

Public Sector Employment Statistics - Change in Method for Estimating Employment in Education in England

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Abstract

As part of the Q3 2012 release of Public Sector Employment Statistics, ONS improved the method that is used to estimate the level of employment in academies in England. This article details the reasons behind this change, and the effects that the change has had on the series published in the Public Sector Employment release.

Summary

The Office for National Statistics, ONS, produces quarterly estimates of public sector employment in the UK. Estimates are provided for total public sector employment and also for sectors, industries and regions. Estimates of private sector employment are also presented. These are derived from the difference between the estimate of public sector employment and the Labour Force Survey estimate of total employment. These statistics can be found in the [Public Sector Employment release](#).

The majority of employment in public sector education is employment in schools. Historically employment in schools has been captured via local authority returns to the Quarterly Public Sector Employment Survey as schools were under local authority control. In 2000, academies were introduced in England. Academies are funded from central government and employment in them will not be included in local authority returns. The Academy Act 2010 made it possible for all publicly funded schools in England to become academies.

Since 2010 there has been a large increase in the number of schools in England that are designated as academies. There were 203 academies in May 2010, 1,070 by September 2011 and 2,309 by September 2012. It is estimated that employment in academies accounts for around 3% of total public sector employment.

ONS routinely checks its outputs to ensure the methods used provide fit for purpose statistics. It was identified that the previous method for estimating the employment in academies resulted in an underestimate, as not all schools that have become academies were captured in the figures. This under coverage affected the quality of estimates of employment in public sector education in England.

The annual School Workforce Census run by the Department for Education (DfE) provides estimates of the employment in academies in England. These estimates are published as National Statistics in the [School Workforce in England](#) publication. The annual School Workforce Census commenced in November 2010. Prior to 2010 the number of school teachers by school type was constructed by combining data from local authorities (via the old Form 618g) and from academy schools (via the School Census). A new method using the annual School Workforce Census has been developed. This was implemented for the first time in the Public Sector Employment, Q3 2012 release. The entire time series was revised using the new method.

It is estimated that the impact of moving to the new method is to increase the public sector employment series by around 100,000 and decrease the private sector employment series by the same amount for June 2012 estimates. The impact on previous time points decreases as the number of academies decreases going back in time. The public sector employment series affected are total public sector employment, central government employment, general government employment, public sector employment in England (and its regions) and public sector employment in education. The total public sector excluding financial institutions and English further education and sixth form colleges is also affected.

This note outlines details of the new method and the impact on key series in the Public Sector Employment release. The estimate of impact is based on data available up to September 2012 and does not include the impact of any other revisions to the series. In addition, the series presented are not adjusted to remove seasonal effects. Therefore the series may not exactly match the series published in the quarterly Public Sector Employment release.

Key Points

The previous method for estimating the employment in academies in the quarterly public sector employment statistics resulted in an underestimate of this employment. The new method utilises the School Workforce Census, published by the Department for Education, to estimate employment in academies on a quarterly basis.

For June 2012 estimates the new method:

- increases the total public sector employment estimate by around 100,000 to 5.8 million.
- decreases the private sector employment estimate by around 100,000 to 23.8 million.
- increases public sector employment estimates in general government, central government, England and education by the same amount, around 100,000. The estimate of total public sector excluding financial institutions, English further education colleges and sixth form college corporations is similarly affected.
- does not affect public sector employment estimates for local government, public bodies, Scotland, Wales and Northern Ireland.
- has the largest effect at a regional level on estimates for East of England, South East and South West. Each of these regions have an increase in public sector employment of over 20,000.

Methods

The New Method

The School Workforce Census figures, published by the Department for Education (DfE), are used to provide an annual 'benchmark' of employment in academies as at November each year. As the public sector employment figures are quarterly with estimates available for March, June, September and December each year, the November figure will be used to estimate the employment in December.

It is assumed that at an aggregate level the employment in existing academies will not vary significantly during the year. Where a school becomes an academy between censuses the employment in the school at the previous census will be used to estimate its employment. The list of schools becoming an academy in each month, published by DfE, will be used to identify the new academies. Where an academy is created rather than a school converting to academy status it will not be possible to estimate their employment until the following census.

The annual School Workforce Census commenced in 2010. Prior to 2010 the number of school teachers by school type was constructed by combining data from local authorities (via the old Form 618g) and from academy schools (via the School Workforce Census). A consistent time series of employment in academies for inclusion in the quarterly Public Sector Employment statistics was constructed using data from the November 2010 School Workforce Census. The list of open academies was matched to the November 2010 school level School Workforce Census data. The employment of academies open in each quarter was aggregated to provide an estimate for periods prior to November 2010. Full details of the new method and the reasons for choosing it can be found in Annex A.

