

Article

Public and Private Sector Earnings: March 2014



Contact:
Jamie Jenkins
labour.market@ons.gsi.gov.uk

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1. Key points

- Average pay levels vary between the public and private sectors because of the different jobs and characteristics of the people within each sector
- In April 2013 it is estimated that on average the pay of the public sector was between 2.2% and 3.1% higher after adjusting for the different jobs and personal characteristics of the workers
- The average pay difference in favour of the public sector has narrowed since the year 2010, which in part reflects the restraints on public sector pay over this period
- On average large organisations tend to earn more than small organisations and the public sector generally consists of large organisations (over 500 employees) whereas the private sector is more evenly split between large and smaller organisations
- After further adjusting for the different organisation sizes between the public and private sector, in April 2013 it is estimated that on average the pay of the public sector was between 1.3% and 2.4% lower than the private sector
- Looking at those who are among the lowest earners in each sector, using the bottom 5% as a cut off point, public sector workers earned on average around 13% more than private sector workers in 2013 when adjusting for the different jobs and personal characteristics of the workers. When further adjusting for the different organisational sizes the estimate was around 8% more
- For the higher earners, using the top 5% as a cut off point, public sector workers earned on average around 6% less than private sector workers in 2013 when adjusting for the different jobs and personal characteristics of the workers. When further adjusting for the different organisational sizes the estimate was around 11% less
- Looking more locally across the UK in 2013, when adjusting for the different jobs and personal characteristics of the workers, on average, Northern Ireland had the largest pay difference in favour of the public sector at 15% (7% when adjusting for organisation size). Public sector workers, on average, earned 8% less (11% less when adjusting for organisation size) than private sector workers in London.
- Comparing low and high earners, London had the largest variation between public and private sector in April 2013. Among the lowest earners in each sector, using the bottom 5% as a cut off point, public sector workers earned 20% more (15% more when adjusting for organisation size) than private sector workers. For the higher earners, using the top 5% as a cut off point, public sector workers earned 24% less (28% less when adjusting for organisation size) than private sector workers

2. Introduction

Comparing the pay of the public and private sector is not a straightforward task as there are a number of different methodologies available which will yield different results.

For instance we can compare median pay in the two sectors, the point at which 50% of employees earn more and 50% of employees earn less. Looking at median gross earnings excluding overtime, private sector employees earned £10.48 per hour in 2013. This compares to £14.15 in the public sector, a difference of £3.67 (35.0%). Median pay tends to be used to compare earnings between different groups. However, when comparing average pay in the public sector with the private sector it may be more appropriate to use mean rather than median pay.

This is because of differences in the earnings distributions of each sector. The private sector has a wage distribution that is more dispersed than the public sector with more higher earners. Comparing mean gross hourly earnings excluding overtime, public sector workers earned on average £16.28 per hour in 2013, which was £2.12 (14.5%) more than private sector employees who earned £14.16 per hour.

Using simple averages to compare earnings between the two sectors is often misleading as employees have different personal characteristics that can impact on their pay. For example, there are pay differences because of disparities in the types and skill levels of jobs, employee experience, distribution of men/women, and the location of the job.

This is based on earnings data collected in the Annual Survey of Hours and Earnings (ASHE). Due to the timing of this survey, in April each year, it does not pick up bonus payments made throughout the year.

It is possible to adjust the ASHE data so that the proportions of bonus payments paid in each industry (at the two-digit SIC) over the course of a year are reflected. This adjustment has been made using the Average Weekly Earnings series published monthly based on the Monthly Wages and Salaries Survey.

Using simple averages to compare earnings between the two sectors is often misleading as employees have different personal characteristics that can impact on their pay. For example, there are pay differences because of disparities in the types and skill levels of jobs, employee experience, distribution of men/women, and the location of the job.

Regression modelling can be used to account for some of these differences. Accounting for sex, age, occupation, region that the job is located in, employment status of full and part time and employment status of permanent and temporary, job tenure and including an adjustment to better reflect bonus payments, it is estimated that public sector employees earned on average 2.7% more per hour (excluding overtime) than the private sector in 2013. This estimate of 2.7% is subject to a margin of error as it comes from survey results. The estimate provided is such that there is 95% certainty that from all samples possible the pay gap in 2013 would be between 2.2% and 3.1%.

However, another important factor is the size of the organisation. Regardless of sector, large organisations tend to pay more on average than small organisations. This could be due to several factors such as working conditions, responsibility and unionisation.

Including organisation size in the regression model, it is estimated that in 2013 employees in the public sector earned 1.9% less per hour (excluding overtime) than those in the private sector. This estimate of -1.9% is also subject to a margin of error such that there is 95% certainty that from all samples possible that the pay gap in 2013 would be between -1.3% and -2.4%.

These estimates are by no means a definitive measure of the public-private sector pay gap. Whilst these give an estimate of the pay gap for the UK, the pay gap varies between different regions and countries of the UK. There are also differences in the pay gap at different points of the pay distribution (discussed further in Sections B & C).

Also, a different model containing additional or different independent variables would give different results. Information on all factors that affect pay is not available, for example, employee ability or motivation. Also pay information for self-employed workers is not available meaning that some of the highest paid workers, and also some of the lowest paid workers have been excluded.

These comparisons are based solely on hourly pay excluding overtime. Overtime paid at a higher rate would increase an employee's hourly pay whereas working unpaid overtime would effectively reduce hourly pay. If overtime pay and hours were included a different pay gap may be derived.

Employees in both the public sector and the private sector receive other forms of remuneration or benefits. For example, employees may receive pension contributions from their employer and in the private sector some workers may receive a company car or health insurance. These are not collected on the Annual Survey of Hours and Earnings used for this analysis. If these other forms of payment were considered a different pay gap may be derived.

As well as looking at other factors that influence the differences at the national (UK) level, this article looks at regional variations in England and the devolved countries of the UK and differences in the pay gap at different points of the pay distribution.

The rest of the article is split into four sections:

- Section A: Aims to explain why accounting for differences in public and private sector pay is complex, citing a variety of factors to consider.
- Section B: Attempts to estimate the public/private sector pay gap using regression analysis to account for some of the key differences explained in Section A.
- Section C: Uses a regression analysis similar to that in Section B to show pay differences at a regional level.
- Annex 1: The impact of the Standard Occupation Classification revision.

The main source of data used in this article is the Annual Survey of Hours and Earnings (ASHE) which is the Office for National Statistics' (ONS) principal source for earnings estimates, collected in April of each year.

3. Section A: Factors affecting pay comparisons

This section will consider a number of factors that should be taken into account when comparing earnings in the public sector and the private sector. These include:

- Skill level of employees
- Occupational differences
- Age
- Gender
- Qualifications
- Reclassification of some banks to the public sector after the recent recession
- The distribution of earnings in the public and private sector
- The geographical location of the employee
- Organisation size
- Employment status – full time/part time and permanent/temporary

Skill level

Earnings tend to increase as the skill level of the job increases, and in order to show why the skill level of jobs in the public and private sector is relevant for the pay gap between the two sectors, consider the following example.

First, assume that the characteristics of two groups of workers (called group A and group B, each containing 100 people) are identical in terms of age, sex, on-the-job training, productivity etc. However, within these two groups there are a different proportion of high and low skill workers.

In group A there are 60 high skill workers and 40 low skill workers, and in group B there are 40 high skill workers and 60 low skill workers. In both groups a high skill worker is paid £9 per hour and a low skill worker is paid £6 per hour. In this example, the different proportions of high and low skill workers in each group would result in a different average wage. This is represented in table 1:

Table 1

	Group A			Group B		
	Number of workers	Hourly pay per worker (£)	Total Pay per hour (£)	Number of workers	Hourly pay per worker (£)	Total Pay per hour (£)
High skill	60	9	540	40	9	360
Low skill	40	6	240	60	6	360
All workers	100	-	780	100	-	720
Average hourly pay = £7.80			Average hourly pay = £7.20			

This example shows that differences in the proportion of high and low skill jobs in each group, even after controlling for all other characteristics, results in an average wage in group A that is around 8% higher than the average wage in group B. This does not necessarily mean that group A is 'overpaid' in comparison to group B. Rather, the difference in the average wages reflects the higher proportion of high skill jobs in group A.

In terms of the public sector and private sector, and re-grouping occupations according to their skill level (although compositional differences within skill levels still remain between the public and private sector), from low skill to high skill, there was a larger percentage of workers in the two highest skill groups in the public sector compared with the private sector. Overall, 61% of public sector employees are classed as either high skill or upper middle skill compared with 48% of private sector employees.

Table 2 - Percentage of employees by skill level in the public sector and private sector, April 2013, UK

Skill-level	Percentage	
	Public sector	Private sector
High skill	41	23
Upper middle	20	25
Lower middle	31	38
Low skill	8	14

Source: Annual Survey of Hours and Earnings based on the Standard Occupational Classification 2010 (SOC 2010)

Since the public sector is made up of a more skilled workforce than the private sector it would be expected that, on average, public sector pay would be higher than private sector pay (although the overall difference is determined by a number of factors).

