodological challenges. Estimates may be subject to revision as more data become available. Caution should be exercised when comparing the latest estimates with previous years.

2 . The impact of the coronavirus (COVID-19) pandemic on public service productivity

These estimates show the relationship between inputs and outputs in the public service, the structure of which changed in response to the coronavirus (COVID-19) pandemic.

The estimates are not labour productivity for the public service. They instead reflect the volume of services delivered to end users relative to the volume of total inputs: labour, intermediate consumption and capital. The measure is dominated by health and education services because of their relative size.

The pandemic caused widespread cost pressures and disruption to public service outputs , including new safety measures, urgent healthcare treatments taking priority, remote consultations, remote learning within education, support for care homes and restrictions to courts and tribunals.

Specific effects of the pandemic on these data were

- there were fundamental changes in the delivery of services
- there was a lack of data availability or comparability, such as an absence of fully updated mortality tables for this period, educational attainment data being affected by teacher assessment, and proven re-offending data being affected by a slowdown with courts
- where possible, alternative proxy data has been used to mitigate for data gaps or a lack of comparability, but this has not always been possible

Because of changes to some data sources and methods, estimates for some public service areas are less directly comparable with previous annual estimates and caution should accordingly be used when comparing the latest estimates with pre-coronavirus years.

We will continue to develop and improve our methods for estimating public service output and inputs and more data might become available in the future. These aspects may lead to revisions of these preliminary estimates.

Although we are looking to expand coverage of UK public services, not all activities are currently covered by this article. Police, defence and "other" government services use the "output-equals-inputs" convention where productivity growth is always zero. For the service areas that are directly measured (that is, outputs are measured differently from inputs) it is not possible to measure all of the activities they do, nor make an assessment of the quality of service delivery in all areas. Likewise other non-market output, such as charities and non-profit organisations, are not covered.

3 . Overview of public service productivity

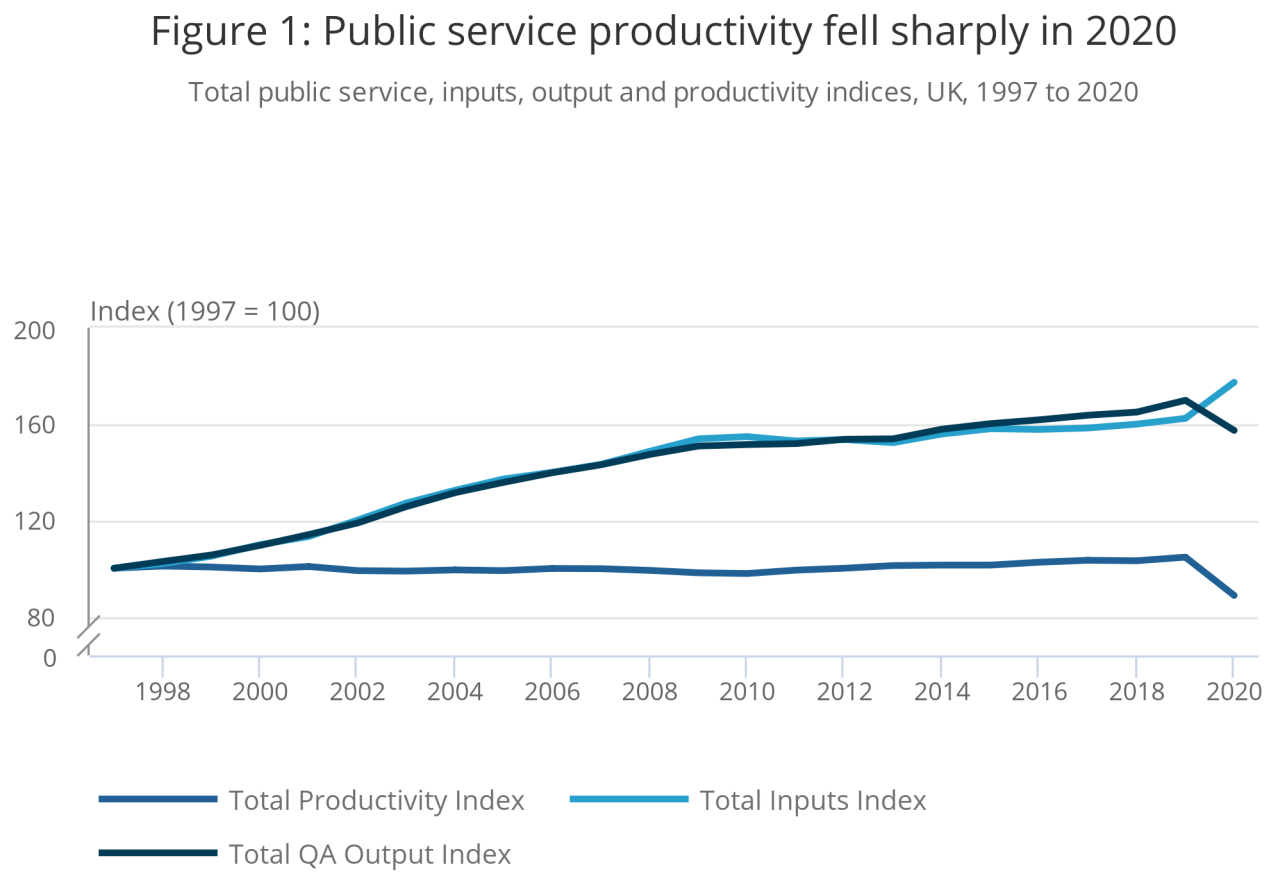
This article includes updated estimates of non-quality-adjusted (NQA) and quality-adjusted (QA) output, inputs and productivity for nine public service areas, in the UK between 1997 and 2020. All these statistics are measured on a calendar year basis.

Public service inputs grew by 9.2%, and output fell by 7.4% in 2020 compared with the previous year. As a result, public service productivity on a quality-adjusted basis fell sharply by 15.2%. Excluding quality adjustments to outputs, public service productivity fell by 13.9%.

Caution should be used when comparing latest estimates with those pre-coronavirus , as many services were delivered in a different way than in 2019, with additional inputs necessary and mandatory restrictions limiting output for certain services.

