



Regional labour adjustments

Further evidence based on ASHE data
17 October 2014

We have undertaken further analysis of the ASHE dataset and confirmed our previous findings on regional pay patterns

- On 16 September Northern Powergrid presented analysis based on case studies using individual occupations in the ASHE data set which showed that:
 - Many occupations are affected by differences in the composition of employees across regions that prevents regional comparisons from being 'like-for-like'
 - The occupations given a determinative weighting in Ofgem's regional labour analysis are affected by this issue, and give regional labour premium estimates for London and the South East that are far too high
 - Evidence from case studies which show evidence of being 'like-for-like' comparisons support a London labour adjustment of 10-15% and a South East adjustment of 0-5% (measured as a percentage of the average pay seen across the rest of the country excluding London and the South East)
- We have now taken this analysis further to ensure we have systematically made use of the full 'breadth' of the ASHE dataset by:
 - Considering every major occupation sub-group (1 to 9)
 - Using the data on number of employees in each region to identify unusual patterns
 - Checking these patterns of employee distribution for correlation with pay patterns across the country, and testing the statistical significance of any relationship
 - Using only those occupation sub-groups which the evidence suggests offer like-for-like comparisons, since they do not show statistical evidence of a regional pay pattern being driven by the distribution of employees, to estimate the London and South East pay premium for like-for-like roles
- The findings from this further, comprehensive and statistically tested, analysis lend further weight to the findings previously highlighted by the work based on case-studies
- The rest of this pack sets out:
 - Details of the approach we have taken to analysing the ASHE dataset
 - Findings for each of the 9 major occupation sub-groups
 - Our conclusions

As before, we have used median hourly wages (in line with ONS best practice), averaged over three years, to reduce the impact of outliers on our results

- We have focussed on median hourly wages in our latest analysis
 - The ONS focusses on the median as its headline statistic since it strips out the distortionary effect of a small number of high earners – this will slightly reduce the ‘compositional’ bias caused by differences in the type of role between regions, though the ‘median’ role may still vary significantly
 - Use of the median also helps eliminate any potential relative pay distortions between London and the rest of the country caused by the national minimum wage – provided the median is above the minimum wage this source of bias will be eliminated
- We have also averaged data over three years:
 - Annual volatility in the data is reduced
 - Differences in SOC codes in place prior to 2011 do not affect the results

We have taken a systematic approach to identifying occupations which may not give 'like-for-like' wage comparisons...

- The ONS warns that regional comparisons using the ASHE data may not be 'like-for-like':
 - Regions with concentrations of highly skilled / highly paid roles will have higher average pay (the opposite being true for concentrations of lower skilled roles)
 - This would be the case even if there are no differences in underlying pay for the same role
- Estimates of the number of employees in a given occupation can indicate where these issues are worst:
 - If there is a concentration of highly skilled roles, this is likely to be reflected in a higher than average ratio of those roles compared to other roles
 - Similarly, an absence of relatively low skilled (and low paid) roles is likely to be reflected in a lower than average ratio of those roles compared to other roles
- To identify such issues we have calculated the ratio of:
 - Employees in a given occupation in each region; to
 - Employees in SOC 5-9 in that same region*
- If a region is out-of-line on this ratio compared to other regions, it indicates that there are likely to be significant differences in the workforce composition in that region
- This cautions against the use of ASHE figures on pay from that occupation as an indication of differences in regional pay driven by cost of living differences (as opposed to differences in jobs between regions)

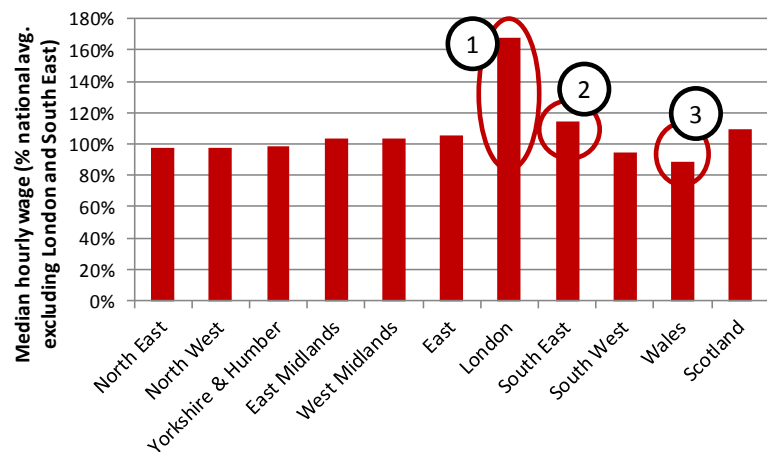
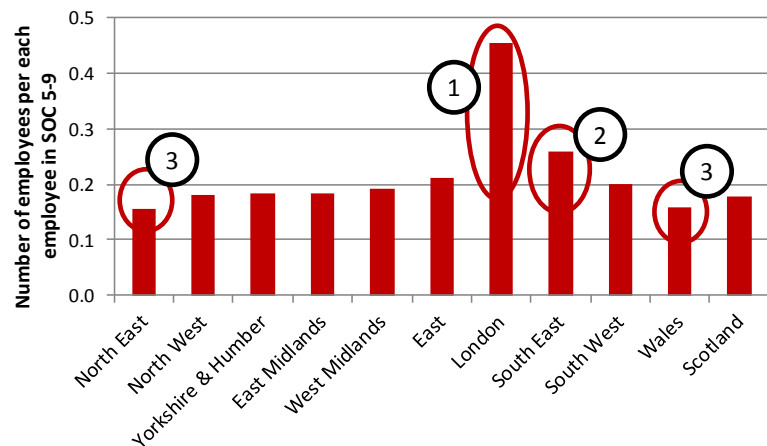
* SOC 5-9 comprises occupations such as skilled trades, caring roles, sales roles, and elementary occupations, which are likely to be equally 'essential' in all regions, and which have a relatively uniform pattern across the country. SOC 1-4 (professional and administrative roles) show extreme concentration in London in particular – so inclusion in the denominator can skew the results for other SOC codes in London.

