

Article

# Understanding average earnings for the continuously employed: Using the Annual Survey of Hours and Earnings 2014

This paper provides additional information and guidance on how to interpret average earnings data for the “continuously employed”. It has a particular focus on the difference between the published rate of growth in median gross weekly full-time earnings for all employees of 0.1% in 2014 compared with those identified as being in continuous employment of 4.1% (ONS 2014). Continuous employment is defined in this article as being in the same job for at least 12 months.

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# 1. Acknowledgements

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## 2. Main points

This article discusses differences in median gross weekly earnings for full-time employees and the sub-set of full-time employees who remained in their job for at least 12 months – referred to as the continuously employed.

The key findings are:

- the difference between the growth in median gross weekly full-time earnings of 4.1% in 2014 for the continuously employed group and of 0.1% for all full-time employees is driven by the low growth in median earnings for all full-time employees
- the figure of 0.1% growth in median earnings for all full-time employees is the lowest reported since 1997, and is in turn driven by some changes in the composition of employees and relatively low earnings for the remainder group of employees in 2014. This group represents the stock of employees who are new to full-time employment (some previous employees will have left and others entered employment) and employees who have moved jobs
- median weekly earnings for the continuously employed group are between 6.5% to 8.7% higher than median weekly earnings for all full-time employees between 2007 and 2014. This can be partly explained by those in continuous employment being more likely to be in higher occupational groups such as professional occupations and managers, directors and senior officials
- median earnings for the continuously employed group also grow consistently faster than median earnings for all full-time employees, across time periods, deciles, age-bands and occupational groups
- changes in the composition of employees affect statistics which compare median levels of all full-time earnings. This should be considered when using growth rates in median earnings
- some changes in the composition of employment by occupational group and pay-band can be identified, with the share of employment increasing for pay-bands around and above the median earnings level between 2013 and 2014

## 3. Introduction

The motivation for this paper is to provide some further information and guidance on how to interpret the statistics published in the ASHE Bulletin in November 2014. It has a particular focus on explaining the difference between the published rate of growth in median gross weekly full-time earnings for all employees of 0.1% in 2014 compared with growth in median weekly full-time earnings for those identified as being in continuous employment of 4.1%. The continuously employed group is defined as those employees who are in the same post for at least 12 months.

The concepts used are not straightforward, and so illustrative examples and infographics are presented in this paper to improve the accessibility of the material.

The main topics presented in this paper are:

- a descriptive analysis of median full-time weekly earnings for all employees and the continuously employed group
- guidance on how to interpret growth in median full-time earnings for all employees and the continuously employed group. A comparison is made with when to use an alternative statistic which captures the median growth rate of earnings for those in employment in consecutive periods
- descriptive analysis of changes in the earnings distribution in the UK since 2011
- a decomposition of mean earnings growth into contributions from the continuously employed group, the remainder group and the effect of the changing composition between the groups

## 4. Analysis of median earnings

### Analysis of median earnings

This section describes the median full-time earnings of all employees and the continuously employed group in levels and growth rates between 2007 and 2014. This provides the context for further analysis of the continuously employed group and comparisons with other approaches to the analysis of earnings using ASHE data which have been published in recent editions of ONS Economic Reviews.

### Definitions

**Headline earnings:** The headline figure for average earnings<sup>1</sup>, published by ONS is the median gross weekly earnings for full-time employees. This is generally published in nominal terms, unadjusted for the effect of inflation.

In this article, the analysis focuses on full-time employees only, and uses measures of gross weekly pay<sup>2</sup>.

**Full-time employees** consist of two groups:

- the continuously employed group<sup>3</sup> – defined in this article and the ASHE bulletin as those that have remained employees, have a weekly earnings observation in both periods and have been in the same post for at least one year. This group represented around 65% of the overall sample in 2014; and
- the remainder group of employees – broken-down into four categories itself, it is defined in this article as reflecting:
  - entrants - those that have entered full-time employment in each year. They may have been previously self-employed, inactive, recently graduated students, unemployed or be new migrants to the UK
  - exiters - who include individuals that have left full-time employment. They may have retired, become unemployed or economically inactive (which covers a multitude of reasons i.e. looking after family/home), become part-time or entered self-employment
  - job-movers. These employees are in full-time employment in both years but between years are either in a different job, with a different employer or both
  - non response. These are the employees that were sampled but the employer did not respond in one of the two years being compared

This means the population of full-time employees changes each year, as students and others enter the labour market, and others leave or retire.

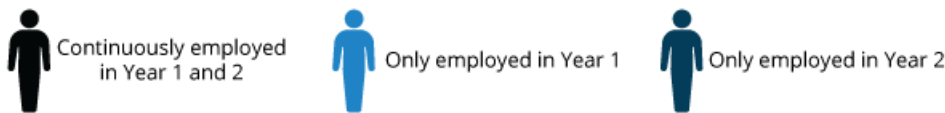
The infographic shows how the entry and exit of employees affects the statistics which compare median earnings between periods for all employees and for the continuously employed group.

