Office for National Statistics

Public and Private Sector Earnings - November 2014

Coverage: **UK**
Date: **19 November 2014**
Geographical Area: **Region**
Theme: **Labour Market**
Theme: **Economy**
Theme: **Government**

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 2014, it is estimated that the average pay in the public sector and private sector was very similar. The estimate ranged between a 0.9% pay gap in favour of the public sector and a 0.1% pay gap in favour of the private sector, after accounting for the different jobs and personal characteristics of the workers.
- On average, large organisations tend to earn more than small organisations and the public sector consists of a higher proportion of large organisations (over 500 employees) compared with the private sector.
- After accounting for the different organisation sizes between the public and private sector, it is estimated that on average the pay of the public sector was between 3.3% and 4.3% lower than the private sector in April 2014.
- Focusing on those who fall within the bottom 5% of earners i.e. the lowest paid, public sector workers earned on average around 12% (8% when further accounting for the different organisational sizes) more than private sector workers in 2014.
- For those who fall within the top 5% of earners i.e. the highest paid, public sector workers earned on average around 8% (13% when further accounting for the different organisational sizes) less than private sector workers in 2014.
- Comparing low and high earners, London experienced the largest variation in the pay gap between the public and private sectors across the earnings distribution in April 2014. In the bottom 5% of earners within London, public sector workers earned 20% more (13% more when accounting for organisation size) than private sector workers. In the top 5% of earners within London, public sector workers earned 24% less (26% less when accounting for organisation size) than private sector workers.

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 £10.50 per hour in 2014. This compares to £14.27 in the public sector, a difference of £3.77 (35.9%). 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 the private sector containing a larger proportion of higher earners. Comparing mean gross hourly earnings excluding overtime, public sector workers earned on average £16.36 per hour in 2014, which was £2.24 (15.9%) more than private sector employees who earned £14.12 per hour.

This comparison of averages is made using earnings data collected in the Annual Survey of Hours and Earnings (ASHE). However, using these 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, disparities in the types and skill levels of jobs, employee experience, distribution of men/women, and the location of the job could all contribute to the observed pay difference between the sectors.

Regression modelling can be used to account for some of these differences by including controls for sex, age, occupation, job tenure, region that the job is located in, the employment status of full and part time and the employment status of permanent and temporary. Further to this, due to the timing of ASHE (collected in April); the data does not reflect bonus payments made throughout the year. Using the Average Weekly Earnings series (published monthly based on the Monthly Wages and Salaries Survey), 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.

When accounting for all variables previously highlighted, as well as including an adjustment to better reflect bonus payments, it is estimated that public sector employees earned on average 0.4% more per hour (excluding overtime) than the private sector in 2014. This estimate of 0.4% 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 2014 would be between -0.1% and 0.9%.

However, another important factor that could determine employee pay is the size of the organisation. Regardless of the 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. When organisation size is included in the regression model, it is estimated that in 2014, employees in the public sector earned 3.8% less per hour (excluding overtime) than those in the private sector. This estimate of -3.8% is also subject to a margin of error such that there is 95% certainty that from all samples possible, the pay gap in 2014 would be between -4.3% and -3.3%.

In addition to the estimate of the pay gap for the UK, we also observe differences in the pay gap across the pay distribution and across the regions and devolved countries of the UK. These are discussed further in sections B & C.

The estimates are by no means a definitive measure of the public-private sector pay gap. A different model containing additional or alternative independent variables would give different results. However, it is not possible to include all factors that affect pay, such as employee ability or motivation, as information on these factors is not available. Equally, pay information for self-employed workers is not available meaning that some of the highest paid workers, as well as some of the lowest paid workers, have been excluded.

The public and private sector pay comparisons have been 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. Again, if overtime pay and hours were included; a different pay gap may be derived.

Another consideration that could impact on the estimate of the pay gap is the differing forms of employee payment used in the sectors. 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 in the Annual Survey of Hours and Earnings used for this analysis and if considered, it could result in a different estimate of the pay gap.

This article is split into three 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

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 whereas 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: Example Table

	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	

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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, when occupations are re-grouped according to their skill level from low skill to high skill, the public sector has a larger percentage of workers in the two highest skill groups when compared with the private sector. However, compositional differences within the skill levels still remain between the public and private sector. Overall, 63% of public sector employees are classed as either high skill or upper middle skill compared with 47% of private sector employees.