...and ensured robustness of our findings by testing the statistical significance of the relationships we identify in the dataset

- Based on the basic data set for each SOC code, we calculate the correlation between:
 - The level of pay in each region; and
 - The ratio we use to measure relative differences of employee concentration in each region.
- We do this in three ways:
 - First, we estimate it using data on all 11 regions
 - Second, we drop London from the dataset (so use data on 10 regions)
 - Third, we drop both London and the South East (so use data on 9 regions)
- By estimating the correlations seen across country excluding the London and the South East we can test for a relationship between the two variables having isolated the risk of a spurious correlation driven by the two potential 'outlier' regions.
- We then test all these correlations for statistical significance at the 1%, 2.5% and 5% level using a one tailed distribution
- We use a one tailed distribution since negative and positive correlations indicate very different economic relationships between the variables, so each should be tested for separately:
 - Where a positive correlation is identified, statistical significance gives evidence that differences in the concentration of employees across regions in the SOC codes are driving differences in the level of pay. It is implausible to suggest that causality could run in the opposite direction, since higher pay cannot logically encourage more employment in a given region
 - Where a negative correlation is identified, it may give evidence that employers have responded to higher pay by avoiding employing people in regions with higher pay wherever possible, although causation could run in the opposite direction (big concentrations of employees could involve a higher than typical number of lower paid employees)

SOC 1: Managers, directors and senior officials

No of employees nationally:	2.3 million
Median hourly wage – highest pay region:	£27.9 (London)
Median hourly wage – lowest pay region:	£14.8 (Wales)



The data on the number of employees in the occupation shows that:

1. London has four employees in the category per ten in SOC 5-9; well over twice the ratio seen in most other parts of the country
2. The South East is also an outlier with a relatively high concentration of these employees, though it is less extreme; about 20% higher than the ratio seen in other parts of the country
3. Wales and the North East show the lowest numbers of employees in this occupation, relative to employees in SOC 5-9

This pattern mirrors the pattern of median hourly pay in each region

1. Pay in London is 68% above the average outside London and the SE
2. Pay in the South East is 15% higher than the same average
3. Pay in Wales is the lowest in the country

There is a close association between the two sets of figures. The correlation is 0.97⁺⁺⁺. Excluding London it is 0.72⁺⁺⁺. Excluding the South East as well it remains 0.46⁻.

SOC 1 conclusions:

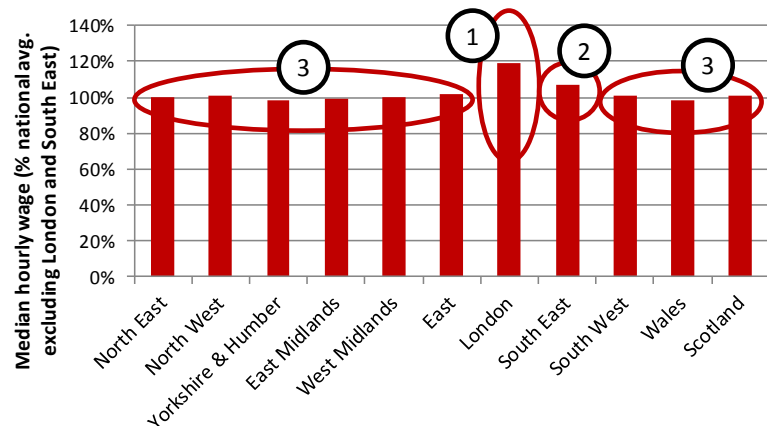
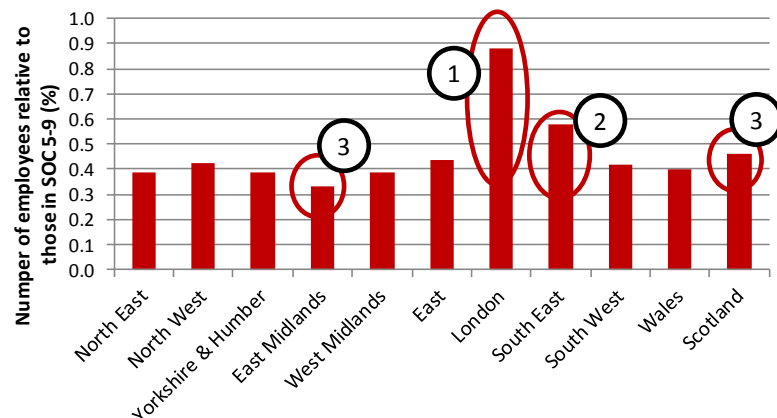
The average employee is likely to differ markedly in London and the South East compared to other regions

