

Article

# Public Service Productivity Estimates: Total Public Services, 2012

This release contains updated output, inputs and productivity estimates for public services in the UK between 1997 and 2012. Previously published estimates for 1997-2010 are updated, and new estimates are provided for 2011 and 2012. It provides an analysis of key trends, and identifies which public service areas are the main drivers of total public service productivity.



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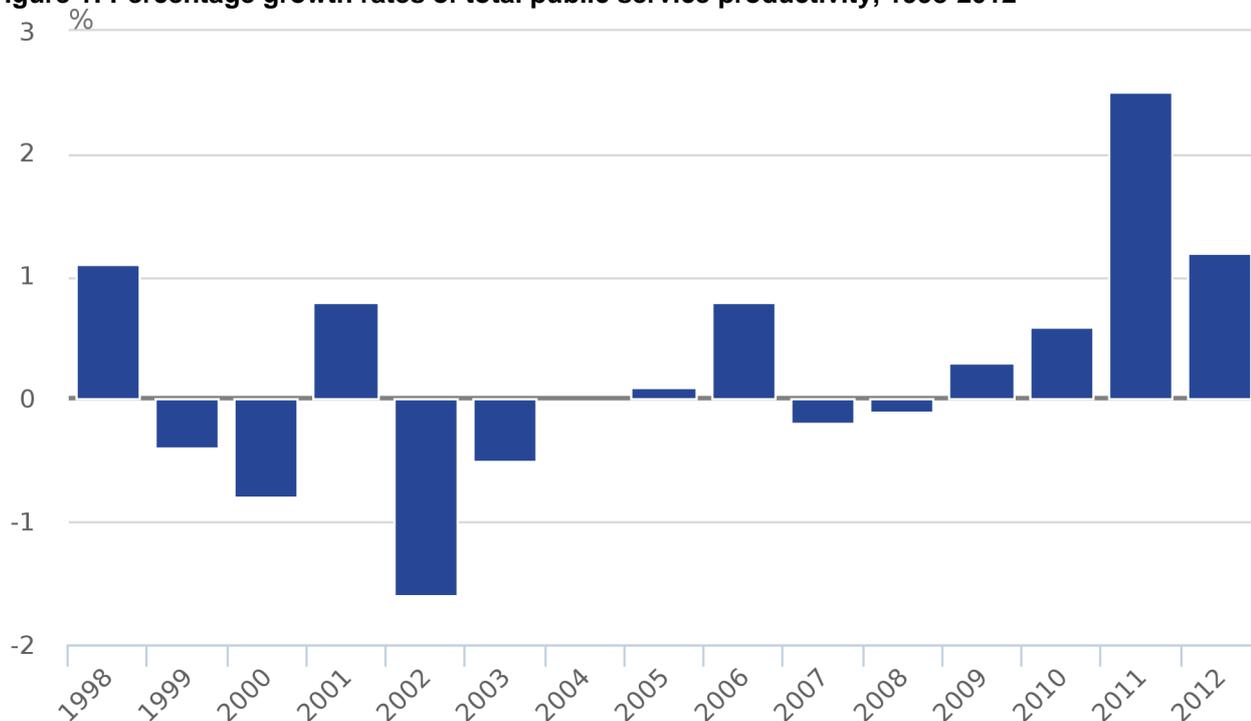
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# 1. Key points

- Estimated growth rates of total public service productivity are 2.5% in 2011 and 1.2% in 2012, the two largest growth rates in productivity since the series began in 1997
- There are four consecutive years of total public service productivity growth from 2009 to 2012. Average total public service productivity growth in 2011 and 2012 is 1.8% per year, compared to an average of 0.4% per year in 2009 and 2010
- Positive productivity growth for total public services in 2011 and 2012 is driven by falling volume of inputs, the first two falls in the volume of inputs since the series began in 1997
- Total public service output growth slowed down substantially from 4.0% in 2008 to 0.4% in 2011 and 0.1% in 2012, the smallest output growth rate in the series. Output includes an element of quality adjustment for healthcare and education which is positive in all years except 2012
- Healthcare and education have the greatest combined share of estimated government expenditure on public services at 54% in 2012; therefore, growth rates for healthcare and education have the greatest influence on estimated growth rates for total public services

**Figure 1: Percentage growth rates of total public service productivity, 1998-2012**



Source: Office for National Statistics

[Reference table 1: Growth rates and indices for total public service output, inputs and productivity, 1997-2012 \(29 Kb Excel sheet\)](#)

## 2. Introduction

This release contains updated output, inputs and productivity estimates for public services in the UK between 1997 and 2012. Previously published estimates for 1997-2010 are updated, and new estimates are provided for 2011 and 2012. It provides an analysis of key trends, and identifies which public service areas are the main drivers of total public service productivity.

Much of the data in this release are based on the latest estimates of expenditure on government services at a detailed functional level which are published annually by ONS following a data validation exercise by Eurostat and are complete up to the end of calendar year 2012 (ONS 2014a). Data for 2013 at the required level of detail will be available in Spring 2015. Data availability issues are discussed in more detail in the background notes.

This release includes estimates of healthcare and education output, inputs and productivity which have been previously published in more detail in separate articles (ONS 2014b, ONS 2015a).

ONS public service productivity estimates were developed in response to the recommendations of the Atkinson Review on the measurement of government output and productivity for the National Accounts (Atkinson 2005). Users of productivity estimates include UK government departments such as the Cabinet Office and organisations such as the National Audit Office and Office of Budget Responsibility. Productivity estimates for individual service areas are also of interest to researchers in each sector, for example the Nuffield Trust makes use of estimates of healthcare productivity.

It is important to note that while these productivity estimates provide a measure of the amount of output which is produced for each unit of input, they do not measure value for money or wider government performance. They do not say, for example, whether the inputs have been purchased at the lowest cost, or whether the desired outcomes are achieved through the output provided. The background notes provide more information on the interpretation of the statistics in this release.

Estimates of output, inputs and productivity are given as growth rates which show the relative movement compared to the previous year. Growth rates for output and inputs are converted to indices with a base year of 1997, and the productivity index is calculated by dividing the output index by the inputs index. The percentage change in the productivity index between consecutive years provides the annual growth rates for productivity. Positive productivity growth will occur when output growth is greater than inputs growth, i.e. more output is being produced for each unit of input compared to the previous year.

Estimates for total public services are produced by combining the growth rates for individual service areas, listed below. Growth rates are combined based on their relative share of total government expenditure, which are used as expenditure weights. This means that the growth rate of service areas with a greater proportion of total expenditure will contribute more to the overall growth rate for total public services.

- Healthcare
- Education
- Social Security Administration
- Adult Social Care
- Children's Social Care
- Public Order and Safety (including the courts, the fire services and the prison service but excluding police)
- Police
- Defence
- Other (including general government services, economic affairs, environmental protection, housing and recreation)

For most service areas output is estimated as the quantity of activities performed and services delivered. For healthcare and education a quality adjustment is applied which adjusts the quantity estimate of output based on the quality of the service provided. For three service areas, police, defence and other services, it is hard to estimate the quantity of output as there are no market transactions and the services are collectively consumed. For these service areas it is assumed that the volume of output is equal to the volume of inputs used in producing them, known as the 'inputs=output' convention. This means that for police, defence and other services, productivity growth is zero in all years as the growth rate of output is equal to the growth rate of inputs.

For most service areas estimates of inputs are produced by combining current price expenditure on labour, goods and services and capital consumption each adjusted by a suitable deflator. Further information on methods including variations between service areas is given in the paper Sources and Methods for Public Service Productivity Estimates: Total Public Services (ONS 2014c). A table giving a brief summary of methods for estimating output and inputs for each service area is given in Annex A.

The estimates in this release have an open revisions policy, meaning that each time a new article is published revisions are allowed for the whole of the time period. There have been small revisions to previously published growth rates of output, inputs and productivity for total public services in all years. There has been no change in the previously published annual average growth rate of total public services between 1997 and 2010 which remains at 0.0%. Further information on revisions and their cause is provided in the revisions section.

## 3. Total public services

### Key points

- Annual average growth rate<sup>1</sup> for total public service productivity has increased from 0.0% for the period 1997-2010 to 0.2% for the period 1997-2012, driven by positive estimated growth rates of total public service productivity of 2.5% in 2011 and 1.2% in 2012 - the two largest positive growth rates in productivity since the series began in 1997
- Positive productivity growth is driven by falling inputs which fell by 2.0% between 2010 and 2011 and a further 1.1% between 2011 and 2012. This is the first time the volume of total public service inputs has fallen since the series began in 1997 and follows a trend of slowing growth rates in inputs from 4.1% in 2008 to 1.3% in 2010
- Output growth remains positive while continuing a downward trend from 4.0% in 2008 to 0.1% in 2012, the smallest output growth rate in the series
- There was consistently high positive growth in both output and inputs throughout the period 2000-2005, where both output and inputs growth rates remained above the average for 1997-2012. During this time the relative growth rates of output and inputs varied, leading to periods of both rising and falling productivity. The largest fall in productivity is seen during this period in 2002 which is also the year of the largest positive growth in inputs

### Context

- Falling inputs in 2011 and 2012 coincide with reductions in some departmental budgets as stated in the Spending Review 2010 (HM Treasury 2010)
- The Efficiency and Reform Group in Cabinet Office (CO) working in partnership with HM Treasury and other government departments helped to deliver savings of £5.5 billion in financial year 2011/12 and a further £10 billion in 2012/13 across the themes of procurement, transformation, projects and workforce (CO 2014). This savings figure is against a 2009/10 baseline
- As growth of total public services is calculated by combining growth rates of output and inputs from individual service areas, context information given for each service area contributes to the overall story for total public service productivity

## Contribution of service areas

Figure 2 shows the expenditure weights for each service area in 2012, which represent the amount to which the growth rate of each individual service area contributes to the growth rate for total public services. Healthcare and education provide the greatest contribution with a combined weight of 54% in 2012, with the growth rates of these service areas having a correspondingly large influence on the estimated growth rate for total public services.