Over time the public sector has outsourced some jobs to the private sector. While some of this outsourcing has involved contracting out high skill jobs to the private sector, for example, Information Technology (IT) support, much of the outsourcing that has occurred has been in lower-skilled jobs, for example, cleaning. The result of this outsourcing has been to take many of the low skilled jobs that would have been carried out in the public sector and transfer them to the private sector.

Occupational differences

Even looking at more detailed occupational classifications, there are still differences in the jobs that are typically performed in the two sectors. [Incomes Data Services](#) published a report in 2011 that detailed some of the difficulties in comparing public sector and private sector earnings.

The report uses the example of the category 'primary and nursery education teaching professionals'. Primary school teachers are typically employed in the public sector, whereas nursery teachers are typically employed in the private sector. It would be expected that, on average, a primary school teacher would earn more than a nursery teacher due to the different levels of qualifications and training associated with the two jobs.

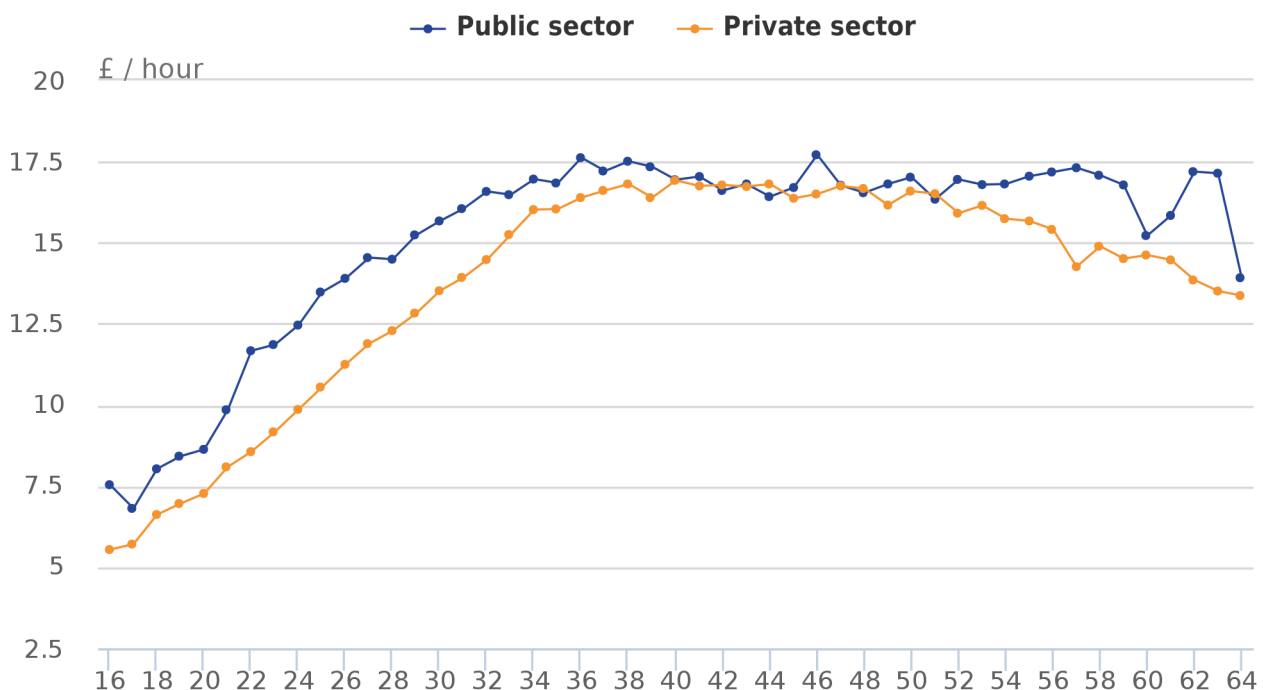
However, by grouping both jobs into one category, the public sector earns, on average, more than the private sector in this category because the jobs typically performed in the public sector are among the higher paid jobs in this category compared with the lower paid jobs that are performed in the private sector.

This example demonstrates that comparing jobs in the public and private sector, and the corresponding earnings differences, is not a straightforward task, even after using narrow definitions for occupation classification, because differences still remain between public sector and private sector occupations.

Age

The following graph shows that earnings tend to increase with age in both the public sector and the private sector. Average mean hourly earnings peak in the early-mid 40's in both sectors. They decline slightly approaching retirement although the decline happens earlier in the private sector than in the public sector. This is possibly because higher earners in the private sector are likely to leave the labour market earlier than higher earners in the public sector due to having higher wages.

Figure 1 - Mean hourly earnings by age in the public sector and private sector, aged 16-64, April 2013, UK



Source: Annual Survey of Hours and Earnings (ASHE) - Office for National Statistics

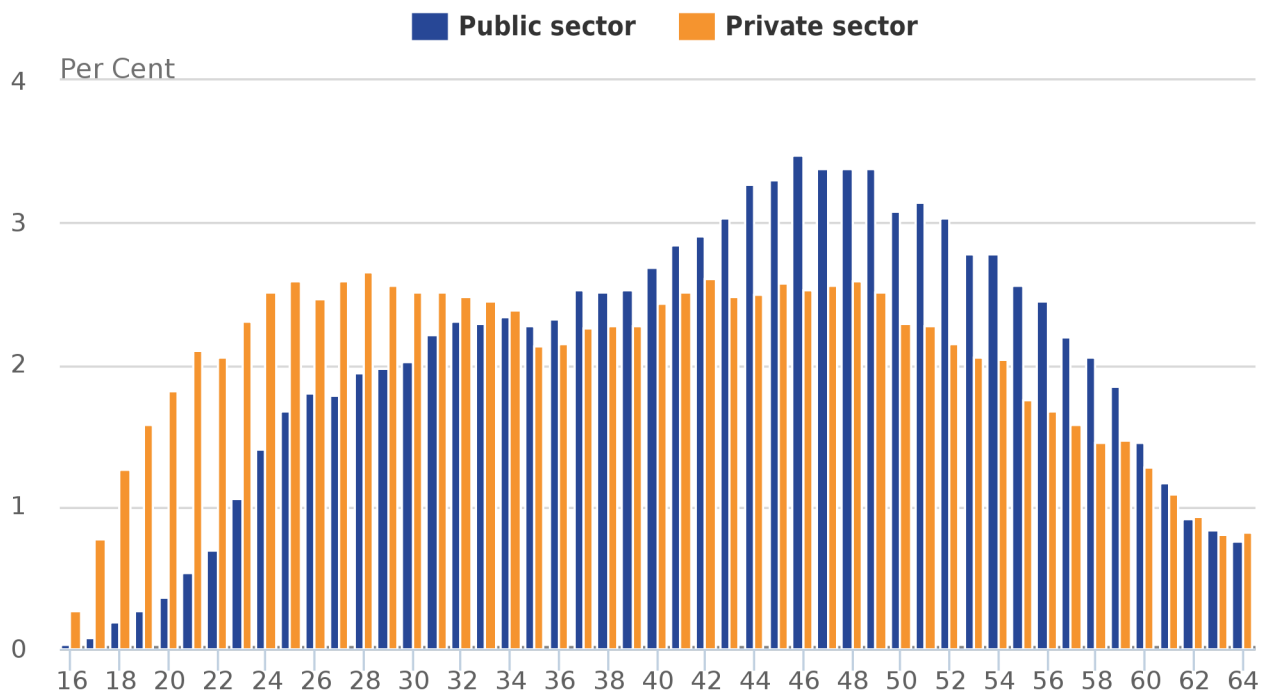
Age is used here as a proxy for experience (a reasonable assumption given that experience tends to increase with age). Similar to the example given above regarding the different skill mix in the public and private sector,

keeping all other factors constant, if group A was made up of an older workforce than group B, it would be expected that, on average, there would be higher earnings in the sector with the older (more experienced) workforce.

The public sector generally consists of an older workforce than the private sector. Around 15% of employees in the private sector are aged 16 to 24 compared with around 5% of employees in the public sector, and around 44% of public sector workers are aged 35 to 49 compared with around 36% of private sector workers.

The difference in the age profiles of the two sectors, with a larger proportion of younger workers in the private sector compared with the public sector, and a larger proportion of older workers in the public sector compared with the private sector, is represented in the graph below.

Figure 2 - Percentage of workers by age in the public sector and the private sector, aged 16-64, April 2013, UK



Source: Annual Survey of Hours and Earnings (ASHE) - Office for National Statistics

Again, similar to the difference in the skill levels of the two sectors, given that the public sector is made up of an older workforce than the private sector it would be expected that, on average, public sector pay would be higher than private sector pay (although, again, the overall difference depends on a number of factors).

Gender

The difference in pay between men and women is a well-established area of research, with men tending to earn, on average, more than women. Female employees in the public sector earn considerably more, on average, than female employees in the private sector. This is due to the different jobs that are typically carried out by women in the public and private sectors.