Figure 1: Public service productivity fell sharply in 2020

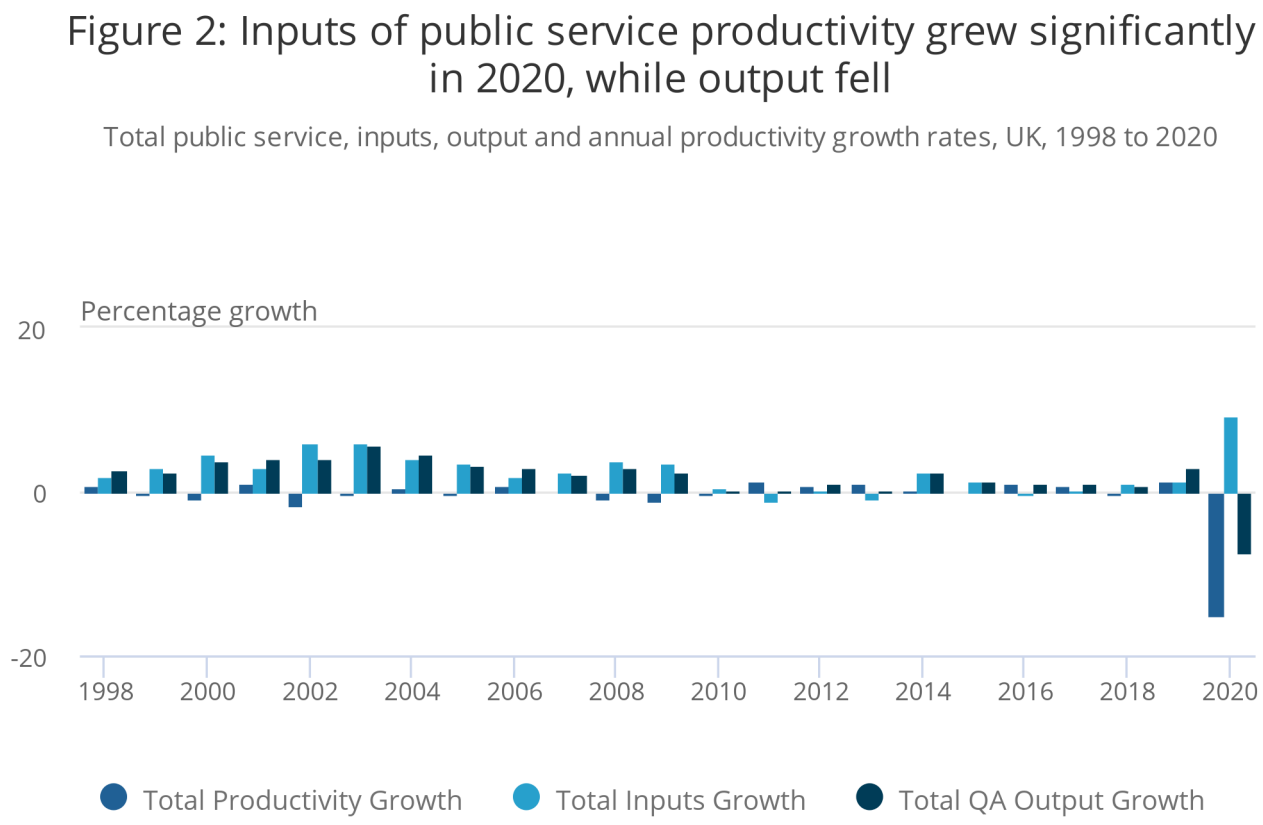
Total public service, inputs, output and productivity indices, UK, 1997 to 2020



Source: Public service productivity from the Office for National Statistics

Figure 2: Inputs of public service productivity grew significantly in 2020, while output fell

Total public service, inputs, output and annual productivity growth rates, UK, 1998 to 2020



Source: Public service productivity from the Office for National Statistics

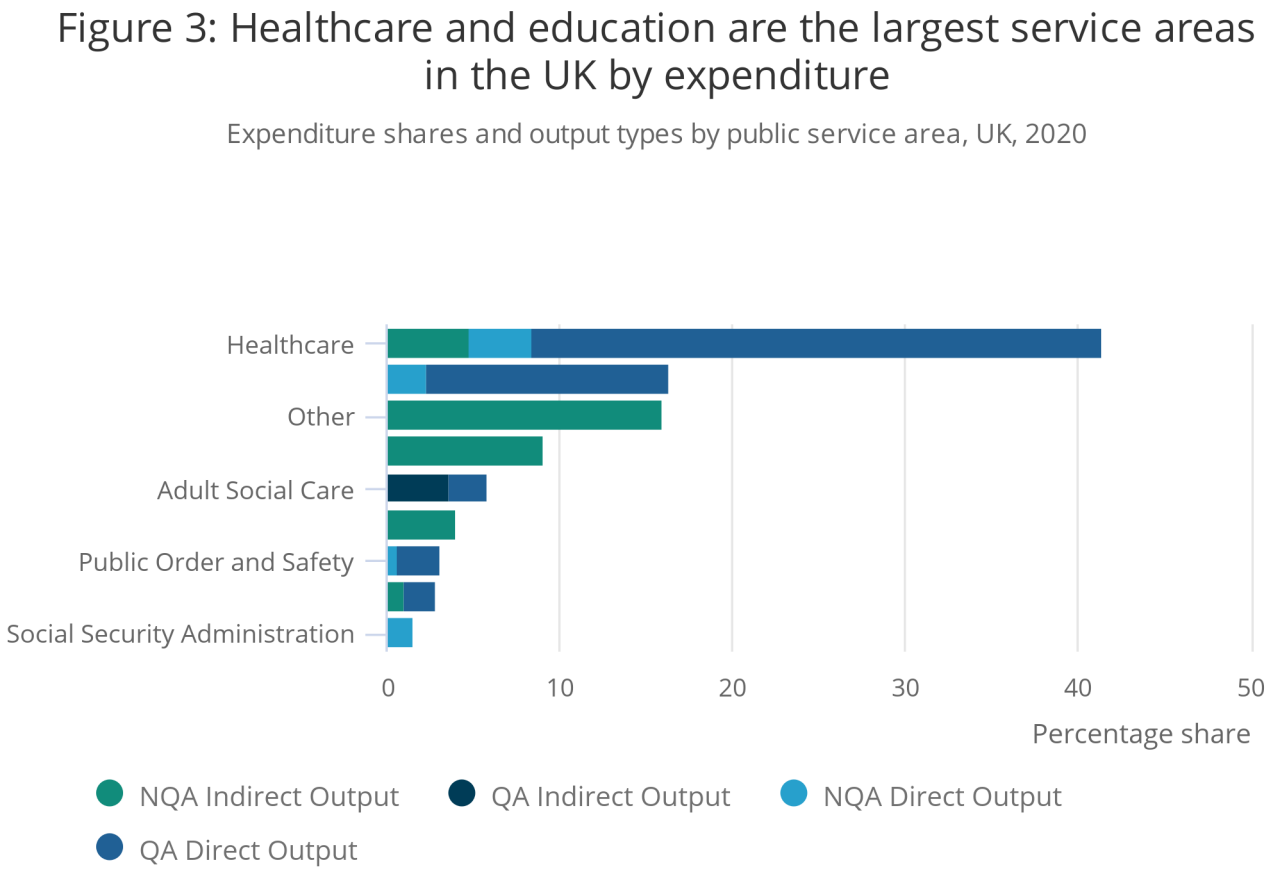
Inputs growth in 2020 was the highest recorded since the beginning of the data series in 1997. This reflects the extra resources required and provided to produce public services as a result of the coronavirus (COVID-19) pandemic.