### Figure 2: Expenditure weights by service area, 2012

Source: Office for National Statistics

#### Notes:

1. service areas which use the 'inputs = output' convention for which productivity growth is by default zero are:  
Police  
Defence  
Other services

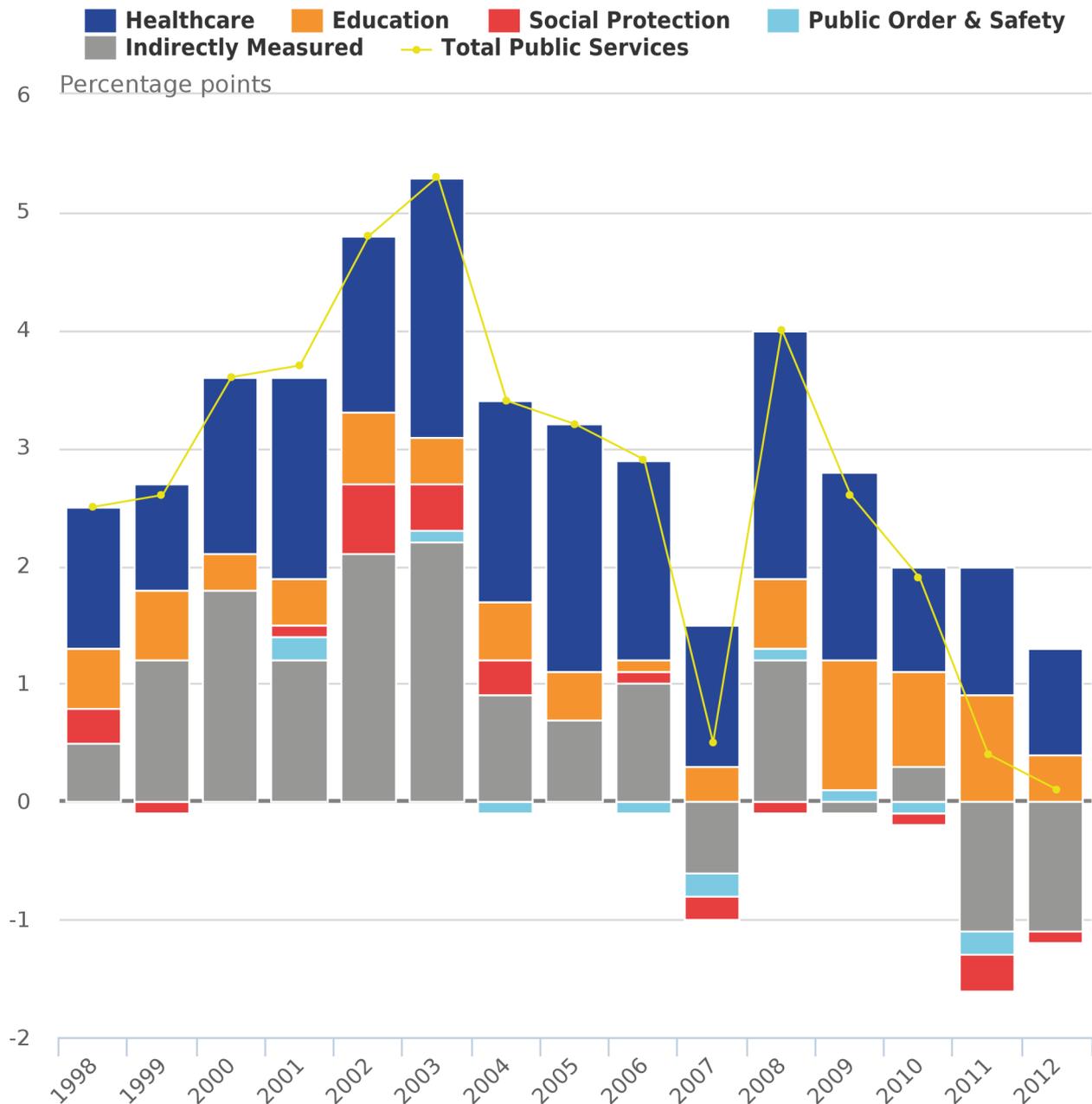
[Reference table 2: Expenditure weights by service area, 1997-2012 \(29 Kb Excel sheet\)](#)

Total public service growth in each year is estimated as the sum of contributions to growth from individual service areas, calculated as the growth rate for each service area multiplied by its expenditure weight in the previous year. Contributions to growth are calculated separately for output and inputs and are shown in figures 3 and 4 respectively.

Figure 3 shows how small positive output growth in 2011 and 2012 is driven by growth in output for healthcare and education offset by falling output in the majority of other service areas. A large part of the negative contributions are from defence and other services which use the 'inputs=output' convention and therefore reflects falling inputs in these service areas rather than a measured decrease in output.

**Figure 3: Contributions to total public service output growth, 1998-2012**

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Source: Office for National Statistics

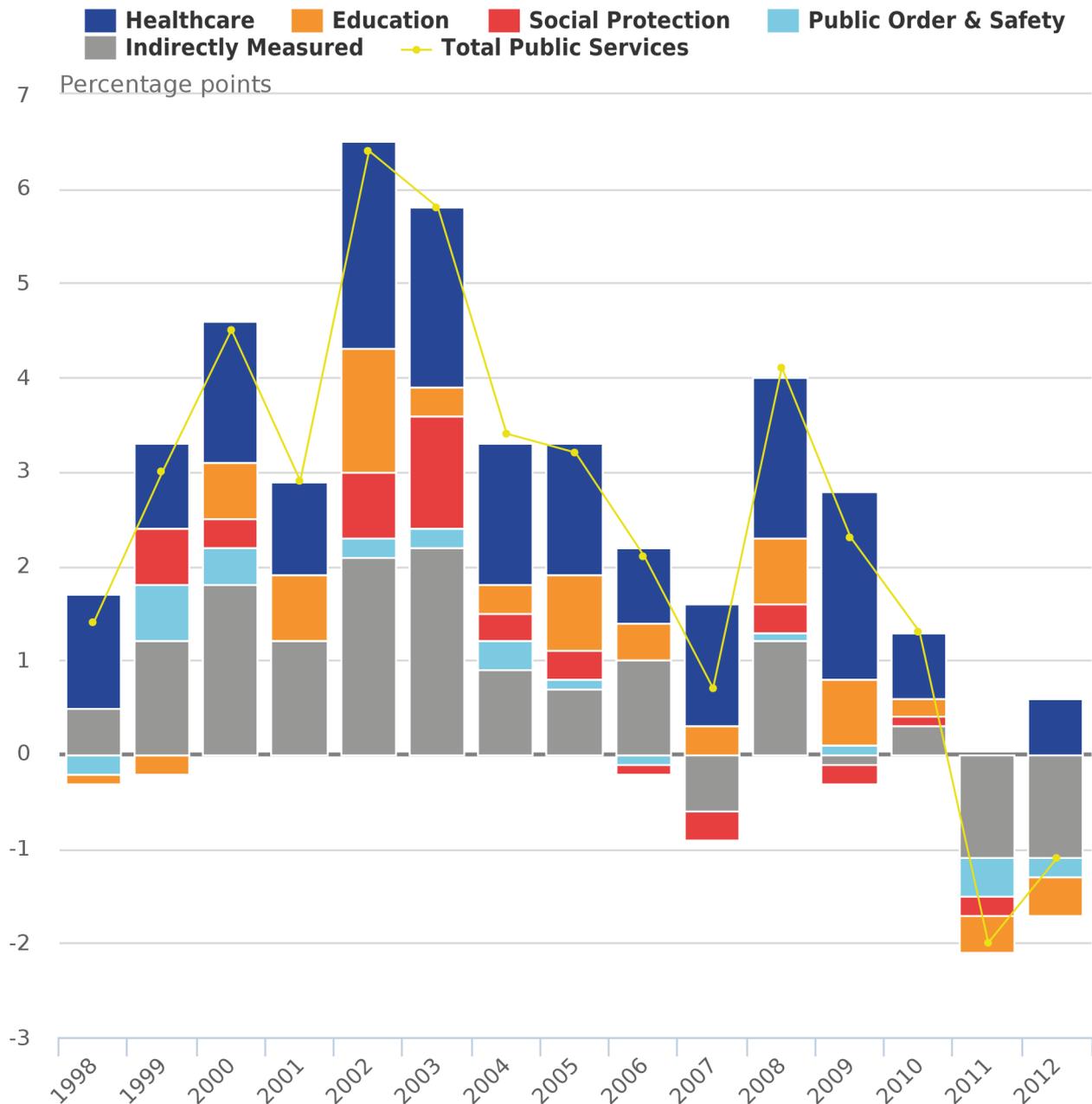
Notes:

1. Social protection combines contributions to growth for social security administration, adult social care and children's social care.
2. Indirectly measured combines contributions to growth for police, defence and other services.

Figure 4 shows the majority of service areas contribute a negative growth rate to total public service inputs in 2011, and healthcare is the only service area contributing a positive growth in inputs of more than 0.1 percentage points in 2012. In both 2011 and 2012 the largest negative contributions, representing falling inputs, come from the education, defence and other service areas.

**Figure 4: Contributions to total public service inputs growth, 1998-2012**

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Source: Office for National Statistics

Notes:

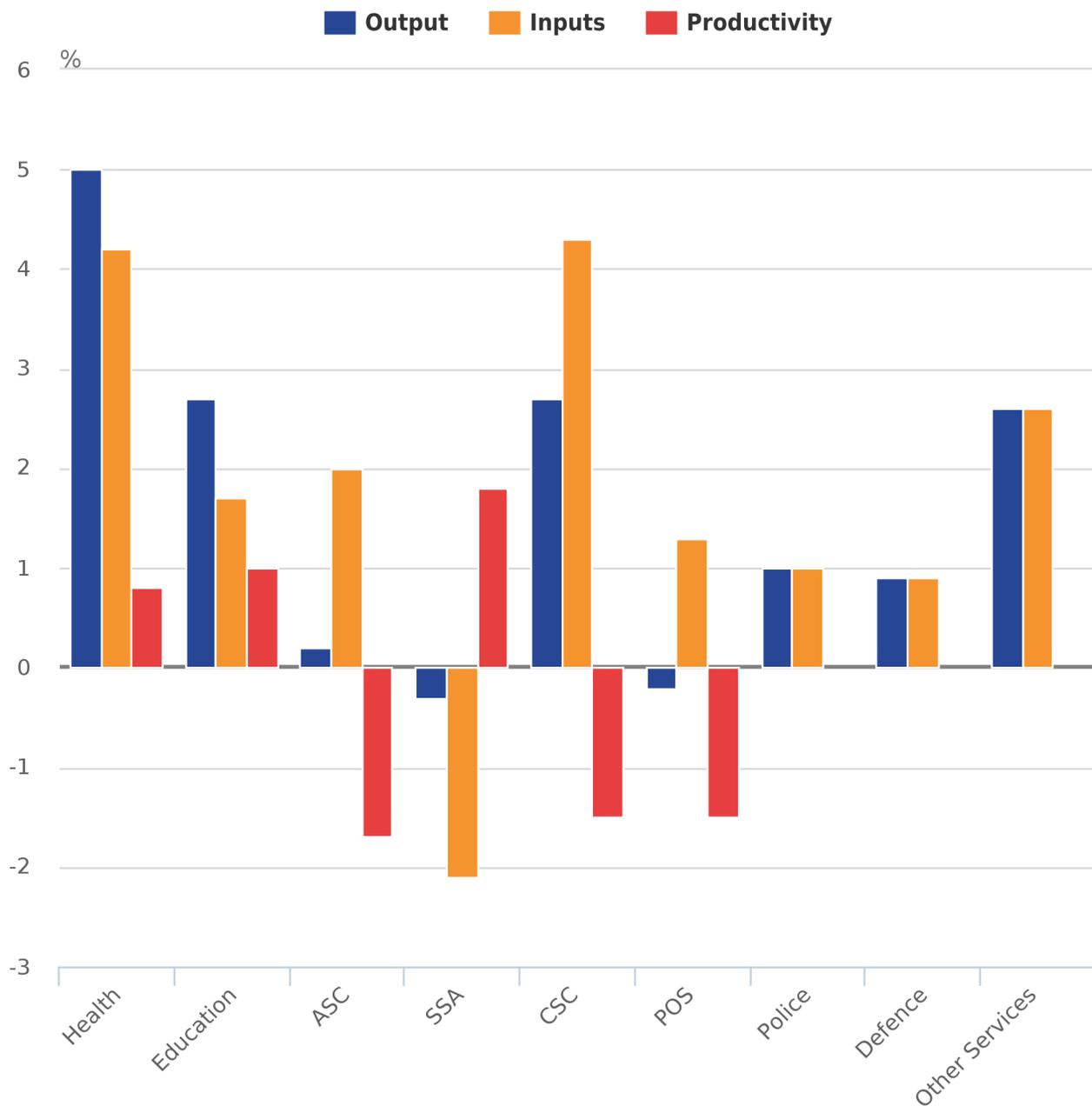
1. Social protection combines contributions to growth for social security administration, adult social care and children's social care
2. Indirectly measured combines contributions to growth for police, defence and other services

Figure 5 shows the annual average growth rates for output, inputs and productivity between 1997 and 2012 for individual service areas. Healthcare and children's social care show the strongest annual average growth in both output and inputs.