Table 2: Percentage of employees by skill level in the public sector and private sector, April 2014, UK

percentage

Skill-level	Public sector	Private sector
High skill	43	22
Upper middle	20	25
Lower middle	32	38
Low skill	6	15

Table source: Office for National Statistics

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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 will be 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. This report can be found on the IDS website.

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.

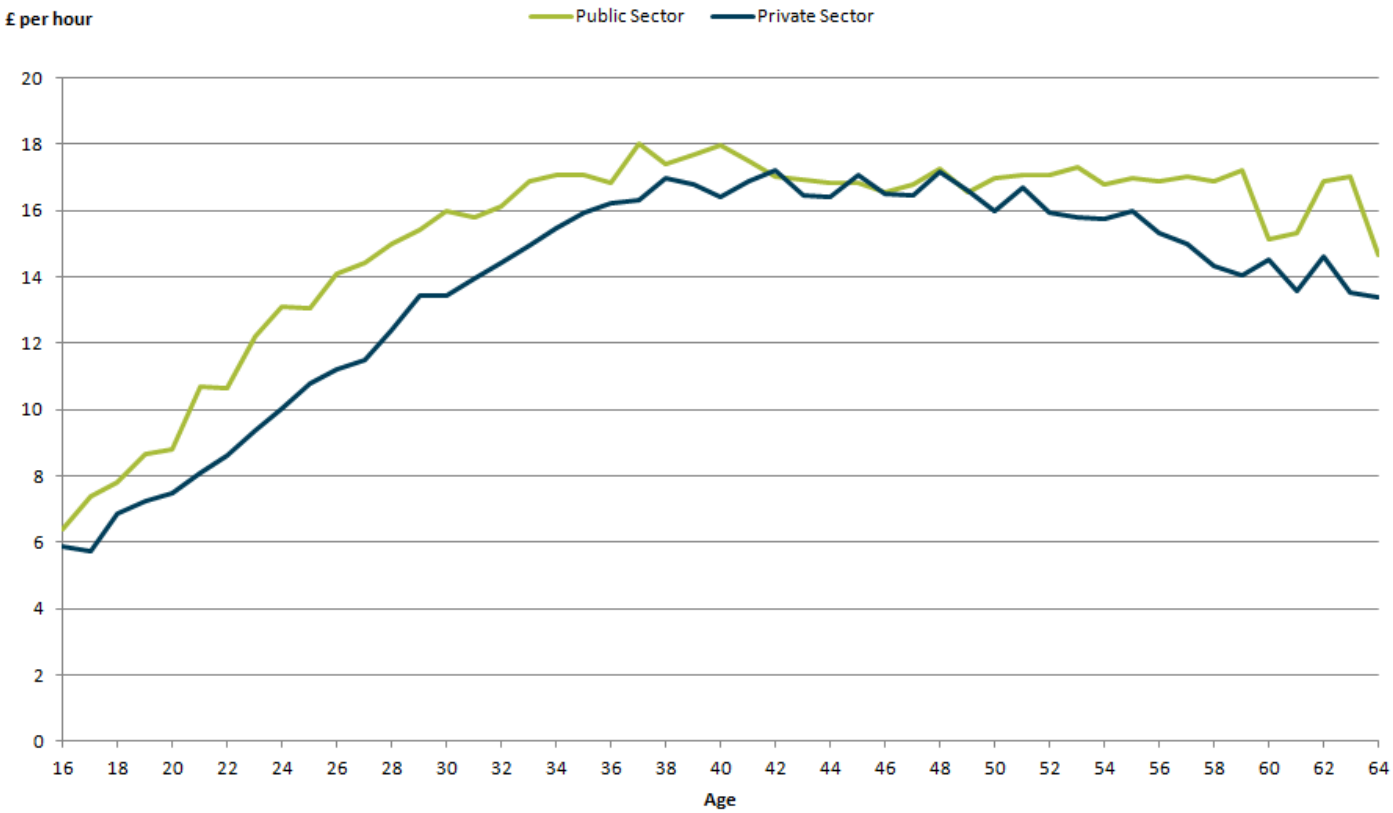
However, by grouping both jobs into one category, the public sector earns, on average, more than the private sector in this category because the jobs typically performed in the public sector are among the higher paid jobs in this category compared with the lower paid jobs that are performed in the private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

