Methods changes in Public Service Productivity Estimates: Education 2013

1. Introduction


This publication will use the same methods as in *Public Service Productivity Estimates: Education 2012*¹, with the exception of the following changes.

Changes to the method of quality adjustment for schools:

- **Output**: Changing the method of quality adjusting education output for England to Level 2 attainment² which measures the proportion of students attaining the threshold of 5 approved GCSE subjects or a Level 2 vocational qualification of equivalent size. This method replaces use of Average Point Scores from 2008 onwards. Prior to 2008 GCSE Average Point Scores continue to be used.

  These changes have led to a downward revision to the annual average growth rate of quality adjusted education output for 2008 to 2012 from 4.0% to 3.6% per year.

Changes to the treatment of academies:

- **Inputs**: Including academies in the direct measure of labour, in line with the direct measure of labour used for all other state-funded schools. This creates a more realistic time series which avoids spurious decreases in inputs caused by conversion of maintained schools to academies since 2010.

  These changes have led to an upward revision to the annual average growth rate of education inputs for 2010 to 2012 from -1.2% to +0.4% per year.

---

¹ ONS (2014) - *Public Service Productivity Estimates: Education 2012*  

² All estimates of education output in this paper are for output after quality adjustment has been applied.

³ DfE (2015) - *Level 2 and 3 attainment by young people aged 19 in 2014*  
• **Output:** Treating academies in the same way as maintained schools in the calculation of outputs by separating student numbers and expenditure on academies into the relevant phase of education (e.g. primary or secondary) as the number of primary academies has increased.

These changes have led to a downward revision to the annual average growth rate of education output for 2002 to 2012 from 2.6% to 2.2% per year, and for 2010 to 2012 from 3.7% to 2.2% per year.

**Overall revisions from methods changes:**

• The annual average growth rate of overall quality adjusted education output for 2002 to 2012 as a result of these changes is revised downward from 2.8% to 2.2%.

• The annual average growth rate of overall education inputs for 2002 to 2012 as a result of these changes is revised upward from 1.4% to 2.0%.

• The downward revision to output combined with the upward revision to inputs lead to a downward revision in average productivity growth for 2002 to 2012 from 1.3% to 0.2%.

Further information on our methodology can be found in the education productivity sources and methods document.

2. **Changes to quality adjustment**

The quantity of education received is adjusted for the quality of education. Quality of education is challenging to measure as it encompasses many aspects of a child’s education; therefore, due to the practicality of what it is possible to consistently measure, exam performance is used as a proxy for quality. For published productivity estimates up to and including those in Public Service Productivity Estimates: Education 2012, Key Stage 4 Average Point Scores (APS) were used as the education quality adjustment for England.

Research by ONS has found that significant increases in the APS in England between 2008/09 and 2011/12 can in part be attributed to increases in the number of non-GCSE examinations taken as a result of changes in the type of examinations which counted towards performance. The rise in the APS over this period therefore overstates the increase in education quality and consequently the rise in education productivity.

In 2011 DfE announced changes to school performance tables as a result of Professor Alison Wolf’s review of vocational education. These changes limited the size and number of non-GCSEs which counted towards performance, again resulting in significant changes to the type of examinations that some students sat in the following years. This led to a large fall in the APS in 2012/13 which cannot be directly attributed to changes in the quality of the education system.

---

4 Note that total revisions may not sum to totals due to rounding.
5 ONS (2012) - Sources and methods for public service productivity estimates: education
Planned reforms to the education system in England will also impact on the suitability of the APS as a consistent measure of examination performance over time going forward. As a result, use of the APS as a quality adjustment is no longer fit for purpose. A thorough consideration of all available attainment statistics was undertaken by ONS and the Department for Education to identify an alternative measure which would provide a consistent time series in light of previous and upcoming changes to education policy. The most suitable measure is deemed to be statistics on Level 2 attainment at age 16.

Level 2 attainment equates to achievement of 5 or more GCSEs at grades A*-C or an eligible Level 2 vocational qualification of equivalent size. This is a threshold measure of the percentage of students achieving a particular level of attainment, compared to the APS which takes into account the full distribution of attainment data, making Level 2 attainment less susceptible to changes in the education system and pupil behaviour.

Level 2 attainment statistics are very similar to measures published in school performance tables on the percentage of students achieving 5+ A*-C GCSEs; however, the qualifications which count towards Level 2 are restricted and therefore are less likely to have been influenced by changes in the number of non-GCSE examinations taken. Level 2 attainment statistics will be used as the education quality adjustment from 2008/09 onwards, revising the previously published series.

Level 2 attainment has been selected as the quality adjustment for education in England on a short term basis to ensure a consistent time series while planned changes to the education system are implemented. ONS will be looking again at the suitability of the quality adjustment on a long term basis once new statistics on pupil achievement such as ‘Attainment8’ (the new headline measure of school performance from 2016) or benchmarking tests become available.