The Old Method

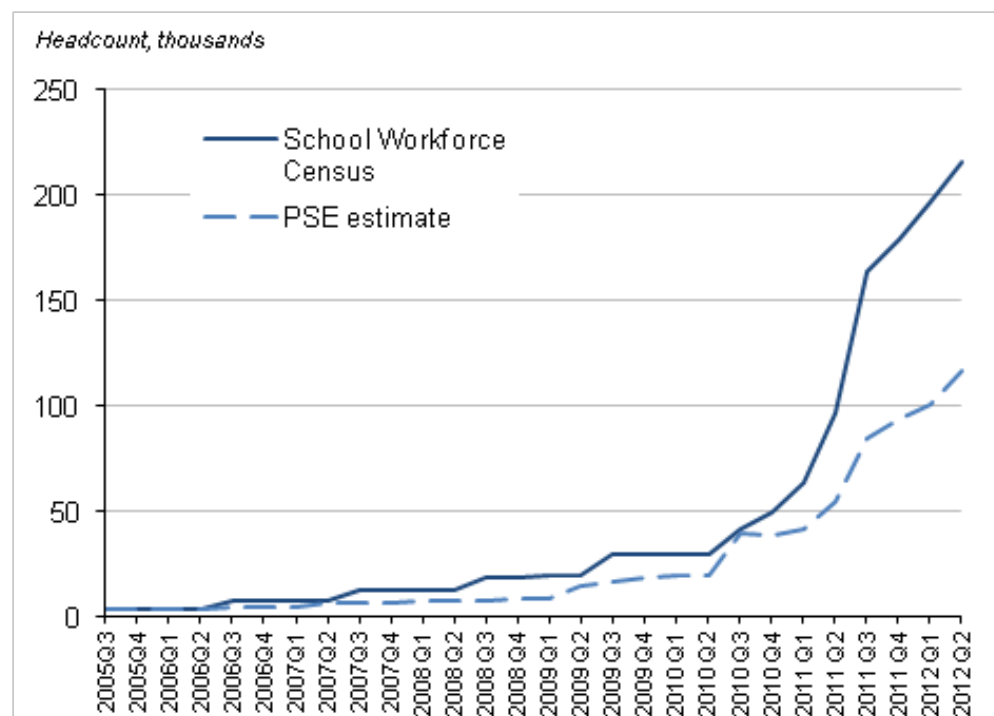
Employment was gathered directly from around 200 academies and academy trusts. These academies were amongst the first to be set up in England and be added to the Inter-Departmental Business Register (IDBR), the standard sampling frame for ONS business surveys. Only academies that were live on the IDBR could be included in the Quarterly Public Sector Employment Survey. Further academies were not added to the sample as the increase in number of academies exceeded the resources available to survey them directly. In addition, the time lag between academies being created and being added to the IDBR prevented the IDBR being used to identify the employment in new academies. Therefore, employment in academies which converted from local authority maintained schools each quarter was estimated based on returns from local authorities. Where a local authority was identified as having a drop in employment the ONS team re-contacted them to ask if any schools had become academies and if so, to estimate the employment in those schools. This value was used as a proxy for the employment of the new academy.

Reason for Change

Analysis comparing the old method for estimating the employment in academies with the statistics from the School Workforce Census showed that the method was providing underestimates. This is likely to be due to the method not capturing the employment of all schools which had become academies or new academies that had not previously been local authority maintained schools. The aim of the public sector employment statistics is to provide estimates that are as accurate as possible and that have full coverage of the public sector. The old method did not meet this aim. Chart 1 contains estimates of employment in academies based on the old and new methods and

shows the extent of the likely underestimate. The series diverged considerably from 2011 Q2 (June) onwards. Note, the 'School Workforce Census' series is constructed using returns to the 2010 and 2011 school workforce censuses and the list of open academies. Therefore the series may differ from estimates from the School Workforce Census and predecessor data collections published by the Department for Education.

Chart 1 - Comparison of Employment in Academies Using Old and New Method



Source: Quarterly Public Sector Employment Survey - Office for National Statistics

Notes:

1. The new method series is constructed using returns to the 2010 and 2011 school workforce censuses and the list of all open academies, published by the Department for Education. Therefore the series may differ from estimates from the School Workforce Census and predecessor data collections published by the Department for Education.

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In addition, the new method maximises the use of data that is already collected and will reduce the burden on respondents to the Quarterly Public Sector Employment Survey. This is fully compliant with the principles in the [Code of Practice for Official Statistics](#).