In the private sector a significant proportion of low paid jobs, such as cleaning and catering, are carried out by women. In the public sector, while women still perform lower paid jobs, such as caring and clerical work, there are also a high proportion of women employed in professional, higher paid occupations, such as nursing or teaching.

Table 3 - Percentage of female employees by skill level in the public sector and private sector, April 2013, UK

Skill-level	Percentage	
	Public sector	Private sector
High skill	42	16
Upper middle	14	16
Lower middle	37	54
Low skill	7	14

Source: Office for National Statistics

Table 3 shows that in 2013 16% of women in the private sector were employed in high skill jobs, compared with 42% in the public sector. Table 3 also confirms that a higher proportion of women in the private sector were employed in low skill jobs (14%) compared with the public sector (7%).

Also the two sectors have a different percentage of men and women working within them. Around 66% of employees in the public sector are female, compared with around 42% of employees in the private sector.

Qualifications

Another characteristic that partially determines earnings is the level of qualifications of the employee. Employees with higher level of qualifications tend to earn more than employees with lower level of qualifications. Using LFS data, and taking an average over the four quarters of 2013, 45% of employees had a degree or an equivalent qualification in the public sector, compared with 27% of employees in the private sector.

This indicates that, overall, the public sector consists of a higher qualified workforce than the private sector. A higher qualified workforce would, on average, receive higher pay than a less qualified workforce. Therefore, it would be expected that, on average, the higher level of qualifications in the public sector would translate into higher average earnings in the public sector compared with the private sector.

Table 4 - Percentage of employees by highest qualification in the public sector and private sector, four quarter average, 2013, UK

Qualification	Percentage	
	Public sector	Private sector
Degree or equivalent	45	27
Higher education	14	9
GCE A Level or equivalent	18	25
GCSE grades A-C or equivalent	16	22
Other qualifications	5	10
No qualifications	3	7

Source: Office for National Statistics

Reclassification of banks

In 2007, Northern Rock was reclassified as a public sector company, and, in 2008, Lloyds Banking Group, Royal Bank of Scotland Group and Bradford & Bingley were also reclassified as public sector companies. As the IDS report points out, average earnings in the financial sector are higher than average earnings in the private sector as a whole.

Therefore, the reclassification of the banks into the public sector had an effect on the public/private sector pay gap as some of the highest earners in the UK economy were incorporated into the public sector. For consistency over time the main series assumes employees of those banks reclassified to the public sector in 2008 were in the private sector throughout.

Distribution of earnings

The IDS report also points out some key differences when using the mean or the median to calculate the pay gap between average public sector earnings and average private sector earnings. If every worker was ordered in terms of their hourly earnings, the median value would be the person in the middle.

That is, this person would have higher earnings than half of all employees, and would also have lower earnings than half of all employees. As the IDS report comments, the median is “useful for finding a pay rate for a ‘typical’ worker within a fairly homogeneous group” (IDS, p. 13, June 2011). Mean hourly pay, on the other hand, is calculated by taking the total income of a group of workers and dividing by the total number of hours worked in this group. Therefore, the mean takes into account any very high or low earners in the dataset.

ASHE tends to use median pay to compare earnings between different groups. However, when comparing average pay in the public sector and private sector it may be more appropriate to use mean rather than median pay. This is because of differences in the earnings distributions of the public sector and private sector.

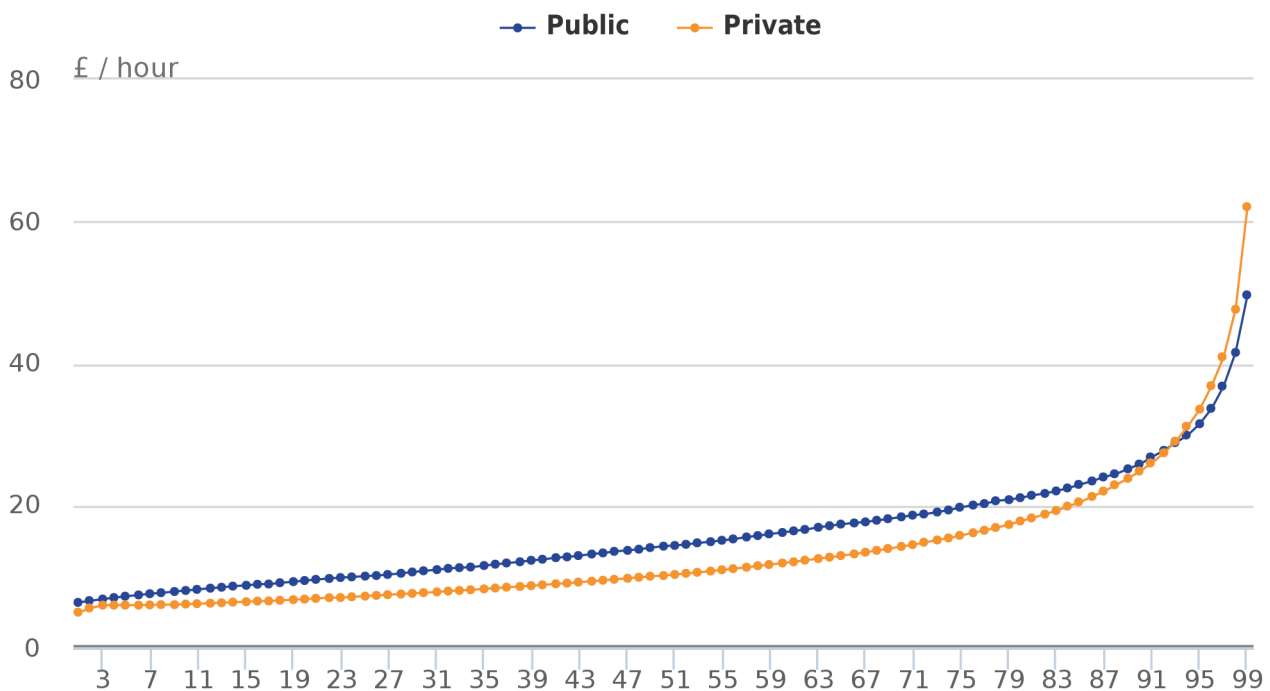
As table 2 shows, the private sector is made up of a higher proportion of low skilled workers (14%) than the public sector (8%). These workers typically have a low level of formal qualifications, and earnings of low skilled workers tend to be at the lower end of the earnings distribution.

However, the private sector also includes many of the highest paid employees in the UK. Therefore, the private sector has a wage distribution that is more dispersed than the public sector, with some of the highest paid jobs, but also includes a large proportion of the low paid workers in the UK.

If each person working in each sector is placed in order, in terms of their hourly pay (excluding overtime), the bottom 5% of workers in the public sector earn less than £7.19 per hour, whereas in the private sector, 5% of workers earn less than £6.19 per hour.

Looking at the top 5%, in the public sector earnings are greater than £31.49 per hour, while in the private sector the top 5% earn more than £33.63 per hour. The top 1% of earners in the private sector, at more than £60.21 per hour, earns considerably more than the top 1% of earners in the public sector at more than £49.65 per hour.

Figure 3 - Distribution of hourly earnings in the public sector and private sector, April 2013, UK



Source: Annual Survey of Hours and Earnings (ASHE) - Office for National Statistics

When comparing the 95th percentile of earners with the 5th percentile in each sector:

- In the private sector the top earners are paid around 5.4 times as much as the bottom earners.
- In the public sector, the top earners are paid around 4.4 times as much as the bottom earners.

This shows that public sector pay is more compressed than private sector pay between high and low paid employees. Using median pay as the measure of the pay gap between the public sector and the private sector may not reflect this difference in the wage distribution of the private sector compared with the public sector. Therefore, in order to take this into account, mean pay will be used in this article to compare the average earnings of the public sector and the private sector.

Hourly earnings vs. Weekly earnings

ASHE measures the earnings of employees in the public sector and the private sector in terms of hourly and weekly earnings. It is important to use the correct method of measuring earnings when considering the public-private sector pay gap due to differences in the average hours worked in the two sectors.

The reason why the average number of hours worked is relevant can be shown in the following example: Assume that there are two sectors, called sector A and sector B, and each sector pays each of their employees £500 per week. However, in sector A, each employee works 25 hours per week, and, in sector B, each employee works 50 hours per week. This means that, in terms of hourly pay, each employee in sector A earns £20 per hour whereas each employee in sector B earns £10 per hour.

If weekly earnings between the two sectors were compared it would be assumed that workers in sector A and sector B earned the same amount (and in weekly terms this is correct). However, for each hour of employment, employees in sector A earn twice as much as employees in sector B. Therefore, average hourly earnings provide a more accurate comparison of the difference in average earnings of the employees in each sector.

On average, employees in the private sector work more hours per week than employees in the public sector. This is shown in table 5 below (note that these average figures include employees who work part-time):

Table 5 - Average number of paid hours excluding overtime worked per week in the public sector and private sector, April 2013, UK

	hours
<hr/>	
Average weekly hours worked	
<hr/>	
Public sector	30.2
Private sector	32.7

Source: Annual Survey of Hours and Earnings

This means that a comparison of average weekly earnings in the public and private sectors gives a smaller pay gap than the average hourly earnings pay gap. However, for an analysis on the earnings difference between the public sector and the private sector, average hourly earnings provides a more accurate estimate because the effect of working longer hours is removed.