Total public service output and inputs are calculated by aggregating output and inputs of nine service areas based on their share of expenditure, as explained in our methods article. A larger expenditure share means that the service area has a larger contribution to the overall productivity statistic. The largest expenditure shares were:

- healthcare (41.4%)
- education (16.2%)
- "other" government services (16.0%): general government services, economic affairs, environmental protection, housing, recreation, and other public order and safety

Figure 3: Healthcare and education are the largest service areas in the UK by expenditure

Expenditure shares and output types by public service area, UK, 2020



Source: Public service productivity from the Office for National Statistics

Notes:

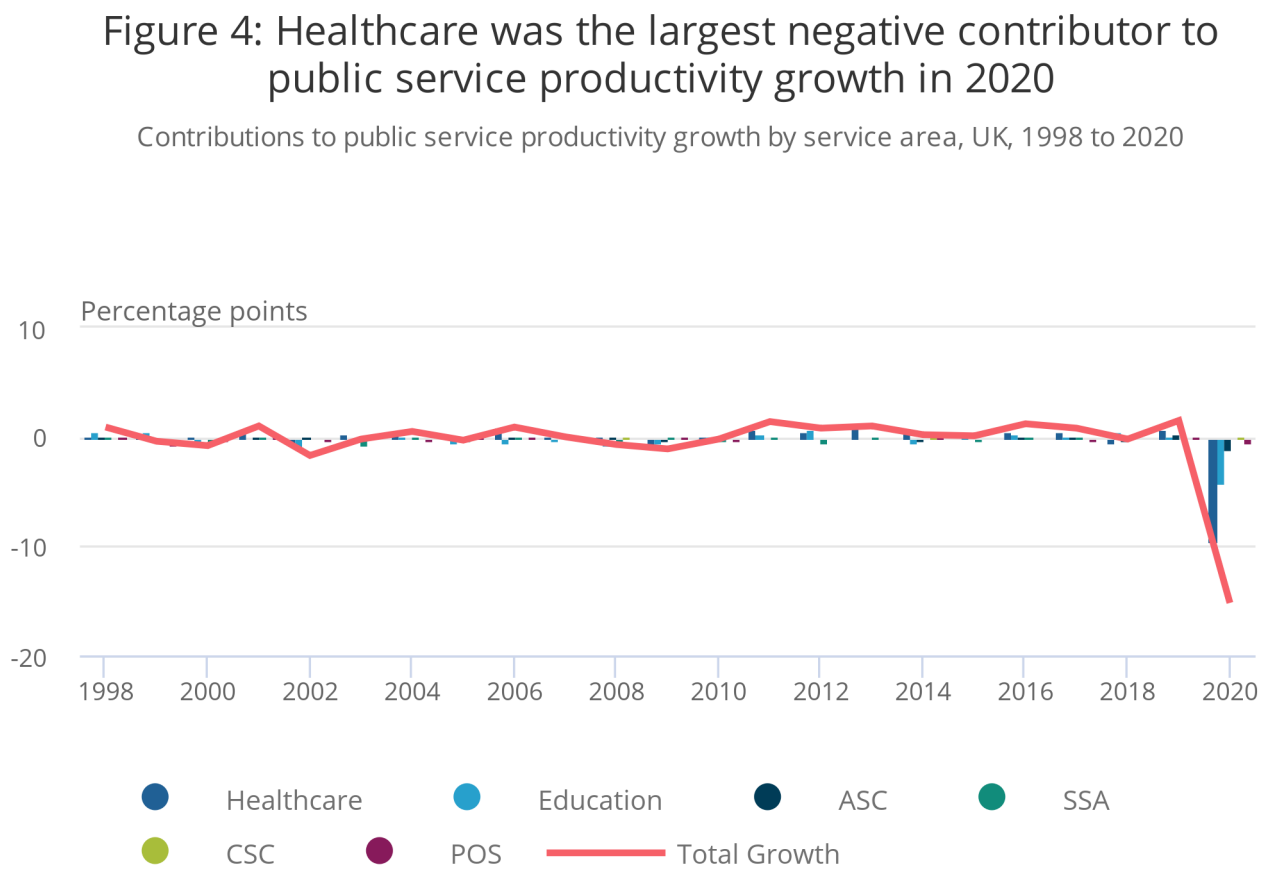
1. Percentage share of components may not sum to 100 because of rounding.
2. QA means quality-adjusted. NQA means non-quality adjusted.
3. "Direct" means output is measured using activity indicators. "Indirect" means output is measured following the "output-equals-inputs" convention.

The contributions to growth in Figure 4 reflect the productivity growth for the service areas measured directly, weighted by their expenditure share each year. Healthcare had the largest negative contribution to public service productivity in 2020 (negative 9.6 percentage points), followed by education (negative 4.1 percentage points) and adult social care (negative 1.1 percentage points). These areas all saw increased resourcing and restrictions to what they could deliver because of the pandemic.

Police, defence and "other" government services are not included in Figure 4, since they are measured using the "output-equals-inputs" convention where productivity growth is always zero.

Figure 4: Healthcare was the largest negative contributor to public service productivity growth in 2020

Contributions to public service productivity growth by service area, UK, 1998 to 2020



Source: Public service productivity from the Office for National Statistics

Notes:

1. Growth of components may not sum to overall growth because of rounding.
2. The contribution to growth for each component depends on both its growth rate and its weight in total output.
3. ASC "Adult social care", SSA "Social security administration", CSC "Children's social care", POS "Public order and safety".

4 . Healthcare

Healthcare represents the largest service area included in public service productivity estimates by expenditure share (around 41.4% of total public service provision).

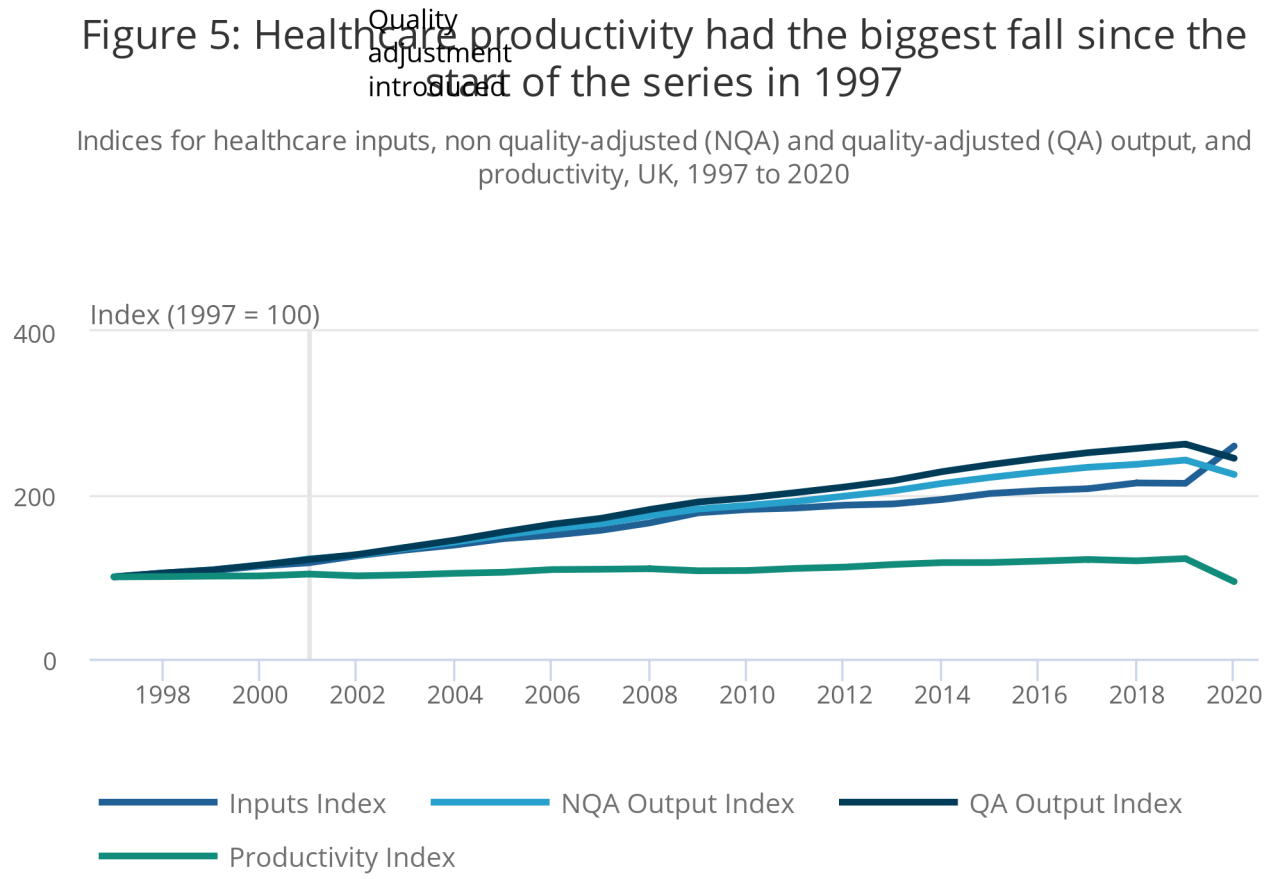
Public service healthcare productivity fell sharply by 23.0% in 2020 on a quality-adjusted basis, the most significant one-year fall in productivity since the start of the data series. This was driven by growth in inputs of 21.2% and output falling 6.6%.