This example demonstrates that comparing jobs and the corresponding earnings differences in the public and private sector is not a straightforward task. Even after using narrower definitions for occupation classifications, differences can 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 late 30's to early 40's for the public sector, with the peak appearing slightly later (early-mid 40's) in the private sector. Both sectors experience a slight decline 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 2014, UK



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

Notes:

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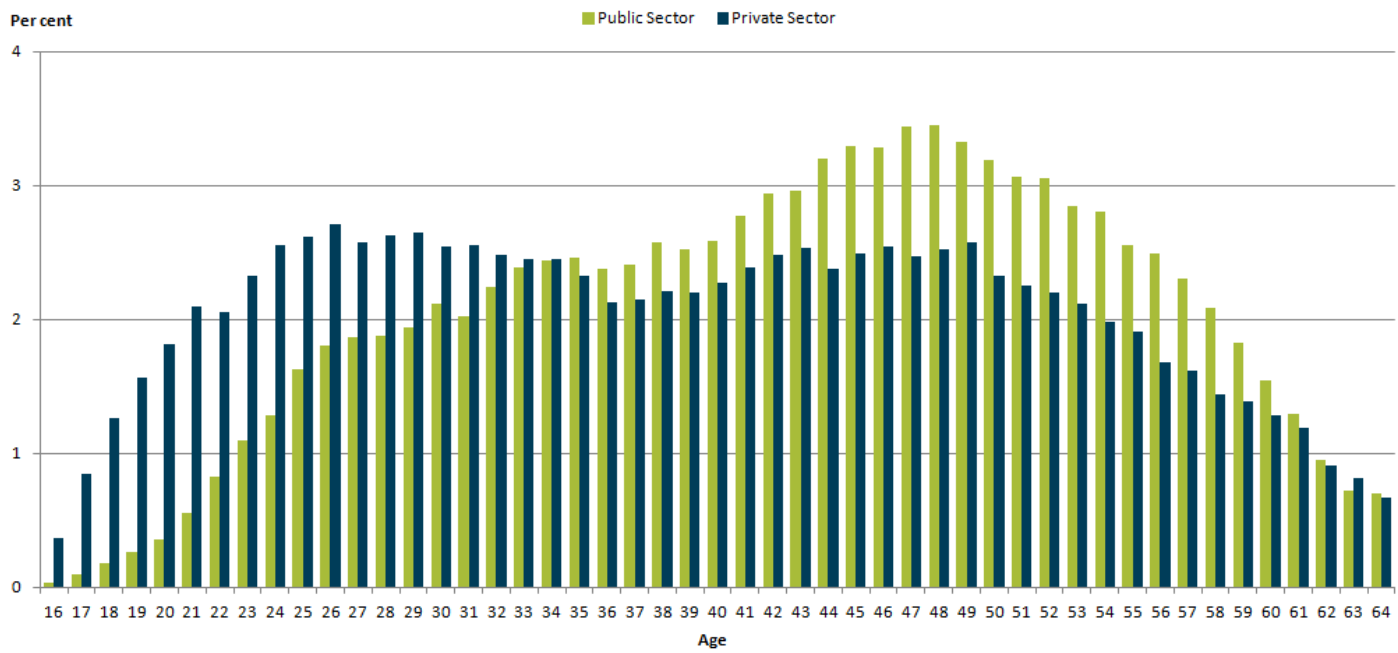
Age is used here as a proxy for experience (a reasonable assumption given that experience tends to increase with age). Similar to the example given above regarding the different skill mix in the public and private sector, keeping all other factors constant, if group A was made up of an older workforce 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 graph below represents the difference in the age profiles of the two sectors. As can be seen, the private sector contains a larger proportion of younger workers, while the public sector contains a larger proportion of older workers.

