Office for National Statistics

Article

Public service productivity: total, UK, 2018

Updated measures of output, inputs and productivity for public services in the UK between 1997 and 2018. Includes service area breakdown, as well as impact of quality adjustment and latest revisions.

Table of contents

1 . Main points

- Total public service productivity grew by 0.6% in 2018, continuing the ongoing upward trend that began in 2011.

- Total inputs grew by 0.4% and total output grew by 0.9% in 2018; this was principally driven by healthcare and education.

- Inputs and output have grown at a slower rate in the period after the 2008 to 2009 economic downturn compared with the previous decade, but productivity growth since the economic downturn has been stronger than the previous decade, as output is growing faster than inputs.

- Healthcare productivity was unchanged in 2018; however, it has historically outperformed total public service productivity and remains the largest service area by expenditure in public service productivity.

- Education productivity growth was 3.8%, making it the primary contributor to total public service productivity growth in 2018; it outperformed total public service productivity for the first time since 2005.

- Among the service areas that are adjusted by quality, productivity in adult social care and public order and safety have both declined.

2 . Overview

This article includes updated measures of output, inputs, and productivity for public services in the UK between 1997 and 2018. As in our previous publications on total public service productivity, it shows detailed information on the growth of inputs and output, different service areas, the impact of quality adjustment, and the latest revisions. Additional information on the strengths and limitations of the data, methods used, and the data uses and users are in the latest public service productivity Quality and methodology information report.

Furthermore, it looks at the measures of productivity in other countries. Measures of public service productivity have been an area of development internationally for many years. Following the Atkinson Review (PDF, 1.1MB) in 2005, the Office for National Statistics (ONS) has been at the forefront of these measures and development alongside significant progress made by other national statistic institutes (NSIs), which we summarised in a previous article, A guide to quality adjustment in public service productivity measures.

Comparing productivity between different countries is challenging, both for the differences between services provided, the characteristics of the public service areas, and the methodology adopted to measure inputs and output. For example, some NSIs refer to the state, non-market, public sector or public service productivity.

Therefore, it is not the aim of this article to establish a direct comparison between productivity estimates. We suggest, however, that looking at a growth rate of inputs and output between countries can help to better understand productivity globally and contextualise UK productivity in a wider debate. Healthcare and education are presented in most detail because of their large expenditure shares and contribution to total public service productivity growth.

3 . Total public service productivity

Productivity of public services is estimated by comparing growth in the total amount of output with growth in the total amount of inputs used. Productivity will increase when more output is being produced for each unit of input compared with the previous year.

Total public service output and inputs are calculated by aggregating output and inputs for nine service areas. These service areas are:

- healthcare

- education

- adult social care

- children's social care

- social security and administration

- public order and safety

- police

- defence

- other government services (this includes general government services, economic affairs, environmental protection, housing, recreation, and other public order and safety)

Output and inputs indices for each service area are aggregated together using their relative general government (combined central and local government) expenditure weight, using data from the UK National Accounts on a Classification on the Function of Government (COFOG) basis.

Figure 1: Total public service productivity grew in 2018, continuing an upwards trend that began in 2011

Total public service productivity growth rates and index, UK, 1997 to 2018

Figure 1: Total public service productivity grew in 2018, continuing an upwards trend that began in 2011

Total public service productivity growth rates and index, UK, 1997 to 2018
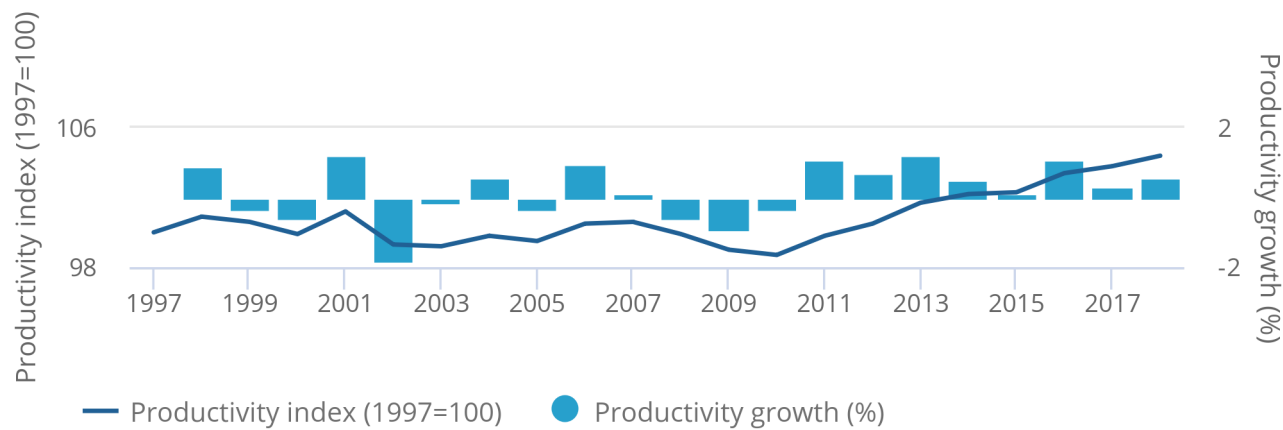
Source: Public Service Productivity – Office for National Statistics

Notes:

1.   The bars, showing year-on-year growth, are referenced to the right-hand side axis and the line, showing the productivity index, is referenced to the left-hand side axis.

In 2018, public service productivity continued an upward trend that began in 2011. In the last year, it increased by 0.6%, as shown in Figure 1.
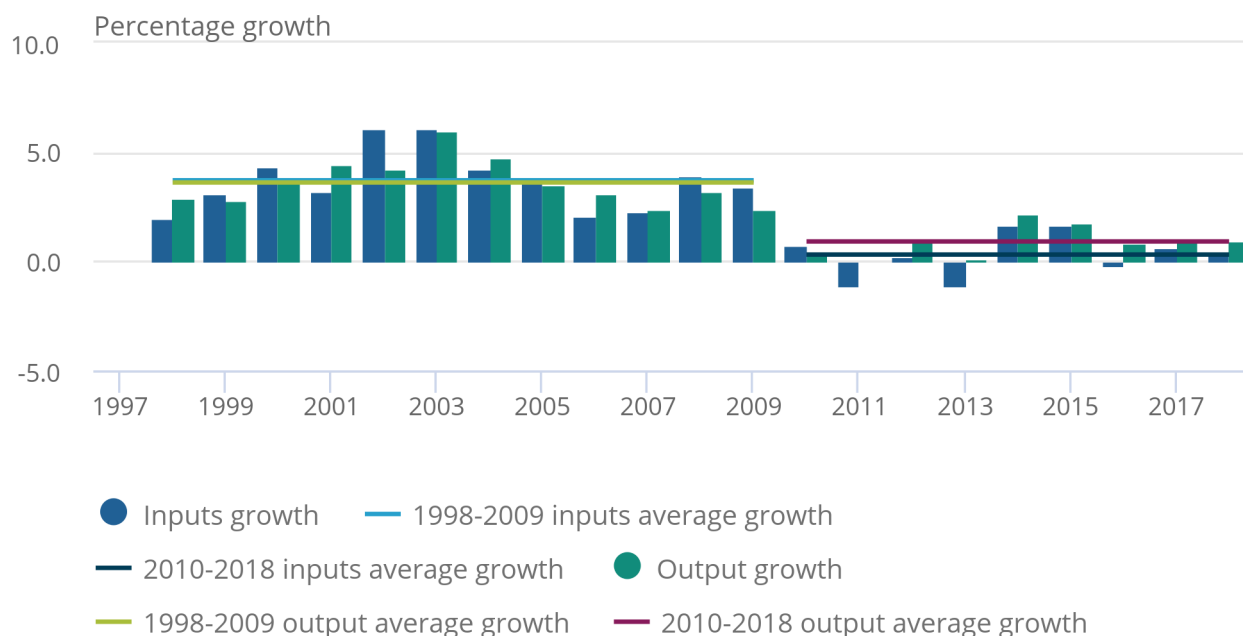
Between 1998 and 2009, total public service productivity growth fluctuated around zero, with an average productivity growth in this period of negative 0.1% per year. From 2010 to 2018, the average annual growth rate was 0.6%.

Figure 2: Output growth has been consistently greater than inputs growth since 2010, resulting in productivity growth

Inputs and output growth with average growth before and since 2010, UK, 1997 to 2018

Figure 2: Output growth has been consistently greater than inputs growth since 2010, resulting in productivity growth

Inputs and output growth with average growth before and since 2010, UK, 1997 to 2018

Percentage growth

- ● Inputs growth
- — 1998-2009 inputs average growth
- — 2010-2018 inputs average growth
- ● Output growth
- — 1998-2009 output average growth
- — 2010-2018 output average growth

Source: Public Service Productivity – Office for National Statistics

Notes:

1. The four average lines use a simple mean of the growth rates of inputs or output (as labelled) across the years in which they are drawn across.

To better understand productivity increases over the last eight years, Figure 2 includes growth rates of inputs and output for each year. Since 2010, both inputs and output growth have fallen. However, as output is now growing faster than inputs, total productivity is increasing.

The slower inputs growth from 2010 reflect the period after the economic downturn in 2008, when the government reduced spending and, in some cases, service provision.

Our statistics are in line with various literature that highlights the increase of public service productivity during the "austerity" period of the last decade. This was possible because innovative solutions were put in place to deal with funding constraints. Some of these efforts include the actions taken by public services and described in research by the Police Foundation and Health Foundation. However, we need to be careful in defining the relationship between "austerity" and innovation, as there is an expected time lag between changes in public spending and its effect on outcomes.

One of the most significant challenges in public service productivity measurement is where data limitations require us to indirectly measure some services, including most local government services where, by convention, we assume "output equals inputs". This implies that for those services, productivity changes cannot be observed (Figure 4). However, even with direct output measurement, these measures may not fully account for changes in the quality of the services offered.

As described in our Improved methods article, we apply quality adjustments to account for this. Overall, 49.1% of total public service productivity is quality adjusted. Of the public service output that is not quality adjusted, 12.6% is measured directly while the remaining 38.3% is measured indirectly.