Positive annual average growth rates between 1997 and 2012 for productivity in healthcare, education and social security administration are offset by negative annual average productivity growth in adult social care, children's social care and public order and safety over the same period. As healthcare and education have the largest expenditure weights this results in an overall small positive annual average productivity growth of 0.2% between 1997 and 2012 when all service areas are combined.

**Figure 5: Annual average growth rates in output, inputs and productivity between 1997 and 2012, by service area**

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Source: Office for National Statistics

Notes:

1. ASC - Adult Social Care; SSA - Social Security Administration; CSC - Children's Social Care; POS - Public Order and Safety.
2. Productivity growth for police, defence and other services are zero as they use the inputs = output convention and therefore have constant productivity by definition.

## Notes for total public services

1. Annual average growth rates from the base year in 1997 are calculated as geometric means from the output, inputs and productivity indices using the formula:

$$(\text{index in current year} / 100) ^ { (1 / \text{number of years} - 1) } - 1$$

## 4. Effect of quality adjusting output

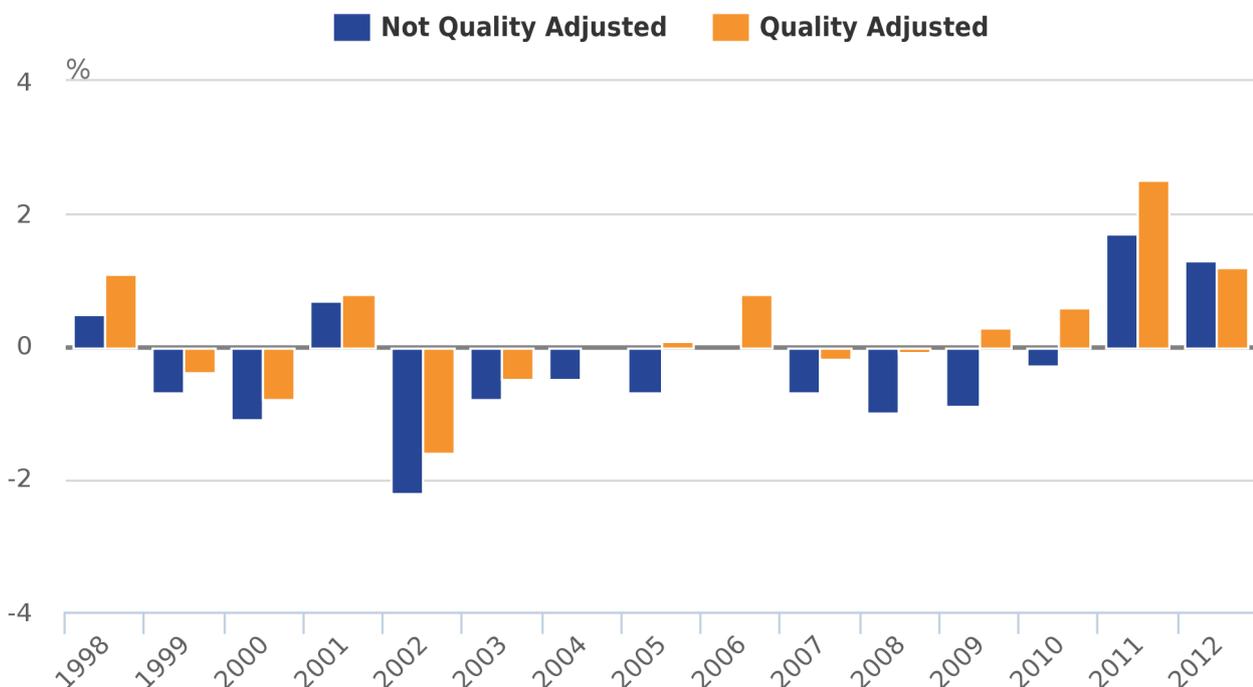
There are two elements to direct estimates of output; the quantity of activities performed and services delivered, and the quality of those activities and services. At present a quality adjustment factor is only applied to services in healthcare and education, which adjusts the quantity estimate of output to account for quality.

As healthcare and education together make up 54% of total government expenditure in 2012, quality adjustment of output has an impact on estimates of total public service productivity. If the quality adjustment is positive it will increase estimates of productivity growth, while a negative quality adjustment will decrease estimates of productivity growth.

Figure 6 shows the combined effect of the quality adjustments for healthcare and education on total public service productivity estimates. Total public service productivity estimates calculated using quantity of output are compared to estimates calculated using quality adjusted output.

**Figure 6: Comparison of growth rates of total public service productivity using quantity and quality adjusted estimates of output, 1998-2012**

UK



Source: Office for National Statistics

Notes:

1. Quality adjustment is only applied to the healthcare and education service areas

In all years from 1997 to 2011 quality adjustment of healthcare and education output increases the overall estimate of productivity growth. The exception is in 2012 when the quality adjustment makes a marginal negative contribution of -0.05 percentage points, driven by the negative quality adjustment for education.

Over the whole period 1997 to 2012 quality adjustment of output for healthcare and education increases annual average productivity growth for total public services by 0.5 percentage points, from a fall of -0.3% to growth of +0.2%.

Further information on the methods of quality adjustment and their impact on estimates of output and productivity for the healthcare and education services areas are available in the previously published articles (ONS 2014a, ONS 2015a).

[Reference table 3: Growth rates of output and productivity for total public services excluding quality adjustment for healthcare and education, 1998-2012 \(28 Kb Excel sheet\)](#)

## 5. Indirectly measured output

For service areas where it is hard to estimate the quantity of output as there are no market transactions and the services are collectively consumed it is assumed that the volume of output is equal to the volume of inputs used in producing them, known as the 'inputs=output' convention. This means that productivity growth is zero in all years as the growth rate of output is equal to the growth rate of inputs. This applies to the police, defence and other service areas which have a combined expenditure weight of 32% in 2012.

In addition to police, defence and other services, the 'inputs=output' convention is also applied to approximately 10% of healthcare outputs for services delivered by non-NHS providers and 60% of childcare outputs for services relating to non-looked after children. Together these indirectly measured outputs account for approximately 37% of total expenditure.

Zero contributions to productivity growth from service areas with indirectly measured output limit productivity growth of total public services, making both positive and negative growth rates smaller (closer to zero). The extent to which they affect total public service productivity growth is proportional to the expenditure weight. The total expenditure weight of unmeasured output service areas has been steadily decreasing from 39% in 1997 to 32% in 2012, mainly driven by falls in the proportion of expenditure on defence. The impact of indirectly measured output on total public service productivity therefore decreases over the time series.

Annual average growth in productivity for total public services between 1997 and 2012 increases from 0.2% including all service areas to 0.4% if police, defence and other services are excluded entirely from the estimates.

[Reference table 4: Growth rates of total public service output, inputs and productivity excluding police, defence and other services, 1998-2012 \(28.5 Kb Excel sheet\)](#)

## 6. Growth rates of individual service areas

The following sections provide more detailed data on the output, inputs and productivity growth rates for individual service areas. Where possible, commentary has been provided to put the changes seen into context to aid interpretation. All charts (with the exception of social security administration) are shown on the same axes to aid comparison between service areas.

A table giving a brief summary of methods for estimating output and inputs for each service area is given in Annex A of this release.

# 7. Healthcare

The healthcare estimates given here have been previously published in Public Service Productivity Estimates: Healthcare 2012 (ONS 2015a) which contains more detailed information on healthcare productivity estimates and methods.

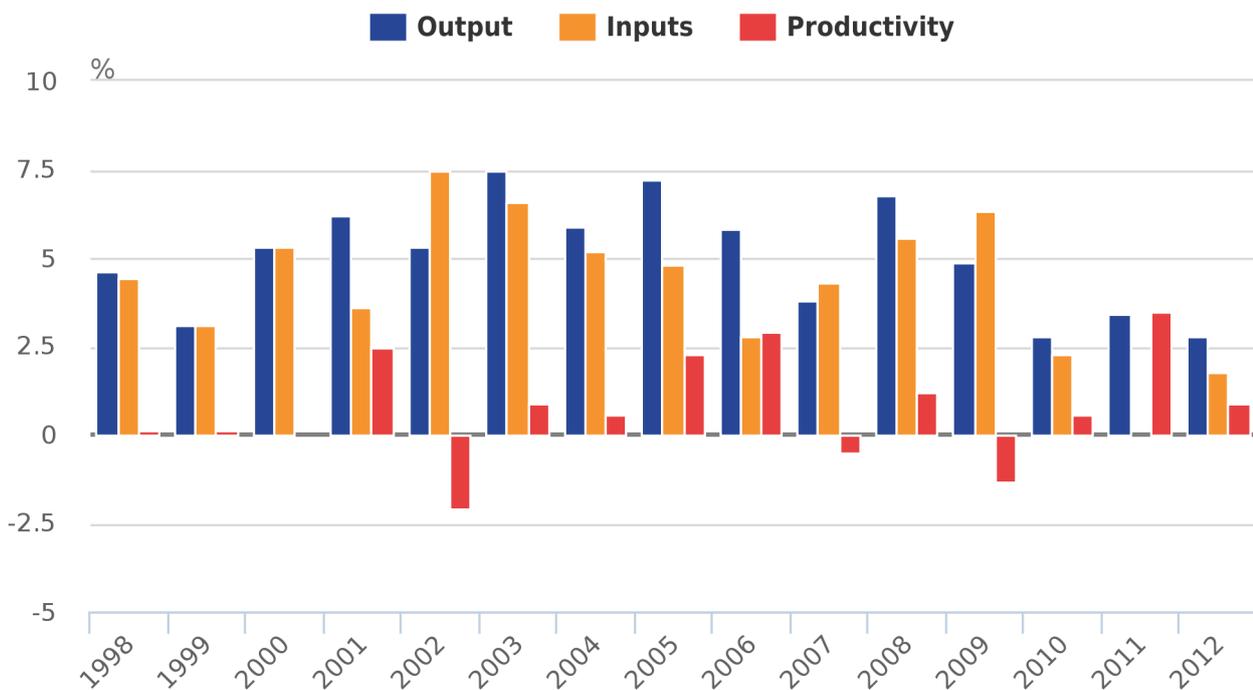
A quality adjustment is applied to healthcare output which reflects two measures of quality:

- Delivery of intended outcomes including survival rates, health gain and waiting times
- Meeting users' needs measured through the National Patient Survey

Healthcare has the largest contribution to total expenditure at 34% in 2012, so changes in healthcare output and inputs have a correspondingly large effect on changes to total public service output and input growth.