Impact on Key Series

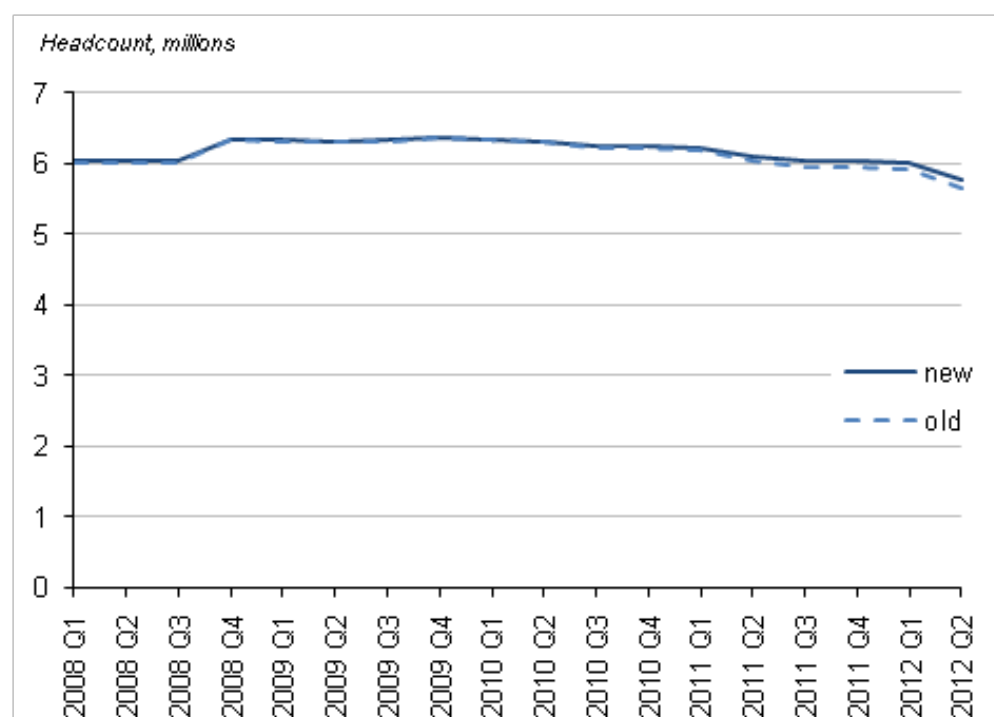
As previously stated the change in methodology causes an increase in the estimates of public sector employment of around 100,000 and a corresponding decrease in private sector employment at June 2012. The impact on previous time periods is smaller. The following charts show the impact on each

of the series. The 'old' and 'new' series are based on data available at September 2012 and are not seasonally adjusted. Therefore the series may differ from those published in the quarterly Public Sector Employment release. The charts below show the series from Q1 (March) 2008 onwards as most of the impact due to the change in methodology is after this quarter. The full public sector employment time series has been revised back to the start of the series using the new methodology.

Total Public Sector Employment

The impact on the Total Public Sector Employment series is small in proportion to the total series.

Chart 2 - Comparison of UK Total Public Sector Employment Using Old and New Methods for Estimating Employment in Academies



Source: Quarterly Public Sector Employment Survey - Office for National Statistics

Notes:

1. The new and old series are based on data available at September 2012 and are not seasonally adjusted. Therefore the series may differ from those published in the quarterly Public Sector Employment release.

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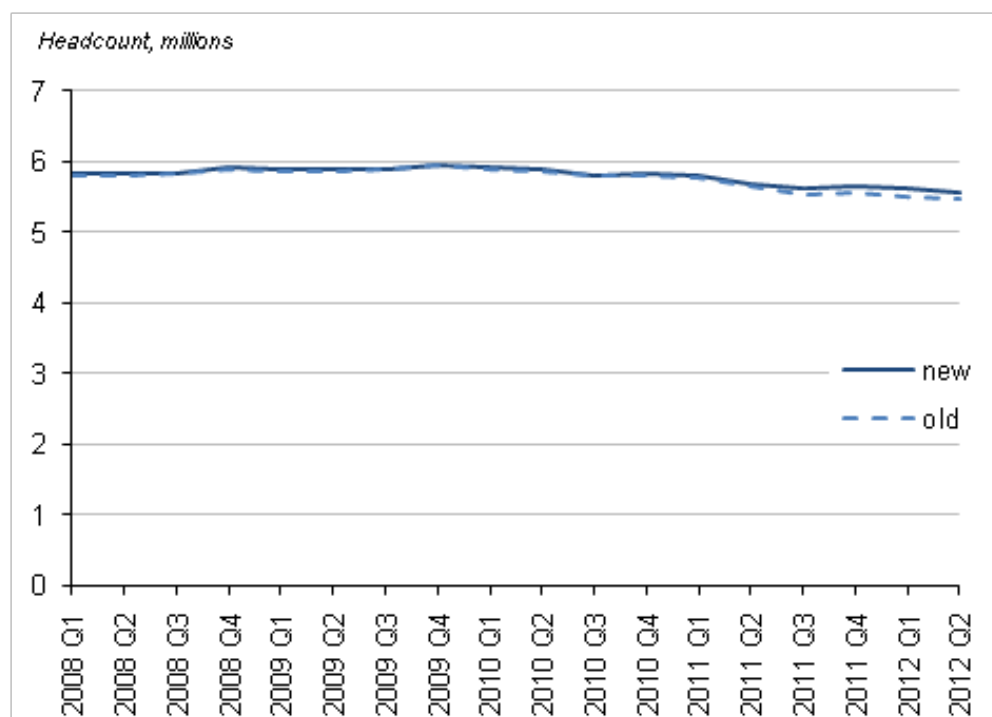
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Total Public Sector excluding financial institutions, English further education colleges and sixth form college corporations

In April 2012 sixth form college corporations and further education college corporations in England were reclassified to the private sector. In addition, since 2008 some financial institutions have been

classified to the public sector. Chart 3 shows the impact of the change in methodology on estimates of total public sector employment excl. financial institutions and English colleges.