Excluding quality adjustments to outputs, public service healthcare productivity fell by 23.5% in 2020, reflecting a fall in non-quality adjusted output growth of 7.2%.

Caution should be used when comparing latest estimates with those pre-coronavirus as some non-urgent services were stopped to reduce the spread of COVID-19 and any healthcare benefits from these decisions compared with a hypothetical case where services were not reduced are difficult to measure.

Figure 5: Healthcare productivity had the biggest fall since the start of the series in 1997

Indices for healthcare inputs, non quality-adjusted (NQA) and quality-adjusted (QA) output, and productivity, UK, 1997 to 2020



Source: Public service productivity from the Office for National Statistics

While the figures in Figure 5 are calculated on a calendar year basis, most of the data used in healthcare productivity are produced using financial year data. As a result, falls in output in the financial year ending 2021 may have some effect on the 2020 figures.

Productivity estimates for adult social care in England, financial year ending 2021 are available.

5 . Education

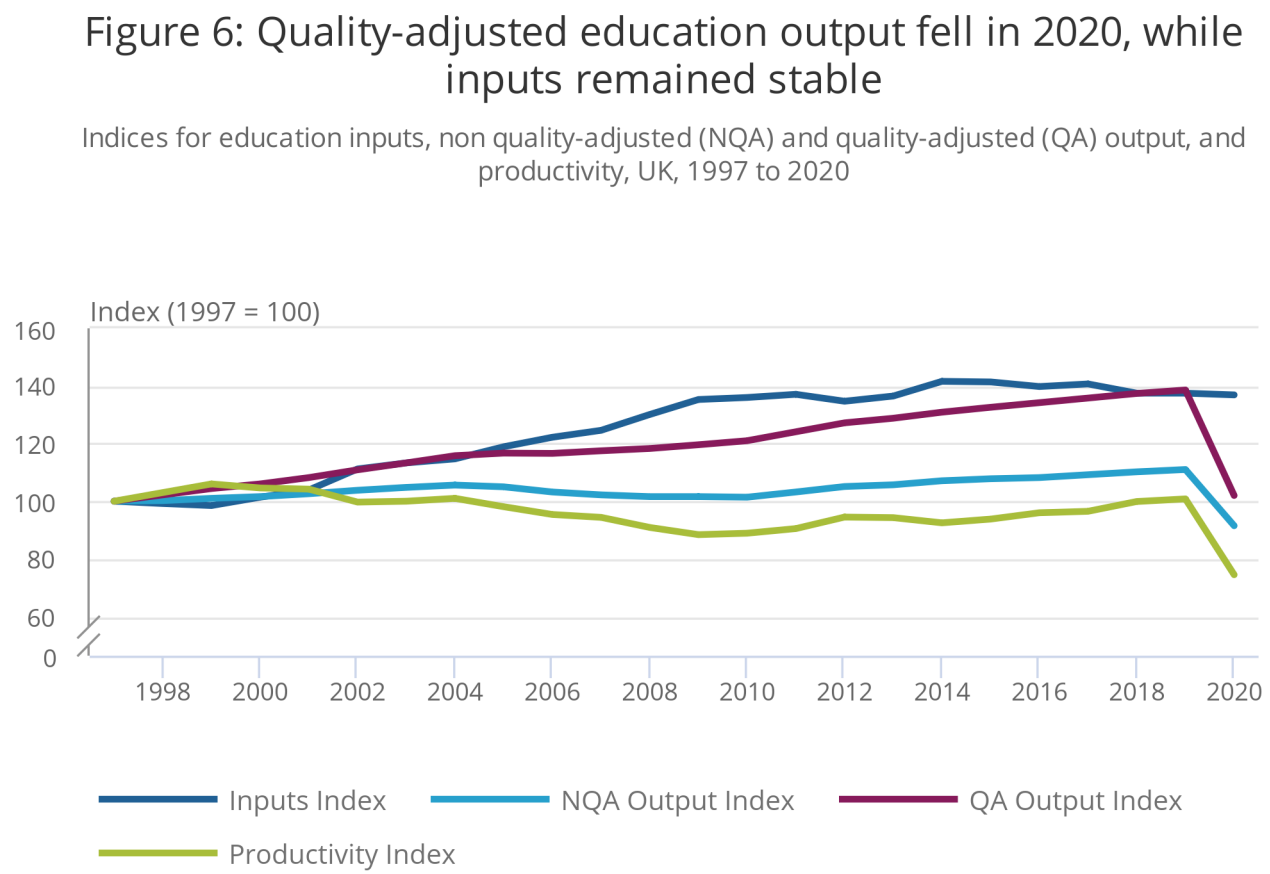
Education is the second largest service area in public service productivity by expenditure share.

UK education services productivity fell sharply by 26.1% in 2020 on a quality-adjusted basis. This was driven by a fall in output of 26.4% and relatively stable inputs growth of negative 0.4%.

Excluding quality adjustments to outputs, education services productivity fell by 17.2% in 2020, reflecting a fall in non-quality adjusted output growth of 17.5%.

Figure 6: Quality-adjusted education output fell in 2020, while inputs remained stable

Indices for education inputs, non quality-adjusted (NQA) and quality-adjusted (QA) output, and productivity, UK, 1997 to 2020



Source: Public service productivity from the Office for National Statistics

Quantity output fell by 17.5% in 2020, largely because of the impact of remote learning on teaching hours, teaching materials provided and increased sickness rates as a result of coronavirus. This was estimated in a similar way to national accounts estimates but differs somewhat because of slight differences in the coverage and source data used to compile productivity estimates.

When the quality adjustment is taken into account, total output in 2020 fell even further (26.4%). While some data on teacher assessed attainment were available in 2020, this was not used to determine the quality of education given that it was not comparable with non-teacher assessed attainment data. Instead, research from the Department for Education and Education Policy Institute (EPI) on pupil learning loss was used to develop a proxy measure for educational attainment in 2020. Our proxy measure assumes that were pupils assessed as normal in 2020, attainment would have fallen because of the significant learning loss as quantified in the EPI reports. Adjustments for bullying and the disadvantage gap have not been included for 2020 because of a lack of comparable data.