The top half of the infographic shows a stylised example of how changes to the composition of employees between Year 1 and Year 2 can lead to different effects on the median level of earnings for all employees and the continuously employed group. In Year 1, the median earnings level is the same for both groups of employees. However, as more employees have entered at the bottom of the earnings distribution in Year 2, this results in the levels of median earnings differing from each other. This hypothetical example therefore demonstrates how employees entering the labour market each year can cause a difference in the growth rates of median earnings levels for the two groups.

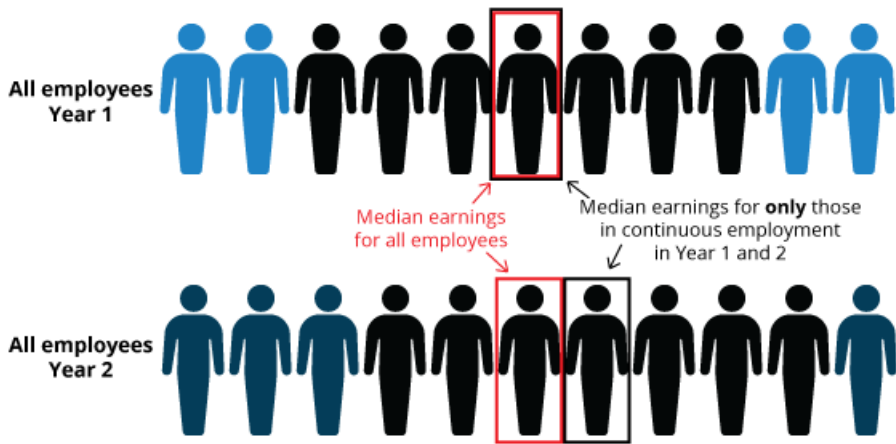
The second half of the infographic summarises the data from the ASHE bulletin in November 2014 for the two groups.

### Explaining the impact that employees entering and exiting has on comparisons of median earnings

- 1 The below graphic shows how **entry** and **exit** of employees between two time periods can affect the statistics when attempting to compare median earnings and earnings growth between periods
- 2 In Year 1 the median earnings is simply the earnings of the middle individual in the earnings distribution. In Year 2 workers **entering** and **exiting** will change the distribution of earnings, resulting in the median earnings for **all** employees and for those **continuously** employed to be different



The below characters are ordered by earnings from lowest to highest



Data below from ASHE 2014

	Median earnings for all employees (£)	Median earnings for only those in continuous employment (£)
2013	517.4	540.6
2014	518.0	562.9
Median Earnings Growth (%)	0.1	4.1

- 3 Comparing all employees in 2013 with all employees in 2014 the growth in median earnings was 0.1%
- 4 When only considering those workers who are present in both years (shown in black above) the growth in median earnings was 4.1%

5 Therefore the earnings of the employees **entering** and **exiting** will affect the median earnings for the two years and the resultant earnings growth figure. This helps explain why the earnings growth for those in continuous employment is much higher than that of all employees

## Median earnings levels and growth in median earnings

Table 1 compares the median weekly earnings of the full-time continuously employed group and all full-time employees from 2007 to 2014. It shows the difference between the median earnings of the two groups in pounds per week, and in the last column, the weekly earnings of continuously employed as a percentage of all full-time employees.

It also shows the growth rate in median gross weekly earnings for all full-time employees and the continuously employed group<sup>4</sup>.

Workers in the same full-time job for at least 12 months can experience pay increases due to a range of factors. For example:

- pay progression. In many organisations, employees progress through a pay scale. Progression may be dependent on the time an individual has been on the pay scale (known as incremental progression), be related to performance, or as a result of having completed particular qualifications
- entitlement to a higher minimum wage
- pay settlements. This refers to the 'across the board' pay increases, usually awarded on an annual basis
- overtime payments
- bonuses and other performance pay

Table 1 reports data on median earnings and growth in median full-time earnings for all employees and the continuously employed, as previously published in Figure 2 of the November 2014 ASHE bulletin (ONS 2014).

**Table 1: Median full-time weekly earnings in levels and growth rates for all employees and continuously employed [1], 2007 to 2014, current prices**

	All Employees		Continuously Employed <sup>1</sup>		Earnings of continuously employed as a % of All employees earnings	
	Levels (£)	Growth rate (%)	Levels (£)	Growth rate (%)		
			Year 1	Year 2		
2007	457.6	3.2	469.0	490.5	4.6	107.2
2008	479.1	4.7	482.6	515.3	6.8	107.5
2009	488.5	1.9	504.8	524.7	4.0	107.4
2010	498.5	2.1	513.3	533.7	4.0	107.0
2011	500.7	0.4	520.0	539.2	3.7	107.7
2						
2012	506.1	1.6	521.9	540.4	3.6	106.8
2013	517.4	2.2	532.7	550.9	3.4	106.5
2014	518.0	0.1	540.6	562.9	4.1	108.7

Source: Annual Survey of Hours and Earnings – Office for National Statistics

1. Those employees who appear in consecutive samples, have a weekly earnings observation in both periods and are classified by their employer as being in the same job for at least 12 months. This group represented around 65% of the overall sample in 2014.
2. Methodology to create data prior to 2011 was based on SOC2000 basis, SOC2010 is used from 2012 onwards.
3. Employees on adult rates, pay unaffected by absence.
4. Full-time defined as employees working more than 30 paid hours per week (or 25 or more for the teaching professions).
5. 2014 data are provisional.
6. Figures rounded to one decimal place.
7. Figures may not match due to rounding
8. Prior median earnings are given for the continuously employed group in each year. This is the value from which growth of median earnings for the group is calculated.