**Figure 7: Growth rates for healthcare output, inputs and productivity, 1998-2012**

UK



Source: Office for National Statistics

## Key points

- Public service healthcare has experienced its third consecutive year of productivity growth since 2010. The last period prior to this to experience consecutive years of productivity growth was 2003 to 2006
- In 2011 public service healthcare productivity increased by 3.5% - the largest increase since the series began. Growth in productivity was still positive but fell back to 0.9% in 2012, due to a decrease in output growth to 2.8% and an increase in input growth to 1.8%
- The last two years of positive productivity growth have increased the annual average growth rate for public service healthcare productivity from 0.6% between 1997 and 2010 to 0.8% between 1997 and 2012
- The main component of public service healthcare output growth continues to be hospital and community health service activity, while the main component for inputs growth continues to be goods and services rather than labour volumes
- There was a smaller than average, but still positive, contribution to public service healthcare output growth from the quality-adjustment factor in 2012

## Context

- The much slower growth rates of inputs from 2009-2011 compared to previous years comes at a time of the Nicholson efficiency challenge which required the NHS in England to make £20 billion savings by the end of the Spending Review period in 2015
- Decreased growth rates of inputs in 2011 and 2012 compared to previous years is also associated with lower budget increases experienced across the UK health service under the Spending Review 2010 (HM Treasury 2010)
- Increased contribution of labour to the growth rate of inputs from 2002-2004 coincides with an expansion in recruitment within the NHS as a result of the NHS Plan launched in 2000 and the Agenda for Change reforms launched in 2004

[Reference table 5: Growth rates and indices of output, inputs and productivity for individual service areas, 1997-2012 \(117.5 Kb Excel sheet\)](#)

## 8. Education

The education estimates given here have been previously published in ONS 2014b which contains more detailed information on productivity estimates and methods.

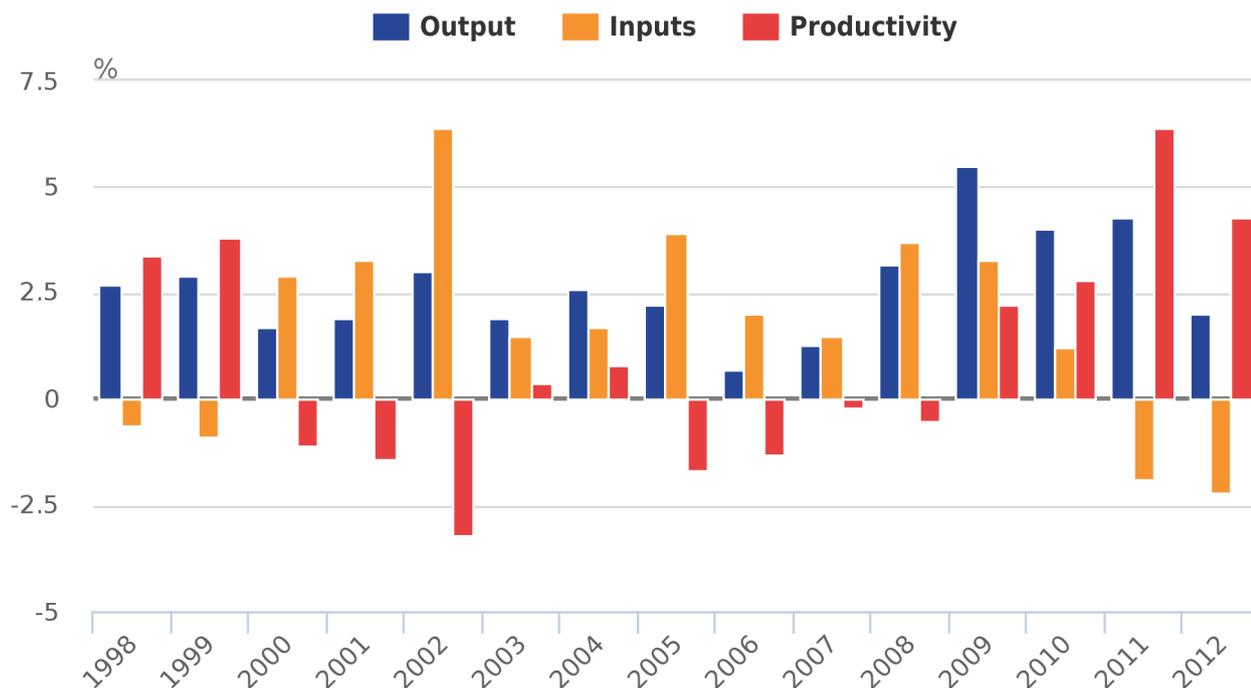
The quantity of education output is estimated as the total number of full-time equivalent students and pupils at government funded settings across the UK, adjusted for attendance. A quality adjustment is applied to the quantity estimates based on Average Point Scores (APS) for GCSEs or Standard Grades and equivalent qualifications.

Education estimates included in this release and in ONS 2014a introduce a new data source for adjusting teacher numbers by the number of hours worked in the estimation of inputs. More information on this change including a sensitivity analysis of how this change has affected estimates of education productivity is given in Methods Change in Public Service Productivity Estimates: Education 2012 (ONS 2014d).

Education has the second largest contribution to total expenditure at 20% in 2012, so changes in education output and inputs have a correspondingly large effect on changes to total public service output and inputs growth.

**Figure 8: Growth rates for education output, inputs and productivity, 1998-2012**

UK



Source: Office for National Statistics

## Key points

- Estimated growth rates of education productivity of 6.4% in 2011 and 4.3% in 2012 are the largest positive growth rates in productivity since the series began in 1998, driven by falling inputs combined with strong growth in output
- Falls in inputs in 2011 and 2012 are attributed to falls in teacher and support staff numbers and the volume of goods and services
- Strong positive growth in output from 2009-2012 are largely attributed to growth in attainment at GCSE and equivalent level
- Positive productivity growth in 2011 and 2012 has led to an increase in annual average growth rate of productivity from 0.3% for the period 1997-2010 to 1.0% for 1997-2012
- Recent positive growth in productivity from 2009-2012 follows a period of extended small or negative productivity growth from 2000-2008 where growth of inputs exceeded growth of output
- The quality adjustment has a strong positive impact on growth rate of output for 1998-2011, representing a year on year increase in overall Average Point Score. The exception is for 2012 which is the first year where the quality adjustment has a negative contribution to total output growth, driven by a fall in the overall Average Point Score for England

## Context

- As the quantity of education output is estimated from the number of full-time equivalent pupils and students, and schools make up around 80% of total quantity by expenditure share, changes in education output are mainly driven by changes in the school age population
- Strong positive growth in output quantity from 2010-2012 is partially explained by the increase in the UK population and birth rate increasing the number of pupils in primary education. We would expect this population growth to be reflected in the secondary education sector from around 2016 onwards

[Reference table 5: Growth rates and indices of output, inputs and productivity for individual service areas, 1997-2012 \(117.5 Kb Excel sheet\)](#)

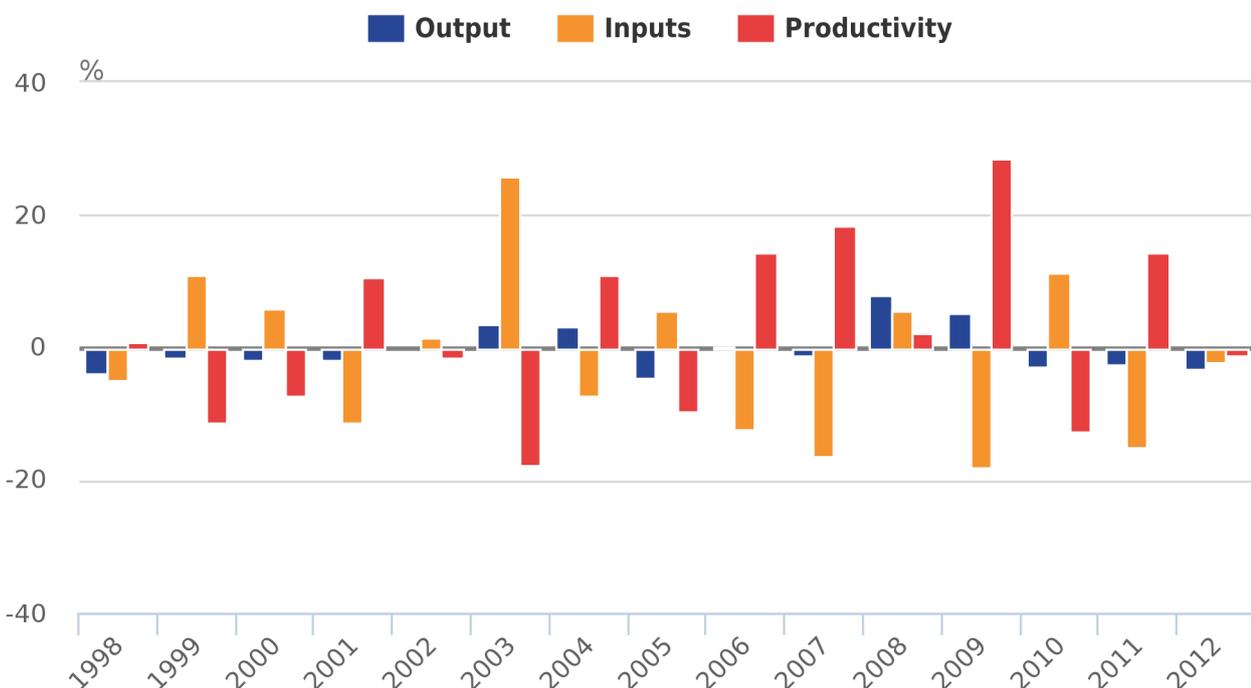
## 9. Social security administration

Social security administration (SSA) has the smallest expenditure share of all service areas at 1.1% in 2012, and so changes in growth rates of output and inputs for SSA has a minor impact on the overall growth rates for total public services.

A large proportion of SSA expenditure is for activities undertaken in the administration of benefits by the Department for Work and Pensions (DWP); however, the estimates presented here cannot be taken as direct estimates of DWP productivity as they both exclude other activities undertaken by DWP which fall within other classifications of government expenditure, and include administrative activities of other departments such as administration of tax credits by Her Majesty's Revenue and Customs (HMRC).