Chart 3 - Comparison of Total Public Sector Employment Excluding Financial Institutions, English Further Education Colleges and Sixth Form College Corporations Using Old and New Methods of Accounting for Employment in Academies



Source: Quarterly Public Sector Employment Survey - Office for National Statistics

Notes:

1. The old and new series are based on data available at September 2012 and are not seasonally adjusted. Therefore the series may differ from those published in the quarterly Public Sector Employment release.

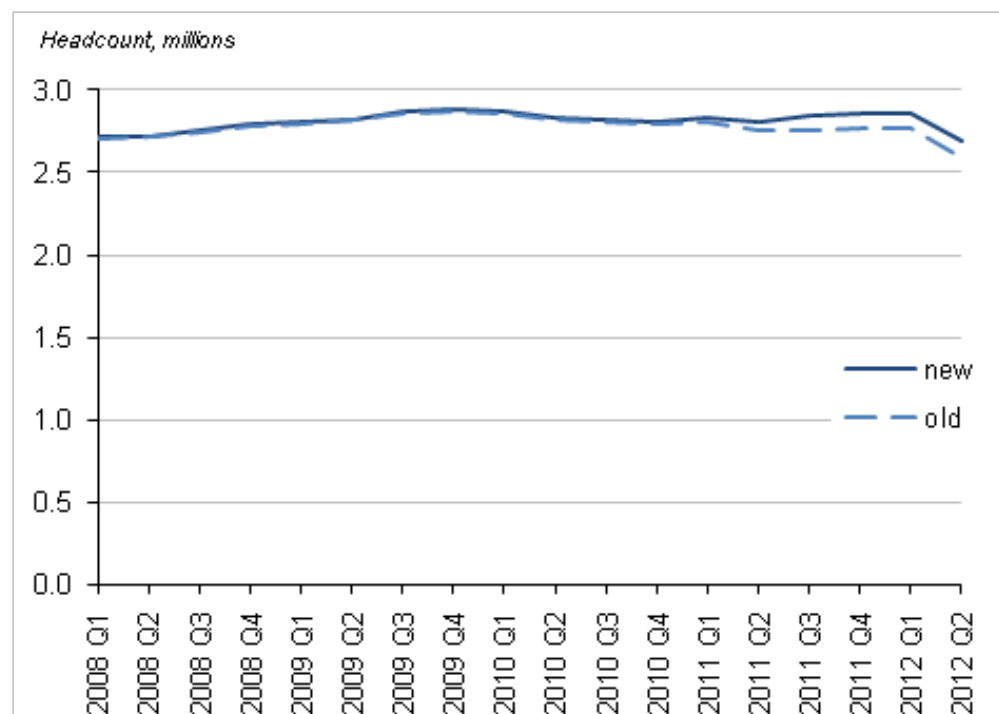
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Central Government

As academies are classified to central government, this time series is also affected. The Local Government time series is not affected as local authorities are asked to only include schools whose employment in is on their payroll. As academies are no longer under local authority control their staff should have moved off the local authority payroll.

Chart 4 - Comparison of UK Central Government Employment Using the Old and New Methods of Estimating Employment in Academies



Source: Quarterly Public Sector Employment Survey - Office for National Statistics

Notes:

1. The old and new series are based on data available at September 2012 and are not seasonally adjusted. Therefore the series may differ from those published in the quarterly Public Sector Employment release.

Download chart

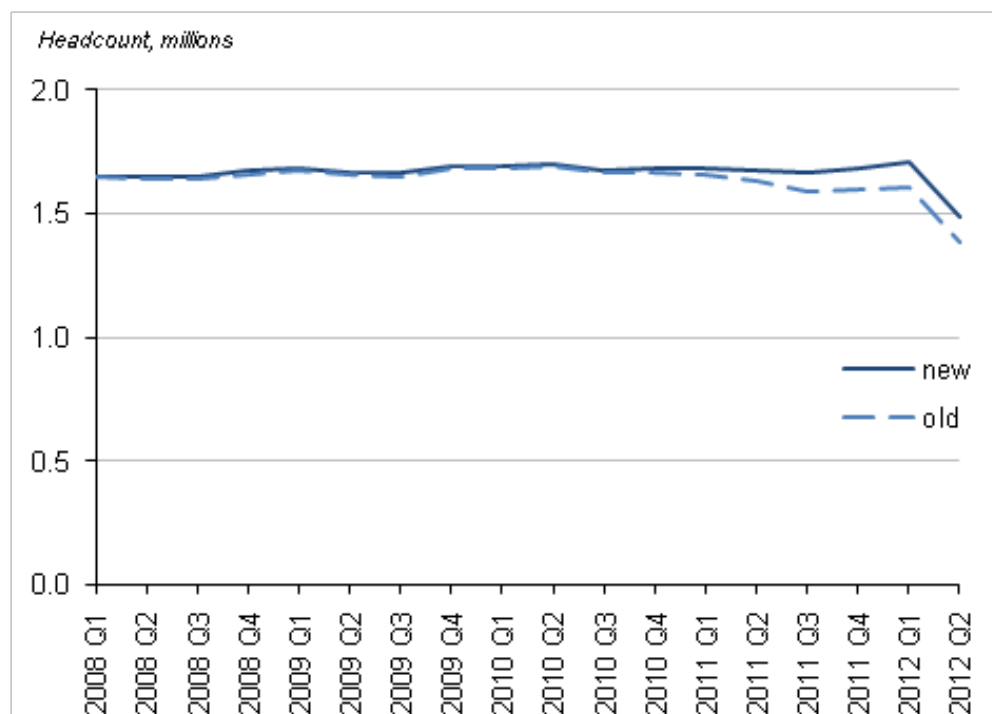
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Public Sector Employment in Education