Table 1 shows that median weekly earnings for the continuously employed group are around 6.5% to 8.7% higher than median weekly earnings for all full-time employees between 2007 and 2014.

The relatively large increase in the difference between the median levels of earnings of all full-time employees and the continuously employed group seen in 2014 is mainly the result of the low increase in median earnings for all full-time employees compared with previous years. The ASHE bulletin reported that the growth of 0.1% in median gross weekly earnings for full-time employees was the smallest annual growth since 1997 – the first year for which ASHE data are available.

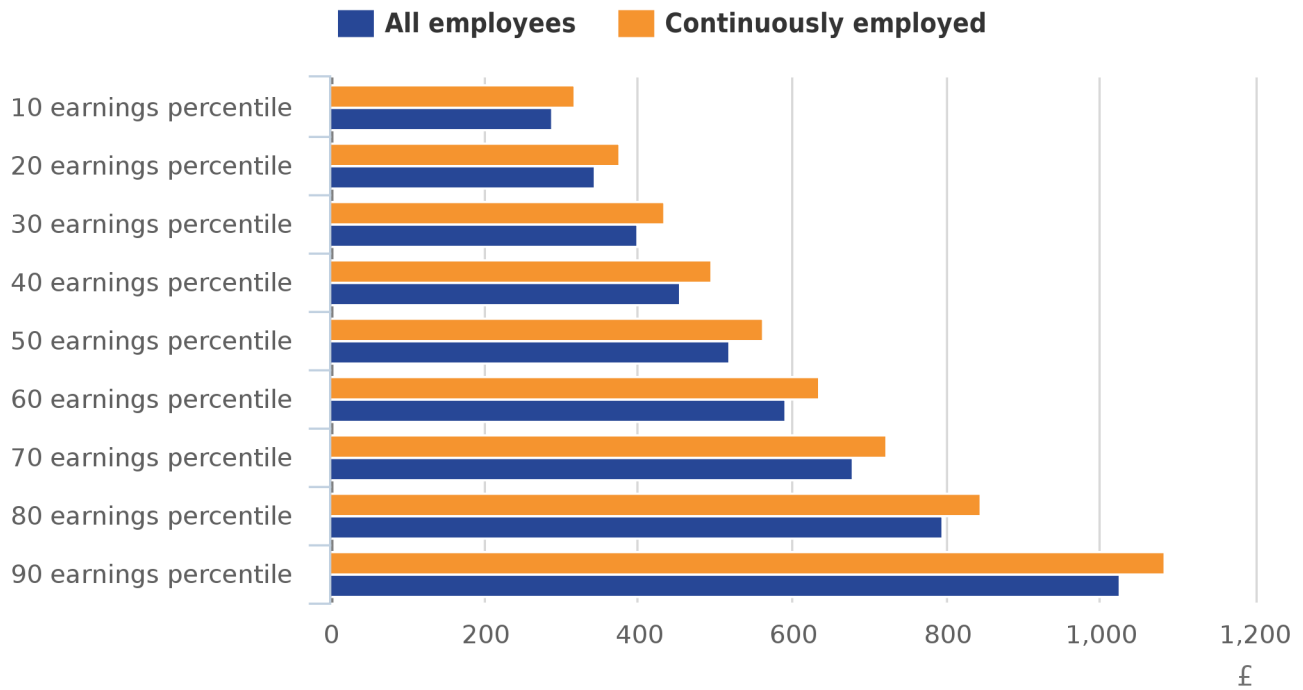
The low growth rate for median earnings in 2014 is in turn driven by some changes in the composition of employees and relatively low earnings for the remainder group of employees in 2014. This is explored in the next section on occupational changes within the work-force.

Earnings can also be analysed for all full-time employees and the continuously employed group across the distribution of earnings and by age, and occupational group. This additional analysis shows that the characteristics reported in Table 1 – where the continuously employed group experience higher average earnings than for all full-time employees holds when controlling for other factors.

## **Full-time earnings by decile for all employees and the continuously employed**

In levels: Figure 1 shows the full-time gross weekly earnings in 2014 by percentile for all employees and the continuously employed.