Because of the use of proxy data these estimates should be treated with caution. The evidence for a fall in education output in 2020 is strong, however, the accuracy of these estimates is affected by the lack of non-teacher assessed examinations in 2020.

6 . Adult social care

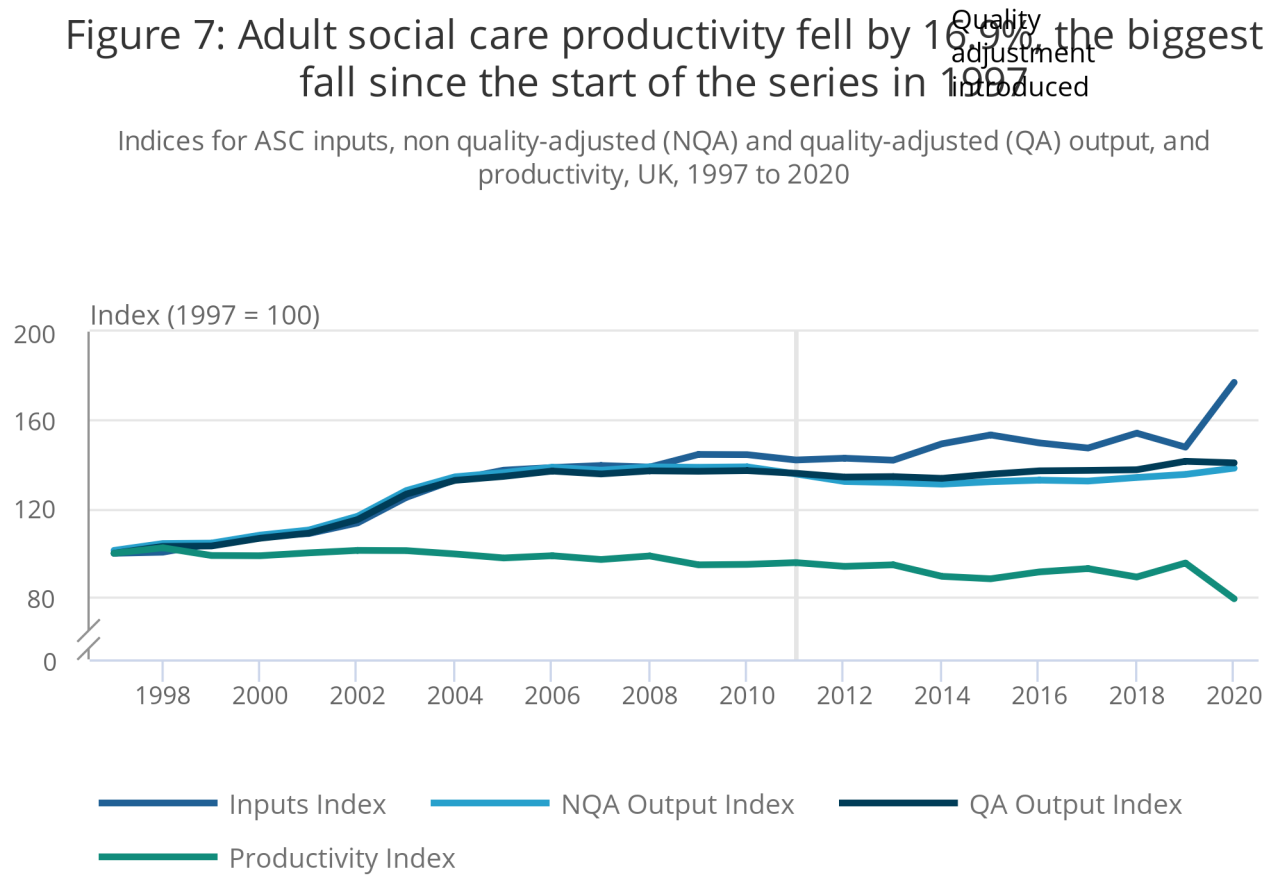
Adult social care (ASC) output is a measure of the care and support provided to older people, adults with learning or physical disabilities, adults with mental health problems, drug and alcohol misusers, and carers. ASC output is partially measured directly and, from 2011 onwards, is adjusted to account for the quality of the services provided.

Where activity data are not available, output is measured on an "output-equals-inputs" basis.

ASC productivity fell by 16.9% in 2020 on a quality-adjusted basis, the largest fall since 1997. Inputs grew by 19.7%, while output remained stable (negative 0.5%).

Figure 7: Adult social care productivity fell by 16.9%, the biggest fall since the start of the series in 1997

Indices for ASC inputs, non quality-adjusted (NQA) and quality-adjusted (QA) output, and productivity, UK, 1997 to 2020



Source: Public service productivity from the Office for National Statistics

Every year we used to publish public service ASC productivity for England on a financial year basis (The methodology for these statistics are similar to the measures included in this article, although cover only England, as opposed to the whole UK and use different data sources for input expenditure.

Productivity estimates for adult social care in England, financial year ending 2021 are available.

7 . Public order and safety

Public order and safety (POS) includes a range of services. Where applicable, output is also adjusted for quality.

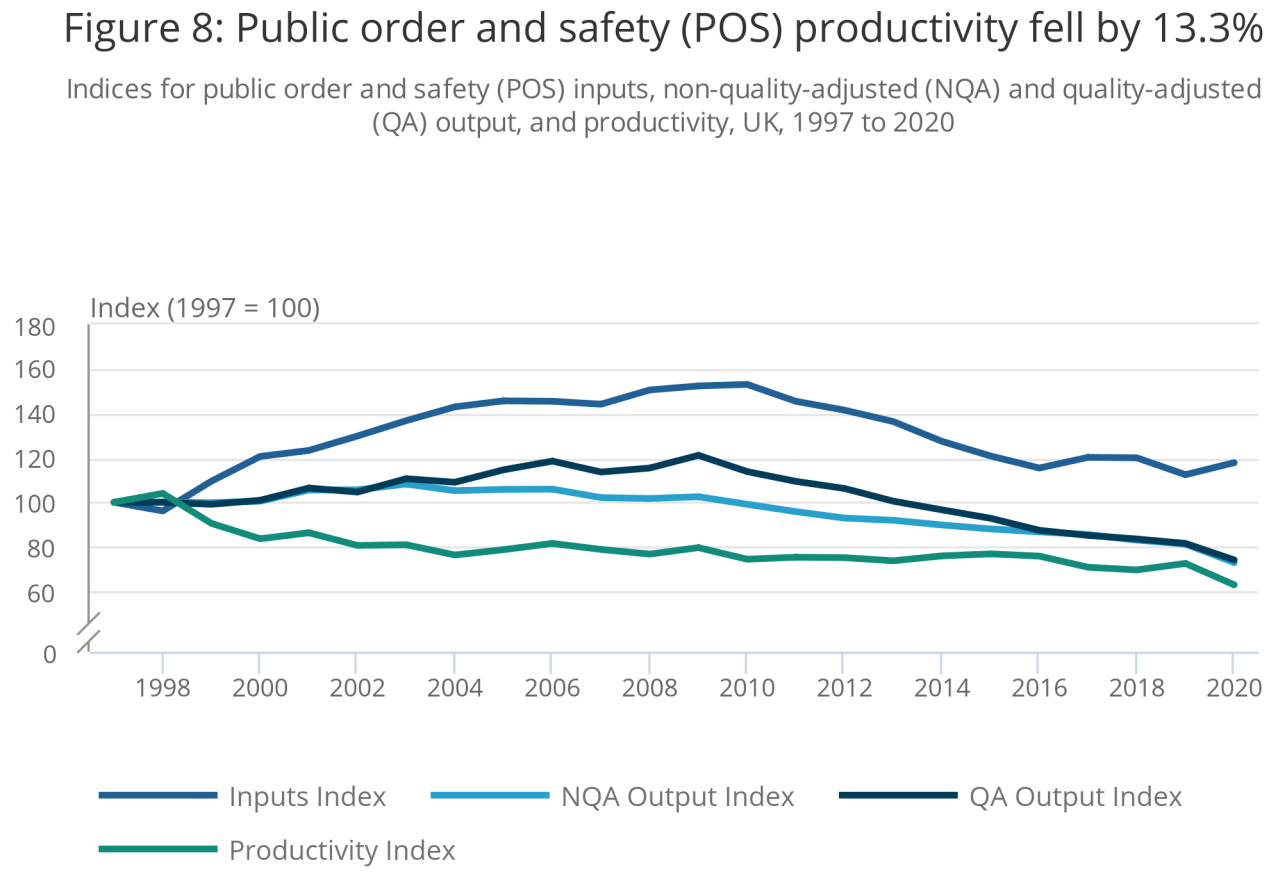
POS productivity fell by 13.3% in 2020 on a quality-adjusted basis. This was driven by growth in inputs of 4.7% and a fall in quality-adjusted output of 9.2%. A reduction of activity and slowdown of case completion within the courts system was the main contributor to the fall in output. Restrictions to deal with the coronavirus (COVID-19) pandemic contributed to these falls.