Such a difference is likely to contribute significantly to the pay premium of 68% seen in London and 15% seen in the South East

- +++ statistically significant at the 1% level
- ++ statistically significant at the 2.5% level
- + statistically significant at the 5% level
- close to statistical significance at the 5% level

SOC 2: Professional occupations

No of employees nationally:	5.0 million
Median hourly wage – highest pay region:	£21.8 (London)
Median hourly wage – lowest pay region:	£18.0 (Yorkshire)



The data on the number of employees in the occupation shows that:

1. There are nearly as many professionals in London as there are employees in SOC 5-9; over twice average outside London and SE
2. For every ten employees in SOC 5-9 in the South East there are six professionals; 44% higher than the 'rest of country' average
3. There is relatively little variation in the rest of the country, with Scotland and the East Midlands the most extreme cases

This pattern is mirrored by median hourly pay in each region

1. Pay in London is 19% above the average outside London and SE
2. Pay in the South East is 7% above the same average
3. There is virtually no variation in median pay across the rest of the country (with several DNOs at +/- 1-2%)

There is a close association between the two sets of figures. The correlation is 0.99⁺⁺⁺. Excluding London it is 0.93⁺⁺⁺. Excluding the South East as well it remains 0.73⁺⁺

SOC 2 conclusions:

The average employee is likely to differ in London and the South East compared to other regions

Such a difference is likely to contribute to the pay premium of 19% seen in London and 7% seen in the South East

- +++ statistically significant at the 1% level
- ++ statistically significant at the 2.5% level
- + statistically significant at the 5% level
- close to statistical significance at the 5% level

SOC 3: Associate professional and technical occupations

No of employees nationally:

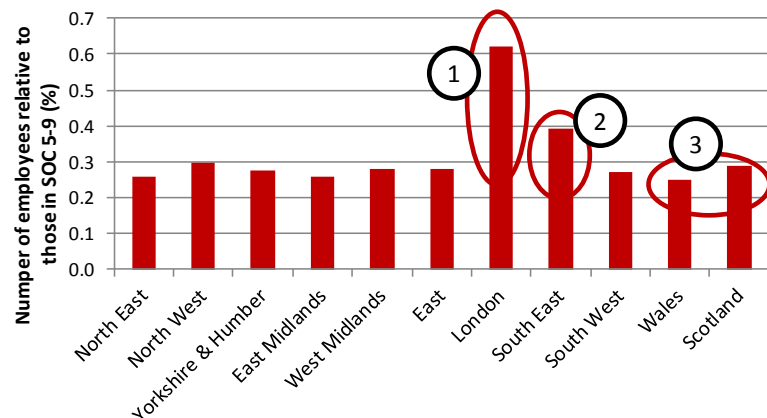
3.4 million

Median hourly wage – highest pay region:

£17.3 (London)

Median hourly wage – lowest pay region:

£13.2 (East Midlands)



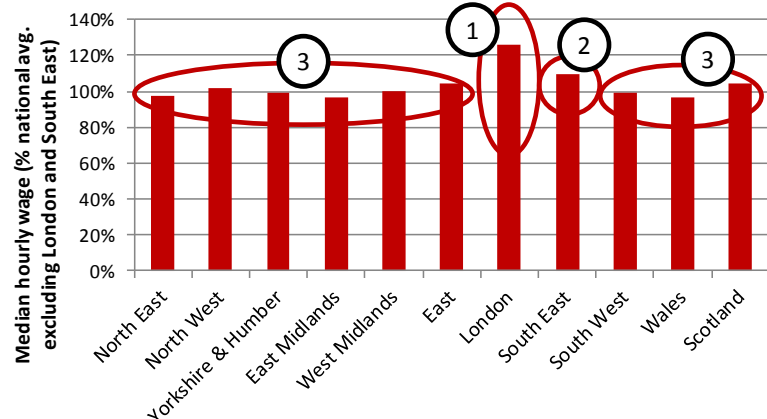
The data on the number of employees in the occupation shows that:

1. In London there are six associate professional employees for every ten in SOC 5-9; over twice the average outside London and SE
2. In the South East there are four employees for every ten in SOC5-9; 44% above the same average
3. There is relatively little variation across the rest of the country, with the biggest outliers (Scotland and Wales) at +6% and -9%.