Figure 3: Non-quality adjusted productivity continues to grow, but at a slower pace than the quality adjusted series

Indices for headline productivity, NQA productivity, productivity when excluding indirectly measured service areas and productivity when excluding healthcare, UK, 1997 to 2018

Figure 3: Non-quality adjusted productivity continues to grow, but at a slower pace than the quality adjusted series

Indices for headline productivity, NQA productivity, productivity when excluding indirectly measured service areas and productivity when excluding healthcare, UK, 1997 to 2018
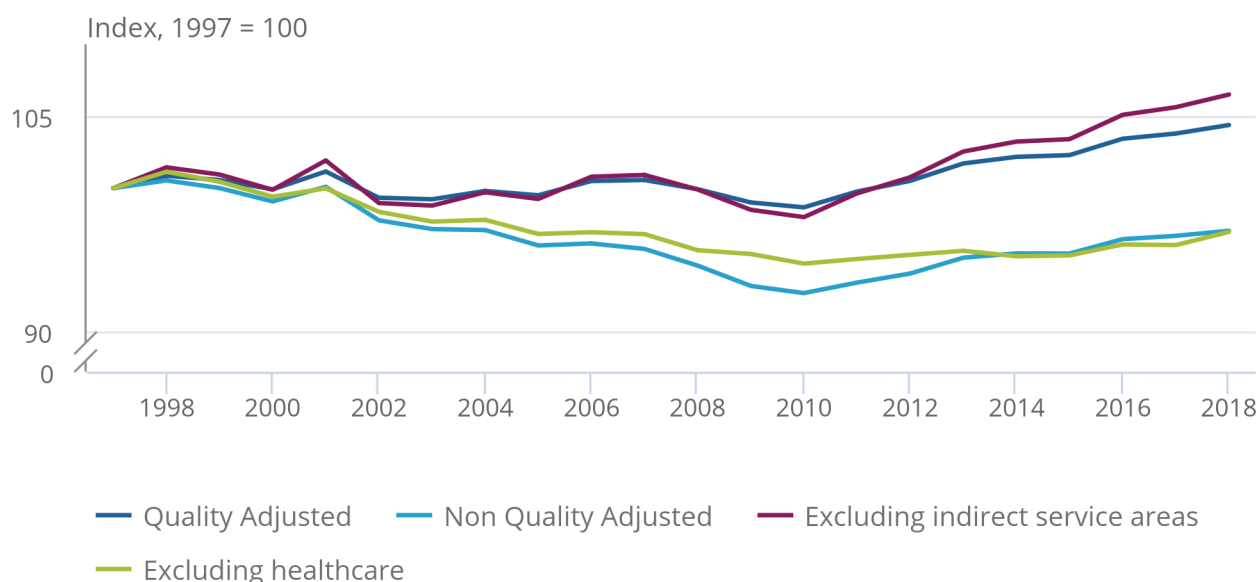
Source: Public Service Productivity – Office for National Statistics

Notes:

1. The series excluding indirectly measured service areas includes only six service areas and includes quality adjustment where possible.

2. The non-quality adjusted series excludes any growth from quality adjustments, assuming all output is not adjusted for quality, and includes all nine service areas.

Quality adjustments have contributed positively to public service productivity growth since 1997. Figure 3 shows that productivity increases by an average of 0.2% per year if quality adjustments are included, while productivity decreases by an average of more than 0.1% when only non-quality adjusted output series are used. When indirectly measured service areas ("output equals inputs") are excluded, average productivity growth is slightly higher.

The positive impact of healthcare on our headline quality adjusted series is also clear (see Section 7). Average annual productivity growth is negative 0.1% when healthcare is excluded. From 2014 onwards, this series is also lower than the non-quality adjusted productivity series for all nine service areas.

4 . Contributions of each service area to total public service productivity

Public service productivity includes nine different service areas. Three of them (police, defence, and other public services) are difficult to measure directly as they are largely "collective" services. Therefore, the convention "output equals inputs" is applied. Productivity remains constant because output volume is assumed to equal the volume of inputs used to create them. This convention is not ideal and we continue to explore methods and data developments to improve these series.
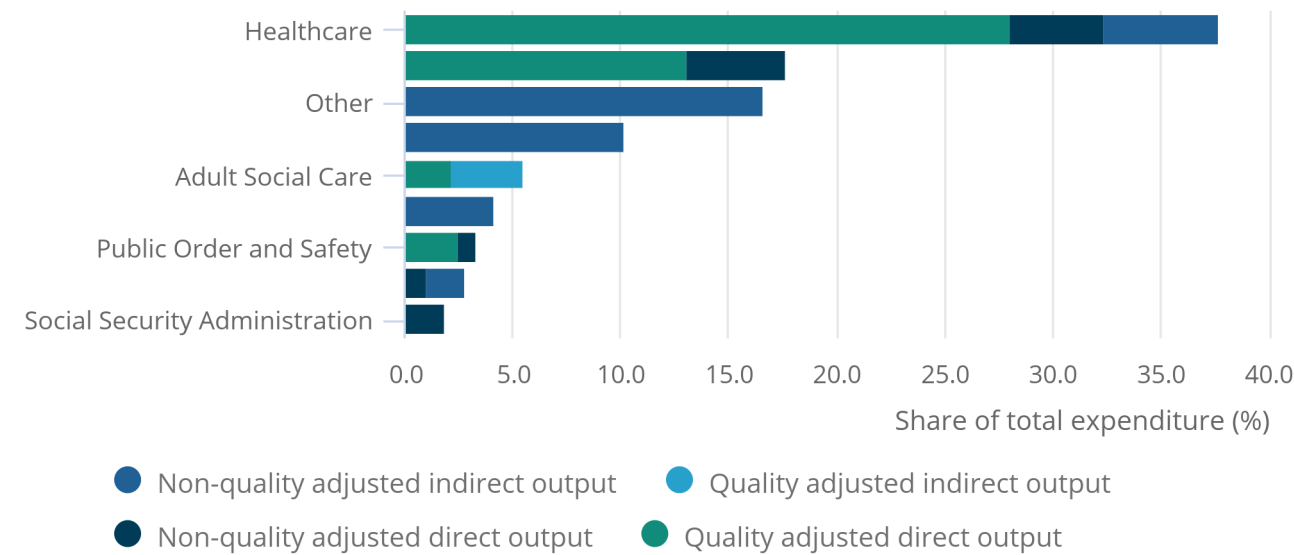
The impact of different service areas depends on their share of total public service expenditure. Healthcare has the largest expenditure share (38%), followed by education (18%) and then other government services (17%).

Figure 4: Healthcare and education are the largest service areas in the UK by expenditure

Expenditure shares and output types by public service area, UK, 2018

Figure 4: Healthcare and education are the largest service areas in the UK by expenditure

Expenditure shares and output types by public service area, UK, 2018

Legend:
- Non-quality adjusted indirect output
- Quality adjusted indirect output
- Non-quality adjusted direct output
- Quality adjusted direct output

Source: Public Service Productivity – Office for National Statistics

Notes:

1. The contributions may not fully sum to the total because of rounding.

Figure 4 shows the nine broad public service areas, listed in order of their share of total government expenditure in 2018. The different colours in each bar indicates the proportion of that service area that are directly or indirectly measured and whether they are quality adjusted.

Four service areas (healthcare, education, adult social care, and public order and safety) are adjusted for quality. Quality adjustment is recommended by the Atkinson Review (PDF, 1.1MB), as it enables us to reflect the final outcomes of the services.

Figure 5: Healthcare productivity has historically outperformed total public service productivity, despite no productivity growth in 2018

Productivity indices for total public service productivity and for the service areas that include quality adjustment, UK, 1997 to 2018

Figure 5: Healthcare productivity has historically outperformed total public service productivity, despite no productivity growth in 2018

Productivity indices for total public service productivity and for the service areas that include quality adjustment, UK, 1997 to 2018

Index, 1997 = 100

Healthcare · Education · ASC · POS · Total
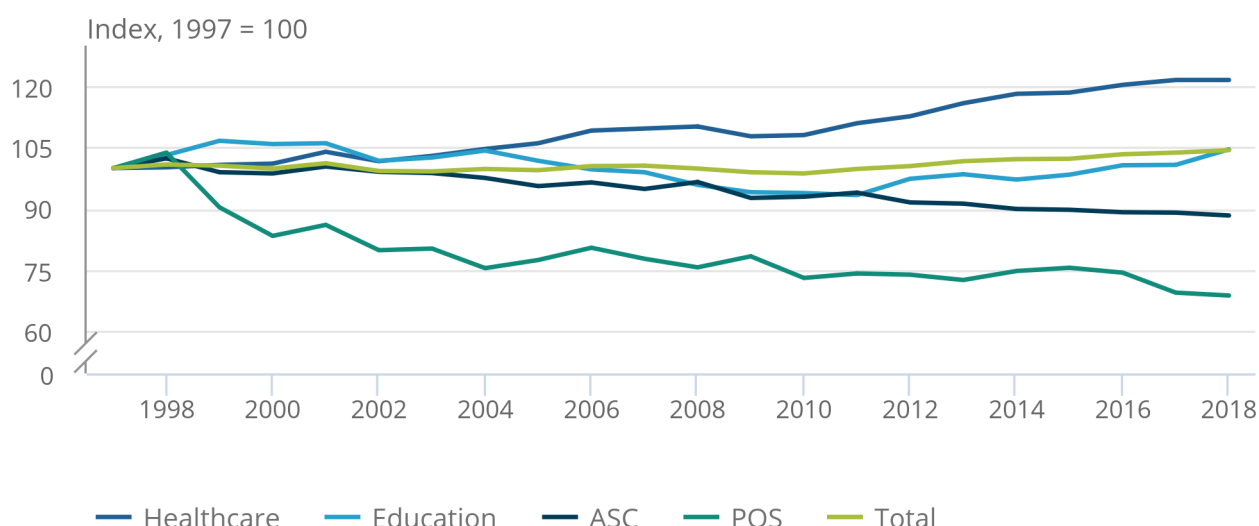
Source: Public Service Productivity – Office for National Statistics

Figure 5 shows the productivity indices of the quality adjusted service areas over time. As we have seen in previous publications, healthcare is the only service area with consistently improving productivity since 2004, whereas education growth has increased since 2011. Adult social care, like public order and safety, has drawn total public service productivity downwards over time.