The other public sector employment series that is affected by the change in methodology is employment in Education. Prior to the reclassification of English further education and sixth form colleges in April 2012, the new series shows a flatter trend for employment in Education. The old series showed a decreasing trend from mid 2010 onwards.

Chart 5 - Comparison of UK Public Sector Employment in Education Using Old and New Methods of Estimating Employment in Academies



Source: Quarterly Public Sector Employment Survey - Office for National Statistics

Notes:

1. The old and new series are based on data available at September 2012 and are not seasonally adjusted. Therefore the series may differ from those published in the quarterly Public Sector Employment release.

Download chart

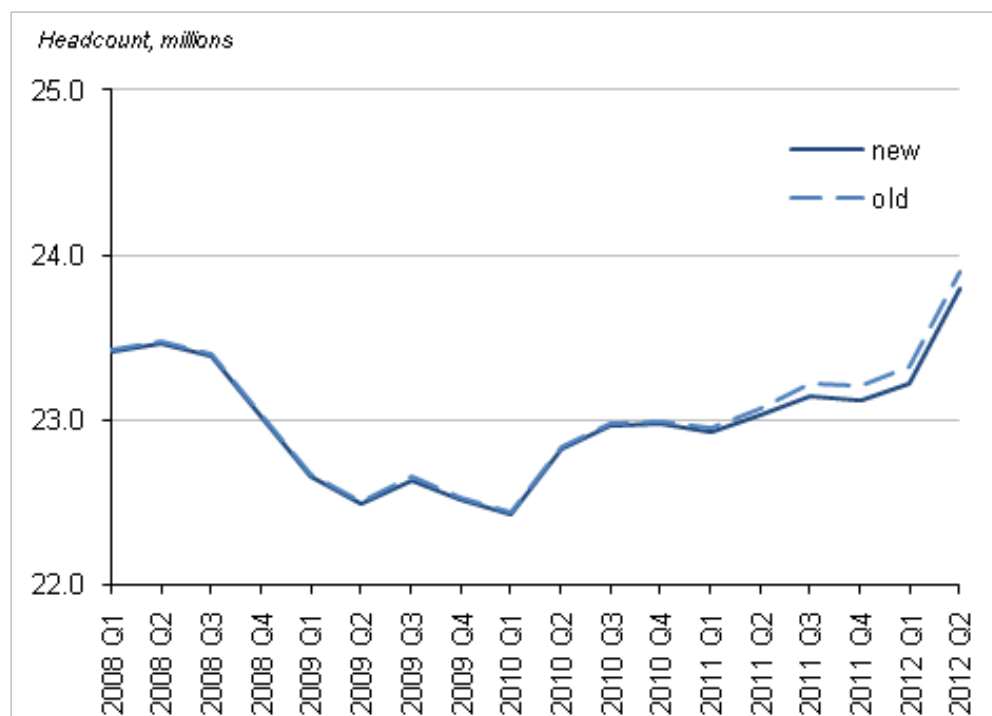
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Private Sector Employment

Estimates of private sector employment, derived from the public sector employment estimates and the Labour Force Survey estimates of total employment have also been revised due to the new methodology. The horizontal axis has been adjusted so that the difference in the estimates is visible.

Chart 6 - Comparison of Private Sector Employment Series Using Old and New Methods of Estimating Employment in Academies



Source: Quarterly Public Sector Employment Survey - Office for National Statistics

Notes:

1. The old and new series are based on data available at September 2012 and are not seasonally adjusted. Therefore the series may differ from those published in the quarterly Public Sector Employment release.