Figure 2: Percentage of workers by age in the public sector and the private sector, aged 16-64, April 2014, UK



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

Notes:

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Again, similar to the difference in the skill levels of the two sectors, the difference in age profiles between the public and private sector will impact on the observed pay. 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. However, the overall difference will still depend on a number of other 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 2014, UK

percentage

Skill-level	Public sector	Private sector
High skill	43	16
Upper middle	13	16
Lower middle	37	53
Low skill	7	15

Table source: Office for National Statistics

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Table 3 shows that in 2014, 16% of women in the private sector were employed in high skill jobs, compared with 43% in the public sector. Table 3 also confirms that a higher proportion of women in the private sector were employed in low skill jobs (15%) compared with the public sector (7%).

Also, the two sectors have a different percentage of men and women working within them. Around 67% 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 2014,

47% of employees had a degree or an equivalent qualification in the public sector, compared with 28% 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 when compared with the private sector.

Table 4: Percentage of employees by highest qualification in the public sector and private sector, four quarter average, 2014, UK

percentage

Qualification	Public sector	Private sector
Degree or equivalent	47	28
Higher education	14	9
GCE A Level or equivalent	18	25
GCSE grades A-C or equivalent	15	22
Other qualifications	5	10
No qualifications	2	6

Table source: Office for National Statistics

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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.

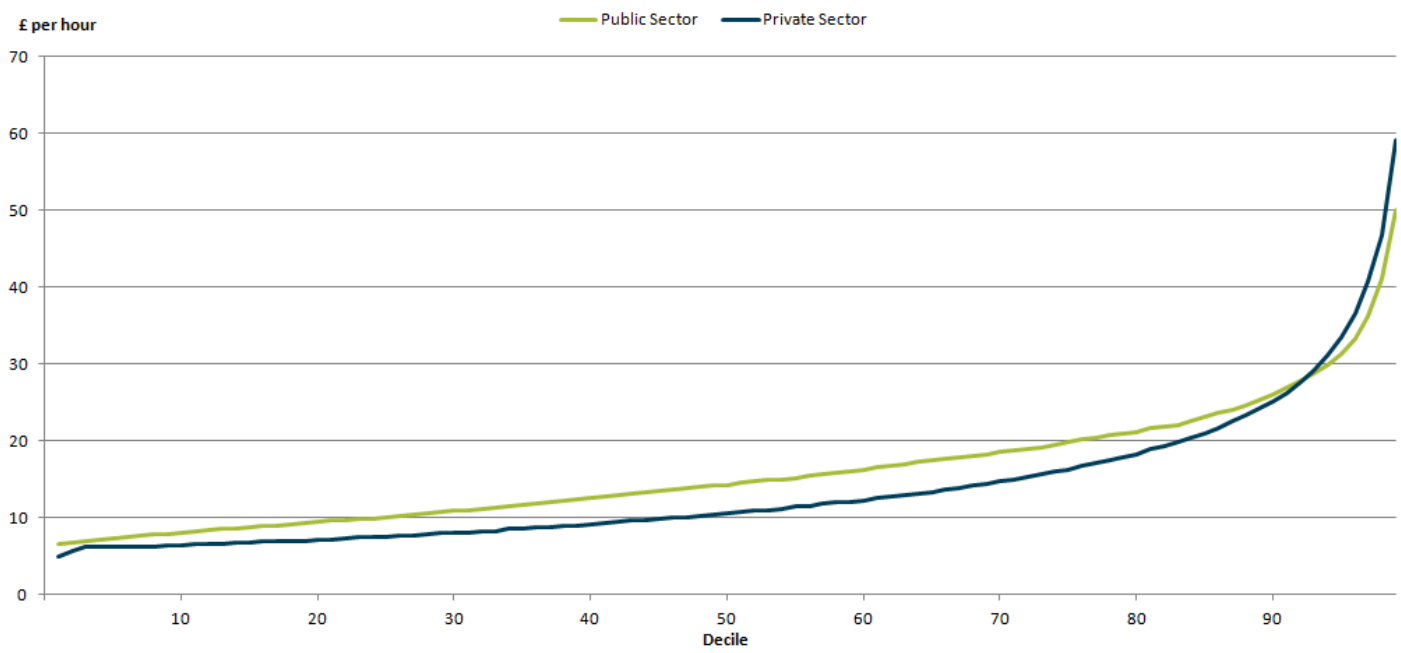
As table 2 shows, the private sector is made up of a higher proportion of low skilled workers (15%) than the public sector (6%). These workers typically have a low level of formal qualifications, and earnings of low skilled workers tend to be at the lower end of the earnings distribution.