In Figure 6, we take the productivity growth for each service area and weight it by its expenditure share each year. Police, defence, and other government services are not included in Figure 6 as they are measured using the "output equals inputs" convention and consequently have no impact on estimates of productivity growth.

Contributions to total public service productivity growth by service area, UK, 1998 to 2018

Figure 6: Education was the largest contributor to total public service productivity growth in 2018

Contributions to total public service productivity growth by service area, UK, 1998 to 2018
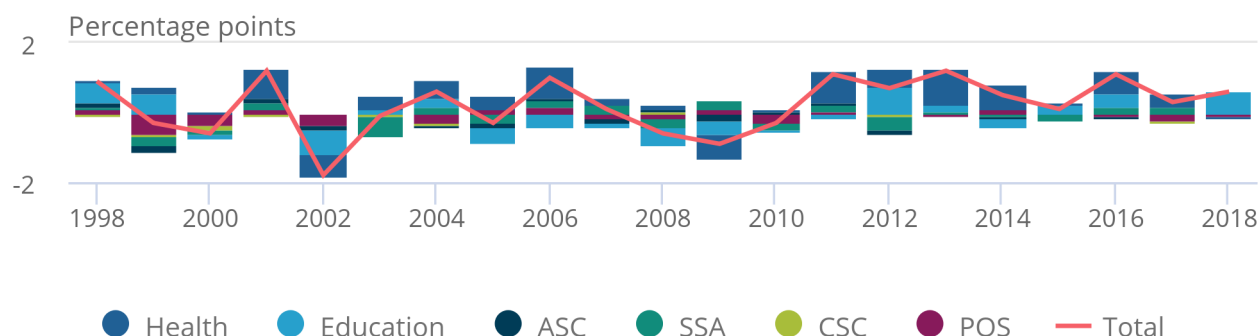
Source: Public Service Productivity – Office for National Statistics

In 2018, education contributed 0.7% to total productivity growth, making it the primary contributor. There was also a small positive contribution from social security administration, close to 0%. The other four service areas with directly measured outputs (healthcare, adult social care, public order and safety and child social care) had small negative contributions, all close to 0%.
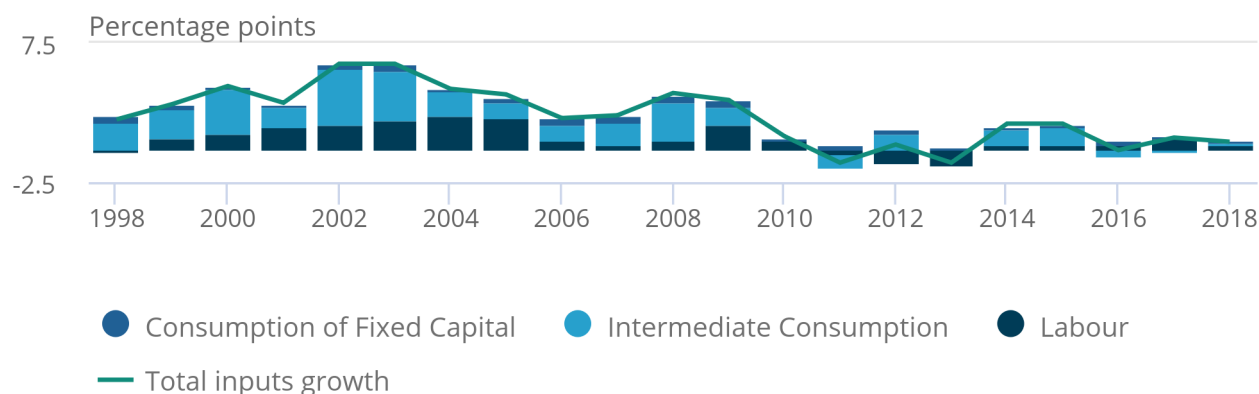
5 . Total public service inputs

Inputs in public service productivity consist of three component parts: labour, goods and services (intermediate inputs), and capital. For most service areas, inputs are measured indirectly by using current expenditure adjusted by a suitable deflator. In some areas, inputs are measured directly, such as the number of full-time equivalent staff.

Figure 7: Inputs growth remained moderate into 2018, continuing the trend of low growth that began in 2010

Contributions to total inputs growth by input component, UK, 1998 to 2018

Figure 7: Inputs growth remained moderate into 2018, continuing the trend of low growth that began in 2010

Contributions to total inputs growth by input component, UK, 1998 to 2018

Source: Public Service Productivity – Office for National Statistics

Total inputs grew by 0.4% in 2018. This continues the historically weak growth in inputs since the economic downturn in 2008.

Labour inputs

Labour inputs are defined by the volume of labour used to provide a public service. Therefore, all the workers that contribute to producing the service (for instance teachers, doctors and administrative staff) are included here. As seen in Figure 7, labour inputs grew by 0.3% in 2018. While this continues the positive trend of increasing annual labour inputs which began in 2014, they have still not returned to their pre-austerity level. Accounting for 48.3% of total public service expenditure, labour continued to be the largest input to public services in 2018. This is a marginal increase in labour's expenditure weight from 2017, when it accounted for 48.0% of total expenditure.

Intermediate inputs

Intermediate inputs reflect all other goods and services purchased to deliver the public services, except for fixed capital assets that last for more than a year. Examples of intermediate inputs include energy, professional services, medical supplies and utilities. The volume of this input is calculated by removing price growth from expenditure growth using appropriate price indices (known as deflators). In 2018, intermediate inputs grew by 0.5%, as illustrated in Figure 7.

Despite this, the share of total public service expenditure spent on intermediates fell to 41.1%, its lowest level since 2012, from 41.4% in 2017. Historically, the share of total public service expenditure spent on intermediate inputs has increased: from 1997 to 2014, its share of total expenditure increased from 33.7% to 43.0%. Since 2015, it has declined with 2018 being the fourth consecutive year that its share of total expenditure fell (down to 41.1%).

Capital inputs

Capital inputs cover the use of fixed capital assets that last more than a year, such as buildings, computers, software and other equipment. In 2018, capital inputs in public services increased by 0.5%, the lowest annual growth in capital measured as seen in Figure 7.

It should be noted that capital historically has a small expenditure weight of around 10%, as most public services are not very capital intensive. In 2018 specifically, capital accounted for 10.6% of total expenditure, down slightly from its 2017 level.

However, there are large differences in the proportion of capital by service areas. In defence, capital accounts for 27.0% of expenditure, while in children's social care it accounts for as little as 0.1%.

Figure 8: Healthcare was the biggest contributor to total inputs growth in 2018

Contributions to total inputs growth by service areas, UK, 1998 to 2018

Figure 8: Healthcare was the biggest contributor to total inputs growth in 2018

Contributions to total inputs growth by service areas, UK, 1998 to 2018
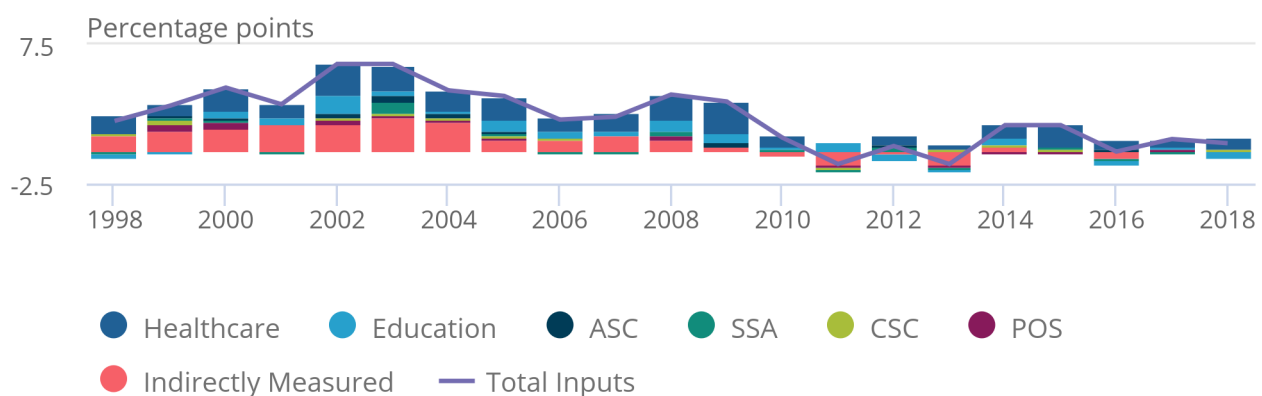
Source: Public Service Productivity – Office for National Statistics

Inputs growth can also be split by service area, as shown in Figure 8. Healthcare inputs are consistently the biggest source of inputs growth each year when you discount the inputs growth in indirectly measured service areas. The graph also shows that education often also plays an important role.

Interestingly, Figure 8 also shows the relatively large historical impact that public order and safety and social security administration can have on total inputs growth, considering their relatively small scale as measured by expenditure.

6 . Total public service quantity and quality output

Total quantity output in public services is, wherever possible, directly measured in terms of activity volumes. If it is not possible to measure activities directly, quantity output is measured indirectly by equating output to the sum of inputs.

As such, productivity growth in service areas with indirectly measured outputs will always equal zero, meaning they have a dampening effect on total public service productivity.

Where the data allow, public service quantity output is then adjusted for quality. Quality adjustments to quantity outputs are an attempt to measure public services by the value they provide as well as by the cost of delivering them. All quality adjustments are linked to the desired outcomes of the provision of the public service being measured. More information on quality adjustment can be found in A guide to quality adjustment in public service productivity measures.