**Figure 1: Median full-time weekly earnings for all employees and continuously employed, by earnings percentiles, 2014**



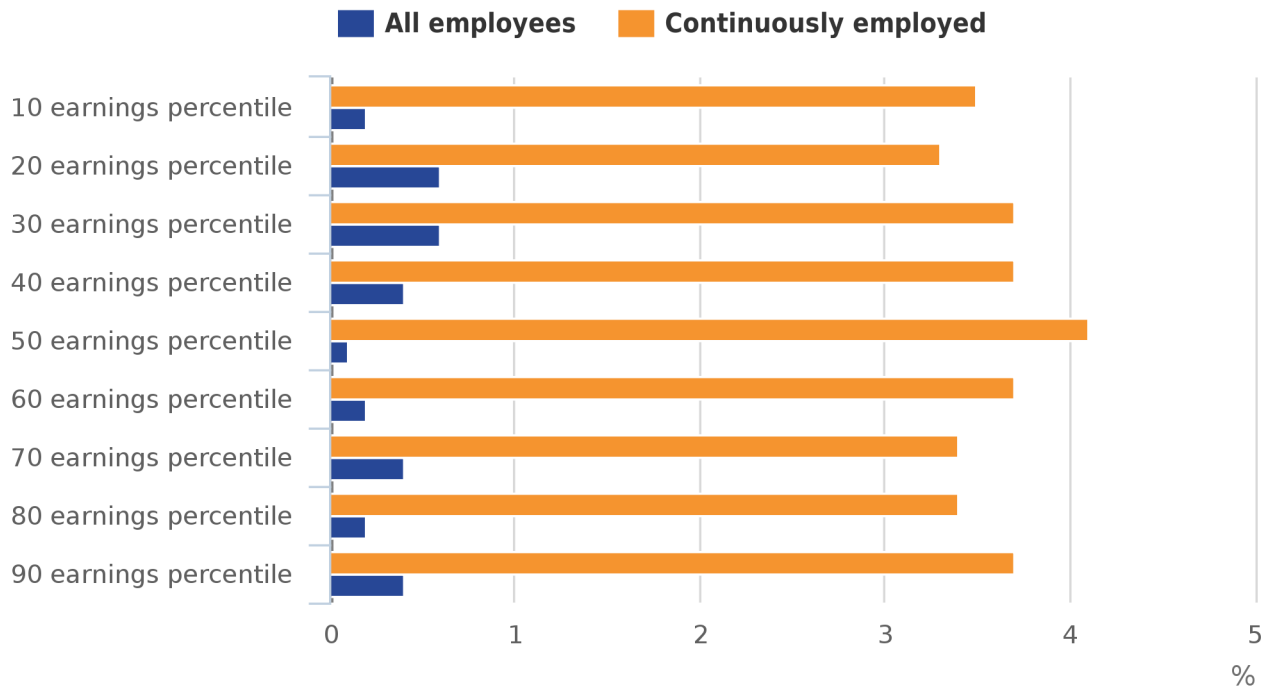
**Source: Annual Survey of Hours and Earnings (ASHE) - Office for National Statistics**

As reported in Table 1, at the median or 50th percentile, the difference between the earnings of the continuously employed group compared with all full-time employees is £45 (rounded to the nearest pound), or 8.7% in 2014. There are also differences in average earnings per week in favour of the continuously employed across all deciles in 2014.

In growth rates: Figure 2 shows the growth in gross weekly earnings for all full-time employees and the continuously employed group by decile between 2013 and 2014. Again, as reported in Table 1, at the 50th percentile, the difference between the 4.1% growth in median earnings for the continuously employed is contrasted with the 0.1% growth in median earnings for all full-time employees in 2014.

Growth rates are seen to be higher for the continuously employed group across each earnings decile, but in 2014 the percentage point difference was greatest at the median (50th percentile).

**Figure 2: Growth in full-time weekly earnings for all employees and the continuously employed, by earnings percentile, 2013 to 2014.**