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 £7.31 per hour, whereas in the private sector, 5% of workers earn less than £6.31 per hour.

Looking at the top 5%, in the public sector earnings are greater than £31.37 per hour, while in the private sector the top 5% earn more than £33.40 per hour. The top 1% of earners in the private sector, at more than £59.09 per hour, earns considerably more than the top 1% of earners in the public sector at more than £50.11 per hour.

Figure 3: Distribution of hourly earnings in the public sector and private sector, April 2014, UK



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

Notes:

1. Click on chart image to enlarge

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

- In the private sector, the top earners are paid around 5.3 times as much as the bottom earners.
- In the public sector, the top earners are paid around 4.3 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 2014, UK

hours

	Average weekly hours worked
Public sector	30.3
Private sector	32.6

Table source: Office for National Statistics

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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 2014, for those where the size of the organisation is available, 90.7% of those working in the public sector 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 2014, around 48.3% 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 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 given that the aim of the regression model is to calculate a public sector pay gap after all other influencing factors have been controlled for, it can be argued that organisation size should be included as a control variable.

If, by contrast, the view is held that public sector employees should earn the same as private sector employees irrespective of organisation size, then it would be useful to see the results without organisation size included. Equally, from a statistical point of view, given that over 90% of those working in the public sector are also in large organisations, the inclusion of organisation size can lead to issues of collinearity. As the variables are highly correlated, the inclusion of organisation size in the regression can impact on the precision of the estimate of the public and private sector pay gap. Furthermore, this is the only variable in the regression which is a reflection of the organisation rather than the individual.

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 what impact they may have 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 2014, UK

pounds

	Mean hourly earnings
Full time	16.07
Part time	11.52

Table source: Office for National Statistics

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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 2014, UK

percentage

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

Table source: Office for National Statistics

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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 (exluding overtime) by whether job is permanent or temporary, April 2014, UK

pounds

	Mean hourly earnings
Permanent	14.95
Temporary	12.64

Table source: Office for National Statistics

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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 2014, UK

percentage

	Permanent	Temporary
Public sector	90	10
Private sector	93	7

Table source: Office for National Statistics

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Given the relative differences in the composition of the public and private sector with respect to these factors, as well as the corresponding pay differential between permanent and temporary jobs and full-time and part-time jobs, it is necessary to control for these factors in the regression analysis. This will allow a comparison of pay between the public and private sector that is not confounded by the influence of these variables.

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.

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 with and without a control for organisation size. Looking at the model which doesn't control for organisation size we can see that between 2012 and 2014 the pay gap fell from 3.1% to 0.4%. When controlling for organisation size the same trend is apparent as we see that in 2012, public sector workers on average earned 1.0% less than their private sector counterparts. This gap grew to -3.8% in 2014.

Tables 10 & 11: Average difference in hourly pay between public and private sector workers expressed as a percentage of private pay, April 2012-2014, UK

Regression model without organisation size

percentage

	Difference in Pay
2012	3.1
2013	2.3
2014	0.4

Table source: Office for National Statistics

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Regression model with organisation size

percentage

	Difference in Pay
2012	-1.0
2013	-2.1
2014	-3.8

Table source: Office for National Statistics

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This downward trend in the pay differential is likely to be a reflection of public sector pay restraint which has 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 2014, UK

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

Notes:

1. Click on chart image to enlarge

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Between 2008 and 2010, in the wake of the financial crisis and through the first part of the subsequent recession, the pay gap moved in favour of the public sector. From 2010 onwards, this trend had reversed and the pay gap moved back towards its 2008 level. As previously mentioned

the downward trend since 2010 could be as a result of public sector pay restraints. 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 2002-2014, UK

Regression model without organisation size

percentage

	2002 [1]	2003 [1]	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Lower Bound	-4.0	-2.2	0.5	2.1	1.2	0.4	-0.5	2.0	3.8	3.3	2.7	1.8	-0.1
Estimate	-3.5	-1.7	1.0	2.6	1.7	0.9	0.1	2.4	4.3	3.8	3.1	2.3	0.4
Upper Bound	-2.9	-1.2	1.5	3.1	2.2	1.5	0.6	2.9	4.8	4.3	3.6	2.8	0.9