Figure 9: Healthcare was the main contributor to total output growth in 2018

Contributions to total output growth by service areas, UK, 1998 to 2018
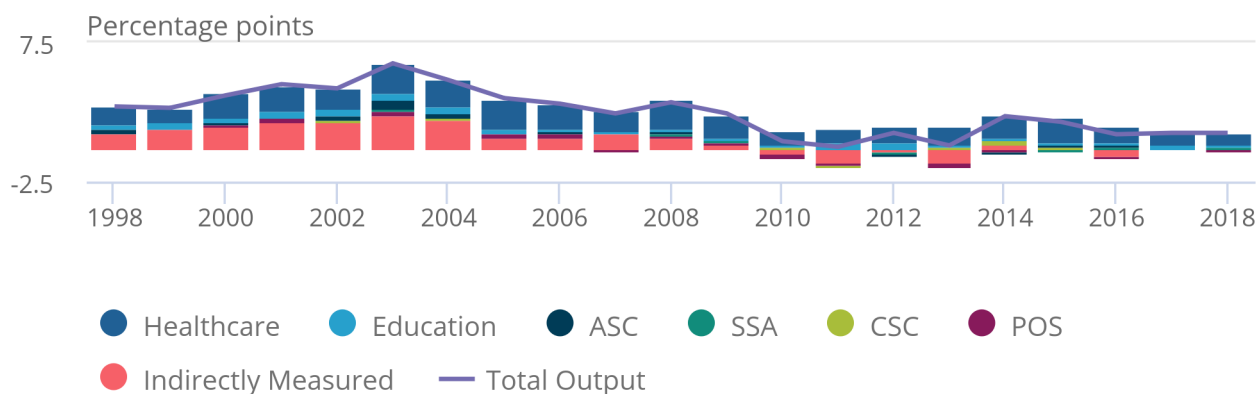
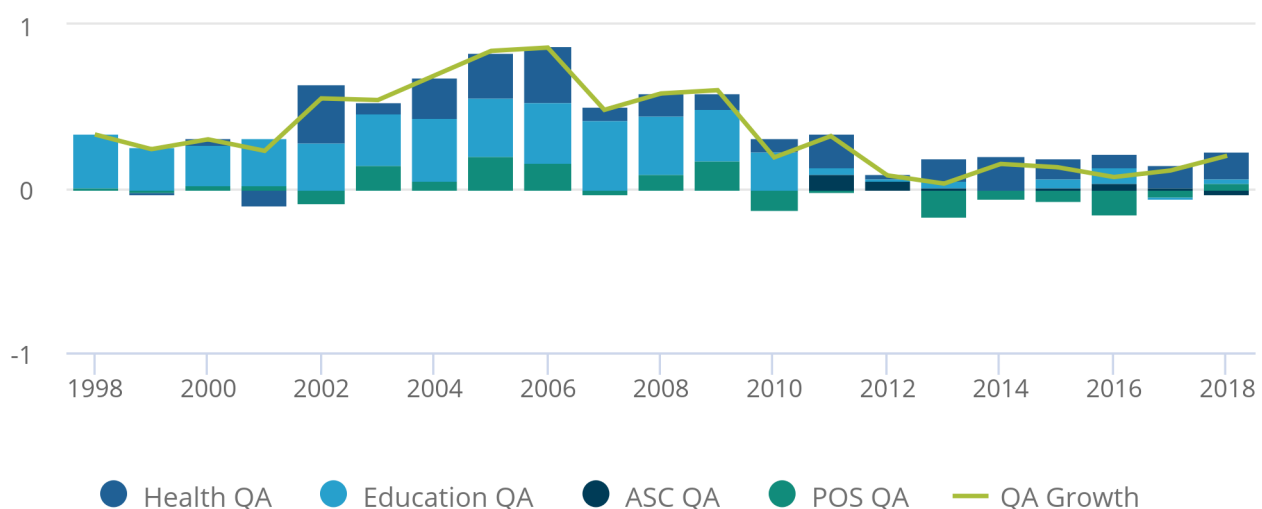**Source: Public Service Productivity – Office for National Statistics**

Total public services quality output grew by 1.0% in 2018. This continues a period of steady annual increases in quality adjusted outputs, with growth of 0.9% and 1.0% in 2016 and 2017 respectively.

The largest contributor to outputs growth was healthcare, continuing a trend since the beginning of the series in 1997. Similarly, education also contributed positively to output growth in 2018 as it has done since these estimates began in 1997.

Public order and safety (POS), as well as the group of indirectly measured service areas (police, defence and other government services), had a dampening effect on total outputs growth in 2018. Figure 9 shows that POS has had a negative impact on outputs growth in every year since 2010. It should be noted that this is in large part because of the quality adjustment applied to POS (see Section 10 for more detail on the quality adjustment applied to POS output). While the impact of the indirectly measured services on total output is also large throughout the series, the collective nature of these services means they better represent changes in expenditure rather than changes in the quantity of services provided.

Figure 10: In 2018, quality adjustment improved output measures in all service areas apart from adult social care

Figure 10: In 2018, quality adjustment improved output measures in all service areas apart from adult social care

Source: Public Service Productivity – Office for National Statistics

As with total public service output, healthcare was the biggest contributor to growth in quality adjustments in 2018. Historically, education has also been a large contributor, though its contribution to quality adjustment growth has reduced since 2010. This may be because of a slowdown in the growth of attainment measures over this period.

Detailed information on our chosen measures of attainment in England, Wales, Scotland and Northern Ireland can be found in our Improved methods for total public service productivity : total, UK, 2017. More recently, a quality adjustment to adult social care was introduced in 2011. For the second year, it had a negative impact in 2018. The first time it had a negative contribution was in 2014 as a result of a change in the data source used for this between financial years ending (FYE) 2014 and 2015.

7 . Healthcare

Healthcare represents the largest service area included in public service productivity. Output is estimated in four sectors:

- hospital and community health services

- primary care output (previously referred to as Family Health Services)

- GP prescribing

- non-NHS provision

It should be noted that non-NHS provision includes services that may not be delivered by the public sector, but are paid for by the government: this is why we define this series as public service productivity not public sector productivity.

Indices for healthcare inputs, output and productivity, UK, 1997 to 2018

Figure 11: Healthcare productivity did not increase in 2018

Indices for healthcare inputs, output and productivity, UK, 1997 to 2018

Index, 1997 = 100
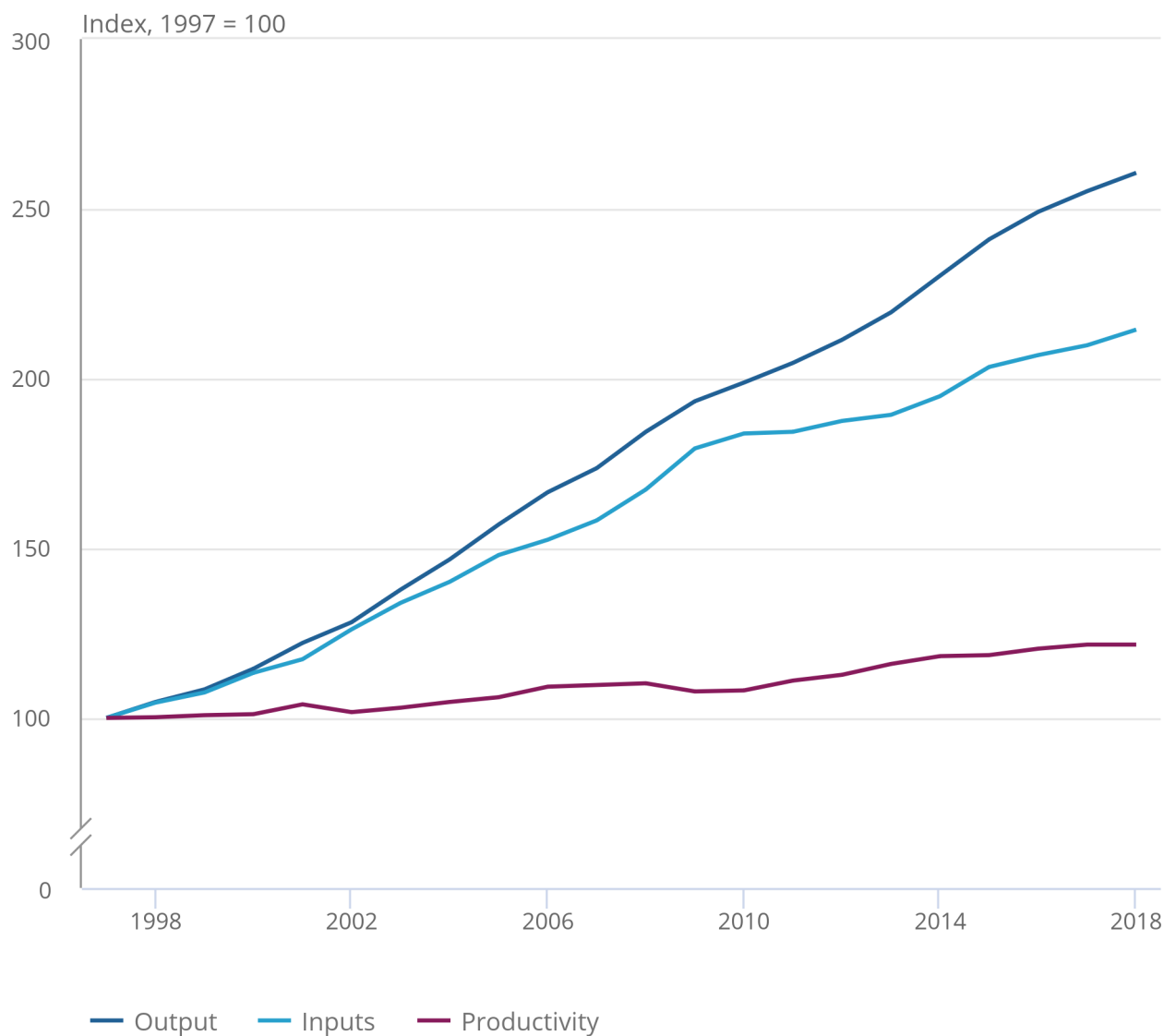
Source: Public Service Productivity – Office for National Statistics

As seen in Figure 11, healthcare contributes positively to total public service productivity growth throughout the data time series, with the only exceptions in 2002 and 2009, where it was negative. However, in 2018 productivity growth was close to zero, the lowest growth since 2009. This was driven by 2.2% growth of inputs and 2.1% growth of output.

More analyses on healthcare productivity in England are included in the healthcare productivity article. This year, some important developments have been included, as explained in the Methodological developments to public service productivity: healthcare, 2021 update.

Healthcare productivity in other countries

Measuring public health services has been an important focus in many countries in recent years, especially in shifting to direct volume measures of output, as noted in the Challenges in the measurement of public sector productivity in OECD countries.