Inputs and output growth were somewhat steadier within the Fire and Rescue Service. Prisons output also remained approximately steady, with improved overall safety offsetting a fall in the prison population.

Changes to how prisons operated as a result of the pandemic have probably affected prison safety statistics. While there were increased deaths because of natural causes, these were offset by reductions in other deaths and injuries as well as fewer escapes. Inputs within the prisons service increased.

Figure 8: Public order and safety (POS) productivity fell by 13.3%

Indices for public order and safety (POS) inputs, non-quality-adjusted (NQA) and quality-adjusted (QA) output, and productivity, UK, 1997 to 2020



Source: Public service productivity from the Office for National Statistics

Reoffending data are not included in the quality adjustment in 2019 and 2020. Data on proven reoffending have been affected by the coronavirus (COVID-19) pandemic and are no longer comparable with the previous year, as explained in the 2019 article.

8 . Children’s social care

Children's social care productivity grew by 2.4% on a quality-adjusted basis in 2020. Inputs fell by 1.4% compared with the previous year. Non-quality adjusted output grew by 0.9% while quality-adjusted output also grew by 0.9%, with only a small improvement in the quality of services delivered.

However, these estimates have been affected by the coronavirus (COVID-19) pandemic.

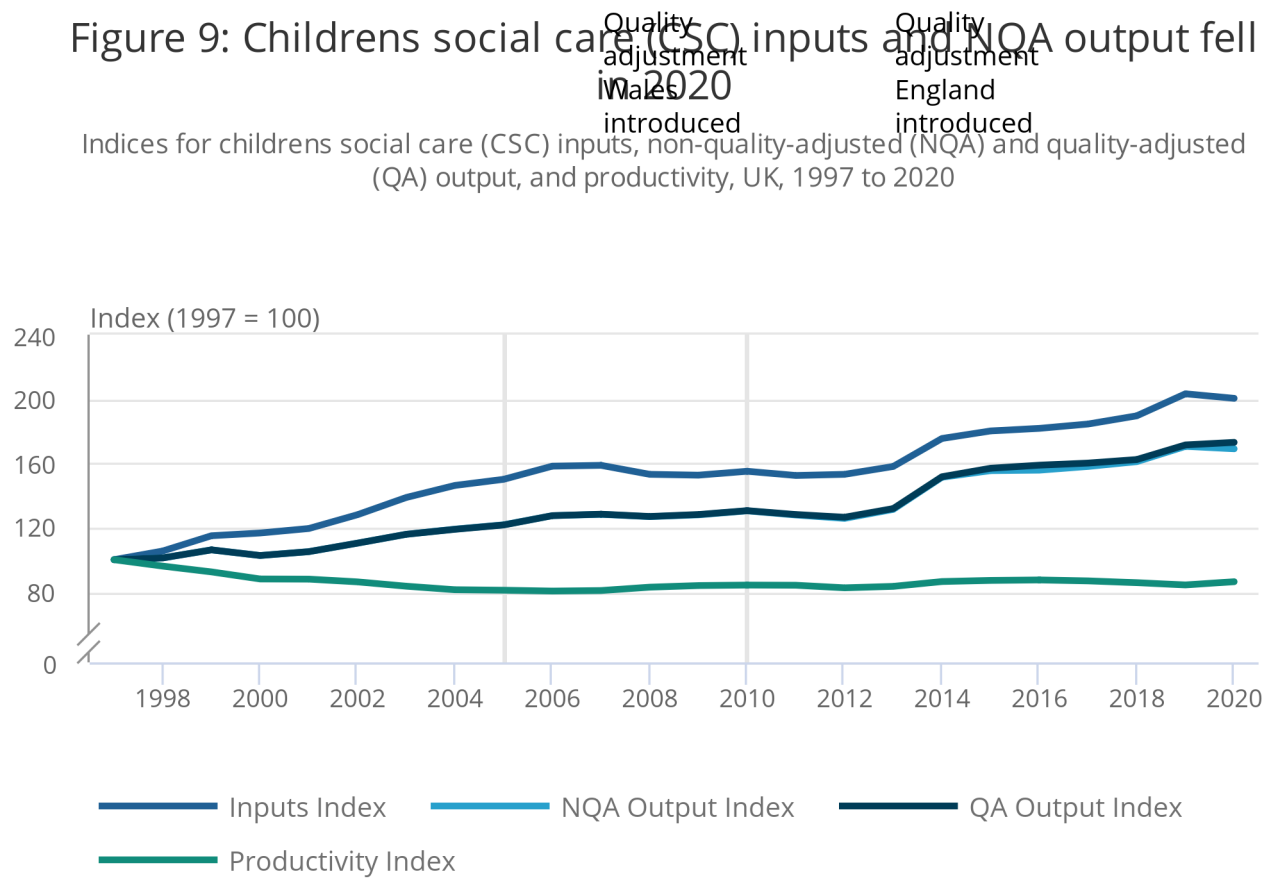
While overall current price expenditure for children's social care increased in 2020, inflation in the cost of labour increased dramatically. As such, when expenditure is converted into real prices, inputs are estimated to fall.

Some indicators measuring the quality of services have also improved, resulting in a positive growth in quality adjusted output in 2020. However, some indicators that would normally be indicative of improved quality (for example, stability of foster placements) may have been impacted by changes to service delivery as a result of the pandemic.

Caution should be used when comparing the latest estimates with pre-coronavirus years.