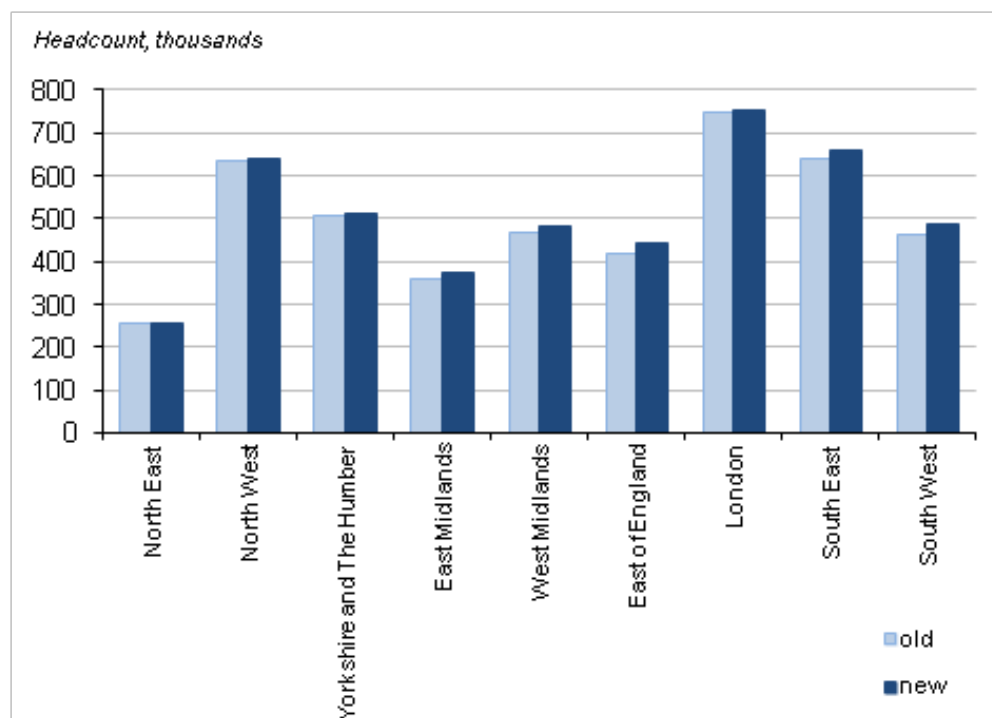
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Regional Public Sector Employment in England

Estimates for public sector employment in each of the English regions have also been revised due to the change in methodology for estimating the employment in academies. The estimate of public sector employment has increased in all regions. The regions with the largest increase in estimates of public sector employment are East of England, South East and South West. Estimates of public sector employment in each of these three regions increased by over 20,000. Chart 7 shows the estimate of public sector employment for each region in June 2012 based on the old and new methods.

Chart 7 - Comparison of Regional Public Sector Employment in England, Q2 2012, Using Old and New Methods



Source: Quarterly Public Sector Employment Survey - Office for National Statistics

Notes:

1. The old and new series are based on data available at September 2012 and are not seasonally adjusted. Therefore the series may differ from those published in the quarterly Public Sector Employment release.

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Conclusions

The new method will produce more accurate estimates of employment in education in England, maximises the use of existing data and will reduce burden on respondents to ONS surveys. The impact of the change in method will be to increase estimates of public sector employment by around 100,000 and reduce the estimate of private sector employment.

Annex A - Estimation of employment in academies in England in the public sector employment estimates

This document outlines the key quality characteristics of the new method for estimating employment in academies in England, published as part of Public Sector Employment statistics. This is the information that was used to decide if this method should be used.

The [framework](#) and the questions in it were originally developed as a mechanism for assessing the quality of methods used to estimate public service output and productivity in the UK. It is based on the dimensions of output quality and process quality previously published elsewhere. The dimensions and attributes of statistical quality are combined in a framework with three sections: Concepts, Data and Techniques.

- Concepts - This section draws out information on what the method aims to measure and who the main customers are.
- Data - This section draws out information on the input data underlying the method. That is the data that are used in the method rather than the estimates produced from the method. This includes information on how accurate the data are, the timeliness and punctuality of supply and whether available over the domains of interest, for example consistency over time. This section is based on the European Statistical System quality domains (relevance, accuracy, timeliness and punctuality, accessibility and clarity, comparability, and coherence).
- Techniques - This section draws out information on the technique used in the method. This includes whether it is, or could be, used elsewhere, compliance with international or other guidelines, and whether it can be implemented. This section is based on the process quality domains.

Concepts

C1: What is the concept being measured?

The overall concept being measured is employment in the public sector and its constituent parts. Within this the employment in schools in England needs to be estimated. In 2000, academies were introduced in England. Academies are classified to central government as they are not under local authority control so their employment is not captured through local authority returns to the Quarterly Public Sector Employment Survey (QPSES). Therefore the employment in academies needs to be estimated.

C2: Is the concept clearly defined and who has defined it?

The concept of an academy was established in 2000. The [Academies Act 2010](#) further defines it. The classification of academies to central government was agreed by the ONS Classification Committee.