Organisation size

Research that is wider than the UK shows that workers in large organisations tend to earn on average more than workers in small organisations. This can be down to several factors such as working conditions, responsibility and unionisation.

The public sector tends to be concentrated in large organisations with at least 500 employees. In April 2013, for those where the size of the organisation is available, of those working in the public sector, 92.0% were working in these larger organisations.

For the private sector there is a much more even split of employees across the organisation sizes. In April 2013 around 49.0% of workers were in the larger organisations of 500 or more employees.

The types of jobs and people who work in small and large organisations differs across the economy but as Section C will show, when controlling for these differences, large organisations tend to earn more on average than smaller organisations. There are very few small public sector organisations and so when looking solely at the private sector, larger private sector organisations tend to pay on average more than smaller private sector organisations.

As in the previous publication of Public and Private sector earnings the analysis that follows will include both estimates that control for organisation size and estimates that do not. This is because it is a factor which has strong arguments for both inclusion and exclusion.

The argument for including it is that there is clear evidence from the private sector that large organisations pay more than small organisations for the same job. In other words, organisation size impacts on pay and a higher proportion of the public sector is made up of large organisations.

If, by contrast, a view is held that differences in average organisation size should not be a consideration in estimating the overall differences in earnings between public sector and private sector employees then organisation size should not be included in the model. Furthermore this is the only variable in the regression which is a reflection of the organisation rather than the individual.

A further consideration is that, given that smaller sized organisations are largely found in the private sector and larger sized organisations are mainly found in the public sector, this positive correlation between the organisation

size variable and sector variable leads to the variation explained by public/private sector status being captured instead in the organisation size variable. This means that it is not possible to disentangle the impact of firm size from the impact of working for public/private sector by simply including two separate variables and it is difficult to say how much of the public/private sector effect is then captured by the public/private sector status variable and how much is captured in the organisation size variable.

Throughout the report estimates are shown for models including and excluding organisation size.

Employment status

The additional factors of whether a job is full time or part time and whether it is permanent or temporary were also considered to determine if these had any impact on pay. It was found that on average employees in full time jobs earn more per hour than those in part time jobs.

Table 6 - Average hourly earnings (excluding overtime) by whether job is full time or part time, April 2013, UK

	Pounds
	Mean hourly earnings
Full time	16.10
Part time	11.47

Source: Annual Survey of Hours and Earnings

The private sector has a higher percentage of full time workers. Part time working may be more common in the public sector due to the public sector promoting flexible working as part of its objective to be a model employer.

Table 7 - Percentage of employees working full time or part time by sector, April 2013, UK

April 2013, UK

	Percentage	
	Full time	Part time
Public sector	68	32
Private sector	74	26

Source: Annual Survey of Hours and Earnings

It was also found that on average employees in permanent jobs earn more per hour than those in temporary or casual jobs. This is likely to be due to the nature of temporary jobs compared to permanent jobs.

Table 8 - Average hourly earnings (excluding overtime) by whether job is permanent or temporary, April 2013, UK

	Pounds
	Mean hourly earnings
Permanent	14.96
Temporary	12.82

Source: Annual Survey of Hours and Earnings

The private sector has a slightly higher percentage of permanent workers compared to the public sector.

Table 9 - Percentage of employees working in permanent or temporary jobs by sector, April 2013, UK

April 2013, UK

	Percentage	
	Permanent	Temporary
Public sector	90	10
Private sector	94	6

Source: Annual Survey of Hours and Earnings

4. Section B: Regression analysis of public and private sector earnings for the UK

The following analysis uses a statistical technique, called regression analysis, to estimate the pay difference when controlling for some of the factors that have been discussed in Section A. The primary source of data is ASHE using hourly earnings (excluding overtime) for employees whose pay in the April period was not affected by absence and were paid adult rates. This data has been adjusted using information from the Average Weekly Earnings series to allow for bonus payments paid outside of the pay period covered by ASHE.

Every 10 years the Standard Occupation Classification (SOC) is updated by the ONS to ensure that it keeps pace with changes in the occupational composition of the labour market. Since the last publication of estimates of public and private sector pay the ONS has introduced the latest occupation classification SOC 2010. Given that occupation is one of the key determinants of earnings, this update has had an effect on the estimated pay differential. After implementing SOC 2010 we find that the estimated pay differential is lower than under SOC 2000. This is mostly because of two changes that were implemented under SOC 2010.

Firstly a tighter definition of managers has been applied such that some managers, mostly in the private sector, were moved down the occupation classification such that their pay compared more favourably to public sector counterparts in the same occupation group.

Secondly many nursing professions, mostly in the public sector, were moved up the occupation classification such that their pay compared less favourably to private sector counterparts in the same occupation group.

A full explanation of the SOC revisions and their effects on the estimates of public and private sector pay can be found in Annex 1.

The regression model used to estimate the pay difference was specified as follows.

Dependent variable:

- Log of bonus adjusted hourly earnings excluding overtime

Independent variables:

- Gender - because of differences in the distribution of men and women in the public and private sector
- Age and Age Squared - because the relationship between earnings and age is non-linear
- Occupations (coded to SOC 2010 for 2011-2013 and coded to a SOC 2010 equivalent for 2002-2010) - Because pay is heavily influenced by occupation
- Region (that the job is located in – 12 across the UK) - because of differences in the percentage of jobs in each sector across the country
- Sector (Public, Private or Non-profit organisations)
- Employment status – full and part-time employment - because full time workers tend to be paid more per hour than part time workers with the percentage split varying between the sectors
- Employment status – Permanent or temporary employment - because permanent workers tend to be paid more on average than temporary workers with the percentage split varying slightly between the sectors)
- Job Tenure based on days worked <=183, 184-366, 367-732, 733-1830, 1831-3660, 3661-7620, 7321+ - job tenure is a proxy for organisation specific experience

Interaction terms:

- Sex*Age and Sex*Age squared - the potential work experience proxied by age for males and females are different, i.e. women experience more career interruptions than males.
- Occupation*Age – The return to work experience may be different for different occupations.
- Occupation*Region – Industry and labour market structures that impact on wages may differ between regions.

When controlling for organisation size we also include:

- Organisation size, categorised into six bands <=10, 11-25, 26-50, 51-250, 251-500, 501+
- Organisation size*Occupation - Because evidence shows large organisations tend to pay more than small organisations for the same job

Tables 10 and 11 below show the results obtained from the above regression model both when we do and don't control for organisation size. Looking at the model which doesn't control for organisation size we can see that between 2011 and 2013 the pay gap fell from 3.8% to 2.7%. When controlling for organisation size the same trend is apparent as we see that in 2011 public sector workers on average earned 0.7% less than their private sector counterparts. This gap grew to -1.0% in 2012 and then to -1.9% in 2013.

Tables 10 & 11: Average difference in hourly pay between public and private sector workers expressed as a percentage of private pay, April 2011-2013, UK

Regression model without organisation size

	Without organisation size percentage
	Difference in Pay
2011	3.8

2012	3.1
2013	2.7

Source: Annual Survey of Hours and Earnings and Monthly Wages and Salaries Survey

Regression model with organisation size

April 2013, UK

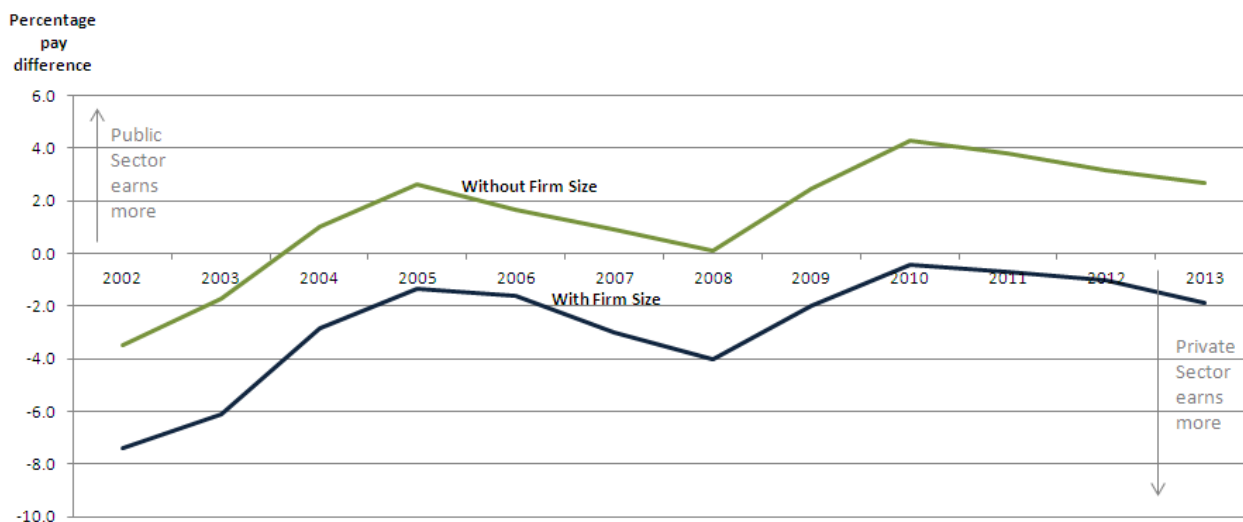
	With organisation size percentage
	Difference in Pay
2011	-0.7
2012	-1.0
2013	-1.9

Source: Annual Survey of Hours and Earnings and Monthly Wages and Salaries Survey

This downward trend in the pay differential is likely to be a reflection of public sector pay freezes which have limited the growth of earnings in the public sector since 2010.