Figure 9: Childrens social care (CSC) inputs and NQA output fell in 2020

Indices for childrens social care (CSC) inputs, non-quality-adjusted (NQA) and quality-adjusted (QA) output, and productivity, UK, 1997 to 2020



Source: Public service productivity from the Office for National Statistics

Notes:

1. The majority of quality adjustment for children's social care is introduced from 2010 onwards, with small differences in QA and NQA output on account of additional quality adjustment for Wales extending back to 2005.

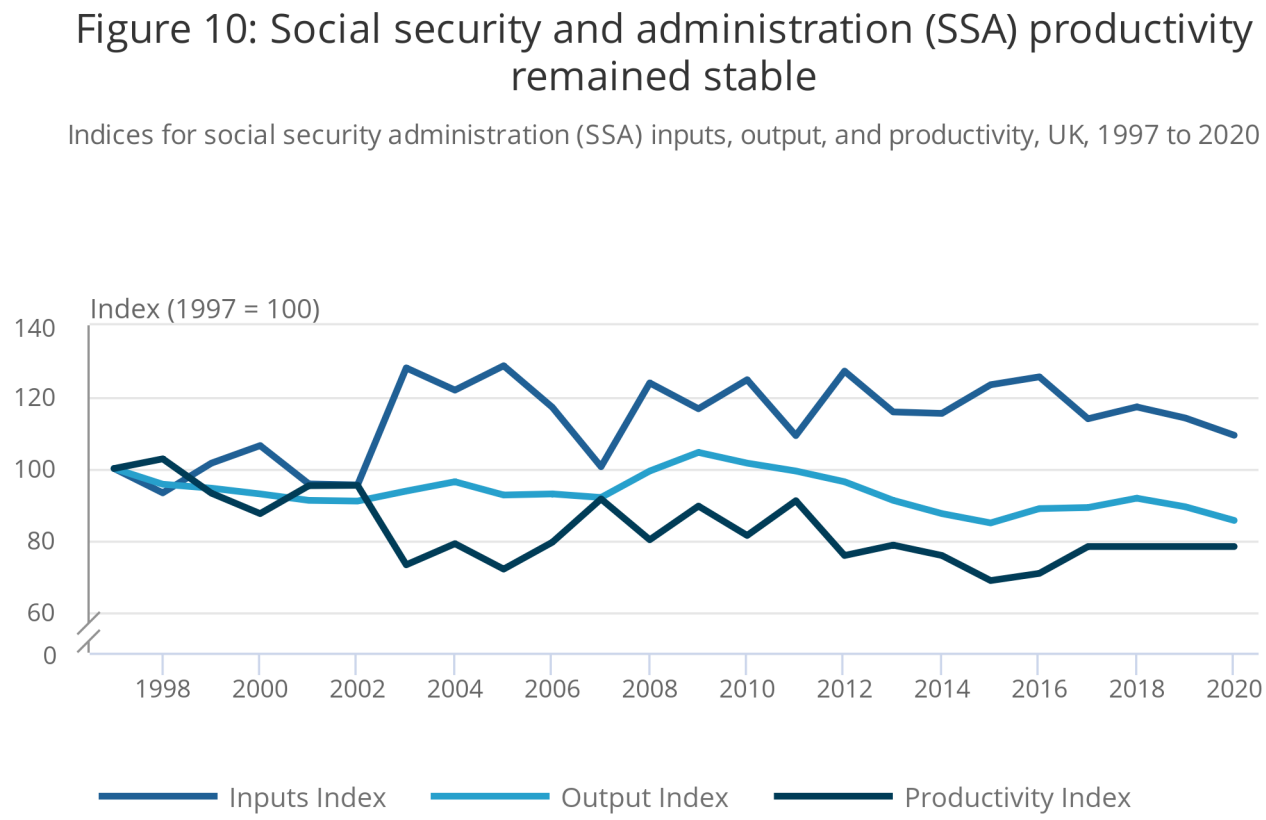
9 . Social security and administration

Inputs into social security and administration (SSA) fell by 4.2% in 2020.

It should be noted that a new method has been applied: from 2018, output is assumed to be equivalent to inputs. Productivity growth is therefore stable (0% growth) since 2018.

Figure 10: Social security and administration (SSA) productivity remained stable

Indices for social security administration (SSA) inputs, output, and productivity, UK, 1997 to 2020



Source: Public service productivity from the Office for National Statistics

Because of the introduction of Universal Credit in our data sources not yet being available, output estimates from 2018 onwards have become less robust, resulting in the change in methods as described in Section 13: Data sources and quality.

These statistics reflect the activities related to the administration of social security. Therefore, SSA can be significantly affected by events happening in the wider economy, such as an economic downturn or a change in the UK's employment rate and the general state of the UK labour market.

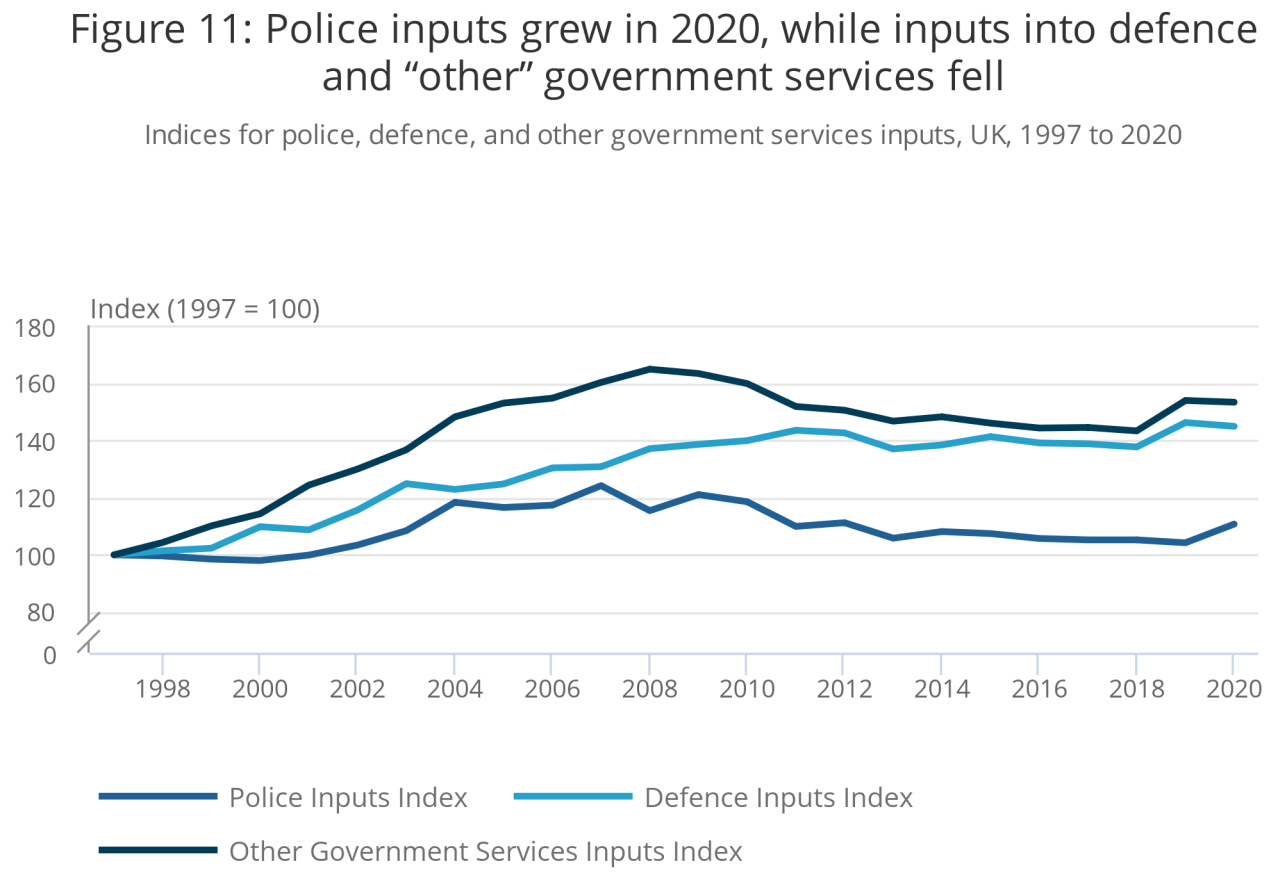
10 . Police, defence and "other" government services

Police, defence and "other" government services are three sectors in which all output is indirectly measured.