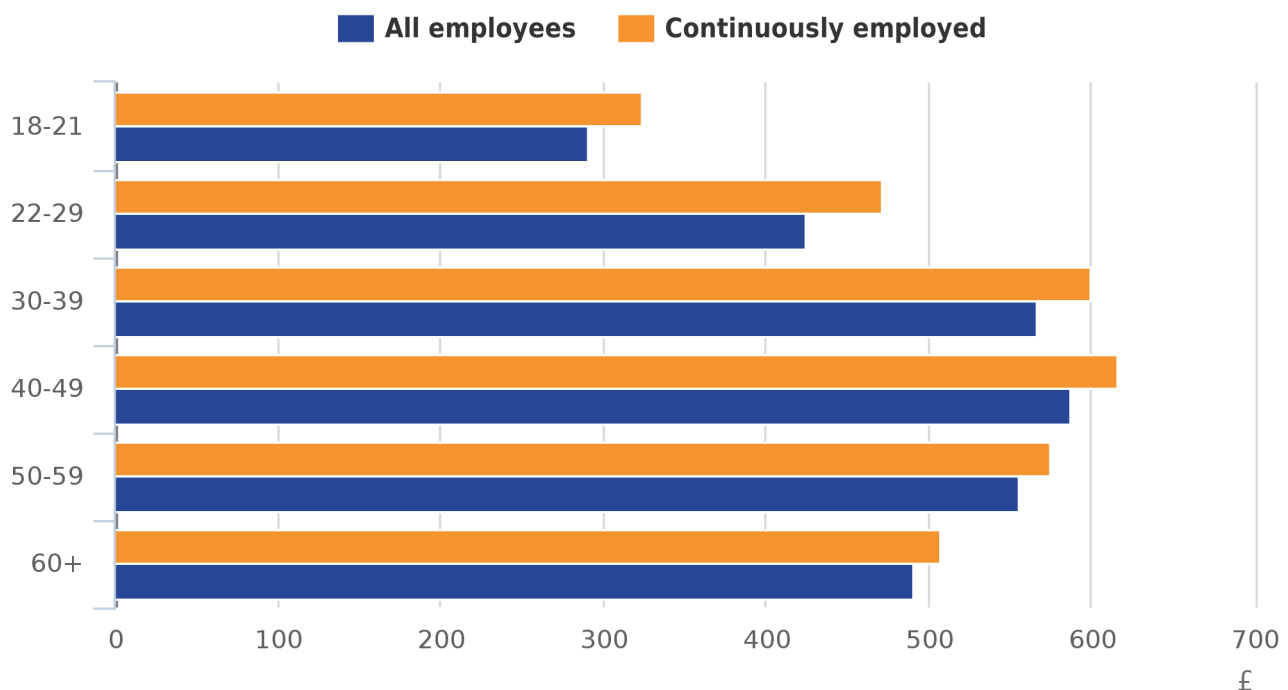


Source: Annual Survey of Hours and Earnings (ASHE) - Office for National Statistics

## Earnings by age group for all full-time employees and the continuously employed

In levels: Figure 3 shows the median full-time weekly earnings of the continuously employed group are higher for each age group in 2014 than for all full-time employees. The largest absolute difference is £47 for 22-29 year olds and the smallest is £16 for those aged over 60. In percentage terms, the largest difference of 11.7% between the groups is for 18-21 year olds, and the smallest difference of 3.3% for those aged over 60.

**Figure 3: Median full-time weekly earnings for all employees and the continuously employed, by age, 2014**



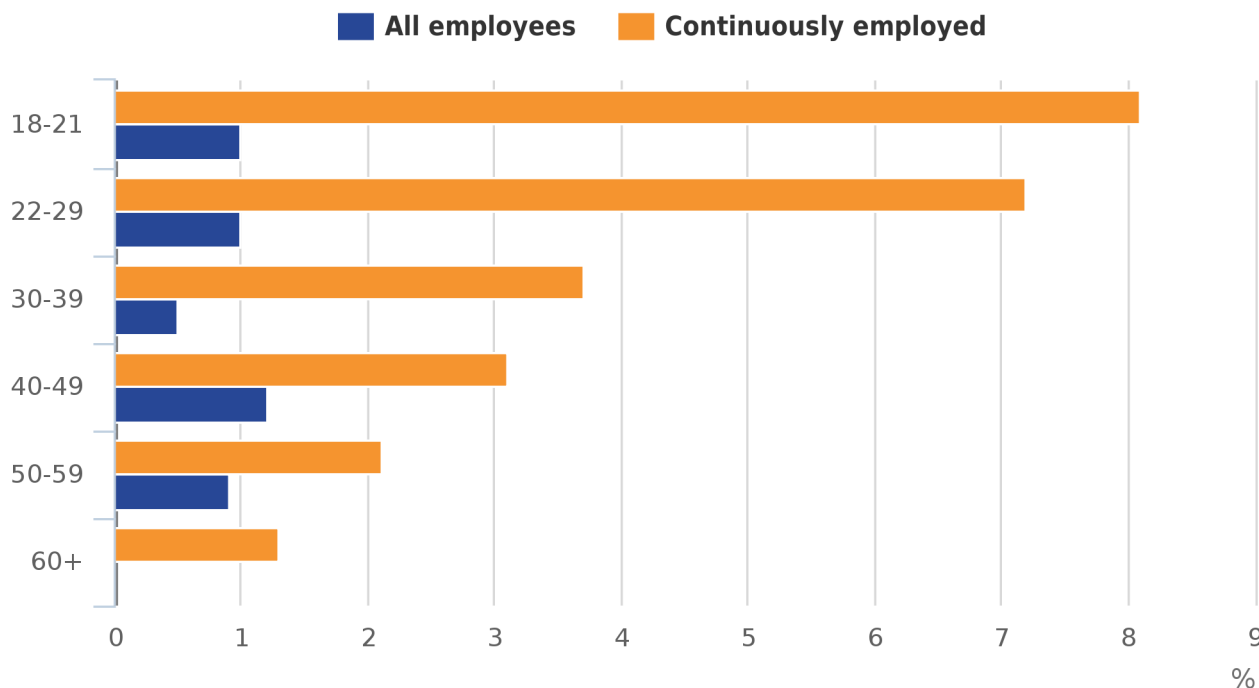


Notes:

1. The 16-17 age group has been excluded due to the limited sample size of those within this group being defined as Continuously Employed.

**In growth rates:** Figure 4 shows that the continuously employed group experienced faster growth in median weekly earnings than for all employees for all age groups in 2014. Much faster growth for younger employees who have been continuously employed is apparent, compared with all full-time employees. This may be due to the fact that pay progression within jobs is fastest for younger people starting their working life.