Longer term trends can be seen in Figure 4 below.

Figure 4: Average difference in mean hourly pay (excluding overtime) between public and private sector workers expressed as a percentage of private pay using different regression models, April 2002-April 2013, UK



Source: Annual Survey of Hours and Earnings (ASHE), Monthly Wages and Salaries Survey - Office for National Statistics

Notes:

1. No data is available for Northern Ireland for 2002-2003, estimates for these years refer to Great Britain

Between 2008 and 2010, in the wake of the financial crisis and through the first part of the subsequent economic downturn, the pay gap grew in favour of the public sector. From 2010 onwards the pay gap began to fall back towards its 2008 level. As previously mentioned the downward trend since 2010 could be as a result of public sector pay freezes. The relevant 95% confidence intervals for these estimates can be found in the tables below.

Tables 12 & 13: 95% confidence intervals for the average difference in the mean hourly pay (excluding overtime) between public and private sector workers expressed as a percentage of private pay, April 2002-2013, UK¹

Regression model without organisation size

percentage	2002 ¹	2003 ¹	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Lower Bound	-4.0	-2.2	0.5	2.1	1.2	0.4	-0.5	2.0	3.8	3.3	2.7	2.2
Estimate	-3.5	-1.7	1.0	2.6	1.7	0.9	0.1	2.4	4.3	3.8	3.1	2.7
Upper Bound	-2.9	-1.2	1.5	3.1	2.2	1.5	0.6	2.9	4.8	4.3	3.6	3.1

Source: Annual Survey of Hours and Earnings and Monthly Wages and Salaries Survey Notes: 1 No data is available for Northern Ireland for 2002-2003, estimates for these years refer to Great Britain

Regression model with organisation size

percentage	2002 ¹	2003 ¹	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Lower Bound	-8.1	-6.7	-3.4	-1.9	-2.2	-3.6	-4.6	-2.5	-0.9	-1.2	-1.6	-2.4
Estimate	-7.4	-6.1	-2.8	-1.4	-1.6	-3.0	-4.0	-2.0	-0.4	-0.7	-1.0	-1.9
Upper Bound	-6.8	-5.6	-2.3	-0.8	-1.1	-2.4	-3.4	-1.5	0.1	-0.2	-0.5	-1.3

Source: Annual Survey of Hours and Earnings and Monthly Wages and Salaries Survey Notes: 1 No data is available for Northern Ireland for 2002-2003, estimates for these years refer to Great Britain

Quantile regression

The above regression models consider the difference in the mean pay of public and private sector workers. This does not take account of the fact that the distribution of pay tends to be narrower in the public sector than the private sector and so does not give a complete picture.

It is possible to use a different regression method, known as quantile regression, to estimate the difference in the median pay of public and private sector workers as well as the difference for each percentile for example the 5th or 10th percentile etc. This is useful as it indicates if the pay gap is different at different points of the pay distribution, effects which cannot be captured by mean regressions.

It should be noted that estimates across different quantiles of the income distribution compare the average hourly pay for a certain distribution of the public sector workforce to the average pay for a certain distribution of the private sector workforce. For example if we observe a positive public sector premium at the lower end of the distribution, this does not necessarily imply that if an individual in the lower end of the income distribution in the public sector was to move to the private sector, they would earn a lower hourly pay. It implies that individuals in the lower end of the public sector income distribution conditional on observed characteristics earn an hourly premium compared to the individuals in the lower end of the private sector income distribution conditional on observed characteristics.

The pay gap between private and public sector workers has been estimated for the 5th and 10th percentile, the median and the 90th and 95th percentile for 2011-2013, using the regression model both excluding and including organisation size.

Tables 14 & 15: Average difference in hourly earnings between public and private sector workers expressed as a percentage of private pay by percentile, April 2011-2013, UK

Regression model without organisation size

	Percentage					
	Percentile					
	5th	10th	50th	90th	95th	Mean
2011	14.7	13.8	6.7	-3.8	-7.3	3.8
2012	13.2	12.4	6.0	-4.0	-6.7	3.1
2013	12.7	12.0	4.9	-2.9	-5.9	2.7

Source: Office for National Statistics

Regression model with organisation size

	Percentage					
	Percentile					
	5th	10th	50th	90th	95th	Mean
2011	10.8	10.3	3.1	-8.3	-12.4	-0.7
2012	9.5	9.0	2.5	-7.2	-9.9	-1.0
2013	8.4	8.3	1.3	-7.2	-10.8	-1.9

Source: Office for National Statistics

The model which does not control for organisation size, shown in table 14, indicates that the pay gap was wider at the bottom end of the distribution than it was at the top. For instance in 2013, at the 5th percentile, public sector workers earned 12.7% more than private sector workers. At the other end of the pay distribution, at the 95th percentile, public sector workers earned 5.9% less than private sector workers. This shows that the mean pay gap of 2.7% for 2013 was heavily influenced by the bottom end of the pay distribution.

By contrast the model which does control for organisation size, shown in table 15, indicates that pay gap at the top of the pay distribution was wider than the pay gap at the bottom of the distribution. Drawing the same comparison between the 5th and 95th percentiles in 2013, the pay gap at the bottom of the distribution was 8.4% whereas at the top it was -10.8%. The mean pay gap of -1.9% for 2013 was therefore more heavily influenced by the differential at the top end of the pay distribution.

The pay gap in favour of the public sector at the bottom of the distribution may be due to the private sector having more jobs paid close to the minimum wage than the public sector. The pay gap in favour of the private sector at the top of the distribution can be explained by the fact that the public sector, in general, does not have the very high wages at the top of the wage distribution as seen in the private sector.

Other factors

There may be other factors not collected on the ASHE dataset that, if controlled for, would affect the pay difference between the public and private sector. Employees in both the public sector and the private sector receive other forms of remuneration or benefits that are not taken into account in this analysis. For example, employees may receive pension contributions from their employer, and this is a form of deferred earnings.

In the private sector some workers may receive a company car or health insurance as a form of remuneration. This is a significant payment to the employee that would not be included in their hourly earnings. If these other forms of payment were included in the pay gap model, a different pay gap may be derived.

Qualifications, as discussed in Section A, is also an important determinant of an individual's earnings. The estimates of public and private sector pay in this report however, do not account for qualifications as this is not available on the ASHE dataset. If qualifications could be included in the model we would likely derive a different pay gap. It is however important to note that occupation and education are highly correlated as highly educated individuals tend to be in highly skilled jobs. It is therefore likely that some of the variation in earnings that would have been captured by qualifications has been captured instead, by occupation.

It is also worth noting that self-employed workers are not included on the ASHE dataset. This has an important effect. With regards to the public sector, ASHE captures most of the highest paid workers. However, in the private sector, many highly remunerated workers are self-employed.

This means that the ASHE estimate of average pay does not include many of the highest income workers in the private sector whereas a large proportion of the highest earners in the public sector will be included in the ASHE dataset. Also some of the lowest paid workers may be self-employed. Therefore, the public-private sector pay gap that has been estimated in this article might be different had the ASHE dataset included self-employed workers in the sample.

5. Section C: Regression analysis of public and private sector pay for regions and the devolved countries of the UK

As well as the public and private sector having a variety of different characteristics in terms of the jobs and types of people within them, there is also large variation in these characteristics across the regions and the devolved countries of the UK.

This section uses the regression models with and without organisational size, used in Section B, to estimate differences in public and private sector pay for the regions in England and the devolved countries of the UK. So the results presented are based on a linear regression of log-hourly earnings (excluding overtime) with the following independent variables:

- Sex - due to differences in the distribution of men and women in the public and private sectors.

- Age & Age squared - as the relationship between earnings and age is non-linear.
- Occupation (coded to SOC 2010 for 2011-2013 and coded to a SOC 2010 equivalent for 2002-2010) - Because pay is heavily influenced by occupation.
- Region or Country (that the job is located in) - as there are differences in the percentages of jobs in each sector across the 12 regions or countries of the UK.
- Employment status of full and part time - because full time workers tend to be paid more per hour than part time workers.
- Employment status of permanent and temporary - because permanent workers tend to be paid more on average than temporary workers.
- Sector - Public, Private or Non-profit organisation.
- Job tenure based on days worked: <=183, 184-366, 367-732, 733-1830, 1831-3660, 3661-7620, 7321+.
- Sex*Age & Sex* Age squared – because the potential work experience proxied by age for males and females are different.
- Occupation*Age – the return to work experience may be different for different occupations.
- Occupation*Region – industry and labour market structures that impact on wages may differ between the regions.
- Interactions between Region and Sector - to allow the pay differences between the sectors to be estimated for each region.