Among the statistical institutions working on measures of healthcare, New Zealand published a report on Output and productivity in the education and health industries, which enables us to look at non-quality adjusted healthcare output. Although the methodology of this measure differs slightly to the UK non-quality adjusted healthcare output index because of the inclusion of market producers of healthcare, we can observe the overall trend and growth rates. The data allow us to conclude that, following the 2008 economic downturn, healthcare output in New Zealand continued to grow at a steady rate into 2011. This follows a similar trend to the UK non-quality adjusted output index, which follows a steady growth path into 2018.

Statistics Canada published an experimental series on output and productivity in the hospital sector as well as a report on Improving public sector productivity in Canada. However, to the best of our knowledge, these statistics cover the period until 2010. Similarly, the Australian Bureau of Statistics (ABS) is working on the healthcare output measures and it is looking at Enhancing output measures of the health care industry to account for the quality of health services provided in the future.

Other countries analyse healthcare productivity and output (for instance the US Bureau of Labor Statistics) using different approaches and measures. However, the characteristics of the US system (where private services are dominant) does not allow a proper comparison with the UK healthcare productivity index.
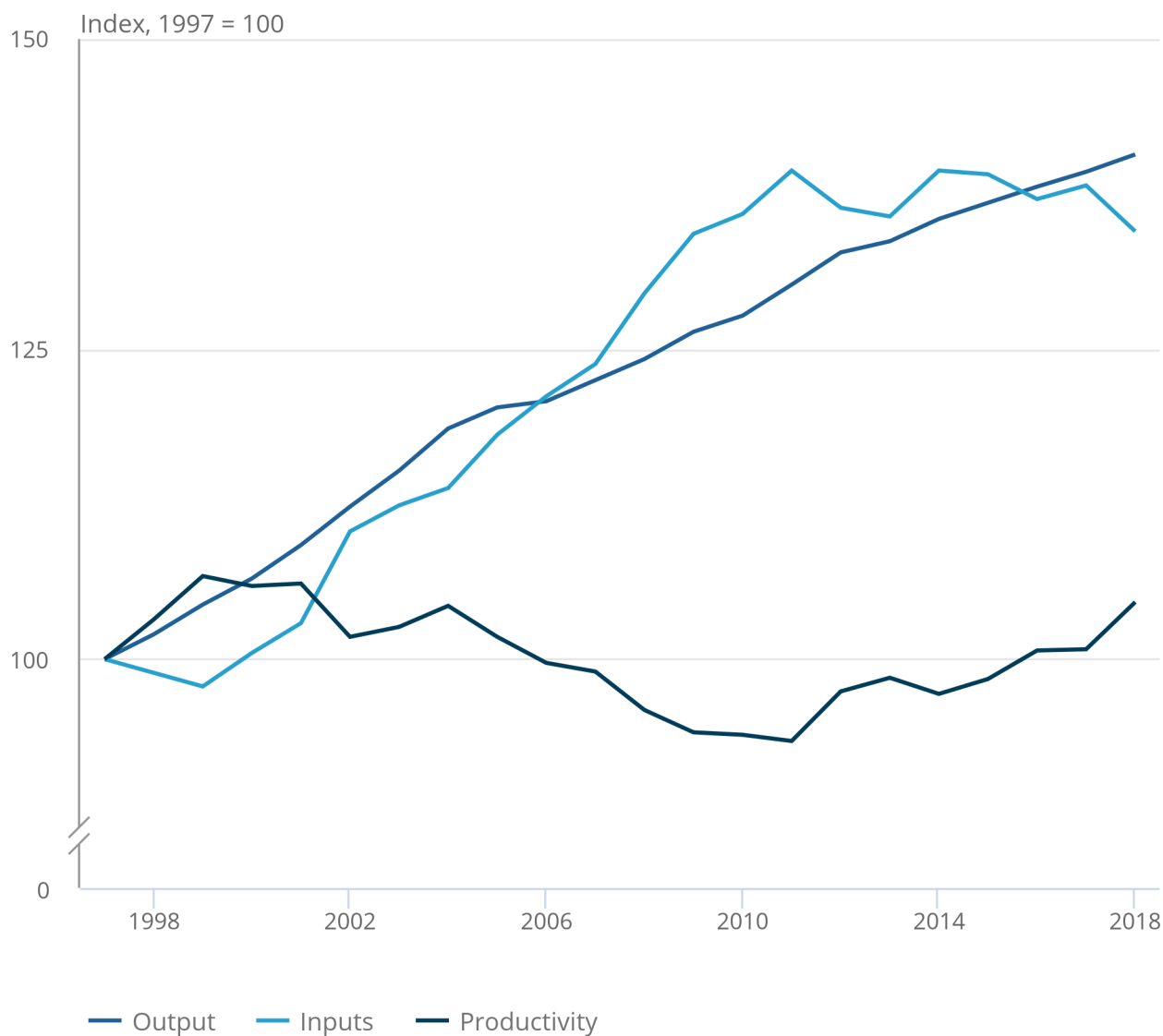
8 . Education

Education is the second largest service area in public service productivity by expenditure share. Output is measured by the sum of full time equivalent (FTE) publicly funded pupil and student numbers in the education system and is adjusted for quality using measures of attainment and data on bullying in schools. This includes any government funded nursery school places, students in primary, secondary and special schools (including academies in England), further education colleges, initial teacher training and some professional healthcare training courses.

Indices for education inputs, output and productivity, UK, 1997 to 2018

Figure 12: Education inputs and output trend growth have diverged in the latest data

Indices for education inputs, output and productivity, UK, 1997 to 2018

Index, 1997 = 100

Legend: Output — Inputs — Productivity

Source: Public Service Productivity – Office for National Statistics

As Figure 12 shows, productivity of UK education services grew by 3.8% in 2018. This was caused by output growth of 1% whilst inputs fell by 2.7%. The fall in inputs was largely driven by falling staff numbers.

The methodology for education productivity has been updated, with more detail available in Improved methods for total public service productivity: total, UK, 2018. These changes concern the quality adjustment for education. In previous articles, attainment at GCSE level or equivalent is used as an indicator for the quality of schools.

For this year, we have also included new data on bullying in schools that we consider as another indicator of quality. This is supported by literature which emphasizes the long-term impact of bullying on children's mental and physical health, well-being, and life outcomes. Therefore, if schools are successful in reducing bullying at school, we record this as an increase in quality.

The second change we introduced to education productivity is an update to the "cohort split" method introduced in last year's publication. A cohort split serves to apply the attainment data over multiple years of education and not only to the year in which the exams were taken. Whereas last year's cohort split approach spread the achievement in education over the five years of secondary education, this year's approach spreads the achievement in education over the 11 years of primary and secondary schooling, with later years given a higher weight to reflect their proximity to the GCSE or equivalent examination. This is consistent with the approach suggested by the 2005 Atkinson Review (PDF, 1.1MB) into non-market output measurement.

Figure 13: Improvements to our measures of quality in education have reduced the growth seen in quality adjusted output

Comparing quality adjusted and non-quality adjusted output growth in education for last year's estimates and this year's estimates, UK, 1997 to 2018

Figure 13: Improvements to our measures of quality in education have reduced the growth seen in quality adjusted output

Comparing quality adjusted and non-quality adjusted output growth in education for last year's estimates and this year's estimates, UK, 1997 to 2018

Index, 1997 = 100

Legend: 2017 QA — 2017 NQA — 2018 QA — 2018 NQA
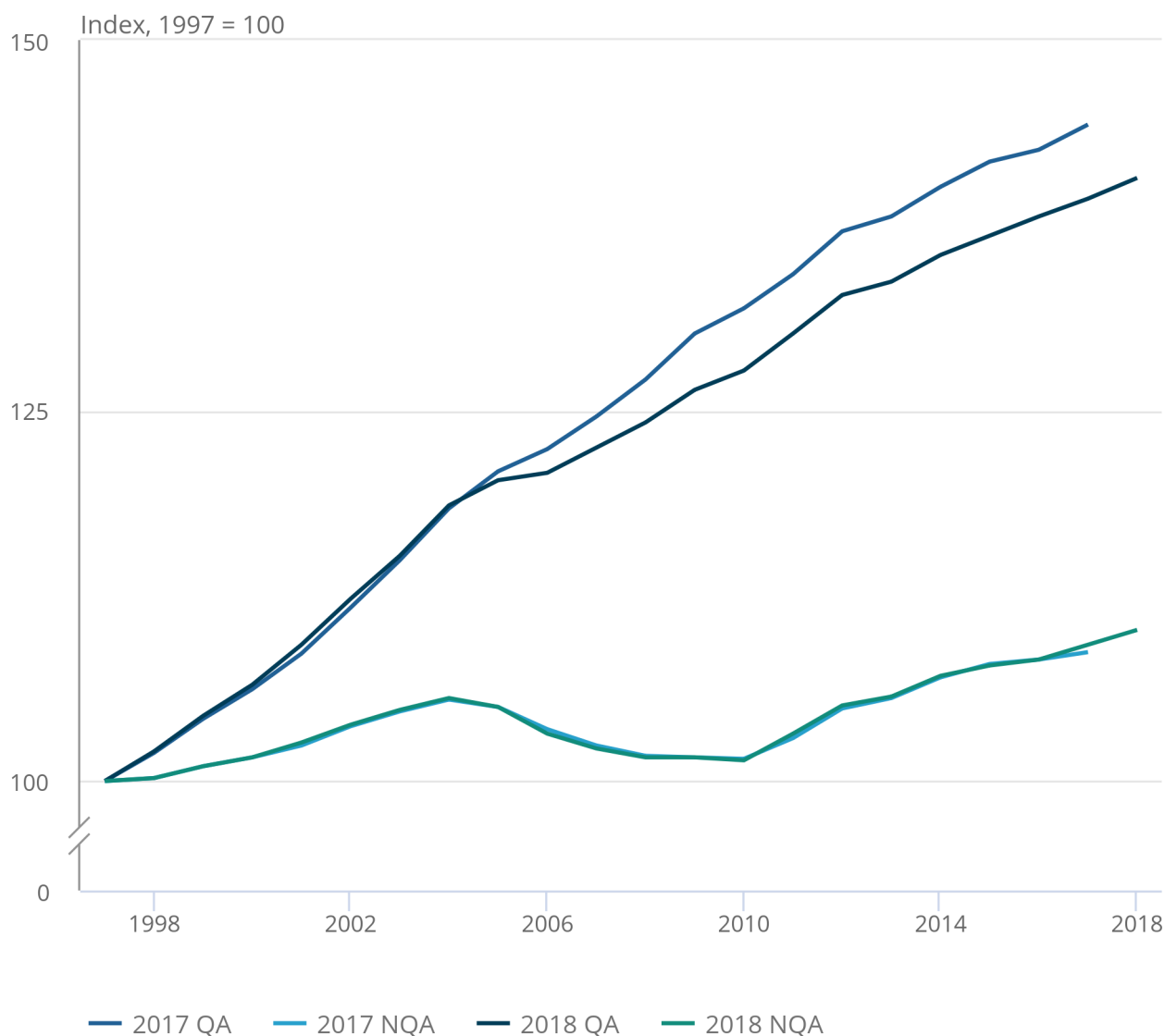
Source: Public Service Productivity – Office for National Statistics

The impact of the changes to our quality measure can be seen in Figure 13, which shows how the two changes to the education quality index affect the quality adjusted output index for education. The minor revisions to the non-quality adjusted output series are a result of small changes to our data processing, starting last year, which has enhanced the consistency of our methods.