**Figure 4: Growth in full-time weekly earnings for all employees and the continuously employed, by age group, 2013 to 2014.**



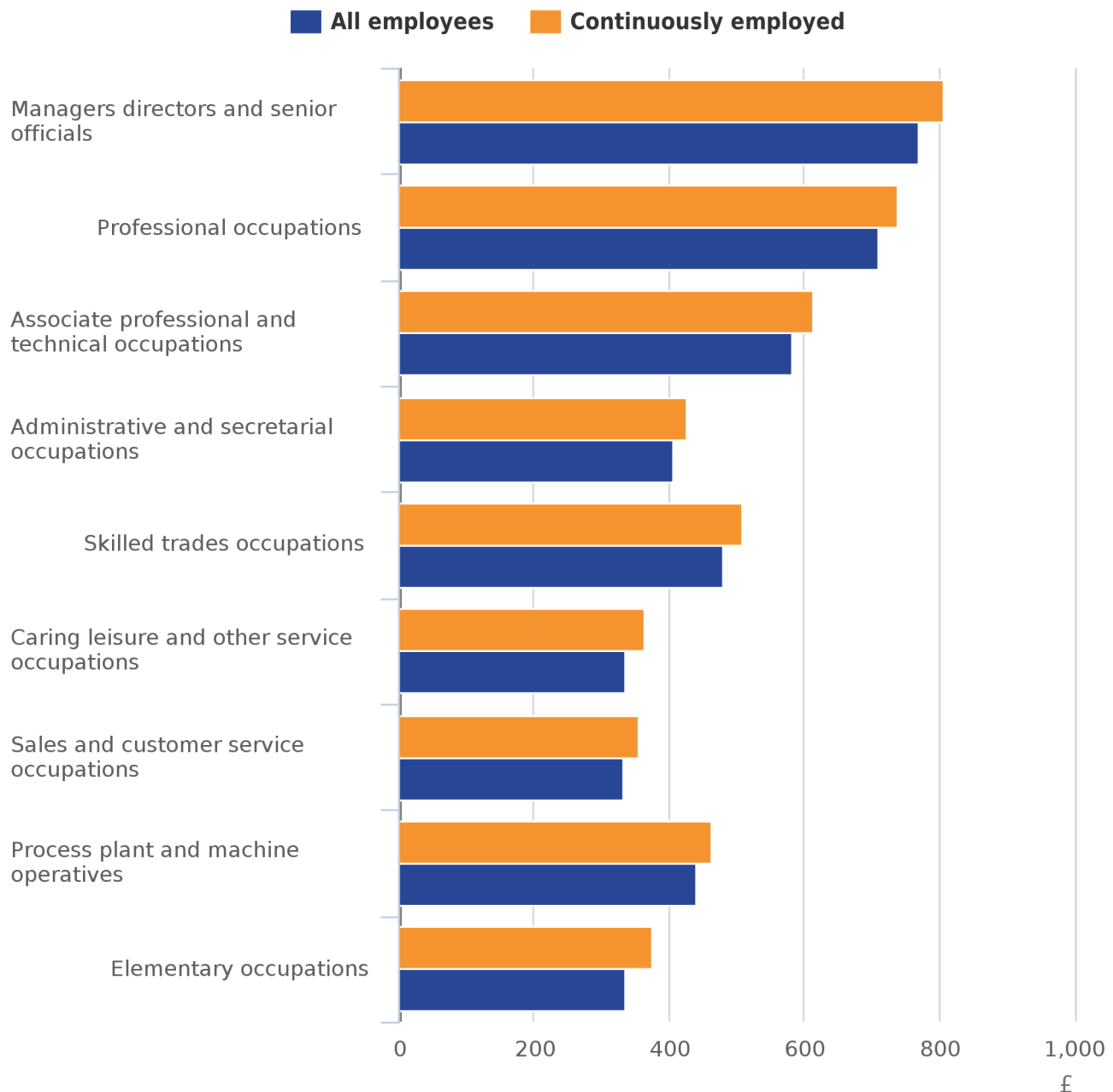
Notes:

1. The 16-17 age group has been excluded due to the limited sample size of those within this group being defined as Continuously Employed.

**Full-time earnings by occupational group for all employees and the continuously employed**

In levels, Figure 5 shows the largest percentage difference in gross median weekly earnings of 11.7% between the continuously employed and all full-time employees is for elementary occupations (£376 per week compared with £336 per week) in 2014, and the smallest percentage difference of 3.8% is for professional occupations (£738 per week compared with £711 per week).