The concept of employment is defined in several places including by the International Labour Organisation, [ILO](#). The ILO definition is "*Persons in employment comprise all persons above a specified age who during a specified brief period, either one week or one day, were in the following categories: - paid employment; - self employment.*" On the QPSES an employee is defined as "*anyone aged 16 years or over that your organisation directly pays from its payroll(s), in return for carrying out a full-time or part-time job or being on a training scheme. Each employee should have a contract of employment.*" This is in line with the definition of employees used on the Short Term Employment Survey and the Business Register and Employment Survey which are also run by ONS.

C3: Why do we want to measure it?

Employment in the public sector is measured to monitor changes in and inform decisions on public and private sector employment. Employment in academies needs to be measured to ensure

quarterly estimates of total public sector employment are as accurate as possible. Employment in academies is estimated to account for around 3% of total public sector employment in the UK.

C4: Is the concept likely to change?

The concept of employment is unlikely to change. There is the potential that at some point in the future the classification or status of academies may change if legislative changes are made. There is no indication that this is likely to happen in the short to medium term.

C5: Who are the key users of the statistics?

Public Sector Employment estimates are used by government departments in monitoring changes in employment in the public and private sector and informing policy decisions. There is also an interest in these figures across the widest range of users with the estimates being quoted and commented on in the media.

Data

Relevance

D1: What is the data source?

The data source that will be used to estimate employment in academies in England is the annual School Workforce Census collected by the Department for Education (DfE). This collects data on teachers and support staff from local authorities, local authority-maintained schools and academies. It is carried out in November each year. The first census on the current basis was carried out in 2010. This replaced separate collections from schools and local authorities.

D2: How well do the available data fit the concept?

The data fit the concept well as the census covers all academies and the definition of what staff to include matches the definition of employees sufficiently. The slight difference arises due to QPSES counting employees on the payroll on a particular date whereas the School Workforce Census includes employees with continuous service of twenty eight days or more in the year. In addition the workforce census is annual, and the reference date does not correspond with one of the reference dates for the QPSES survey. Therefore there is a slight mismatch with the definition of a quarterly employment estimate.

D3: What is the coverage of the data?

The data covers all publicly funded schools and therefore academies.

D4: How are missing data dealt with? What are the impact on estimates?

Where data is not returned for a school no estimate is made of the employment in that school. This may lead to a slight under estimate of the total employment in academies.

D5:

- Are there concerns about completeness? - A small number of academies don't return data. In the November 2011 Census 47 out of 1,449 academies did not return data. The data for these academies was left blank.
- Might there be distortions as a result in changes in definitions over time, or other issues including effects of incentive systems on improving completeness of data recording? - Attempts are being made to engage with schools that did not return in the previous year to help them with future

returns to reduce the level of non-response. However the level of non-response is low. The School Workforce Census remains largely unchanged between years in an effort to lessen the burden on data providers and to allow the school and LA data teams time to bed down the census processes. Therefore there are unlikely to be significant distortions.

- Given the purpose for which the data were originally collected, how well do they fit the concept of current work? - The purpose of the data is to provide information on the school workforce in England. This fits well with the current work to establish number of people employed by academies in England.

Timeliness and punctuality

D6: What is the time lag from reference date to supply?

The aggregate estimates are published in April. That is 5 months after the reference date. School level data is published in July.

D7: What time periods are the data available for?

Data are currently available for 2010 and 2011.

D8: Are the data on time (punctual)?

Yes.

D9: Would the data need to be forecast to match the time periods available for other sources of data?

The first estimate of the employment in academies which feeds into the December estimate of public sector employment will be based upon the previous year's School Workforce Census figures. This will be revised when the latest School Workforce Census figures become available ready for publication of the next quarter's figures in line with the revision policy for the output.

Comparability

D10: Are the data available for all countries of the UK?

Not applicable as academies only exist in England.

D11: Are the data available as a back series?

Data are available for 2010 and 2011. School workforce statistics for England were collected prior to this date on a different basis. There were small numbers of academies in England prior to 2010.

D12: Are there any changes in definitions, data collection or processing techniques used within the time series?

No.

D13: Is the data source expected to be available for some time to come?

Yes.

D14: Are there any anticipated changes in definitions or techniques used to collect and process the data?

No.

Coherence

D15: Are other data available for the same concept? Are the data in line with other sources?
Some information on employment in academies is available from the Inter-Departmental Business Register (IDBR). Academies are added to the register once they register for PAYE or VAT. There can be a long time lag between a school becoming an academy and it being added to the register. Therefore, as expected, the IDBR estimate of employment in academies is lower than that from the School Workforce Census. The previous method of estimating the employment in academies in the QPSES relied on a change in employment in a local authority being identified which was then explained as being due to a school becoming an academy plus a direct survey of some of the first schools to become academies. There was therefore an under coverage of employment in academies in the figures.

Accessibility

D16: Are the data readily available?
Yes. School level data are published by the DfE.

D17: What metadata are available to help interpret the data?
On the DfE website there is a range of metadata about the census. This includes the specification sent to schools and local authorities.