Education productivity in other countries

The Australian Bureau of Statistics recently published analysis of [School output measures in the Australian National Accounts](#). As yet, these are non-quality adjusted series although quality adjustment is noted as a future workstream.

Similar to the UK, [Australia's series](#) show that, following the 2008 economic downturn, public education saw negligible growth until 2010 to 2011. Post 2011, education output grew by nearly 10% over the period to 2018 in Australia.

New Zealand published research into [Quality adjusting sector-level data on New Zealand schools](#), reporting also a direct comparison between the Office for National Statistics (ONS) measures of education productivity (both quality adjusted and non-quality adjusted) with a series up to 2014. Updating the UK series for our latest estimates to 2014 leads to the trend in Figure 14. This illustrates that, throughout the series, New Zealand and the UK have experienced different education productivity index profiles. However, a general downward trend between 1997 and 2014 is consistent. This could be the result of different data availability as well as differing policy contexts of the two countries.

Figure 14: Education productivity for the UK demonstrates a smoother series to 2014 than that for New Zealand, though both are lower than their 1997 level

Quality adjusted and non-quality adjusted education indices over time, UK and New Zealand, 1997 to 2014

Figure 14: Education productivity for the UK demonstrates a smoother series to 2014 than that for New Zealand, though both are lower than their 1997 level

Quality adjusted and non-quality adjusted education indices over time, UK and New Zealand, 1997 to 2014

Source: Statistics New Zealand, Office for National Statistics

9 . 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, using activity measures for provision of day care, home care, "meals on wheels" and care home places. Where activity data are not available, output is measured on an "Output equals inputs" basis.

From 2011 onwards, output measures are adjusted for the quality of the services provided - this adjustment considers the improvement in quality of life for the recipients of the service, accounting for external factors that affect this. More information is available in [Public service productivity: adult social care, sources and methods, 2019 update](#).

Figure 15: Adult social care productivity fell by 0.8% in 2018, its seventh consecutive year of decline

Indices for inputs, output and productivity, UK, 1997 to 2018

Index, 1997 = 100

— Output — Inputs — Productivity
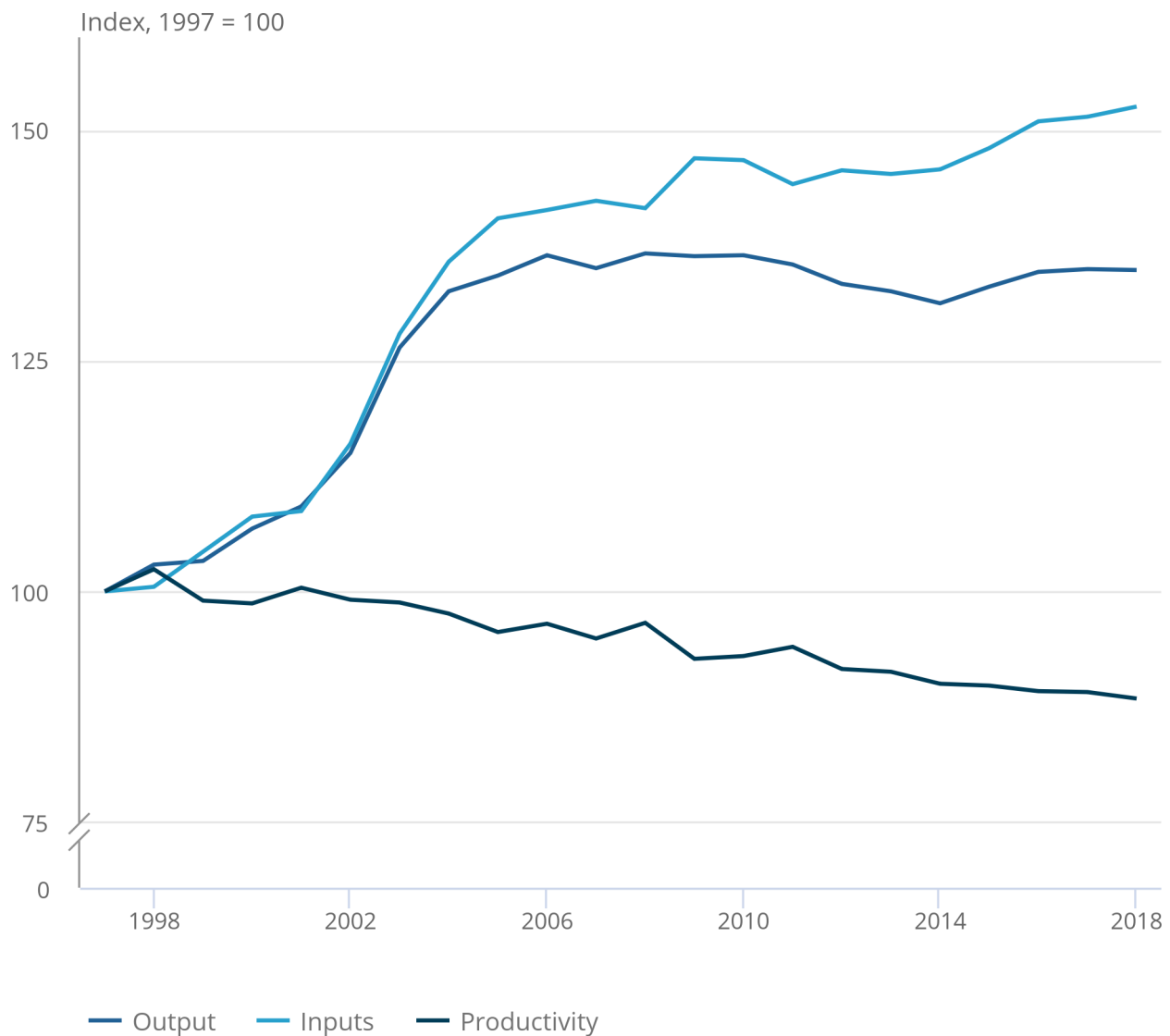
Source: Public Service Productivity – Office for National Statistics

As Figure 15 shows, ASC productivity decreased by 0.8% in 2018, making this the seventh consecutive year of declining productivity. Inputs into ASC grew by 0.7% while output fell by 0.1%, despite 0.5% growth in non-quality adjusted output. Figures for England up to financial year ending (FYE) 2020 will be published in a separate ASC productivity article, to be published in July 2021.

10 . Public order and safety

Public order and safety (POS) consists of courts, probation services, the prison service and the fire and rescue services. The police service is treated as a separate service area within this publication (see Section 13).

Output is measured on an activity volume basis. The output volumes for courts are determined by caseload. For probation services it is the number of people under supervision. Output volume for the prison service is the prison population. The output volume for fire and rescue services is the number of incidents attended and workload in hours.

Where applicable, output is also adjusted for quality. Our quality adjusted output volumes for probation services, the prison service and courts are calculated using data on re-offending, prison safety, custody escapes and court timeliness. Our output volume measures for county courts and fire and rescue services are not quality adjusted because of data limitations. More information can be found in the most recent methodology paper for POS quality adjustment.

Figure 16: Public order and safety productivity fell as output continued to fall in 2018, but inputs have levelled off following high growth in 2017

Indices for inputs, output and productivity, UK, 1997 to 2018

Figure 16: Public order and safety productivity fell as output continued to fall in 2018, but inputs have levelled off following high growth in 2017