**Figure 5: Median full-time weekly earnings for all employees and continuously employed, by major occupational group, 2014**



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

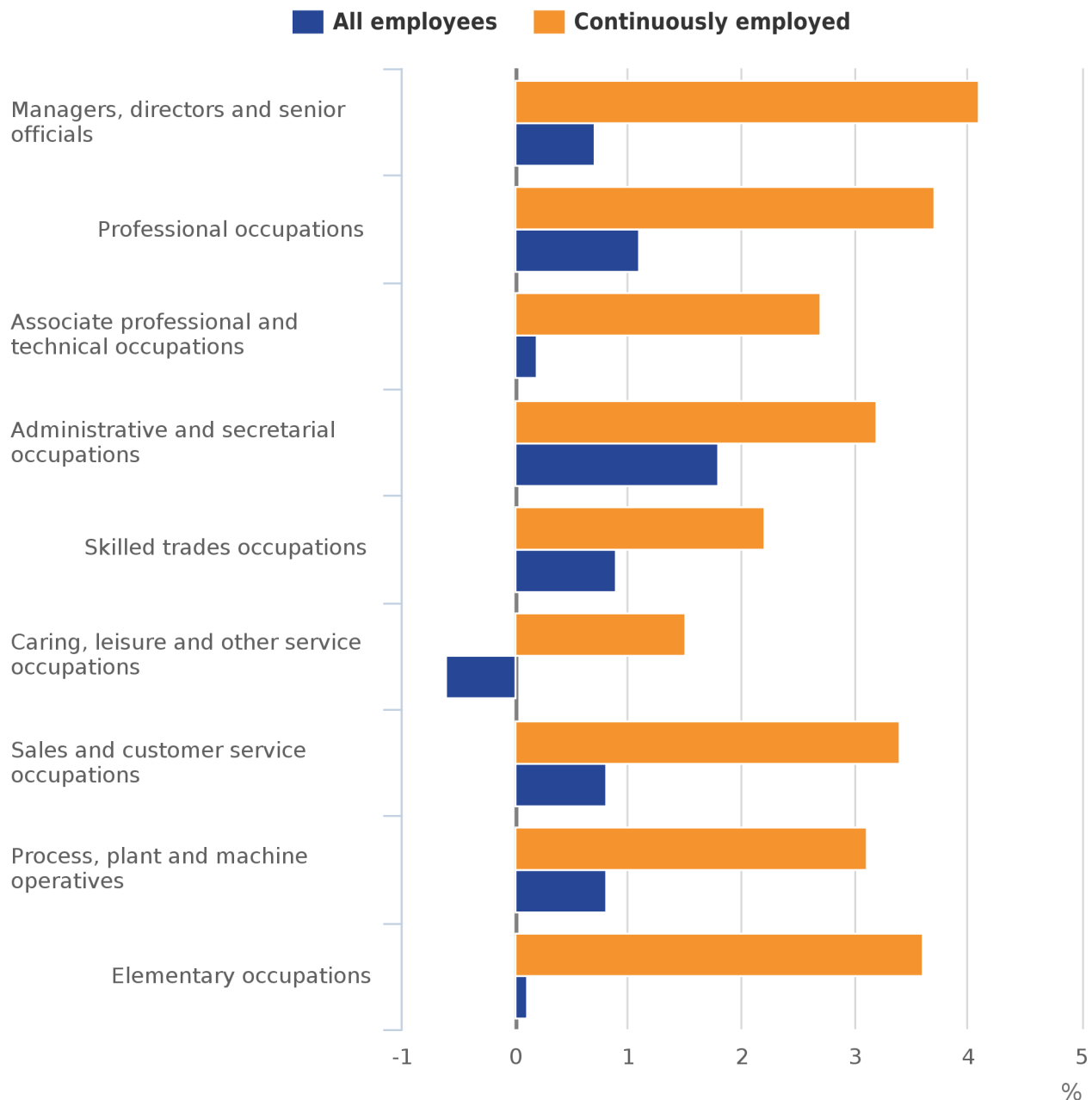
**Notes:**

1. Occupation group is based on the Standard Occupation Classification (SOC) 2010 major groups.

**In growth rates:** Figure 6 shows that growth in median earnings for the continuously employed in 2014 is broadly similar across the main nine occupational groups. However, growth in median full-time earnings for all employees varied more widely across the occupational groups, with caring, leisure and other services seeing a fall in their median earnings in 2014.

Growth in median full-time earnings in elementary occupations and associate professional and technical operations is also relatively weak for all employees in 2014.

**Figure 6: Growth in full-time weekly earnings for all employees and the continuously employed, by major occupational group, 2013 to 2014.**



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

**Notes:**

- Occupation group is based on the Standard Occupation Classification (SOC) 2010 major groups.

The pattern of earnings growth may be partly explained by changes in the share of employment within these occupational groups.

Table 2 shows the proportion of full-time employees by occupational group for the last three years.

**Table 2: Percentage of full-time employees by major occupational group [1] in 2012, 2013 and 2014, and percentage point changes.**

	%			Percentage Point Difference
	2012	2013	2014	

				Change 2012- 2014	Change 2013- 2014
Elementary occupations	8.3	8.0	8.4	0.1	0.5
Process, plant and machine operatives	7.3	7.2	7.3	-0.1	0.0
Sales and customer service occupations	5.3	5.0	5.0	-0.3	0.0
Caring, leisure and other service occupations	6.4	6.5	6.6	0.2	0.1
Skilled trades occupations	9.6	9.5	9.7	0.1	0.3
Administrative and secretarial occupations	11.4	11.2	10.9	-0.5	-0.3
Associate professional and technical occupations	16.8	17.2	17.4	0.5	0.2
Professional occupations	22.9	23.0	23.3	0.4	0.2
Managers, directors and senior officials	12.0	12.4	11.5	-0.5	-0.9

**Source: Annual Survey of Hours and Earnings – Office for National Statistics**

1. Occupation group is based on the Standard Occupation Classification (SOC) 2010 major groups.
2. 2014 data are provisional.
3. Figures rounded to one decimal place.