Techniques

Transparency

T1: What is the technique being used and is it publically documented?
The School Workforce Census figures will be used to provide an annual 'benchmark' of employment in academies as at November each year. As the Public Sector Employment figures are quarterly with estimates available for March, June, September and December each year, the November figure will be used to estimate the employment in December. It is assumed that at an aggregate level the employment in existing academies will not vary significantly during the year. Where a school becomes an academy between censuses the employment in the academy at the previous census will be used to estimate its employment. The list of schools becoming an academy in each month published by DfE will be used to identify the new academies. Where an academy is created rather than a school converting to academy status it will not be possible to estimate their employment until the following census. Previous estimates will not be revised as the impact is likely to be negligible.

T2: Has the techniques ever been peer group appraised?
The technique has been discussed and agreed by a working group which included representatives of the DfE, Local Government Association and Devolved Administrations and an expert in survey methodology.

T3: Could others replicate the technique and obtain consistent results?
The employment in academies in England will not be published as a separate series. It will be included within the employment in education, employment in England and higher level series. Others could replicate the employment in academies as a separate series if they wanted.

Effectiveness

T4: How well does the technique match the concept? What is the impact of any mismatch? Can this be quantified?

The technique enables the concept to be met by providing a sum of employment and enabling the estimate to be updated to reflect schools becoming academies.

T5: Can the technique be applied to all parts of the concept or is it limited in its relevance?

It can be applied to all parts of the concept.

T6: Can you foresee any potential unwanted consequences of the use of this technique including impacts related to equality legislation?

There are no consequences of the use of this technique. Data is not published for Public Sector Employment by any protected characteristics.

T7: What are the benefits of using this technique over other possible techniques?

The main benefit of the technique is that it improves the estimate of employment in academies, by providing full coverage of academies on an annual basis, using data already collected. This reduces the burden on public sector organisations and the costs of producing the estimates. The technique is simple to understand and implement.

Efficiency

T8: Can the technique be implemented in current systems? If not, how easy is it to implement the technique and what are the resource requirements?

It can be implemented in current systems.

T9: Does the technique require additional data collections?

No. The technique uses data already collected for other purposes and reuses it to provide the required estimates. As such it is in line with the Code of Practice for Official Statistics by maximising the use of existing data and avoiding duplicating requests for information.

T10: What are the resource requirements to use the technique?

There is a small amount of resource required to make changes to the system and produce the back series. In the longer term it is anticipated that the new source of employment in academies will reduce resource requirements by ceasing the current surveying of some academies directly.

Robustness

T11: Is the technique sensitive to abnormal data patterns or changes in data trends? If yes, how is it sensitive? What needs to be taken into account when using the technique and interpreting results?

The technique may be sensitive to large changes in employment by schools which become academies. This may cause abnormal movements between the September estimate of employment based on the previous year's workforce census and the December estimate. As employment in academies makes up a small percentage of total public sector employment this is unlikely to have a large impact on headline figures.

T12: What are the key assumptions and approximations? How have they been tested?

The key assumption is that employment in individual academies does not vary at the aggregate level during the year. This has been tested using data from around 200 academies which ONS currently surveys directly in the QPSES. This showed that, although employment in individual academies did vary between quarters, at the aggregate level these movements cancelled each other out.

T13: How sensitive is the technique to deviations from the assumptions?

The technique could be sensitive to deviations from the assumption and may not accurately represent the quarterly movements in employment in academies. As employment in academies is a small percentage of total public sector employment and the movements will, in effect be smoothed over the year, deviations from assumptions are unlikely to have an impact on headline statistics.

Flexibility

T15: Can the technique be adapted if data sources or definitions change?

Provided annual estimates of employment in academies are available, including school level estimates in order to adjust for new academies, the technique can be adapted.

T16: Can the technique be adapted if what we want to measure changes?

Provided annual estimates for the new concept are available then the technique can be adapted.

Integration

T19: Is the technique in line with approved techniques used in other parts of the function or for other functions or other countries where appropriate?

Within the Public Sector Employment estimates there are other sources that are only available on an annual or six monthly basis. These sources are also used to estimate the employment in the quarters for which data is not available. This technique is also used for other functions within the Office for National Statistics where data of the required frequency are not available.

T20: Is the technique in line with international guidance/ best practice?

Benchmarking monthly or quarterly data to an annual estimate with better coverage/ accuracy is considered best practice. However the use of a lower frequency source (eg. annual) as an estimate for a higher frequency output (e.g. quarterly) is not considered best practice. The small contribution of employment in academies to the total public sector employment figures and lack of a robust quarterly estimate without increasing burden makes it necessary to not follow the best practice in this instance.

Conclusions

Overall the use of the annual School Workforce Census and list of schools becoming academies in England provide the best estimate of employment in academies in England for the public sector employment estimate. It adheres to the Code of Practice for Official Statistics by maximising the use of existing sources and minimising burden by avoiding duplicating requests for information.

The main drawback of the method is that estimates are not available on a quarterly basis to match the frequency of the output. Therefore it is necessary to assume that at an aggregate level the employment in academies does not vary substantially between quarters.

Background notes

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

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