**Figure 9: Growth rates for social security administration output, inputs and productivity, 1998-2012**

UK



Source: Office for National Statistics

Notes:

1. Scale of this figure is larger than that of other service areas

## Key points

- Annual average growth in SSA productivity between 1997 and 2012 is 1.8%, the highest average productivity growth of all directly measured service areas
- Productivity growth has been volatile over the series, ranging from -17.8% in 2003 to 28.4% in 2009, driven mainly by similar volatility in expenditure on goods and services in the estimation of inputs
- A small fall in productivity of 1.1% in 2012 is caused by output falling slightly more than inputs, as falling inputs on goods and services are offset by growth in labour inputs
- Growth rates of SSA output have remained relatively stable compared to growth rates of inputs, the largest growth rates in 2008 and 2009 being followed by three years of steadily falling output from 2010-2012

## Context

- Output growth is partly driven by the economic climate which influences the number of benefit claims. Strong output growth in 2008 and 2009 coincides with the onset of the recession in the UK with associated increases in claims for Jobseeker's Allowance and other benefits, while falling outputs from 2010-2012 coincide with a decrease in both new and existing benefit claims administered by DWP
- Falling inputs in 2011 and 2012 reflect cost reductions in social security administration across government as outlined in the Spending Review 2010, and may also be influenced by other improvements in benefits administration such as online submission of benefits claims
- Growth in inputs in 2002 and 2003 follows the creation of DWP in 2001 when there was a period of reorganisation and investment including new Jobcentre Plus offices, pension centres and modernisation of IT systems (DWP 2011). Subsequent falls in inputs within DWP were driven by reductions in staff numbers and other costs initiated by the Gershon Review and the launch of digital services in more recent years
- Volatility in expenditure on goods and services, the main driver for inputs growth, may be exaggerated in some years which have large quarterly changes by the presentation of data in calendar years instead of financial years. The Department for Work and Pensions (DWP) produce their own estimates of departmental productivity using the same methodology but with known differences in scope to those produced in this article, with latest figures available up to the financial year 2012/13 (DWP 2014)

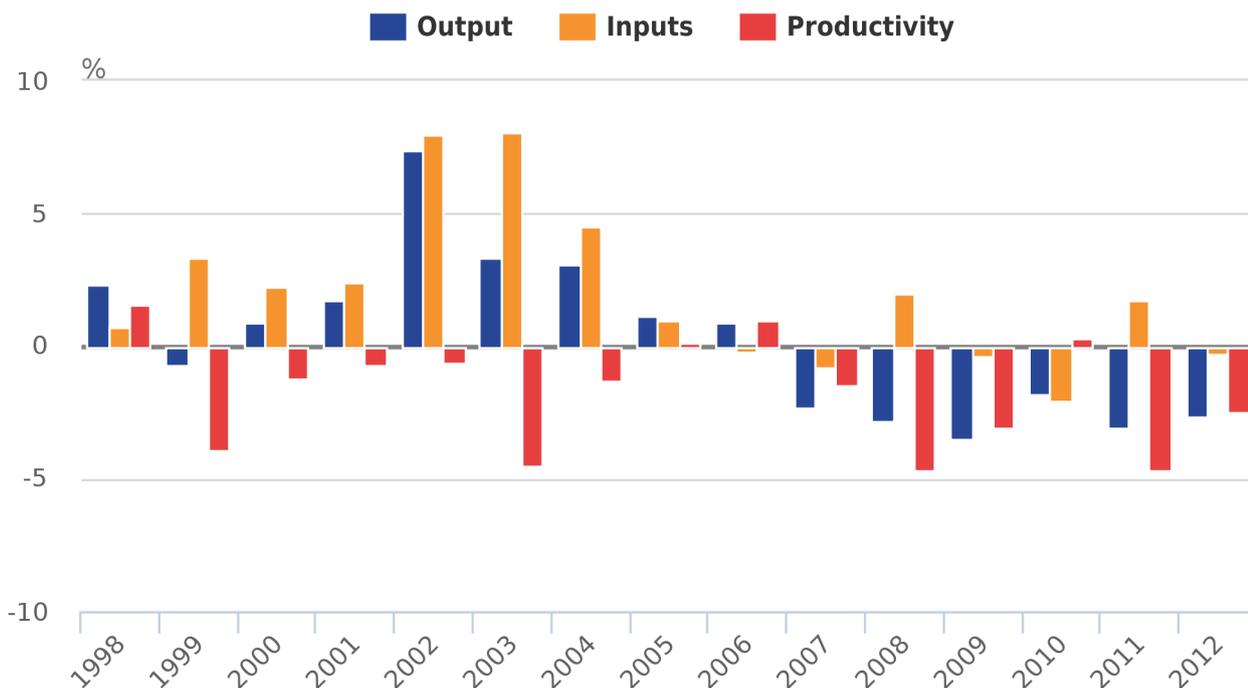
[Reference table 5: Growth rates and indices of output, inputs and productivity for individual service areas, 1997-2012 \(117.5 Kb Excel sheet\)](#)

## 10. Adult social care

Adult social care had an expenditure weight of 6.3% in 2012, so changes in growth rates of Adult Social Care have a relatively small impact on the growth rate for total public services.

**Figure 10: Growth rates for adult social care output, inputs and productivity, 1998-2012**

UK



Source: Office for National Statistics

## Key points

- With the exception of small positive productivity growth of 0.3% in 2010, adult social care productivity has fallen each year from 2007 to 2012 driven by falling output
- A similar period of continuously falling productivity from 1999-2004 is associated with inputs growing faster than output
- Falls in productivity in 2011 and 2012 have led to a decrease in annual average productivity growth of 0.3 percentage points from -1.4% between 1997 and 2010 to -1.7% between 1997 and 2012
- Strong growth in inputs from 1998 to 2004 is driven by rising expenditure on goods and services for independent care which off-sets small or negative contributions to growth from labour inputs
- In 2011 and 2012 falling labour inputs are off-set by growth in procurement of goods and services for independent care

## Context

- Growth in the volume of inputs in 2011 coincide with an additional £2 billion of funding for social care by 2014/15 announced in the 2010 Spending Review (HM Treasury 2010)
- Estimates of falling output in recent years represent only a change in the quantity of care provided measured in terms of time, such as number of weeks of residential care, and number of items, such as number of meals provided. They do not take into account the quality of the service provided or the intensity of need which is being met
- Recent evidence from some studies indicates that the quality of social care services has improved in recent years (Care Quality Commission 2014), suggesting that the inclusion of a quality adjustment in estimates of output could increase estimates of productivity growth
- Estimated falls in output are consistent with a 26% reduction in the number of people receiving adult social care services between 2009/10 and 2012/13, linked to tightening of eligibility criteria for publicly funded support rather than a reduction a demand (The Heath Foundation 2014)
- The drop in the quantity of output in recent years may also be attributed in part to a focus by some councils on prevention, improving independence and promotion of non-residential care as outlined in the Adult Social Care Efficiency Programme launched in 2011 (LGA 2014)

[Reference table 5: Growth rates and indices of output, inputs and productivity for individual service areas, 1997-2012 \(117.5 Kb Excel sheet\)](#)

## 11. Children's social care

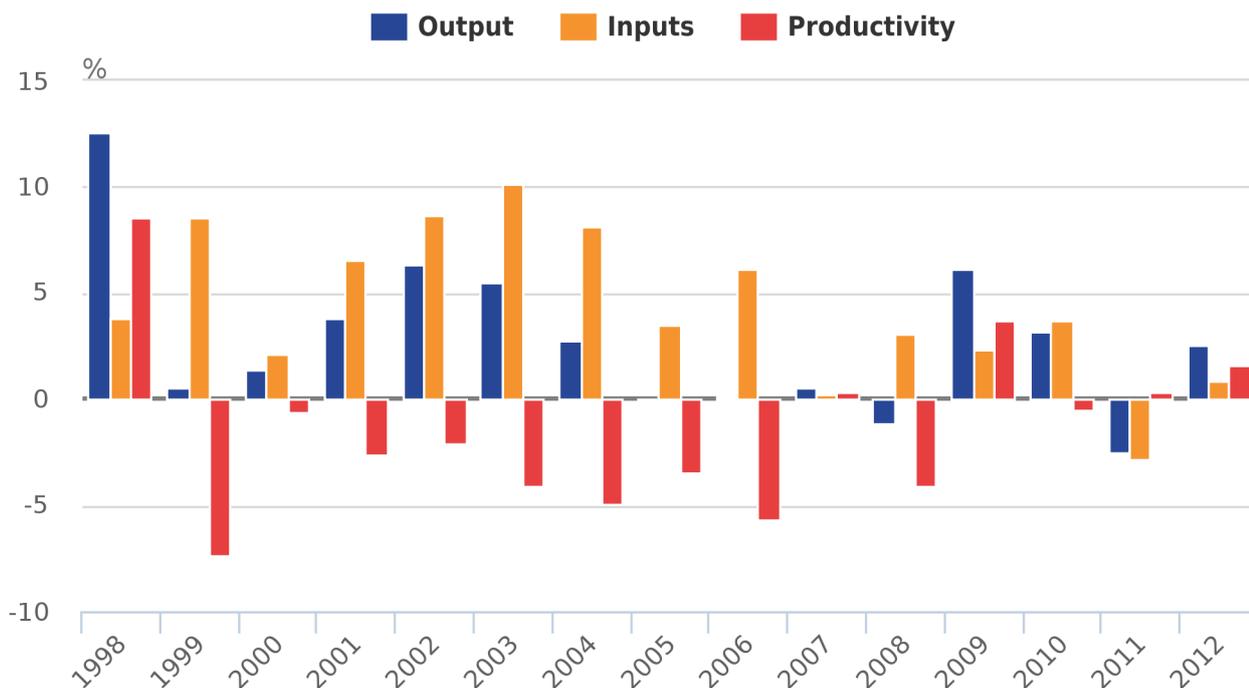
Growth rates of children's social care output are estimated separately for looked after and non-looked after children and then combined to give an estimated growth rate for children's social care output based on their relative proportion of total expenditure (expenditure weights). Output for non-looked after children is not directly measured and uses the 'inputs=output' convention, while output for looked after children is directly measured using data on activities undertaken.

There have been small methods changes in the estimation of children's social care output and inputs since the previously published estimates. These changes and their impact on previously published estimates of children's social care and total public service productivity are given in Methods Change in Public Service Productivity Estimates: Total Public Services 2012 (ONS 2015b). Information on revisions from the previously published estimates including both methods changes and revisions to source data are given in the revisions section of this article.

Children's social care had an expenditure weight of 2.6% in 2012, the second smallest weighting after social security administration. Changes in growth rates of output and inputs for children's social care therefore make a very small contribution to growth rates for total public services.

**Figure 11 Growth rates for children's social care output, inputs and productivity, 1998-2012**

UK



Source: Office for National Statistics

## Key points

- Children's social care experienced eight consecutive years of negative productivity growth between 1999 and 2006, driven in most years by growth of inputs exceeding growth of output
- Falling annual average productivity growth of -1.9% between 1997 and 2010 has slowed to -1.5% between 1997 and 2012 due to small positive productivity growth in 2011 and 2012
- The main driver of inputs growth is procurement of goods and services which grew in all years except 2011; years of low inputs growth reflect where growth of goods and services is offset by a fall in labour inputs
- Estimated growth rates of inputs in 2011 and 2012 are among the lowest since the series began in 1997, with the fall in inputs in 2011 driven by a negative contribution to growth from labour of -2.6%
- Movements in output growth are driven by changes in output for non-looked after children measured using the 'inputs=output' convention, as non-looked after children makes up 60% of total expenditure on children's social care

## Context

- Compared to other services, local authorities have protected spend on children's social care since 2010 with planned real term reductions in spending from 2010/11 to 2012/13 of 5% being the lowest cut compared to other local authority provided services (NAO 2014)
- Demand for care has increased since 2009 with the number of looked after children in England increasing by 4% between 31 March 2010 and 31 March 2012 (DfE 2012)
- The Department for Education is responsible for developing and overseeing policy implementation for children's services and provides support to improve efficiency including support for local authorities in commissioning services and skills

[Reference table 5: Growth rates and indices of output, inputs and productivity for individual service areas, 1997-2012 \(117.5 Kb Excel sheet\)](#)