This pattern mirrors the pattern of median hourly pay in each region

1. Pay in London is 26% above the average outside London and SE
2. Pay in the South East is 9% above the same average
3. Across the other regions two areas have pay that is 4% above the same average, two have pay that is 3-4% below, and the rest are between these extremes

There is a very close association between the two sets of figures. The correlation is 0.98⁺⁺⁺. Excluding London it is 0.89⁺⁺⁺. Excluding the South East as well it remains 0.94⁺⁺⁺



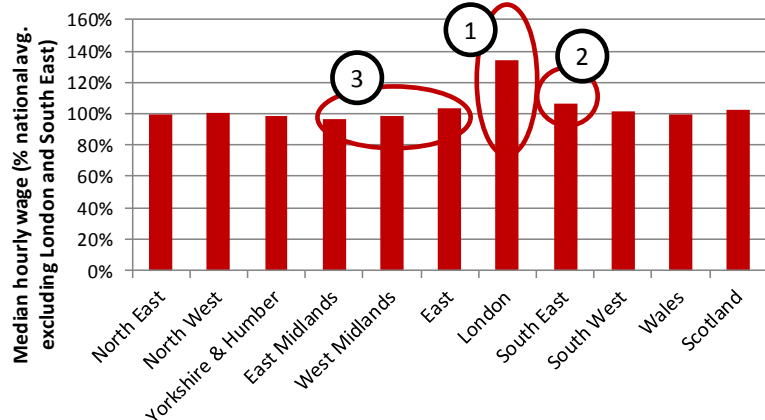
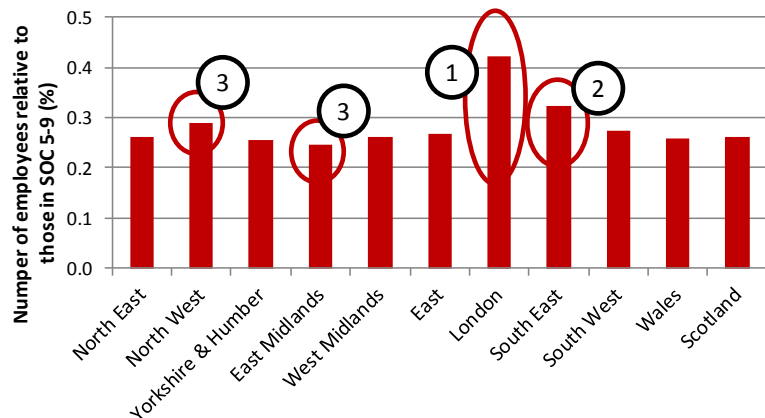
SOC 3 conclusions:

The average employee is likely to differ markedly in London and the South East compared to other regions

Such a difference is likely to contribute significantly to the pay premium of 26% seen in London and 9% seen in the South East

SOC 4: Administrative and secretarial occupations

No of employees nationally:	3.0 million
Median hourly wage – highest pay region:	£12.2 (London)
Median hourly wage – lowest pay regions:	£10.5 (N. West & S. West)



The data on the number of employees in the occupation shows that:

1. In London there are four administrative employees for every ten in SOC 5-9; 60% above the average outside London and SE
2. In the South East the figure is less extreme – but it is still over 20% above the same average
3. There is less variation in the rest of the country, with the North West and East Midlands at the extremes (at +10% and -7%)

This pattern mirrors the pattern of median hourly pay in each region

1. Pay in London is 35% above the average outside London and SE
2. In the South East it is 8% above the average outside London and SE
3. Across the rest of the country the extremes are +/-3%

There is a close association between the two sets of figures. The correlation is 0.97⁺⁺⁺. Excluding London it is 0.82⁺⁺⁺. Excluding the South East as well it remains 0.59⁺

SOC 4 conclusions:

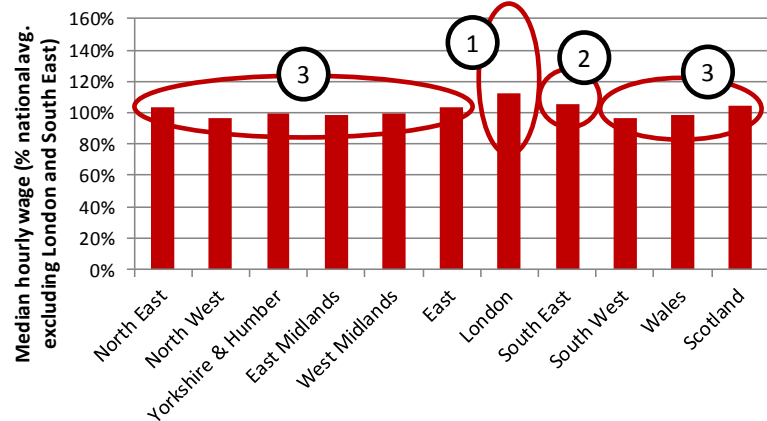
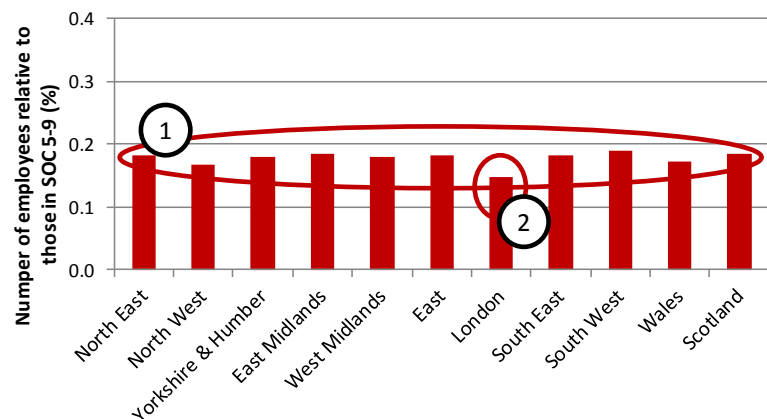
The average employee is likely to differ markedly in London and the South East compared to other regions

Such a difference is likely to contribute significantly to the pay premium of 35% seen in London and 8% seen in the South East

- +++ statistically significant at the 1% level
- ++ statistically significant at the 2.5% level
- + statistically significant at the 5% level
- close to statistical significance at the 5% level

SOC 5: Skilled trades occupations

No of employees nationally:	1.9 million
Median hourly wage – highest pay region:	£9.8 (London)
Median hourly wage – lowest pay region:	£7.8 (Yorkshire)



The data on the number of employees in the occupation shows that:

1. Differences across regions are relatively small compared to SOC 1-4, with between 15 and 19 employees per 100 in SOC 5-9
2. London is still an outlier, 18% below the average excluding London and the SE (compared to a maximum of +/-7% for other regions) but this is well below the difference seen in SOC 1-4

The data on median hourly pay shows that:

1. There is a 12% pay premium in London
2. There is a 6% pay premium in the South East
3. The North East and Scotland set the high point in the rest of the country (+4%) while Wales sets the low point (-4%)

There is a relatively weak correlation between the two sets of figures. For all regions, it is -0.51. Excluding London it is 0.31. Excluding the South East as well it is 0.29

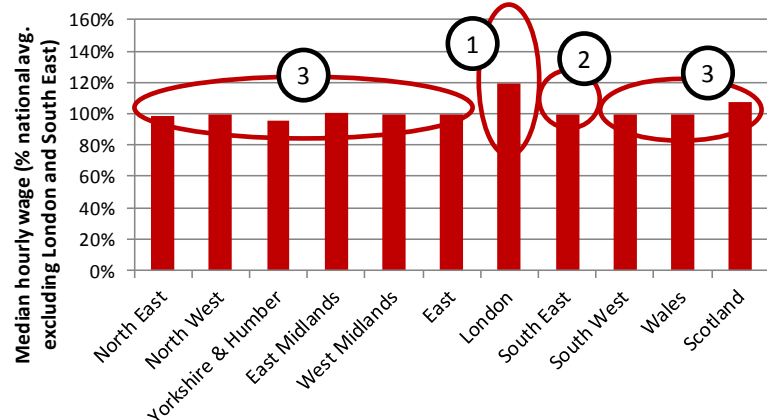
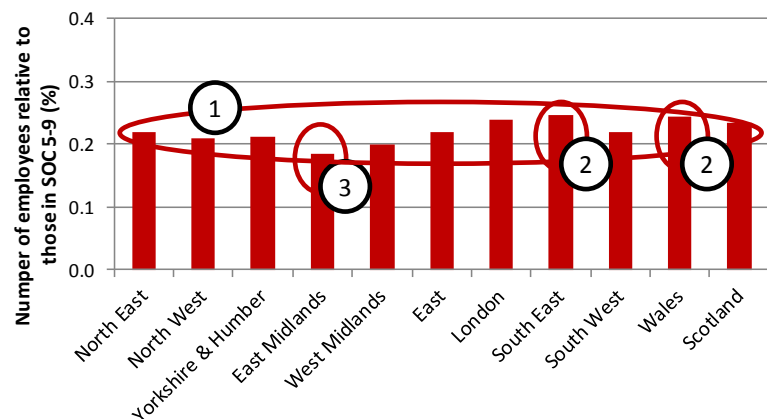
SOC 5 conclusions:

There is little evidence of differences between the average employee in London and the South East

The 12% pay premium in London and 6% in the South East is likely to be relatively robust compared to data from SOC 1-4

SOC 6: Caring, leisure and other service occupations

No of employees nationally:	2.3 million
Median hourly wage – highest pay region:	£28 (London)
Median hourly wage – lowest pay region:	£15 (Wales)