Indices for inputs, output and productivity, UK, 1997 to 2018
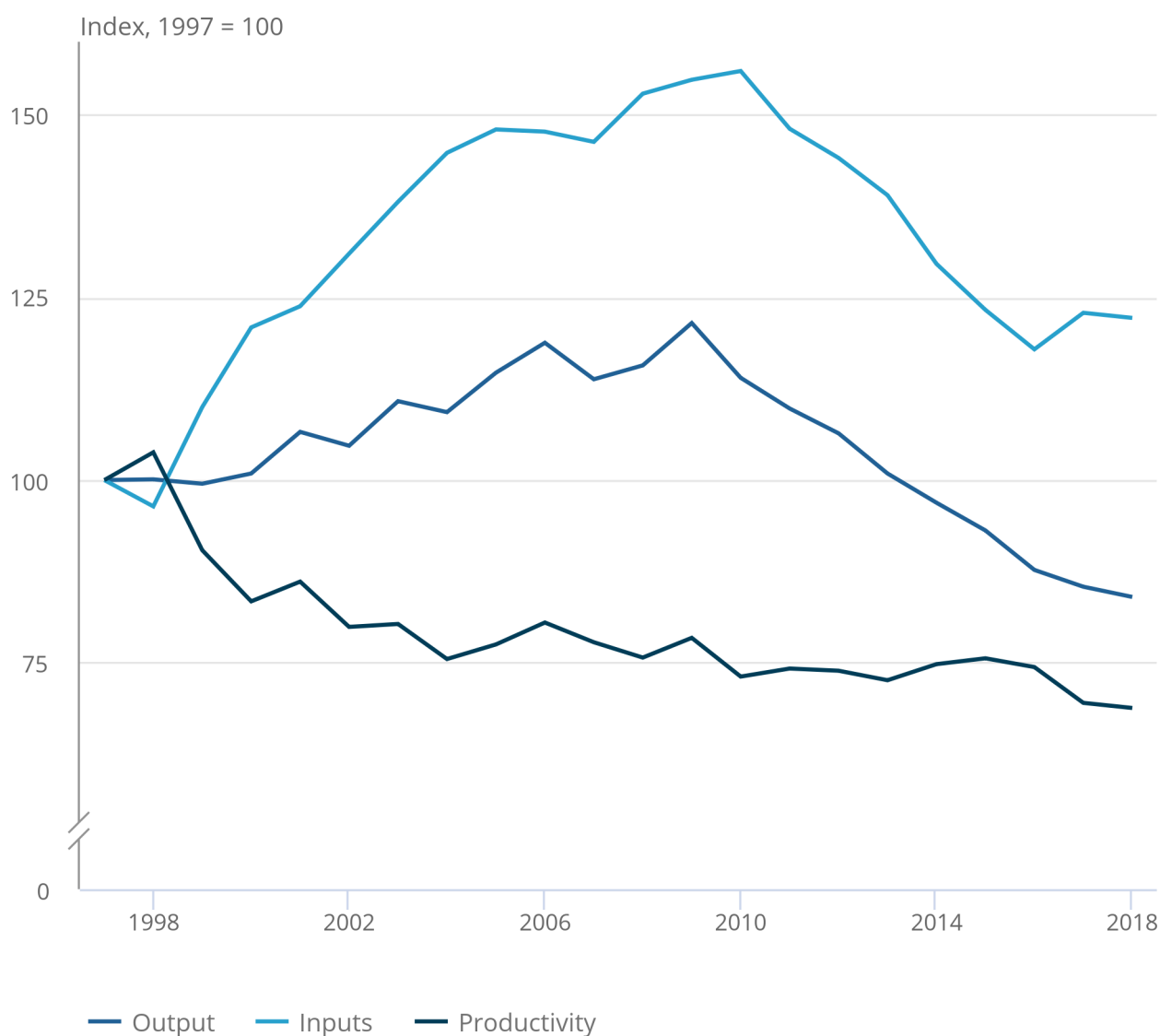
Source: Public Service Productivity – Office for National Statistics

Productivity for POS fell by 1.1% in 2018. Quality adjusted output fell by 1.6%, while inputs fell by 0.5%. As the fall in output was greater than the fall in inputs, productivity for the year has fallen. However, the fall in output was the smallest since 2009.

Fire services output increased by 2.5% in 2018. This only reflects increases in some activity measures for prevention, protection, and incident response, as there is currently no quality adjustment. Quality adjusted activity for courts and probation services also increased in 2018. This is largely because of an increase in our quality index for re-offending rates. As part of our quality adjustment for courts, we also measure timeliness.

The Ministry of Justice (MOJ) are no longer able to publish a comparable time series of Crown Courts timeliness statistics because of the identification of defendant attrition and advise against comparing 2018 and 2019 data with the back series. The Office for National Statistics (ONS) has therefore held some of the data used for quality adjustment constant from Total public service productivity, 2017 as a temporary measure. The MOJ will attempt to provide a comparable back series in future releases. As a relatively small area of the overall quality adjustment, the impact is minor.

Quality adjusted output in the prison service fell, partly because of a fall in prison population. However, the fall in prison service output is also affected by a fall in our quality index for prison safety, caused by an increase in the number of deaths that occurred in prison custody. As prison safety is the largest component of our prison service quality adjustment, this has counteracted improvements made in re-offending rates. This has resulted in a fall in the quality measure used for prison safety which, combined with the fall in quantity prison output, has fed through to the overall fall in POS output.

Figure 17: Quality adjustment in 2018 had a positive impact on public order and safety output for the first time since 2009

Indices for POS quantity and quality adjusted output, UK, 1997 to 2018

Figure 17: Quality adjustment in 2018 had a positive impact on public order and safety output for the first time since 2009

Indices for POS quantity and quality adjusted output, UK, 1997 to 2018

Index, 1997 = 100

— Quantity (NQA) Output   — Quality Adjusted (QA) Output
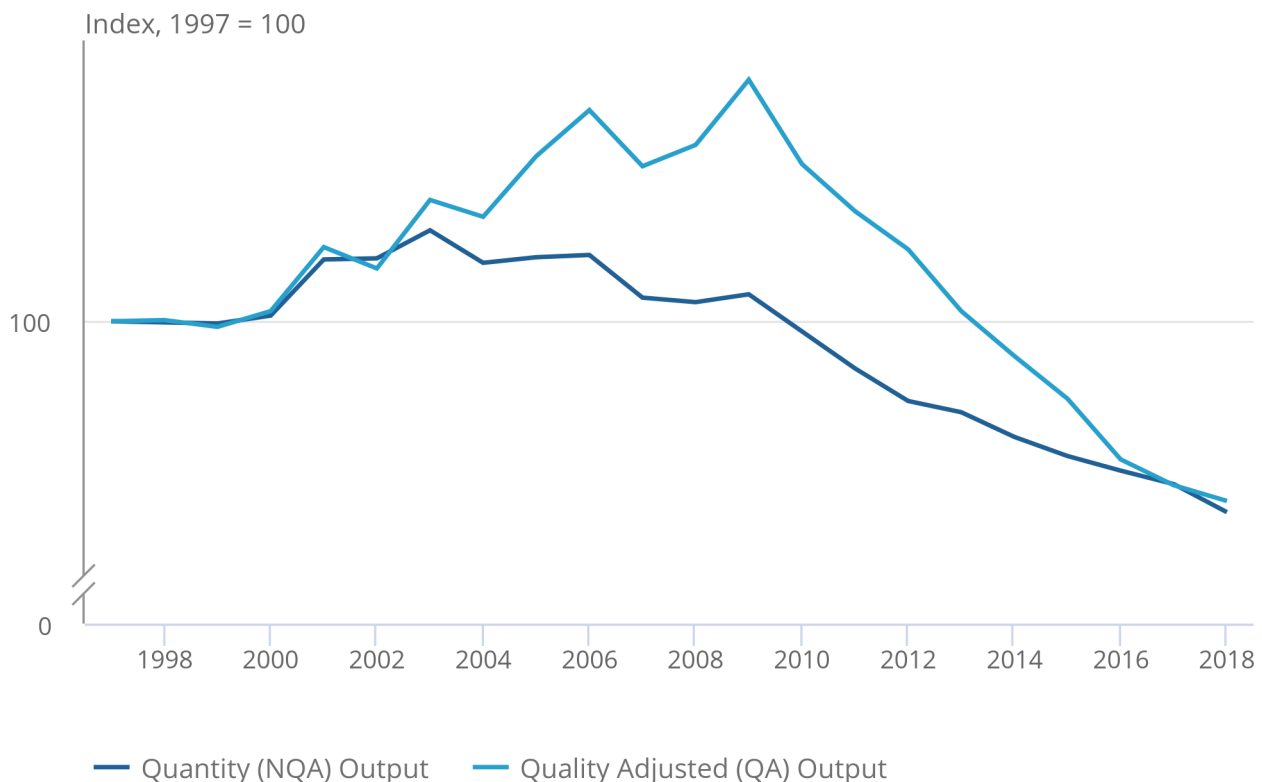
Source: Public Service Productivity – Office for National Statistics

In 2018, quality adjusted POS output growth was higher (less negative) than non-quality adjusted POS output growth for the first time since 2009. In 2017, our non-quality adjusted output index for POS was higher than our index for quality output for the first time in our series. In 2018 the non-quality output index fell by 2.9%, compared with the 1.6% fall in quality output. Therefore, quality adjustment has had a positive impact on total POS output, despite the fall in the quality adjusted series.

11 . Children's social care

Children's social care represents the provision of social work, personal care, protection or social support services to children at risk or in need. In its output measures it includes direct measures of activities related to "looked-after children" – children in short-term care, foster placements, secure accommodation or children's homes.

One-third of children's social care is measured directly, while the remaining two-thirds is measured indirectly – that is, using the "outputs-equal-inputs" convention. For this reason, the inputs and output indices shown in Figure 18 follow similar trends and long-term productivity is broadly flat.

Figure 18: Children's social care productivity fell in 2018 for the fourth consecutive year by 0.1%

Indices for inputs, output and productivity, UK, 1997 to 2018

Figure 18: Children's social care productivity fell in 2018 for the fourth consecutive year by 0.1%

Indices for inputs, output and productivity, UK, 1997 to 2018
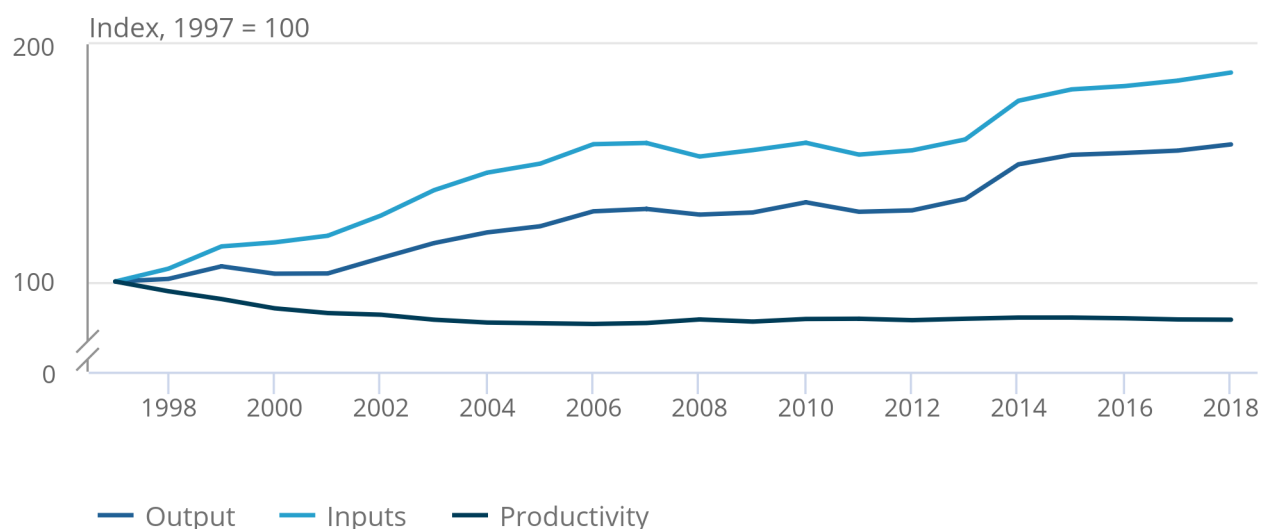
Source: Public Service Productivity – Office for National Statistics

Children's social care productivity has followed its recent trend and decreased by 0.1% over 2018, because of a 1.8% increase in inputs and a smaller 1.7% increase in output, its fourth consecutive year of declining productivity. The service area is a negative contributor to total public service productivity growth, but its small share of total expenditure (2.8% in 2018) means that it has little effect compared with healthcare and education.