The following are also included in the model that controls for organisation size:

- Organisation size – because larger organisations tend to pay more than smaller organisations.
- Occupation*Organisation size - it is assumed that wages for similar occupations are higher the larger the organisation size.

Regression analysis results for regions and the devolved countries of the UK

Tables 16 & 17: Average difference in the mean hourly earnings between public and private sector workers expressed as a percentage of private pay, April 2002-2013, regions and the devolved countries of the UK¹

Regression model without firm size

Percentage

	2002 ¹	2003 ¹	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
United Kingdom ¹	-3.5	-1.7	1.0	2.6	1.7	0.9	0.1	2.4	4.3	3.8	3.1	2.7
North East	1.2	2.7	6.8	6.4	7.5	6.6	3.4	7.5	10.6	10.4	9.1	10.5
North West	0.2	1.7	2.6	4.6	6.3	4.5	4.1	5.4	7.6	8.1	8.4	7.4
Yorkshire and The Humber	0.8	1.7	3.1	6.1	5.4	4.1	2.2	5.3	6.6	8.0	7.8	8.0
East Midlands	1.7	3.2	4.5	7.4	6.8	6.2	4.1	5.8	7.7	9.5	7.5	5.7
West Midlands	0.3	2.0	5.9	6.5	5.8	3.4	3.2	5.2	8.6	8.8	6.7	5.9

East of England	-5.0	-4.6	-0.4	2.4	1.5	-0.4	0.4	4.2	4.0	5.8	4.6	4.6
London	-15.5	-12.9	-10.6	-8.9	-10.2	-10.8	-12.9	-9.5	-7.2	-8.0	-6.8	-7.7
South East	-11.4	-8.5	-4.7	-4.9	-4.4	-5.2	-5.7	-6.1	-2.7	-2.4	-3.7	-2.5
South West	-3.1	0.6	2.7	4.1	4.0	3.0	4.3	4.9	7.0	9.2	6.9	6.1
Wales	1.2	3.9	6.7	8.4	5.2	6.5	5.2	7.9	9.0	7.7	7.2	7.9
Scotland	-2.1	-2.2	-0.3	1.7	-2.4	-1.6	-1.5	2.4	3.2	3.8	2.2	1.9
Northern Ireland ¹	-	-	8.0	10.3	2.3	7.0	8.3	10.6	9.7	10.7	12.3	14.7

Source: Annual Survey of Hours and Earnings and Monthly Wages and Salaries Survey Notes: 1 No data is available for Northern Ireland for 2002-2003, estimates for these years refer to Great Britain

Regression model with organisation size

Percentage

	2002 ¹	2003 ¹	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
United Kingdom ¹	-7.4	-6.1	-2.8	-1.4	-1.6	-3.0	-4.0	-2.0	-0.4	-0.7	-1.0	-1.9
North East	-2.8	-1.4	3.1	2.8	4.4	2.9	-0.3	3.2	6.0	6.2	5.2	6.3
North West	-3.5	-2.5	-1.1	0.9	3.0	0.7	0.1	1.0	2.9	3.6	4.3	2.9
Yorkshire and The Humber	-3.4	-2.9	-1.0	1.7	1.8	0.2	-2.0	0.8	1.7	3.2	3.1	2.8
East Midlands	-3.0	-1.7	0.2	3.1	3.3	1.9	-0.2	1.3	3.2	5.0	3.5	1.7
West Midlands	-3.8	-2.7	1.6	2.4	2.5	-0.5	-0.9	0.8	3.8	4.4	2.6	1.5
East of England	-9.2	-9.2	-4.3	-1.8	-2.1	-4.7	-4.1	-0.8	-0.8	1.0	0.3	-0.2
London	-18.1	-15.9	-13.3	-11.6	-12.3	-13.7	-15.6	-12.5	-10.7	-11.2	-9.9	-11.2
South East	-15.1	-13.0	-8.6	-8.9	-7.7	-9.1	-9.8	-10.3	-7.2	-6.6	-7.6	-6.9
South West	-7.4	-4.3	-1.8	-0.4	0.1	-1.6	-0.6	-0.4	1.5	4.1	2.5	1.2
Wales	-3.9	-1.9	2.3	4.0	1.5	2.0	0.7	3.0	4.0	2.7	2.4	2.3
Scotland	-6.4	-6.6	-3.9	-2.2	-5.6	-5.1	-5.2	-1.7	-1.3	-0.5	-1.8	-2.5
Northern Ireland ¹	-	-	3.7	5.0	-1.8	2.1	1.9	3.7	2.6	3.5	4.8	7.1

Source: Annual Survey of Hours and Earnings and Monthly Wages and Salaries Survey Notes: 1 No data is available for Northern Ireland for 2002-2003, estimates for these years refer to Great Britain

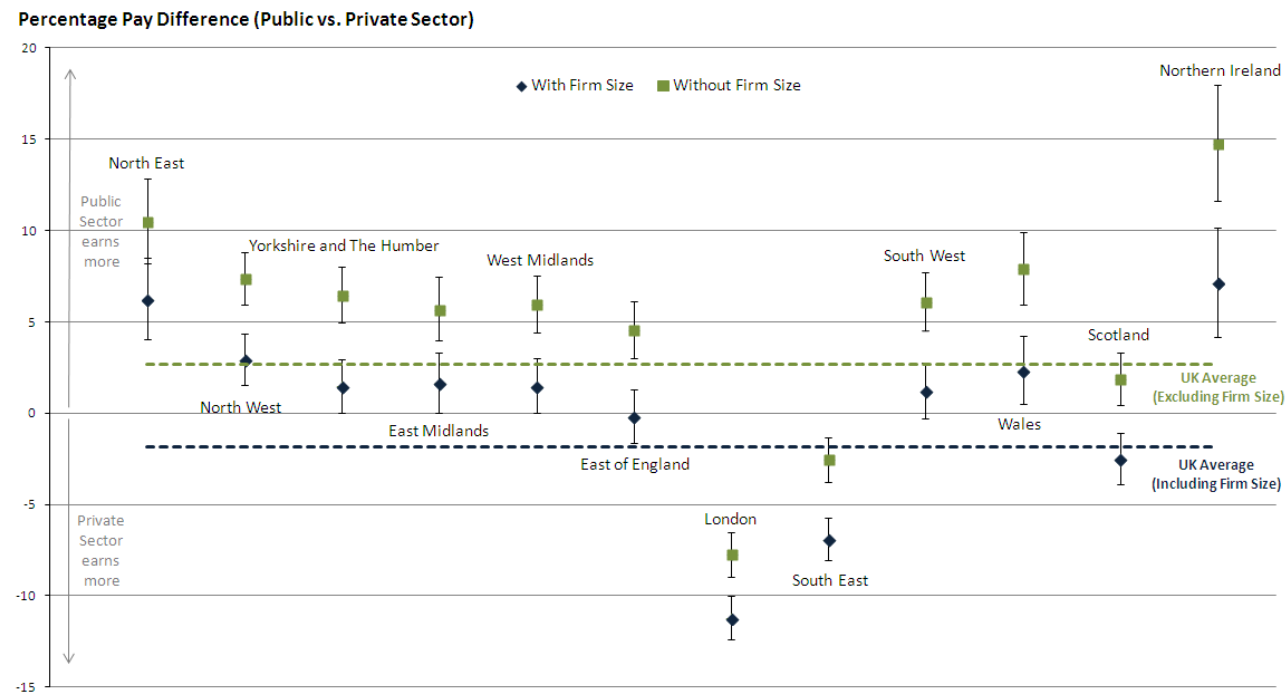
This gives, for example, an estimated pay gap between the public and private sector of 10.5% in the North East in 2013 when accounting for gender, age, occupation, region, full time/part time, permanent/temporary and job tenure. This estimate reduces to 6.3% when organisation size is also accounted for.

When organisation size is not accounted for, in 2013, public sector workers earned more on average than private sector workers in all regions except London and the South East. When organisation size is accounted for public sector workers earned more on average than private sector workers in all regions except London, the South East, the West Midlands and Scotland, where they earned less.

In both models, the pay gap is negative for each of the years considered for London indicating that public sector workers earned less than private sector workers.

It should be emphasised that these differences in pay are estimates. 95% confidence intervals for the estimated pay gaps in each region for 2013 for each model are shown in the following chart.