Table source: Office for National Statistics

Table notes:

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

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Regression model with organisation size

percentage

	2002 [1]	2003 [1]	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Lower Bound	-8.1	-6.7	-3.4	-1.9	-2.2	-3.6	-4.6	-2.5	-0.9	-1.2	-1.6	-2.6	-4.3
Estimate	-7.4	-6.1	-2.8	-1.4	-1.6	-3.0	-4.0	-2.0	-0.4	-0.7	-1.0	-2.1	-3.8
Upper Bound	-6.8	-5.6	-2.3	-0.8	-1.1	-2.4	-3.4	-1.5	0.1	-0.2	-0.5	-1.6	-3.3

Table source: Office for National Statistics

Table notes:

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

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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 2012 to 2014, using the regression model both excluding and including organisation size.

Tables 14 & 15: Average difference in hourly pay between public and private sector workers expressed as a percentage of private pay by percentile, April 2012-2014, UK

Regression model without organisation size

percentage

	Percentile					
	5th	**10th**	**50th**	**90th**	**95th**	**Mean**
2012	13.2	12.4	6.0	-4.0	-6.7	3.1
2013	12.6	11.8	4.7	-3.1	-6.2	2.3
2014	11.5	10.9	2.5	-5.4	-8.3	0.4

Table source: Office for National Statistics

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Regression model with organisation size

percentage

	Percentile					
	5th	**10th**	**50th**	**90th**	**95th**	**Mean**
2012	9.5	9.0	2.5	-7.2	-9.9	-1.0
2013	8.4	8.3	1.1	-7.2	-10.7	-2.1
2014	7.6	7.1	-0.7	-9.6	-12.7	-3.8

Table source: Office for National Statistics

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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 2014, at the 5th percentile, public sector workers earned 11.5% more than private sector workers. At the other end of the pay distribution, at the 95th percentile, public sector workers earned 8.3% less than private sector workers.

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 2014, the pay gap at the bottom of the distribution was 7.6% whereas at the top it was -12.7%.

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.

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.

Section C: Regression Analysis of Public and Private Sector Earnings 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 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 devolved countries of the UK. 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 devolved countries of the UK

Tables 16 & 17: Average difference in the mean hourly pay between public and private sector workers expressed as a percentage of private pay, April 2002-April 2014, regions in England and the devolved countries in the UK[1].

Regression model without organisation size

percentage

	2002 [1]	2003 [1]	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
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**	**2.3**	**0.4**
North East	1.2	2.7	6.8	6.4	7.5	6.6	3.4	7.5	10.6	10.4	9.1	10.3	3.1
North West	0.2	1.7	2.6	4.6	6.3	4.5	4.1	5.4	7.6	8.1	8.4	7.0	5.8
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	5.9	4.9
East Midlands	1.7	3.2	4.5	7.4	6.8	6.2	4.1	5.8	7.7	9.5	7.5	5.3	4.0
West Midlands	0.3	2.0	5.9	6.5	5.8	3.4	3.2	5.2	8.6	8.8	6.7	5.6	4.8
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	4.5	-0.8
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	-8.0
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	-5.1
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	4.1
Wales	1.2	3.9	6.7	8.4	5.2	6.5	5.2	7.9	9.0	7.7	7.2	7.8	7.8
Scotland	-2.1	-2.2	-0.3	1.7	-2.4	-1.6	-1.5	2.4	3.2	3.8	2.2	1.5	-0.4
Northern Ireland[1]	-	-	8.0	10.3	2.3	7.0	8.3	10.6	9.7	10.7	12.3	9.9	8.2

Table source: Office for National Statistics

Table notes:

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

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Regression model with organisation size