We are currently working on improving measures of outputs and quality adjustment for children's social care. If you have any comments or questions, please contact us at productivity@ons.gov.uk.

12 . Social security administration

Social security administration (SSA) covers activities related to the administration of social security, such as pensions and unemployment benefits. This estimate of productivity covers the work of various departments, including the Department for Work and Pensions (DWP), HM Revenue and Customs (HMRC) and others.

Indices for inputs, output and productivity, UK, 1997 to 2018

Figure 19: Social security administration productivity was stable in 2018

Indices for inputs, output and productivity, UK, 1997 to 2018

Source: Public Service Productivity – Office for National Statistics

Figure 19 shows that productivity over time for SSA is somewhat volatile, driven mostly by changes in inputs. Between 2017 and 2018, productivity grew by 0.5%. Inputs grew by 2.5% whereas output grew by 3.0%.

SSA can be significantly affected by events in the wider economy, particularly the state of the labour market. For example, output grew in 2008 and 2009, coinciding with the economic downturn and the increase in the UK's unemployment rate from 5.3% in 2007 to 7.8% in 2009.

The roll-out of Universal Credit has created additional challenges for SSA output measurement in 2018. Universal Credit combines the following benefits:

- Job Seekers Allowance

- Income Support

- Housing Benefit

- Child and Working Tax Credits

- Employment and Support Allowance

While 2018 saw a significant transfer of legacy benefits to Universal Credit, up-to-date unit cost estimates for Universal Credit in 2018 were not available. The use of legacy unit cost data in our methods was judged to likely over-estimate the volume of social security output when evaluated against alternative data sources on claims and SSA expenditure. We have therefore made an adjustment to the volume of Universal Credit claims and load to mitigate for this.

We will review methods of social security administration output measurement in the future, with the aim of incorporating newer unit cost estimates that better reflect changes in how Universal Credit data are collected and reported.

# 13 . Police, defence and other government services

Police, defence and other government services are the three service areas in which all output is measured indirectly, meaning the volume of output is equal to the volume of inputs. As such, these service areas have no impact on our total productivity estimates because the ratio of output to inputs will always equal one.

Figure 20: There was little change in inputs volumes in 2018 for police, defence or other government services

Indices for inputs, UK, 1997 to 2018

Figure 20: There was little change in inputs volumes in 2018 for police, defence or other government services

Indices for inputs, UK, 1997 to 2018

Index, 1997 = 100

Police   Defence   Other
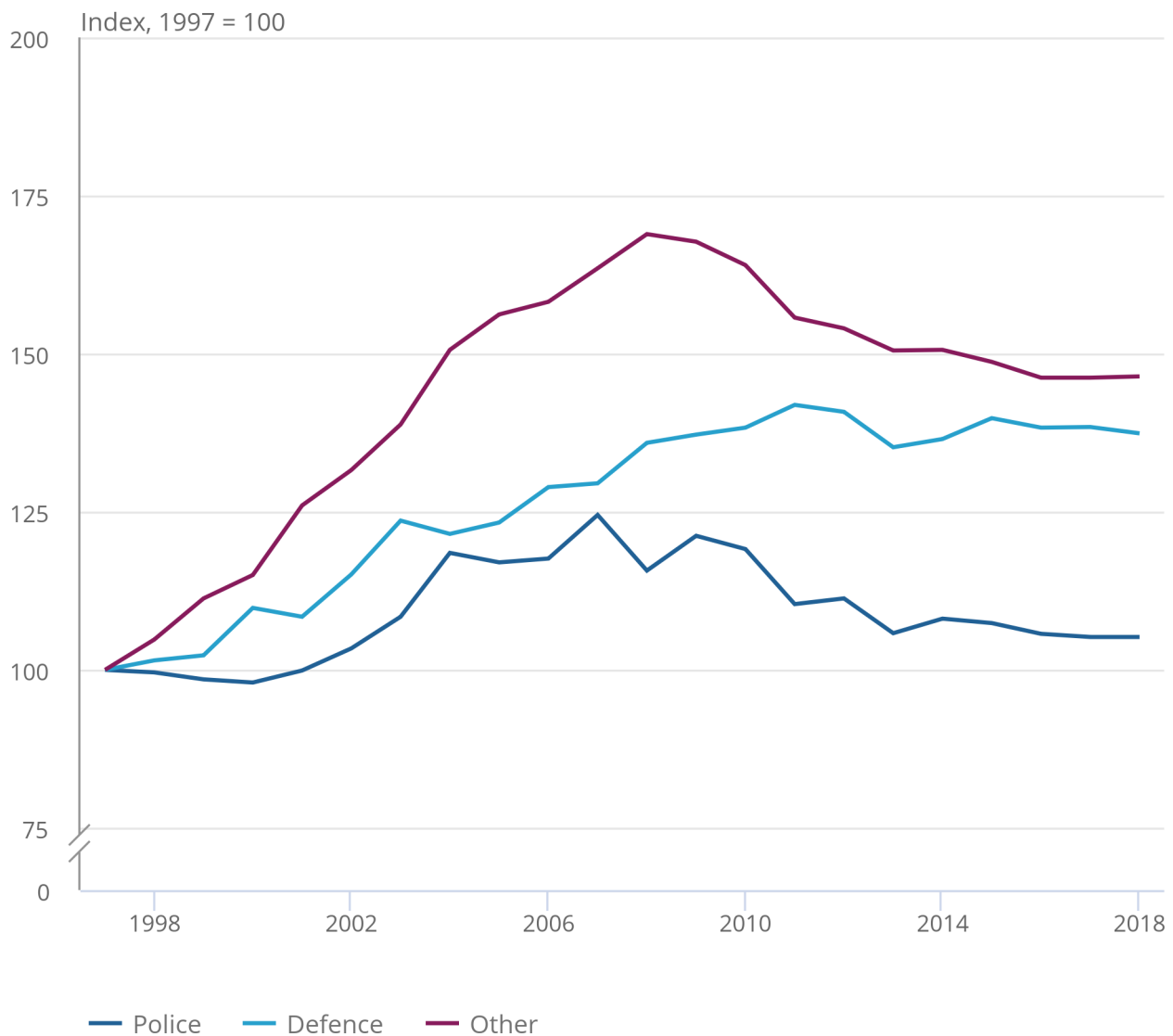
Source: Public Service Productivity – Office for National Statistics

Since the 1998 economic downturn, these service areas have typically had a dampening effect on total public service inputs growth.

In 2018, police inputs remained equal to their 2017 level. There was some small growth in expenditure on labour and capital, but this was offset by a corresponding reduction in procurement.

Defence inputs saw the biggest change of the three indirectly measured services, with a fall of 0.7%. This has been caused by a small fall in capital expenditure.

Other government services include various smaller activities such as spending on housing and recreation. In 2018, it saw moderate growth of 0.1%. This is a combination of growth in labour and capital expenditure with a fall in procurement.

14 . 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 quantity 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. 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.

15 . Data source and methodology

Productivity is the measure of how many units of output are produced from one unit of inputs and is calculated by dividing total output by total inputs.

Inputs include volume estimates of labour (which can either be measured directly through means such as number of staff or indirectly by measuring service area expenditure on staff), intermediate consumption (expenditure on goods and services) and consumption of fixed capital. These inputs, as appropriate, are adjusted for inflation using a suitable deflator.

We measure output either directly or indirectly. If output is measured directly, this means that we have some measurable indicator for the amount of service provided. For example, direct output measurement for schools uses data on the number of students, adjusted for attendance. If output is measured indirectly, as it is for other government services (a service area that includes various smaller activities such as spending on housing and recreation), police and defence, then output is assumed to equal inputs. Therefore, there is no productivity change in these areas as the ratio of inputs to output is always one.

To account for changes in the quality of the service provided, we also use adjustments for quality in some service areas. More information on quality adjustment is available in A guide to quality adjustment in public service productivity measures. It is preferable to use direct measures of output and incorporate an adjustment for quality. Work to develop these methods for different service areas is ongoing and follows the principles of the Atkinson Review (PDF, 1.1MB).

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. A timelier estimate is available in the Productivity economic commentary, UK, which have a two-quarter time lag. However, the quarterly estimates are experimental , whereas the annual estimates are badged as National Statistics. This means that they meet certain quality criteria, listed in the Code of Practice from the UK Statistics Authority.

Estimates in this bulletin cover the UK and, where possible, are based on data for England, Scotland, Wales and Northern Ireland. Where data are not available for all four countries, the assumption is made that the available data are representative of the UK.

More quality and methodology information on strengths, limitations, appropriate uses, and how the data were created is available in Public service productivity: total, UK QMI and Sources and Methods for Public Service Productivity Estimates: Total Public Services.

The data used in this article are available to download. Data used in the construction for each chart are listed as a download under each one, alongside an option to download the chart as an image.

Authors and acknowledgements

Joe Ball, Rhys Humphries, Jon Gardner, Meera Parmar and Sara Zella, Office for National Statistics.

16 . Related links

Productivity economic commentary, UK: October to December 2020

Article | Released 14 April 2021

The main findings from official statistics and analysis of UK productivity, presenting a summary of recent developments.

Improved methods for total public service productivity: total, UK, 2018

Article | 1 April 2021

Explaining methodological improvements to education quality adjustment, healthcare, adult social care, education and police inputs, and the National Accounts data source used in the upcoming Public service productivity article.

Public service productivity, healthcare, England: financial year ending 2019

Article | Released 2 February 2021

Analysis of estimates of output, inputs and productivity for public service healthcare in England, with additional estimates for the UK.

Methodological developments to public service productivity, healthcare: 2021 update

Article | Released 18 January 2021

Methodological changes to public service healthcare productivity, including improved measures of primary care output.