Figure 5: 95% confidence intervals for the average difference in the mean hourly pay (excluding overtime) between public and private sector workers expressed as a percentage of private pay, April 2013, regions in England and the devolved countries of the UK



Source: Annual Survey of Hours and Earnings (ASHE), Monthly Wages and Salaries Survey - Office for National Statistics

Most of the regions or countries are above the UK average whereas London, the South East and Scotland are below. As 28% of employees work in either London or the South East the pay gap in these regions has a larger impact on the UK average than the other regions which represent a lower percentage of employees. In figure 5 it can be seen that a number of the confidence intervals overlap between regions. For regions with overlapping confidence intervals, the pay gap in each region may not be statistically significantly different from each other.

Quantile regression for regions and the devolved countries of the UK

As with the estimate of the pay gap for the UK, quantile regression can be used to estimate the pay gap at different points of the pay distribution. To illustrate this for the regions, the pay gap between private and public sector workers has been estimated for the 5th and 10th percentile, the median and the 90th and 95th percentile for 2011-2013 using the regression model both excluding and including organisational size.

Tables 18 & 19: Average difference in hourly pay between public and private sector workers expressed as a percentage of private pay by percentile, April 2013, regions in England and the devolved countries of the UK

Regression model without organisation size

Percentage

Percentile

	5th	10th	50th	90th	95th	Mean
United Kingdom	12.7	12.0	4.9	-2.9	-5.9	2.7
North East	14.0	13.2	12.3	5.4	2.1	10.5
North West	12.9	13.1	7.6	3.2	1.0	7.4
Yorkshire and The Humber	10.8	10.9	6.4	2.1	-0.6	8.0
East Midlands	9.5	9.7	7.2	2.2	-0.8	5.7
West Midlands	10.1	11.2	7.5	1.5	-2.9	5.9
East of England	11.5	11.1	5.7	1.0	-0.9	4.6
London	20.4	15.3	-3.1	-19.5	-24.3	-7.7
South East	9.0	7.7	-0.6	-9.0	-13.0	-2.5
South West	10.1	10.9	7.1	3.3	0.3	6.1
Wales	11.8	13.1	9.7	2.6	-0.7	7.9
Scotland	14.6	13.3	3.9	-4.9	-5.9	1.9
Northern Ireland	23.0	23.0	16.4	8.6	4.0	14.7

Source: Annual Survey of Hours and Earnings and Monthly Wages and Salaries Survey

Regression model with organisation size

Percentage

	Percentile					Mean
	5th	10th	50th	90th	95th	
United Kingdom	8.4	8.3	1.3	-7.2	-10.8	-1.9
North East	10.8	10.2	8.5	-0.9	-2.7	6.3
North West	9.1	9.4	4.1	-1.0	-3.5	2.9
Yorkshire and The Humber	7.0	7.8	2.5	-3.2	-4.2	2.8
East Midlands	6.7	6.3	3.5	-1.4	-3.9	1.7
West Midlands	6.8	8.0	4.2	-2.9	-7.3	1.5
East of England	7.9	7.9	1.2	-4.3	-5.6	-0.2
London	15.0	10.5	-5.9	-22.6	-27.8	-11.2
South East	4.1	3.7	-4.1	-12.8	-17.1	-6.9
South West	6.7	7.5	3.5	-1.7	-4.6	1.2
Wales	8.1	8.5	5.4	-2.4	-5.8	2.3
Scotland	11.4	9.7	0.1	-8.9	-10.9	-2.5
Northern Ireland	16.4	17.6	8.9	0.7	-1.3	7.1

Source: Annual Survey of Hours and Earnings and Monthly Wages and Salaries Survey

In 2013 we can see that at the bottom of the pay distribution, at the 5th percentile, London had the one of the largest pay gaps in favour of the public sector, just behind Northern Ireland. Furthermore at the 95th percentile, at the top of the pay distribution, London had the largest pay gap in favour of the private sector ahead of the South East.

One explanation for the higher pay differential seen at the top of the pay distribution in London and also in the South East is that there was a higher concentration of high paid private sector jobs in these regions compared to the other regions and devolved countries of the UK. For those regions with a wide gap at the bottom of the pay distribution it may be the case that, as noted previously, there were more people working at or close to the minimum wage. These jobs tend to be more prevalent in the private sector meaning at the bottom of the distribution private sector pay does not compare as well to public sector pay.

Again, these are estimates based on a sample such that different samples would give different results. Also a different model containing additional or different independent variables would give different results.

The regression output for each of the above estimates is available from ONS on request.

6. Annex 1: Changes since the last publication - The impact of the Standard Occupation Classification revisions

On February 28th 2014 ONS published a methodological note explaining the impact of the change in Standard Occupational Classification on the estimates of public and private sector pay. What follows in Annex 1 is this methodological note.

Comparing the pay of the public sector and the private sector is not a straightforward task because the two sectors are made up of a variety of different jobs and types of people. A number of different results can be derived depending on the methodology that is used to calculate pay differences.

ONS uses a statistical technique, called regression, to estimate the pay difference when controlling for some of the factors that influence the pay of the two sectors. The latest report, published in November 2012, estimated that a public sector employee earned, on average, 7.3% more than a private sector employee in 2011.

If controlling for differences in the organisation sizes of the two sectors, as larger organisations tend to on average have higher average pay than small organisations, the estimate of the pay gap was 2.2%.

These estimates are based on earnings data collected in the Annual Survey of Hours and Earnings (ASHE) with an adjustment for bonus payments using the Average Weekly Earnings (AWE) series produced by ONS.

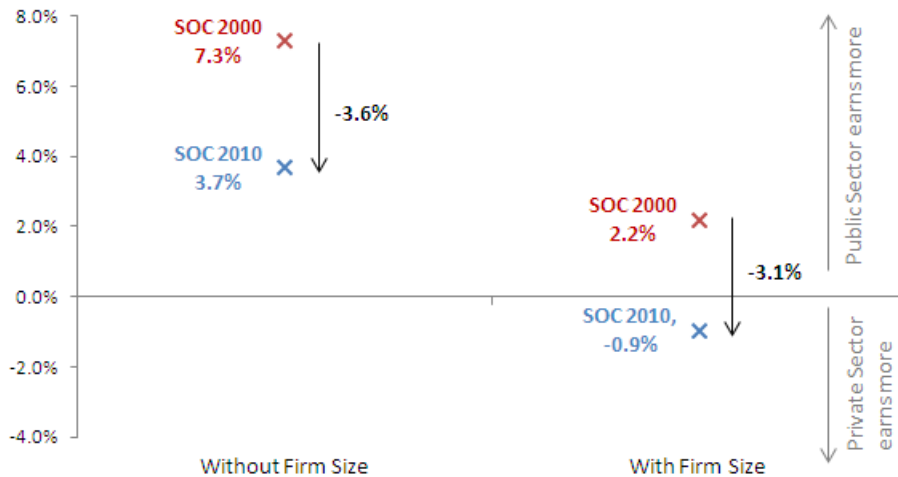
Changes to the occupational classification

Occupation is one of the key variables used within the regression model of the pay difference between the two sectors. ASHE contains information on the types of occupation each employee is working in and is coded to the Standard Occupational Classification (SOC). This is a common classification of occupational information for the United Kingdom and enables operational users in both research/statistical and client-oriented applications to use SOC in as consistent a way as possible.

The SOC classification is updated on a ten year cycle and current ONS estimates of the pay differential have used ASHE coded to the Standard Occupational Code for 2000 (SOC 2000). In 2011, ONS started rolling out an updated occupational classification, SOC 2010, across many of its surveys including ASHE. This results in a discontinuity to the estimate of the public and private sector pay differential.

The 2011 ASHE information was initially published using SOC 2000 and then reworked at a later date on a SOC 2010 basis. Therefore it is possible to look at the pay differential under both occupational classifications for the same year. When considering the regression results without the impact of organisation size the pay differential is revised from 7.3% to 3.7%, and controlling for differences in organisation size the pay differential is revised from 2.2% to -0.9%.

Figure 6 - Pay difference between the public and private sector in 2011 using SOC 2000 and SOC 2010



Source: Annual Survey of Hours and Earnings (ASHE) - Office for National Statistics

Notes:

1. Positive number means the public sector earns more

Why change SOC?

The Standard Occupational Classification, first introduced in 1990, is maintained by the Classification and Harmonisation Unit (CHU) of the Office for National Statistics (ONS).

They conduct this maintenance function by responding to user queries, collecting and collating information on new occupational areas and by developing databases of occupational information for the purpose of revising the classification.

The conceptual basis of the UK national occupational classification has remained unchanged since 1990 but the types of occupation and groupings are updated every 10 years in response to the changes in occupational areas. Additionally SOC is updated to harmonise with the latest international standards and SOC2010 reflects the work of the International Labour Office who revised the International Classification of Occupations (ISCO) from its 1988 version to create a 2008 version.

There are currently nine major occupational groupings, and the main changes introduced between SOC2000 and SOC2010 were:

- an introduction of a stricter definition of managers;
- the reallocation of most nursing occupations from Major Group 3 to Major Group 2;
- a reclassification of occupations associated with information technologies;
- further alignment with the 2008 revision of the International Standard Classification of Occupations (ISCO08), specifically via the introduction of a limited number of supervisory unit groups.