## 12. Public order and safety

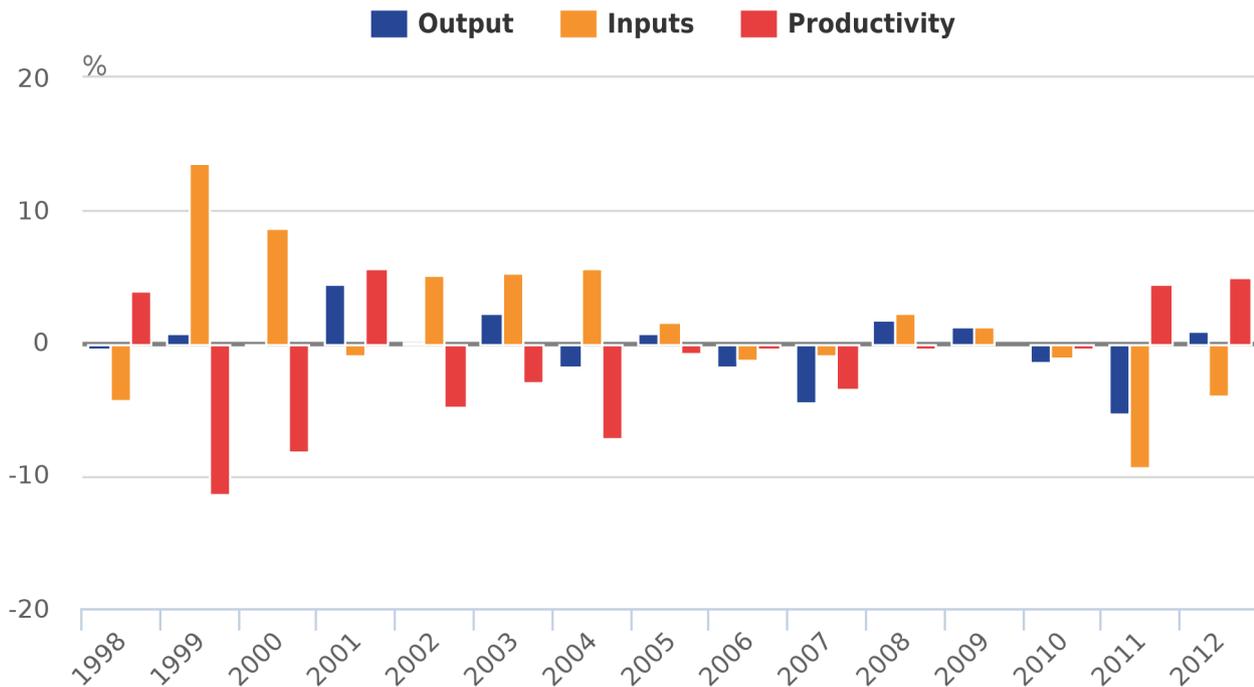
Estimates of output, inputs and productivity growth for public order and safety presented here include activity carried out by the fire services, the courts (including probation) and the prison service. While part of the public order and safety government expenditure classification, the police service is treated as a separate service area for the estimation of productivity. Other elements of public order and safety not listed above are included in the productivity estimates for other services.

Courts holds the largest share of total expenditure on public order and safety at 52% in 2012, with the remainder split fairly evenly between fire services at 20% and the prison service at 27%. Movements in output, inputs and productivity growth for courts therefore make the greatest contribution to growth rates for total public order and safety.

Public order and safety had a relatively small weighting of 3.8% in 2012, down from 4.2% in 2010, and movements in output and inputs contribute a correspondingly small amount to total public service growth.

**Figure 12: Growth rates for public order and safety output, inputs and productivity, 1998-2012**

UK



Source: Office for National Statistics

## Key points

- Public order and safety experienced nine consecutive years of falling productivity between 2002 and 2010, during which estimates of output and inputs growth fluctuated between periods of both positive and negative growth with inputs growth always exceeding output growth
- Annual average productivity growth remains negative at -1.5% between 1997 and 2012; however, strong productivity growth in 2011 and 2012 has increased annual average productivity growth by one percentage point from -2.5% between 1997 and 2010
- Positive productivity growth in 2011 and 2012 is driven by falling inputs in all service areas, the courts, the fire services and the prison service
- Following a high of 13.6% in 1999, growth rate of inputs has decreased following a fluctuating path to the largest fall in the series of -9.3% in 2011, with large falls in inputs for the fire and prison services dominating the fall in inputs in 2011
- Variation in output growth is less volatile than for inputs, ranging between +4.5% in 2001 to -5.3% in 2011
- Output for the prison service increased each year from 2001-2010 by an average of 2.8%; however, overall output growth remains small as growth in the prison service is offset by falls in output in the courts and the fire services whose combined weight is twice as large

## Context

- The courts include legal aid, the crown prosecution service, crown court, county courts and magistrates' courts. While overall output for courts fell in 2011, magistrates' courts saw the largest increase in output in the series coinciding with the public disorder in August 2011 for which more than 3000 people were brought before the magistrates' court (MOJ 2012)
- Rising output for prisons between 1997 and 2010 is associated with a rising prison population driven by tougher sentencing and enforcement outcomes together with an increased proportion of serious offences with associated longer sentences and reduced likelihood of early release (MOJ 2013)
- Falling output for prisons in 2011 could be attributed to slowing growth rates of the prison population from 2009-2012, a fall in total adult sentencing for indictable offences across all courts, and a decrease in the average time served (MOJ 2013)
- Falling output for fire services from 2010 to 2012 is consistent with decreasing numbers of fires and false alarms attended by local authority fire and rescue services which decreased by 6.5% between 2010/11 and 2011/12 (DCLG 2014)

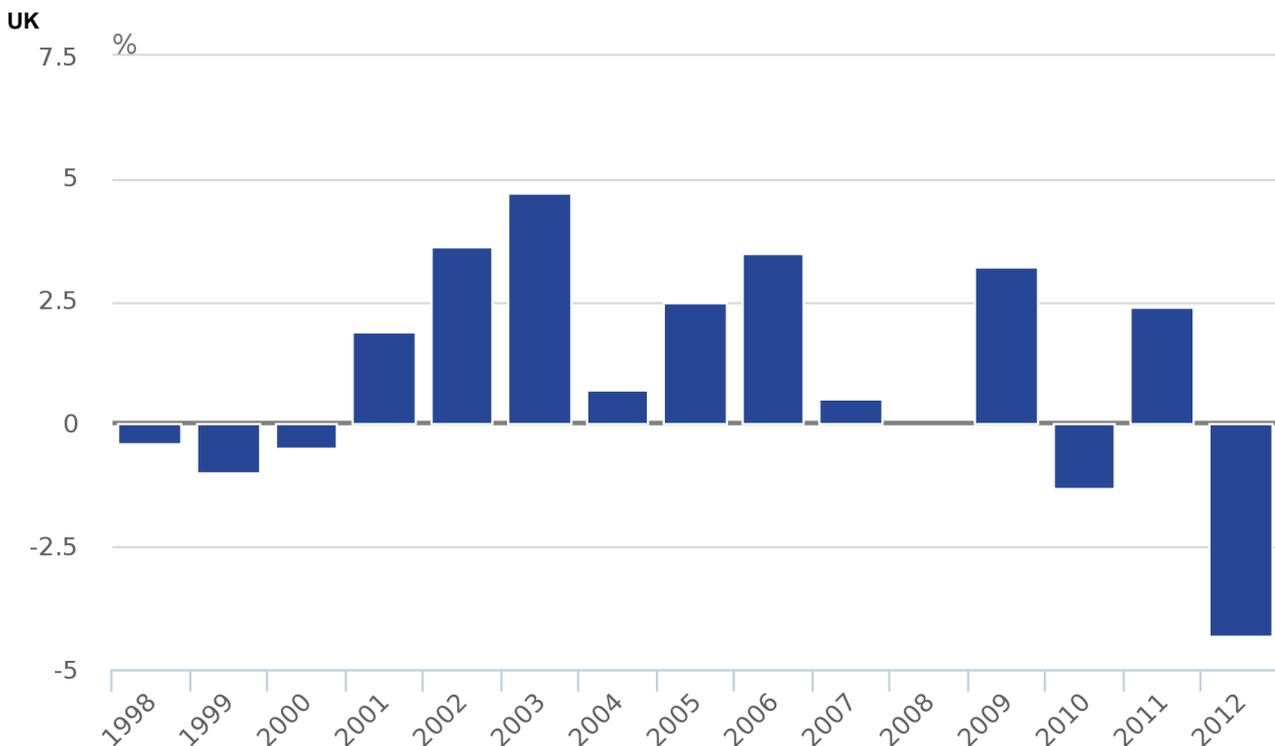
[Reference table 5: Growth rates and indices of output, inputs and productivity for individual service areas, 1997-2012 \(117.5 Kb Excel sheet\)](#)

## 13. Police

Output for police is measured using the 'inputs = output' convention which assumes that the volume of output is equal to the volume of inputs used in producing the output. As output will always be equal to inputs under this convention productivity remains constant with a growth rate of zero.

Police had an expenditure weight of 5.2% in 2012 and makes a zero contribution to estimates of total public service productivity.

**Figure 13: Growth rates for police inputs, 1998-2012**



Source: Office for National Statistics

## Key points

- Small falls in inputs at the beginning of the period are followed by nine consecutive years of positive growth between 2001 and 2009, leading to an annual average growth rate of 1.3% between 1997 and 2010
- A fall in inputs in 2012, driven by falling inputs for both labour and procurement of goods and services, has reduced annual average growth in inputs to 1.0% between 1997 and 2012
- In most years the main driver of the growth of inputs is the volume of labour, with inputs growth in 2011 driven by growth in labour inputs offset by a small fall in procurement of goods and services

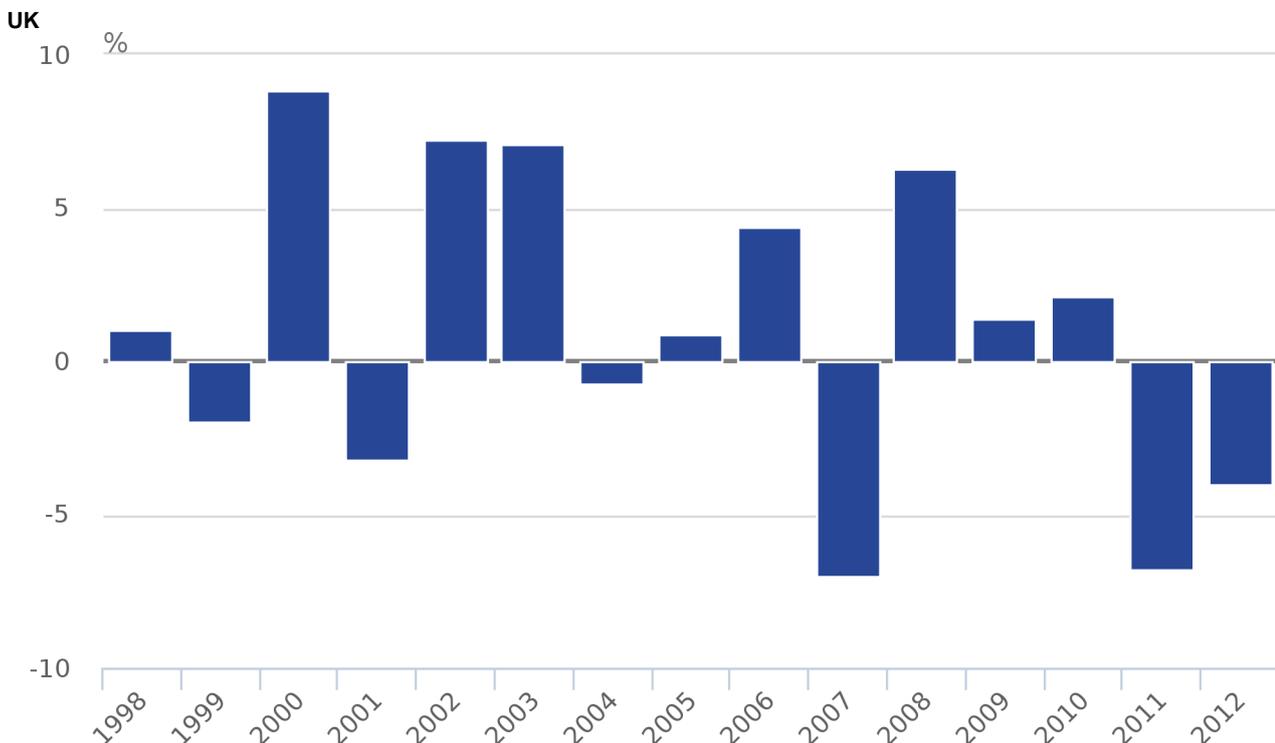
[Reference table 5: Growth rates and indices of output, inputs and productivity for individual service areas, 1997-2012 \(117.5 Kb Excel sheet\)](#)

## 14. Defence

Output for defence is measured using the 'inputs = output' convention which assumes that the volume of output is equal to the volume of inputs used in producing the output. As output will always be equal to inputs under this convention productivity remains constant with a growth rate of zero.