The new quality adjustment for England will continue to be applied for Northern Ireland while a suitable data source on attainment is investigated. Average Point Scores for Scotland are no longer available as a result of major changes to the education system and identification of a suitable alternative is not yet plausible while changes are ongoing. As the APS for Scotland has followed a consistent trend over time and Scotland makes up a small proportion of UK education expenditure, as a short term solution the quality adjustment for Scotland has been forecasted for 2013/14 using a five year geometric average over the period 2007/8 to 2012/13. Average Point Scores for GCSEs continue to be used for Wales where there have not been significant changes to the education system.

Figure 1 below shows the impact of changes to the measure of quality adjustment on the overall output index.

---

7 DfE(2015) - Level 2 and 3 attainment by young people aged 19 in 2014

8 DfE (2015) - Progress 8 measure in 2016 and 2017
3. Changes to the treatment of academies

Academies are state-funded schools in England which are funded directly by central government (Department for Education) rather than through a local authority. They were established under the Learning and Skills Act 2000, which sought to address underperformance in secondary schools, and the first academies opened in September 2002. In 2010, the government introduced legislation (the Academies Act 2010) which sought to increase the number of academies by making it easier for all schools including primary and special schools to convert to academy status. As a result, the number of academies has expanded rapidly in the last five years. At the end of academic year 2009/10 there were just over 200 academies in England. By the end of 2013/14, the number had increased to nearly 4000 with more than half of state-funded mainstream secondary schools being academies, along with a growing number of primary and special schools.

There are several different types of academy. **Sponsored Academies** require a sponsor, which can be an individual, an organisation, a charity, or an existing successful school. Academies which opened between 2002 and 2010 were almost exclusively Sponsored Academies. The Academies Act 2010 enabled all maintained schools to convert to academy status, and these are known as **Converter Academies**. This legislation also authorised the creation of **Free Schools**, a type of academy which are set up by groups with particular interests including parents, education charities and religious groups. The majority (around 70%) of academies are now Converter Academies.

---

3.1. Inputs

Education labour inputs for maintained schools are measured directly using data on the number of staff and average salaries. Previously, academy staff had not been included in the direct labour calculations because there were no data available. This resulted in a sharp decrease in the direct labour index from 2010 due to the rapid conversion of maintained schools to academies.

We now have access to data for academy staff numbers from 2010 onwards when the number of academies increased substantially after the Academies Act was implemented. For the forthcoming Public Service Productivity Estimates: Education 2013 article, these have been combined with staff numbers for maintained schools. This provides a much more realistic trend in the labour index from 2010 onwards and is a more accurate estimation of academies inputs compared to using deflated total expenditure.

To combine the growth rate in labour with the other inputs components to generate an overall inputs growth rate, the growth rates of the individual components are weighted by their share of total expenditure. The expenditure weight for labour previously used local authority labour expenditure on education. As academies are funded by central government, this weight has been increased accordingly by adding the total implied expenditure on academies labour (number of staff multiplied by average salary) to the local authority expenditure.

Figure 2 shows the impact of the changes to the treatment of academies on the overall inputs index. Differences prior to 2002 are a result of minor revisions to capital and goods and services inputs components.

Figure 2: Public service education inputs index 1996-2012 using 2012 and 2013 methodology

Source: ONS
3.2. Output

The overall education output index is calculated by aggregating volume growth in student numbers adjusted for attendance for each phase of education (e.g. primary, secondary) weighted by the share in expenditure for each phase.

For productivity estimates up to and including those published in *Public Service Productivity Estimates: Education 2011* student numbers for academies were included in a separate category with City Technology Colleges. With the growing number of converter academies after 2010, it was decided for *Public Service Productivity Estimates: Education 2012* to combine all academy and City Technology College student numbers and expenditure (except for special schools) with secondary schools.

For the forthcoming *Public Service Productivity Estimates: Education 2013* secondary academies, the few remaining City Technology Colleges, City Academies (the original term for academies when they were first introduced) Studio Schools and University Technical Colleges will be combined with secondary schools, while primary academies will be included in primary schools.

Figure 3 shows the impact on the changes to the treatment of academies on the overall output index. Note that due to the complexity of applying multiple methods changes to education output, the impact of changes to academies methodology is shown using a baseline of education output using the revised 2013 quality adjustment methodology, rather than the previously published figures. Some small revisions to the output index prior to 2010 are a result of the small number of academies which existed from 2002 being reclassified with secondary schools.

Figure 3: Public service education output index 1996-2012 comparing 2012 academies methodology and 2013 academies methodology (both using 2013 quality adjustment)
4. Productivity

The revisions to inputs and output as a result of changes to the treatment of academies and introducing a new measure of quality adjustment from 2008 onwards have had a consequential impact on productivity. In general, upward revisions to inputs and downward revisions to output have resulted in downward revisions to productivity, as shown in figure 4. Any revisions prior to 2008 are as a result of minor changes to data used for the other input components.

The vast majority of the overall revisions for 2008 to 2010 are due to changes in the quality adjustment; however for 2011 and 2012 changes to the treatment of academies (which started to grow at a much faster rate in these years) have a larger impact on the productivity index.

Figure 4: Public service education productivity index 1996-2012 using 2012 and full 2013 methodology (all changes included)

Source: ONS

Contact information
matt.bridge@ons.gsi.gov.uk 01633 45 1802
sophie.danielis@ons.gsi.gov.uk 01633 45 5088