The data on the number of employees in the occupation shows that:

1. Differences across regions are relatively small compared to SOC 1-4, with between 18 and 24 employees per 100 in SOC 5-9
2. The top of this range is set by the South East and Wales (14 and 13% above the same average)
3. The bottom of this range is set by the East Midlands (15% below the average excluding London and the SE)

The data on median hourly pay shows that:

1. There is a 19% pay premium in London
2. There is no pay premium in the South East
3. Across the rest of the country pay varies by +8% (Scotland) to -4% (Yorkshire), indicating that the figures remain relatively variable due to non-cost-of-living issues

There is a relatively weak correlation between the two sets of figures. For all regions, it is 0.38. Excluding London it is 0.19. Excluding the South East as well it is 0.25.

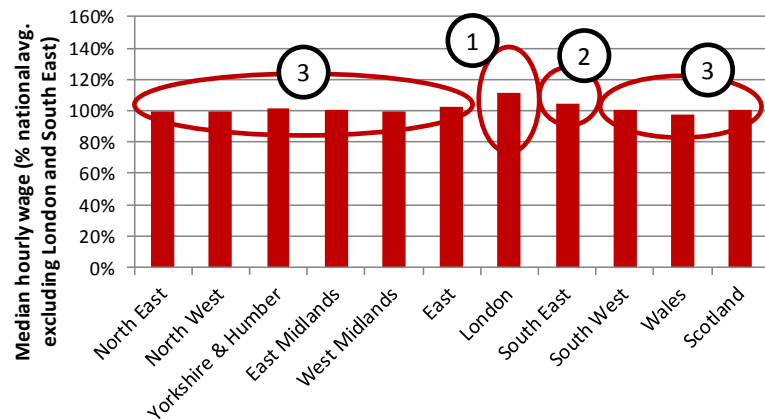
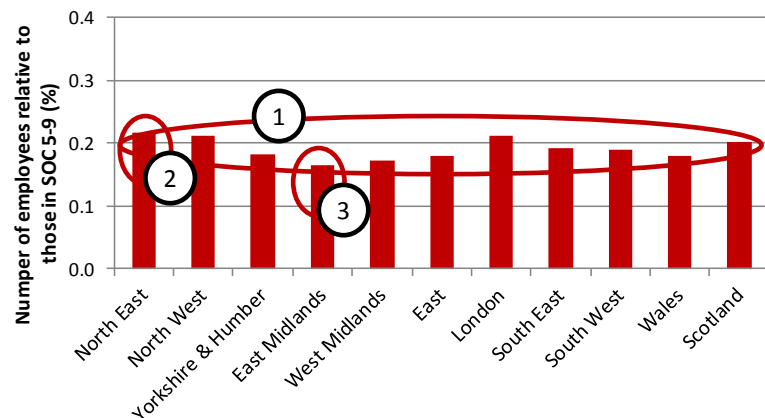
SOC 6 conclusions:

There is little evidence of differences between the average employee in London and the South East based solely on the no. of employees

The pay premia of 19% in London and 0% the South East could still be affected by other issues (illustrated by the 'Scotland premium' of 8%)

SOC 7: Sales and customer service occupations

No of employees nationally:	2.0 million
Median hourly wage – highest pay region:	£7.9 (London)
Median hourly wage – lowest pay region:	£6.9 (Wales)



The data on the number of employees in the occupation shows that:

1. Differences across regions are relatively small compared to SOC 1-4, with between 16 and 22 employees per 100 in SOC 5-9
2. The high point of this range is defined by the North East (15% above the average excluding London and the SE)
3. The low point is defined by the East Midlands (13% below the same average)

The data on median hourly pay shows that:

1. There is a 12% pay premium in London
2. There is a 4% pay premium in the South East
3. The range in other regions is only +/- 2%

There is a relatively weak correlation between the two sets of figures. For all regions, it is 0.32. Excluding London it is -0.07. Excluding the South East as well it is -0.21.