Defence had an expenditure weight of 9.8% in 2012, which has been steadily falling from 14.9% in 1997.

**Figure 14: Growth rates of defence inputs, 1998-2012**



Source: Office for National Statistics

## Key points

- Growth rates of defence inputs are volatile ranging from 8.8% in 2000 to -7.0% in 2007, with an annual average growth rate between 1997 and 2012 of 0.9%
- Inputs fell in 2011 and 2012 by 6.8% and 4.0%, the largest fall in defence inputs in the series with the exception of 2007

## Context

- The Afghanistan and Iraq wars, which commenced in 2001 and 2003 respectively, will have been key drivers for the growth rates seen in 2002 and 2003
- Falling inputs in 2011 and 2012 coincide with £4.3 billion of non-front line savings announced in the 2010 Spending Review including a 25% reduction in civilian and military non-front line organisations and rationalisation of the defence estate (HM Treasury 2010)

[Reference table 5: Growth rates and indices of output, inputs and productivity for individual service areas, 1997-2012 \(117.5 Kb Excel sheet\)](#)

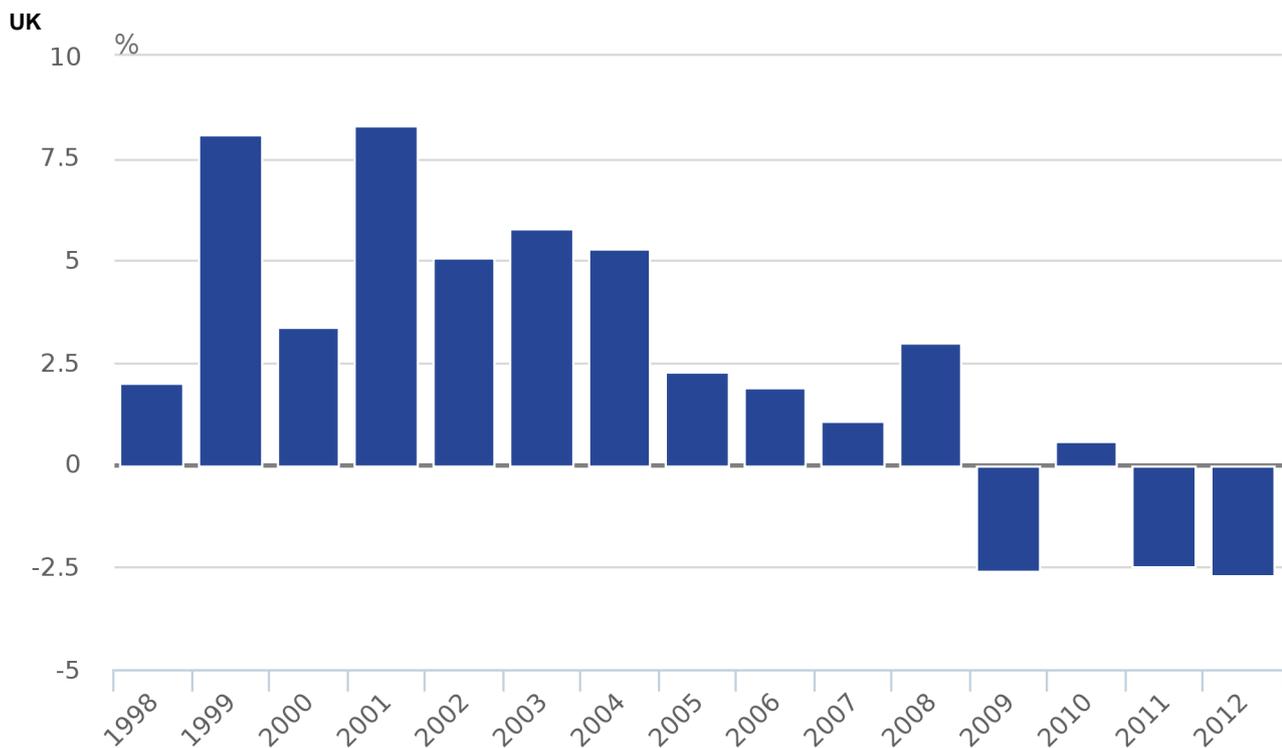
## 15. Other services

Other services comprise all other classifications of government expenditure which are not covered in the other service areas. These service areas and their share of total expenditure on other services in 2012 are; general government services (28%), economic affairs (26%), recreation (18%), environmental protection (14%), housing (13%) and other (1%). General government services include foreign affairs, economic aid to developing countries, basic research and other services undertaken by government not specified by function.

Output for other services is measured using the 'inputs = output' convention which assumes that the volume of output is equal to the volume of inputs used in producing the output. As output will always be equal to inputs under this convention productivity remains constant with a growth rate of zero.

Other services had an expenditure weight of 17% in 2012, the third largest expenditure weight after healthcare and education.

**Figure 15: Growth rates of inputs for other services, 1998-2012**



Source: Office for National Statistics

## Key points

- Inputs of other services grew each year between 1997 and 2008 with the strongest growth in the first half of the period
- Inputs fell in 2011 and 2012 lowering the annual average growth rate of inputs from 3.4% between 1997 and 2010 to 2.6% between 1997 and 2012

[Reference table 5: Growth rates and indices of output, inputs and productivity for individual service areas, 1997-2012 \(117.5 Kb Excel sheet\)](#)

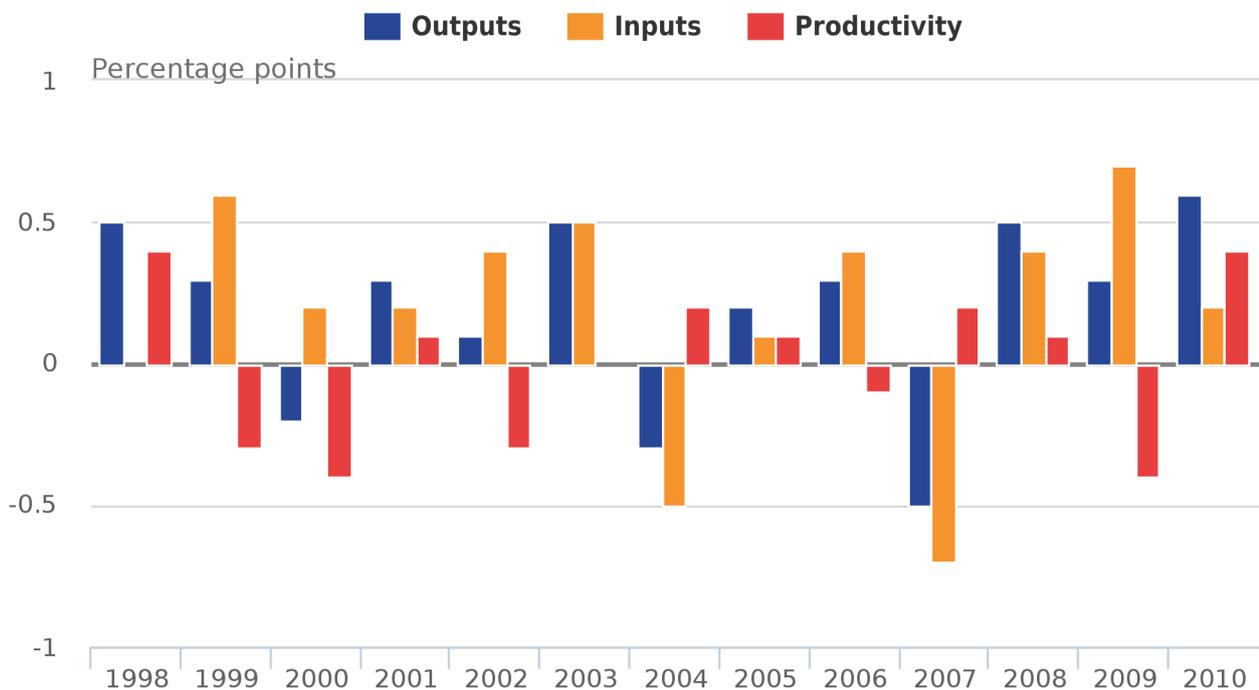
## 16. Revisions

ONS productivity estimates operate an open revisions policy. This means that new data or methods can be incorporated at any time, and will be implemented for the entire time series of data. This section explains the differences between the estimates published in this release, and those published in the last total public service productivity release in 2013 (ONS 2013) and the addendum to the previous release (ONS 2014e).

The education and healthcare estimates in this release are as previously published in the education productivity and healthcare productivity releases in September 2014 and January 2015 respectively (ONS 2014b and ONS 2015a). For all other service areas, this release includes the first revised estimates since ONS 2013 and ONS 2014e.

Figure 16 shows the differences between the annual growth rates in output, inputs and productivity for total public services in this release, compared with ONS 2014e. Revisions to output, inputs and productivity for total public services are less than one percentage point in all years. Annual average growth rate for productivity between 1997 and 2010 remains unchanged at 0.0%, as annual average growth for output and inputs over the same period have both been revised upwards by 0.2 percentage points from 2.9% to 3.1%.

**Figure 16: Revisions to growth rates of total public service , 1998-2010**



Source: Office for National Statistics

## Reasons for revisions

Revisions have been made to estimates for all included service areas, due to:

- revisions made to data, by data providers
- the replacement of forecast data with actual data, particularly for 2010
- using the latest expenditure weights data
- re-estimated forecasts and back-casts using more data points than previously available
- minor methods changes for education and children's social care

Over the period 1997-2010, the majority of revisions to total public service productivity arose from revisions to growth rates of inputs for education, with additional small contributions to revisions from children's social care. In 2010 revisions are also the result of changes in the health and adult social care service areas.

Revisions due to methods changes in individual service areas are summarised below. Further information on revisions to healthcare and education estimates are given in ONS 2014b and ONS 2015a.

## Education methods changes

Revisions to estimates of education inputs growth are mainly due to the new method used to adjust the full-time equivalent teacher numbers for hours worked. More information on this change including a sensitivity analysis of how this change has affected estimates of education productivity is given in Methods Change in Public Service Productivity Estimates: Education 2012 (ONS 2014d).

Revisions to education output estimates are due to changes throughout the series in the further education component and from City Academies now being counted in the secondary sector rather than the city technology colleges category.

## Children's social care methods changes

There are minor changes to source data and methods in the estimation of children's social care productivity.