The update to SOC2010 has meant the UK occupational structure has improved the compatibility with international standards and is a better occupational structure than its predecessor SOC2000.

More details on the revisions to SOC, including a detailed explanation of the four main changes are available in a paper produced by Peter Elias and Margaret Birch, published in May 2010 titled SOC 2010: [The revision of the Standard Occupation Classification 2000](#).

Understanding the discontinuity

Estimates of the pay differential are based on a linear regression of log-hourly earnings with independent variables:

- Sex (because of differences in the distribution of men and women in the public and private sectors)
- Age & Age squared (because the relationship between earnings and age is non-linear)
- Occupations (from Soc 2000 – 11 groups) (because pay is heavily determined by the occupation carried out)
- Region (that the job is located in - 12 across the UK) (because of differences in the percentages of jobs in each sector across the country).
- Sector (Public, Private, Non-profit organisations)
- Employment status of full and part time (because full time workers tend to be paid more per hour than part time workers)
- Employment status of permanent and temporary (because permanent workers tend to be paid more on average than temporary workers)
- Job tenure based on days worked (job tenure is a proxy for organisation specific experience).

A specification test was performed on the regression model with the aim of reducing the specification error as far as possible with the available data and 11 categories of occupation performed best. Using a more detailed occupation level can lead to some categories consisting nearly entirely of occupations in one sector. The 11 categories of occupation used are shown in Table 20 below.

The two main areas of change to the occupational classification that impact on the pay differential are

1. the reallocation of most nursing occupations from a lower occupational group (Major Group 3) to a higher occupational group (Major Group 2)
2. the introduction of a tighter definition of managers

Table 21 shows the relationship between SOC2000 and SOC2010 using the 2011 ASHE dataset. The numbers represent the percentage of individuals that were in one of the occupational groups on SOC 2000 and the corresponding group under SOC2010. Those highlighted in yellow show the diagonal where individuals were in the same occupational group under both classifications. For groups 2, 4, 5, 6, 7, 8 and 9 between 79% and 89% of individuals were in the same group. The main revisions were in major group 3 and among the managerial groupings 1a, 1b and 1c.

The revision of occupations from Major Group 3 to Major Group 2 is shown in Table 21 by the blue shading, where 29% of individuals have been moved up the occupational group.

Table 21 - Percentage of individuals that were in one of the occupational groups on SOC 2000 and the corresponding group under SOC2010 for ASHE, April 2011

	Occupational Group	SOC2000													
		1a	1b	1c	2	3	4	5	6	7	8	9			
SOC2010	1a	35	1	0	0	0	0	0	0	0	0	2	1		
	1b	38	46	14	2	1	2	1	0	2					
	1c	4	4	46	0	0	0	0	1	0					
	2	9	14	7	85	29	3	2	3	1					
	3	9	20	8	6	57	6	4	3	4	3	1			
	4	5	7	7	2	9	4	2	5	82	1	2	4	1	1
	5					14	2	1	0	84	0	0	7	2	
	6					2	1	0	89	1	1	2			
	7					2	3	0	1	85	1	3			
	8					1	1	4	0	1	79	5			
9	0	1	3	1	3	7	85								

Source: Annual Survey of Hours and Earnings (ASHE) - Office for National Statistics

Of those moving from group 3 to group 2, just over 60% are nurses and a further 10% are midwives, physiotherapists and journalists moving groups. Around three-quarters of those moving up the group are in the public sector and their pay in the higher group compares less favourably to their private sector counterparts in Major Group 2 than it did in Major Group 3.

The tighter definition of managers is shown in Table 21 by the orange shading, where 14% of managers in group 1b have moved to major group 2 and a further 20% of managers have moved to major group 3 when using SOC 2010. Most of this movement is for workers in the private sector, accounting for 79% of those moving from group 1b to either 2 or 3. Their pay in these lower groups compares more favourably to their public sector counterparts than it did within the original SOC2000 group of 1b.

Taken together these reclassifications help to explain the reduction in the estimated pay differential of the public sector earning more on average than the private sector when using SOC 2010 compared to SOC 2000.

To further understand the impact of these SOC changes further results have been produced on a SOC 2010 basis, where it is estimated the public sector earned 3.7% more than the private sector. Those occupations where the largest revisions between groups took place were moved back to the groups they were in when using SOC 2000. The occupations moving from group 1b under SOC 2000 to groups 2 and 3 under SOC2010 were sales managers and financial account managers. The results are in table 22.

The estimate of the public sector earning around 3.7% more on average than the private sector increases to 5.1% if nurses are moved from major group 2 back to major group 3. If moving just sales managers back to group 1b the gap increases from 3.7% to 4.7%. The pay gap also increases if moving financial account managers, or midwives, or physiotherapists, but not by as much as the nurses and financial managers.

Rather than moving the occupations individually and moving all collectively, back to the groupings they were in under SOC2000, increases the pay difference from 3.7% to 7.0. This is much closer to the 7.3% original estimate when using a SOC 2000 classification. Therefore, the reclassification of these occupations in SOC 2010 helps to explain the difference in the estimate of the pay gap when using SOC 2010 compared to using SOC 2000.

Producing a consistent time series - roll back SOC 2010

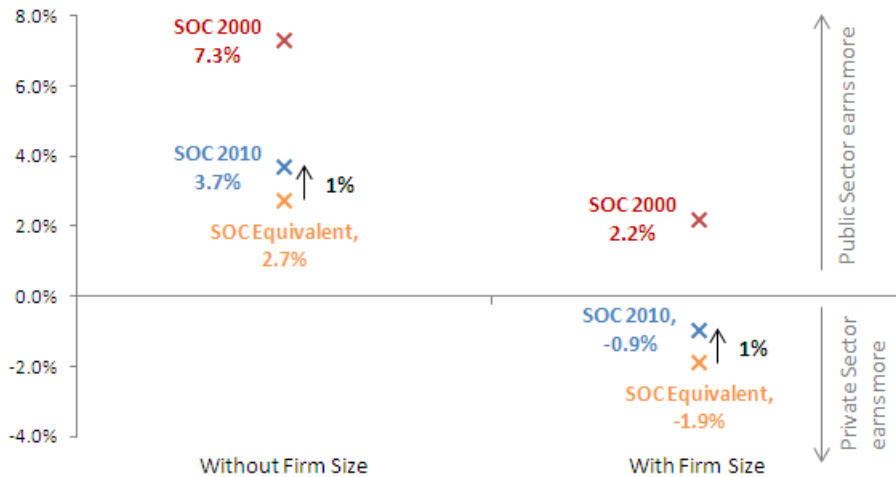
The SOC 2010 classification better reflects the current occupational structure across the United Kingdom. The ASHE 2011 data is available on a dual coded basis but previous years only contain information on SOC 2010. Going forward from 2011, estimates will be available on a consistent SOC2010 basis.

To produce a long run time series ONS has considered several options and our proposed solution is to rollback SOC2010 onto the earlier datasets.

A conversion code has been created which uses probabilistic matching to convert a SOC2000 occupation into a SOC2010 equivalent. The code does not give the exact same occupational group as would be achieved by

investing time and resource to dual code. As the 2011 ASHE was dual coded it is possible to compare the results where SOC 2000 has been converted alongside the actual SOC 2010. After converting SOC2000 to SOC2010 the estimate of the pay differential is closer to the actual SOC 2010 results and in 2011 it is 1% lower for models without and with organisation size included, shown in figure 2. So the conversion gives a lower estimate of the pay differential and assuming that the same difference applies for the back series it is possible to adjust the estimates for 2002 to 2010. This is done by increasing the observed differential when converting SOC2000 to SOC2010 by 1 percentage point.

Figure 7 - Pay difference between the public and private sector in 2011 using SOC 2000, SOC 2010 and SOC 2010 equivalent



Source: Annual Survey of Hours and Earnings (ASHE) - Office for National Statistics

Notes:

1. Positive number means the public sector earns more

Converting SOC2000 to SOC2010 going back in time assumes that the SOC2010 classification is better than the SOC2000 classification for all years where SOC 2000 is available. Particularly for the case of Nurses this may not be the case the further back in time we go as SOC2000 was the optimal coding frame when it was introduced. We have decided to adopt this option as we feel this is the best way of removing the discontinuity with the least drawbacks.

There were two other options that ONS considered. One was to leave the discontinuity but in speaking to some users it was felt that having a time series, understanding the discontinuity and a method to overcome it was important. The remaining option was to minimise the impact of the SOC reclassification by running the regression model with more occupational groups. However, when making comparisons of public and private sector pay, using the three-digit occupational level, some occupations are so specific that they are based entirely in the public or private sector.

When two or more explanatory variables in a regression are highly correlated with each other the variation in one of the variables may be captured instead by one of the other variables. For instance the 3 digit group which contains Nurses, who are predominantly based in the public sector, will be highly correlated with the variable that indicates whether someone is in the public or private sector. We could then start to see the variation explained by public/private sector status being captured instead in the occupation variable. This would compromise the accuracy of the variable we are most interested in. This issue is known as multicollinearity.

7. Background notes

1. 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

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