Of these, only inputs into police grew in 2020, by 6.2%, the first positive increase in five years. Inputs into defence and "other" government services fell marginally, by 0.9% and 0.4% respectively.

Figure 11: Police inputs grew in 2020, while inputs into defence and “other” government services fell

Indices for police, defence, and other government services inputs, UK, 1997 to 2020



Source: Public service productivity from the Office for National Statistics

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11 . Public service productivity, data

Public service productivity estimates: education
Dataset | Released 28 April 2023
Inputs, output and productivity indices and growth rates for education service. Includes estimates of quality adjustment, sub-service expenditure and revisions.

Public service productivity estimates: healthcare
Dataset | Released 28 April 2023
Public service healthcare growth rates and indices for inputs, quality and non-quality adjusted output and productivity, totals and components, for UK, 1995 to 2017.

Public service productivity estimates: total public service
Dataset | Released 28 April 2023
Inputs, output and productivity ind

12 . Glossary

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.

Direct output measurement

Using a cost-weighted activity index to estimate the non-quality-adjusted 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.

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.

COFOG

The Classification of the Functions of Government (COFOG) is the structure used to classify government activities. It is defined by the United Nations Statistics Division.

Service area

The way we refer to the breakdown of public services into nine areas, closely following COFOG.

Intermediate inputs

Also referred to as "goods and services", or "intermediate consumption" (the UK 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.

Deflator

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

13 . Data sources and quality

Productivity is the measure of how many units of output are produced from one unit of inputs. It is calculated by dividing total output by total inputs. Details of inputs and output can be found in the Sources and methods article.

Growth rates of output and inputs for individual service areas are aggregated by their relative share of total government expenditure (expenditure weight) to produce estimates of total public service output, inputs and productivity.

Service areas are defined by Classification of the Functions of Government (COFOG) rather than administrative departments or devolved administrations. As a result, estimates presented cannot be taken as direct estimates of departmental productivity. Lastly, it should be noted that these estimates do not measure, for example, the value for money in public services, or the true effectiveness of the services (quality adjustment includes some measurement of this but coverage is limited).

Estimates of public service productivity are published each year, and on a calendar year basis for consistency with the UK National Accounts. There is a two-year time lag associated with the estimates, because of the timeliness of our data, which come from administrative sources. This means that they meet certain quality criteria, listed in the Code of Practice from the UK Statistics Authority.

As explained in Section 2: The impact of the coronavirus (COVID-19) pandemic on public service productivity, the findings presented in this article were affected by the coronavirus (COVID-19) pandemic. A description of changes in methods because of the pandemic follows.

Healthcare

For output we have included, alongside the measures used in the previous years, the NHS Test and Trace and the COVID-19 vaccination programme, applying the same methods established for the UK National Accounts. These were new health services established to manage and mitigate the impact of COVID-19, and represent a sizeable contribution to public service healthcare output in 2020.

A quality adjustment, as in previous estimates, is applied to the quantity output. However, for 2020, patient experience and the aggregate data on clinical measures recorded on general practitioner (GP) practice computers (based on the quality and outcome framework) were excluded since these data are not available.

Data from Northern Ireland were not available for 2020, therefore Northern Ireland is not included in the weighting for the healthcare measure.

More information can be found in Section 9 of the Healthcare article.

Education

Introduction of a discount rate to account for the impact of remote learning on teaching hours, teaching materials provided, and increased sickness rates as a result of COVID-19.

For quality adjustment, proxy data for attainment, sourced from research from the Department of Education and Education Policy Institute (EPI) has been used to approximate attainment had normal examinations taken place.

Adjustments for bullying and the disadvantage gap have not been included for 2020 because of a lack of comparable data.

Public order and safety

Reoffending data are not included in the quality adjustment in 2019 and 2020. Data on proven reoffending have been affected by the coronavirus (COVID-19) pandemic and are no longer comparable with the previous year, as explained in the 2019 article.

Social security and administration

Because of the introduction of Universal Credit in our data sources not yet being available, output estimates from 2018 onwards have become less robust. A new methodology taking advantage of more granular data on activities, costs and conditionality within the new benefits system will be developed in the future years by the ONS. In the meantime, an "output-equals-inputs" convention has been applied, fixing productivity at 0 until the improved data and methods are available.

Adult social care (ASC)

New output and input measures have been included for the devolved administrations. ASC input measures are produced using expenditure data from the respective administrations and deflators used in the England measure (which for intermediate consumption rely on UK-level price data) reweighted to reflect differences in the provision of care by local authority and independent-sector providers in the devolved administrations.

ASC output measures for Scotland have been updated since financial year ending (FYE) 2017 with a new measure, which includes residential care and home care on a directly measured (cost-weighted activity) basis and other services on an indirectly measured (deflated expenditure) basis using data from Public Health Scotland and the Scottish Government. For Northern Ireland, output is directly measured for services where activity data are available from the Northern Ireland Executive and indirectly-measured for the remaining services and for growth between FYE 2020 and FYE 2021 when activity data collection was discontinued. No activity data are available for Wales and so the output-equals-inputs approach is used for Wales.

Output and inputs for the four nations are weighted together using the implied expenditure from the respective measures for periods before FYE 2012 and using HM Treasury's Country and regional analysis data for subsequent years.

Capital deflators

Different deflators for consumption of fixed capital have been used this year.

14 . Related links

Improved methods for total public service productivity: total, UK, 2019
Article | 20 January 2022
Explaining methodological improvements to education quality adjustment, children's social care, and healthcare output, used in the upcoming public service productivity article.

Public service productivity, healthcare, England: financial year ending 2021
Article | 29 March 2023
Estimates of output, inputs and productivity for public service healthcare in England, with additional estimates for the UK.

Public service productivity, adult social care, England: financial year ending 2021
Article | 25 July 2022
Trends in the inputs, output and productivity of publicly-funded adult social care.

Sources and methods for public service productivity estimates
Article | 11 May 2022
Sources and methods information for the Public service productivity: total, UK publication, detailing the main concepts, output and inputs measures by service area.

International comparisons of the measurement of non-market output during the COVID-19 pandemic
Article | 21 February 2022
Exploration of international differences in the methodologies used to measure non-market output and analysis of the implications for international comparisons of gross domestic product during the coronavirus (COVID-19) pandemic.

15 . Cite this article

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