Previous deflators used in the estimation of volume inputs of labour and the indirectly measured portion of output for both labour and procurement are no longer available beyond 2010. From 2011 onwards the growth rate from the index of labour costs per hour (ILCH) for the public sector is used to deflate expenditure on labour. The existing deflators used in estimating the indirectly measured portion of output, which uses the 'inputs=output' convention, have been replaced with the deflators used to estimate inputs throughout the series.

Activity and expenditure data for children's social care output available on a financial year basis from 2000-01 needs to be converted to a calendar year series back to 1997. This method has been made consistent between looked after and non-looked after children by first backcasting in financial years to 1997-97 and then converting to calendar years from 1997, which also reduces the amount of estimation.

This had led to revisions in estimates of children's social care; however, as children's social care has a very small weighting of 2.6% in 2012, changes to previously published estimates of total public service output, inputs and productivity growth as a result of these changes are no more than 0.1 percentage points in all years.

Further information on these changes and the impact on estimates of children's social care are given in the paper Methods Changes in Public Service Productivity Estimates: Total Public Services 2012 (ONS 2015b).

Final revisions to children's social care estimates shown in the reference tables are due to a combination of the above methods changes and general revisions to source data. Revisions in source data include revisions to activity data for looked after children in England and Wales used to estimate output, and revisions to individual producer price indices and expenditure weights used to create the aggregate procurement deflator for estimating inputs.

## Defence methods changes

Volume of defence inputs is estimated by deflating total expenditure by an implied deflator. A change in the treatment of spending on military weapons was introduced in Blue Book 2014 in line with international standards in the implementation of the European System of Accounts 2010 (ONS 2014f). This led to revisions in the implied deflator and resulting volume of inputs.

[Reference table 6: Revisions to growth rates of output, inputs and productivity for individual service areas, 1998-2010 \(116 Kb Excel sheet\)](#)

## 17. User feedback

If you would like to be invited to our user consultation sessions, please let us know using the contact details for this release.

## 18. References

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## 19. Supporting information

### Further information

[Public Sector Productivity Estimates: Education](#) - Contains updated output, inputs and productivity estimates for public service education in the UK between 1996 and 2012.

[Public Sector Productivity Estimates: Healthcare](#) - Updated output, inputs and productivity estimates for public service healthcare in the UK between 1995 and 2012.

## 20. Annex A: Table of methods

This table provides an overview of the methods for estimating output and inputs for each service area to enable users to compare quickly how estimates for each service area are derived. More information on estimation methods for each service area is available in the paper Sources and Methods for Public Service Productivity Estimates: Total Public Services (ONS 2014c).



Output	Inputs
<b>Healthcare</b>	
Quantity of delivered healthcare services including hospital and community health services, family health service and GP prescribing combined as cost weighted activity index. Non-NHS provision uses 'inputs=output' convention. Adjusted for quality of delivered services including survival rates, health gain, waiting times and results from the National Patient Survey.	Direct measure of volume growth for labour inputs based on full-time equivalent employee numbers in the health service. Indirect measure of volume growth for goods and services and capital consumption dividing current price expenditure by appropriate deflators. Individual growth rates multiplied by previous year expenditure shares to give chain linked Laspeyres volume index of total inputs.
<b>Education</b>	
Quantity as number of full-time equivalent publicly-funded pupil and student numbers in pre-school education, maintained primary, secondary and special schools, and further education colleges, adjusted for attendance combined as cost weighted activity index. Adjusted for quality using change in average point scores at GCSE or equivalent level.	Direct measure of volume growth for local authority labour inputs based on full-time equivalent teacher and support staff numbers adjusted for hours worked. Indirect measure of volume growth for central government labour, general government goods and services and general government capital consumption by dividing current price expenditure by appropriate deflators. Individual growth rates multiplied by previous year expenditure shares to give chain linked Laspeyres volume index of total inputs.
<b>Social Security Administration</b>	
Quantity as number of cases administered for individual benefit types combined as cost weighted activity index. Not quality adjusted.	Current price expenditure on labour, goods and services and capital consumption divided by appropriate deflators to give estimated volume of inputs. Individual growth rates multiplied by previous year expenditure shares to give Laspeyres volume index of total inputs.
<b>Adult Social Care</b>	
Quantity as social services activities measured in terms of time or number of items combined as cost weighted activity index. Not quality adjusted.	Current price expenditure on labour, procurement for independent care, other procurement and capital consumption divided by appropriate deflators to give estimated volume of inputs. Individual growth rates multiplied by previous year expenditure shares to give Laspeyres volume index of total inputs.
<b>Children's Social Care</b>	
Quantity for looked after children as cost weighted activity index. Non-looked after children uses 'inputs=output' convention. Looked after children and non-looked after children combined using expenditure shares to give cost weighted volume index. Not quality adjusted.	Current price expenditure on labour and goods and services divided by appropriate deflators to give estimated volume of inputs, separately for publicly and independently provided care. Individual growth rates multiplied by previous year expenditure shares to give Laspeyres volume index of total inputs.
<b>Public Order and Safety</b>	

Individual cost weighted activity indices for the fire service, the prison service, the courts and the probation service combined using expenditure shares to give cost weighted volume index. Not quality adjusted.	Current price expenditure on labour, goods and services and capital consumption - separately for the courts, the fire service and the prison service - divided by appropriate deflators to give estimated volume of inputs for each component. Individual growth rates multiplied by previous year expenditure shares to give Laspeyres volume index of total inputs.
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#### Police

'Inputs=output' convention.	Current price expenditure on labour, goods and services and capital consumption divided by appropriate deflators to give estimated volume of inputs. Individual growth rates multiplied by previous year expenditure shares to give Laspeyres volume index of total inputs.
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#### Defence

'Inputs=output' convention.	Total current price expenditure divided by derived deflator to give estimated volume of inputs, converted to index.
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#### Other

'Inputs=output' convention.	Total current price expenditure of all included service areas divided by GDP deflator to give estimated volume of inputs, converted to index.
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## 21. Background notes

### 1. Chain linked Laspeyres volume index

A methodology paper by Robjohns (Robjohns 2006) explains how ONS annually chain-links data series. This technique of annually updating the base period weights produces a rate of change in volume terms over the reference period for the data series.

ONS uses this technique to produce estimates of the volume of output and inputs for public services. See ONS 2008 for more information on this method and how Laspeyres volume indices are calculated for the estimates in this release.

### 2. Notes on methods

Estimation of the volume of inputs uses data on government expenditure from the most recent Classification of Functions of Government (COFOG) publication. Due to data quality issues at a detailed level a degree of estimation is used for total government expenditure within the public order and safety classification.

Manual adjustments made to COFOG data for social security administration reflect corrections requested by the Department for Work and Pensions (DWP) to ensure expenditure is reflected accurately on a calendar year basis and is recorded in the correct expenditure classification. This includes the omission of expenditure and receipts associated with the National Insurance Fund (NIF) which sum to zero in financial years, but due to the timing of quarterly data create a distortion of the figures when presented in calendar years.

### 3. Data availability

The data in this release is based on the latest published data for expenditure on government services for the different classifications of functions of government (COFOG). This release, and further unpublished detailed levels of classification required to produce estimates for some service areas, is only available annually after validation by Eurostat sixteen months after the year end (ONS 2014a). Data up to calendar year 2013 will be published in April 2015.

The productivity statistics published in this release are also dependent on the publication of the latest estimates for output, inputs and productivity for the healthcare and education service areas which are published separately by ONS. Both of these releases contain quality-adjustment data which are applied to the latest year. The latest complete datasets available for both service areas are for financial year 2012-13 and academic year 2012-13, with productivity estimates up to calendar year 2012 released by ONS in September 2014 for education and January 2015 for healthcare.

Data for estimating output and inputs becomes available for the health and education service areas at various points after the end of the latest year to which it refers. For example, financial year 2013-14 healthcare output from health administrations on a detailed Health Resource Group (HRG) basis is available from December 2014. The availability of data also differs across the four countries of the UK, with complete geographic coverage for 2013-14 due to be available by Spring 2015.

Data on GCSE and equivalent examination results for academic year 2013-14 varies in timeliness across the four countries of the UK, with detailed data first available around three to four months after summer examinations are completed. Most of this data is therefore already available for 2014 and will be incorporated into the next release of Public Service Productivity Estimates: Education which is planned to be released in the first half of 2015.

### 4. Interpreting estimates of public service productivity

It is important to recognise that the productivity statistics published in this release are based on a concept of output as measured by government consumption expenditure rather than government or state production. This follows from the submission of the estimates of the volume of government output that are used in this release (prior to any quality adjustment) to the GDP (E) (expenditure) side of the UK national accounts. This means that we are using a measure of government purchased output, regardless of what type of business unit produced the output.

Most expenditure is used to fund state providers of public services. There is, however, a growing component of expenditure on private or voluntarily-provided services, such as healthcare services delivered by non-NHS providers and pre-school education delivered by private and voluntary providers. This is counted as a component of government output in our estimates, even though it is provided (or supplied) by business units which are classified as private business or 'non-profit institutions serving households' (NPISH) units in the National Accounts.

Traditional measures of productivity, including those published by ONS, use a supply or production framework. These measures of productivity use Standard Industrial Classification (SIC 07) categories of production as the measure of output, and are on a gross value-added (GVA) basis. Inputs measures count the labour used in the production of these services to estimate labour productivity series such as those produced by ONS (see ONS 2014g). Multi-factor productivity estimates include labour and capital services as inputs (see Franklin 2015).

The interpretation of the expenditure-based productivity estimates presented in this release should therefore be taken as a measure of the technical efficiency with which government is enabling the provision of public services for individuals in the UK (from whatever type of business unit), not producing that service itself. Caution should therefore be used when considering the differences between productivity measures published using the expenditure approach and those using the traditional production approach. Jurd (2011) and Phelps (2010) describe some of these differences in approach in more detail.

### 5. Comparison with the UK National Accounts Blue Book 2014

The estimates of output and inputs in this release are generally consistent with the Blue Book 2014. However there are some exceptions on the output side; the main differences are:

- There is no quality adjustment for healthcare or education in the Blue Book 2014, whereas this release includes a quality adjustment for both service areas

- The Blue Book does not include the method for the output of children's social care used in this release

## 6. Quality and methodology information (QMI)

The ONS QMI publication describes the intended uses of the statistics presented in this release, their quality and a summary of the methods used to produce them.

## 7. Pre-release access

A list of persons receiving pre-release access to this publication is available on the ONS website.

## 8. Contact details

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Media contact details: Telephone 0845 604 1858 (8.30 am - 5.30 pm weekdays) Email: [media.relations@ons.gsi.gov.uk](mailto:media.relations@ons.gsi.gov.uk)

Emergency out of hours (limited service): 07867 906553

## 9. Release information

Details of the policy governing the release of new data are available by visiting: [www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html](http://www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html) or from the Media Relations Office: [media.relations@ons.gsi.gov.uk](mailto:media.relations@ons.gsi.gov.uk)

These National Statistics are produced to high professional standards and released according to the arrangements approved by the UK Statistics Authority.

Planned date of next release: December 2015

Get all the data tables for this release in the data section of the publication.

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This document is also available on our website at [www.ons.gov.uk](http://www.ons.gov.uk).

10. Details of the policy governing the release of new data are available by visiting [www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html](http://www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html) or from the Media Relations Office email: [media.relations@ons.gsi.gov.uk](mailto:media.relations@ons.gsi.gov.uk)