percentage

	2002 [1]	2003 [1]	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
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**	**-2.1**	**-3.8**
North East	-2.8	-1.4	3.1	2.8	4.4	2.9	-0.3	3.2	6.0	6.2	5.2	6.1	-0.5
North West	-3.5	-2.5	-1.1	0.9	3.0	0.7	0.1	1.0	2.9	3.6	4.3	2.7	1.5
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	1.0	0.0
East Midlands	-3.0	-1.7	0.2	3.1	3.3	1.9	-0.2	1.3	3.2	5.0	3.5	1.3	-0.1
West Midlands	-3.8	-2.7	1.6	2.4	2.5	-0.5	-0.9	0.8	3.8	4.4	2.6	1.2	0.6
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	-0.3	-5.2
London	-18.1	-15.9	-13.3	-11.6	-12.3	-13.7	-15.6	-12.5	-10.7	-11.2	-9.9	-11.1	-11.4
South East	-15.1	-13.0	-8.6	-8.9	-7.7	-9.1	-9.8	-10.3	-7.2	-6.6	-7.6	-6.8	-9.3
South West	-7.4	-4.3	-1.8	-0.4	0.1	-1.6	-0.6	-0.4	1.5	4.1	2.5	1.3	-0.6
Wales	-3.9	-1.9	2.3	4.0	1.5	2.0	0.7	3.0	4.0	2.7	2.4	2.4	2.6
Scotland	-6.4	-6.6	-3.9	-2.2	-5.6	-5.1	-5.2	-1.7	-1.3	-0.5	-1.8	-2.7	-4.5
Northern Ireland[1]	-	-	3.7	5.0	-1.8	2.1	1.9	3.7	2.6	3.5	4.8	3.2	1.9

Table source: Office for National Statistics

Table notes:

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

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This gives, for example, an estimated pay gap between the public and private sector of 3.1% in the North East in 2014 when accounting for all variables except organisation size. This estimate reduces to -0.5% when organisation size is also accounted for.

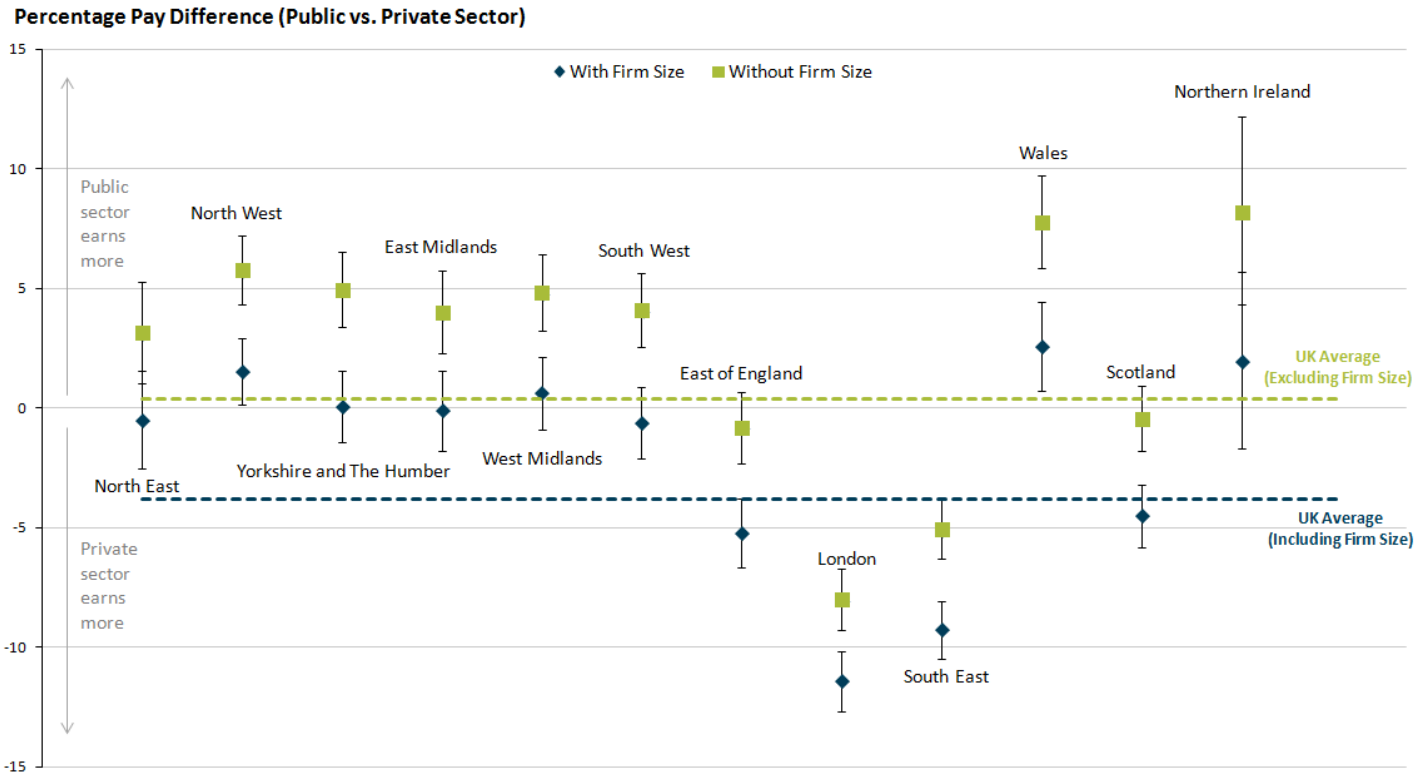
When organisation size is not accounted for, in 2014, public sector workers earned more on average than private sector workers in all regions except London, Scotland, the South East and the East of England. When organisation size is accounted for, the number of regions experiencing a private sector pay premium expands to also include the North East, the East Midlands and the South West.