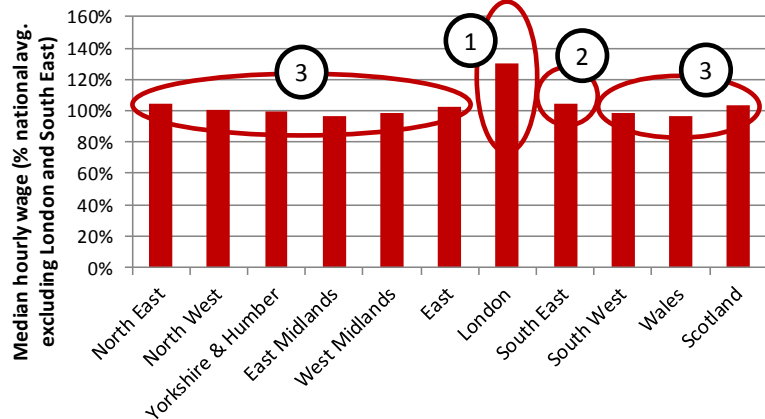
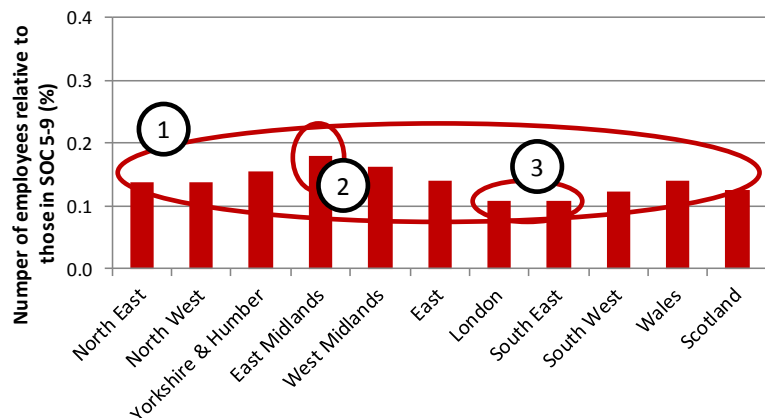
SOC 7 conclusions:

There is little evidence of differences between the average employee in London and the South East

The 12% pay premium in London and 4% in the South East is likely to be relatively robust compared to data from SOC 1-4

SOC 8: Process plant and machine operatives

No of employees nationally:	1.4 million
Median hourly wage – highest pay region:	£12.0 (London)
Median hourly wage – lowest pay region:	£8.9 (Wales)



The data on the number of employees in the occupation shows that:

1. Differences across regions are relatively small compared to SOC 1-4, but higher than SOC 5,6, 7 and 9
2. The high point of this range is defined by the East Midlands (25% above the average excluding London and the SE)
3. The low point is defined by London and the South East (25% below the same average)

The data on median hourly pay shows:

1. A 25% pay premium in London (compared to regions other than London and the SE)
2. A 3% premium in the South East (relative to the same average)
3. Across the rest of the country the low point is defined by the East Midlands (-3%) and the high by Scotland and the North East (+2%)

There is fairly strong negative correlation between the two sets of figures. Across all regions it is -0.61⁺⁺. Excluding London it is -0.66⁺⁺. Also excluding the South East it is -0.54⁺

SOC 8 conclusions:

The average employee is likely to differ markedly in London compared to other regions (e.g. typical manufacturing avoids high wages)

Such a difference will contribute significantly to the pay premium of 25% seen in London

- +++ statistically significant at the 1% level
- ++ statistically significant at the 2.5% level
- + statistically significant at the 5% level
- close to statistical significance at the 5% level

SOC 9: Elementary occupations

No of employees nationally:

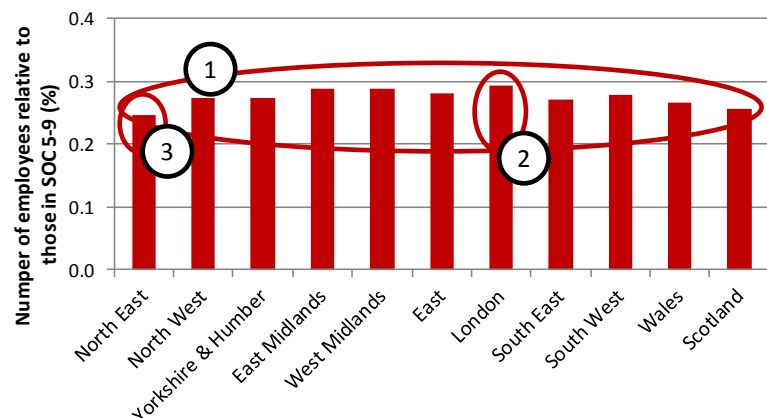
3.0 million

Median hourly wage – highest pay region:

£7.5 (London)

Median hourly wage – lowest pay regions:

£6.8 (N. East & Wales)



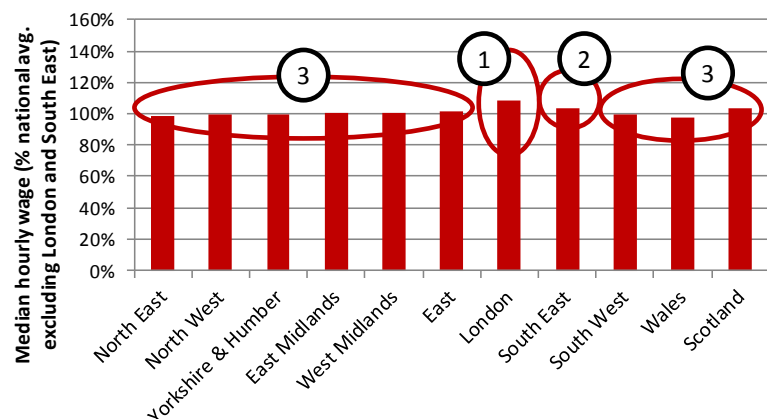
The data on the number of employees in the occupation shows that:

1. Differences across regions are relatively small compared to SOC 1-4
2. The high point of this range is defined by London (7% above the average excluding London and the SE)
3. The low point is defined by the North East (9% below the same average)

The data on median hourly pay shows that:

1. There is an 8% pay premium in London
2. There is a 3% pay premium in the South East
3. The range in other regions is only +/- 2%

There is a relatively weak correlation between the two sets of figures. For all regions, it is 0.39. Excluding London it is 0.09. Excluding the South East as well it is 0.13



SOC 9 conclusions:

There is little evidence of differences between the average employee in London and the South East

The 8% pay premium in London and 3% in the South East is likely to be relatively robust compared to data from SOC 1-4

The ASHE data shows statistically significant evidence that regional wage differences are not 'like-for-like' in SOC groups 1-4 and 8

- There is evidence that the average employee in London and the South East is different from the rest of the country in major SOC groups 1-4 and that this is driving differences in levels of pay across the country
 - There is a concentration of managerial, professional and administrative employees (SOC 1-4) in London and the South East unlike the pattern in any other part of the country
 - There is a relatively high correlation of this pattern across the regions with average pay, which is typically statistically significant, at the 5%, 2.5% or even 1% level, even once London and the South East are dropped from the sample*
 - This indicates that the pay pattern across the country in these SOC codes is likely to be significantly influenced by differences in the type of role being undertaken by employees
 - It would be illogical for causality to flow from the higher pay to the higher concentration of employees in these regions, so it must run in the opposite direction (something linked to the concentration of employees, such as high concentrations being biased towards higher-skilled employees, is at least partially responsible for the pattern of pay across the country)
- There is evidence that the average employee in London and the South East is different from the rest of the country in major SOC group 8 and that this is driving differences in levels of pay across the country
 - There is a relative absence of process, plant and machine operatives (SOC 8) in London and the South East, again unlike the pattern in any other part of the country
 - The correlation is negative and statistically significant, or close to being statistically significant (at the 5% level) once London and the South East are excluded
 - Something related to the distribution of employees across regions means that this data cannot be treated as giving like-for-like comparisons (e.g. typical manufacturing avoids high pay regions)
- But in major SOC groups 5, 6, 7 and 9 there is no evidence from the ASHE data of similar problems
 - The concentration of employees in these occupations is broadly similar in London and the South East compared to the rest of the country
 - The differences which exist from region to region show weak correlation with average pay in those regions, which is not statistically significant (and in almost all cuts of the data falls very far short of being so)

* This confirms that the finding is not being driven by spurious correlation related to the two regions which are outliers in terms of average pay and concentration of SOC 1-4 employees

The findings confirm that there is a ca. 10-15% pay premium in London and a 0-5% pay premium in the South East when like-for-like roles are compared

- Looking only at the major occupation groups which do not show evidence of likely differences in the type of employees across regions:
 - The pay premium in London ranges from 8% to 19%, with a simple average of four data points at 12.8%
 - The pay premium in the South East ranges from 0% to 6%, with a simple average of four data points at 3.2%
- The previous Northern Powergrid analysis of specific occupation case studies, where the comparisons appeared likely to be 'like-for-like', concluded that there was a:
 - 10-15% pay premium in London; and
 - 0-5% pay premium in the South east
- The fact these two sets of findings are closely aligned is significant
 - Since the systematic analysis triangulates on the same conclusions as the case-study analysis, the confidence we can have that this is a robust result is increased
 - The two sets of analysis are complementary – the case study work also confirms that the same range applies amongst relatively highly paid occupations (where they allow for like-for-like comparisons across regions) such as higher education teaching professionals (who, on average, earn around £24 per hour) and medical practitioners (who earn, on average, around £30 per hour)

The ASHE data shows that Ofgem should make a lower regional labour adjustment than proposed in the draft determination

	Totex: submission	Regional labour adjustment			
		Ofgem draft determination	Draft determination: relative to NPgN (using % totex)	NPg proposal: bottom of reasonable range*	Average premium from SOC 5, 6, 7 and 9
ENW	1,794	-28	8	0	0
NPgN	1,300	-26	0	0	0
NPgY	1,725	-33	2	0	0
WMID	1,931	-24	15	0	1
EMID	1,945	-23	16	0	1
SWALES	1,011	-13	7	0	0
SWEST	1,582	-20	12	0	0
LPN	1,883	191	229	64	80
SPN	1,783	79	115	12	32
EPN	2,652	37	90	19	25
SPD	1,496	-25	5	0	0
SPMW	1,840	-31	6	0	0
SSEH	1,170	-16	7	0	0
SSES	2,343	59	106	0	30

*Figures presented on 16 September erroneously assumed that 88% of non-op capex and closely associated indirect labour costs needed to be locally based, which is too high. Figures now corrected to the 40% assumed in the draft determination calculations