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 of any true differences. 95% confidence intervals for the estimated pay gaps in each region for 2014 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 employees expressed as a

percentage of private pay, April 2014, 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

Notes:

1. Click on chart image to enlarge

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Most of the regions or countries are above the UK average whereas London, the South East, the East of England and Scotland are below. As 29% 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 that contain 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 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 across different regions. 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 2014 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 2014, 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	**11.5**	**10.9**	**2.5**	**-5.4**	**-8.3**	**0.4**
North East	9.3	9.3	4.7	-6.5	-7.0	3.1
North West	13.3	13.1	5.3	2.0	-0.4	5.8
Yorkshire and The Humber	9.6	10.4	5.3	0.6	-0.3	4.9
East Midlands	11.4	10.5	4.3	2.3	0.4	4.0
West Midlands	11.7	12.2	5.4	-0.1	-1.8	4.8
East of England	7.6	8.1	1.1	-6.6	-6.8	-0.8
London	19.7	14.8	-3.6	-18.5	-23.7	-8.0
South East	6.9	6.4	-2.3	-11.4	-17.3	-5.1
South West	9.2	9.8	5.0	-1.0	-1.8	4.1
Wales	12.6	13.3	7.5	4.3	5.4	7.8
Scotland	14.2	12.3	2.0	-7.9	-8.4	-0.4
Northern Ireland	17.2	19.1	11.1	2.2	-3.5	8.2

Table source: Office for National Statistics

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Regression model with firm size

percentage

	Percentile					
	5th	10th	50th	90th	95th	Mean
United Kingdom	**7.6**	**7.1**	**-0.7**	**-9.6**	**-12.7**	**-3.8**
North East	7.1	6.0	1.9	-9.7	-12.1	-0.5
North West	10.3	9.3	1.8	-2.6	-6.5	1.5
Yorkshire and The Humber	6.5	6.0	1.8	-4.1	-4.0	0.0
East Midlands	7.7	6.7	1.0	-2.0	-4.3	-0.1
West Midlands	8.1	8.3	2.3	-4.6	-6.4	0.6
East of England	4.7	4.6	-1.9	-9.8	-12.1	-5.2
London	12.9	9.5	-6.1	-20.6	-26.1	-11.4
South East	3.2	2.2	-5.4	-15.5	-19.6	-9.3
South West	5.6	6.3	1.5	-4.7	-7.6	-0.6
Wales	9.2	8.9	3.9	-1.4	-0.9	2.6
Scotland	10.9	9.3	-1.7	-12.1	-11.9	-4.5
Northern Ireland	13.2	13.8	5.8	-1.8	-3.8	1.9

Table source: Office for National Statistics

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Using the model which does not control for organisation size, we can see that the pay gap was wider at the bottom of the distribution than it was at the top of the distribution for every region and devolved country apart from London and the South East. Looking at the model which does control for organisation size, the number of regions experiencing a wider gap at the 95th percentile compared with the 5th percentile increases to also include the East of England, the South West, Scotland, and the North East. All other regions and devolved countries had a wider gap at the bottom of the pay distribution.

One explanation for the higher pay differential seen at the top of the pay distribution in London and 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.

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.

Background notes

1. On 28th February 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.

2. Public and Private Sector Earnings: Pre-release access list 2014

3. 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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