It can be seen that the strongest increase in the proportion of employment in 2014 is for elementary occupations, with the proportion employed in this occupational group increasing from 8.0% in 2013 to 8.4% in 2014. These occupations tend to be the lowest paid and may have contributed to the low growth in median full-time earnings for all employees in 2014.

Growth is also seen in the proportion of employees working in the associate professional and technical occupations from 17.2% in 2013 to 17.4% in 2014. These two occupational groups had relatively low growth in median earnings for these years of 0.1% and 0.2% respectively.

The strongest growth in 2014 in median earnings for all full-time employees is seen in the administrative and secretarial occupations at 1.8%. This is also one of the two occupational groups which has seen a fall in its share of employment from accounting for 11.2% of the total in 2013 to 10.9% in 2014.

Table 3 shows the same data for the continuously employed group.

**Table 3: Percentage of continuously employed by major occupational group in 2012, 2013 and 2014, and percentage point changes.**

	%			Percentage Point Difference	
	2012	2013	2014	Change 2012-2014	Change 2013-2014
Elementary occupations	7.0	7.0	6.8	-0.2	-0.1
Process, plant and machine operatives	7.3	7.3	7.2	-0.0	-0.1
Sales and customer service occupations	4.7	4.4	4.4	-0.3	0.1
Caring, leisure and other service occupations	5.5	5.6	5.5	-0.0	-0.1
Skilled trades occupations	9.8	9.8	9.8	-0.0	-0.0
Administrative and secretarial occupations	11.7	11.5	11.1	-0.6	-0.4
Associate professional and technical occupations	18.1	18.3	18.7	0.5	0.4

Professional occupations	23.0	23.1	24.0	1.0	0.8
Managers, directors and senior officials	12.9	13.1	12.5	-0.4	-0.6

**Source: Annual Survey of Hours and Earnings – Office for National Statistics**

1. Those employees who appear in consecutive samples, have a weekly earnings observation in both periods and are classified by their employer as being in the same job for at least 12 months. This group represented around 65% of the overall sample in 2014.
2. Occupation group is based on the Standard Occupation Classification (SOC) 2010 major groups.
3. 2014 data are provisional.
4. Figures rounded to one decimal place.

These data show that the share of the continuous employed group that were managers, directors and senior officials fell over the period since 2012, and also for administrative and secretarial occupations. Earnings growth was relatively strong for these occupations over the same period for those in the continuously employed group. This may indicate reduced supply of these occupational groups had a positive effect on earnings.

Tables 2 and 3 also show that the full-time continuously employed group are more likely to be employed as managers, directors and senior officials than full-time employees as a whole. In 2014, 12.5% of the continuously employed group are in this occupation compared to 11.5% of total employees. Conversely, only 6.8% of the continuously employed group are in elementary occupations compared to 8.4% of all full-time employees in 2014. These differences in employment shares by occupation can help explain the lower full-time wages on average for all employees (and by implication the remainder group) compared to those in continuous employment.

These differences in earnings, in favour of the continuously employed group across a range of variables are also seen in previous years. A reference table is available with these data.

[Reference table 1 \(71.5 Kb Excel sheet\)](#): Median full-time weekly earnings for all employees and the continuously employed by age, occupational group and percentile 2007-2014.

## Notes for analysis of median earnings

1. The headline statistics, in levels, from ASHE are based on the median rather than the mean. It is ONS's preferred measure of average earnings as it is less affected by a relatively small number of very high earners and the skewed distribution of earnings. It therefore gives a better indication of typical pay than the mean.
2. Initial analysis suggested that hourly pay produces similar trends.
3. Other definitions of the “continuously employed” have been used in analysis by ONS which includes employees who have moved jobs and remained in the ASHE sample in two consecutive years. (e.g Economic Review ONS 2015). This kind of analysis enables the effects of job mobility to be examined for example.
4. Prior median earnings for the continuously employed group in each year are given in the Table and this is the value from which the growth rate of median earnings for the continuously employed group is calculated.

## 5. How to interpret growth of median earnings

For all full-time employees – The change in the median full-time earnings for all employees reflects how much a typical employee – i.e. the employee at the middle, or median, of the earnings distribution was earning in the current year, compared with a typical employee at the median of the earnings distribution in the previous year.

Table 4 shows a hypothetical example where the median person changes as employees enter and exit the distribution. The growth rates have been constructed purely to show how the figures from the ASHE bulletin published in November 2014 could arise in theory.

The table illustrates that the growth rate between the two median points for all employees will therefore not represent the actual change in earnings for the person at the median of the distribution in either time period. For example, they may have dropped out of the population, or moved above or below the median point of the distribution in Year 2. The statistic captures the full-time earnings of an employee at the middle of distribution in each period, allowing for movements into and out of the labour force.

**Table 4: An illustration of labour composition effects on average wages at the median**

	£ per hour		%
	Year 1	Year 2	Growth
Person 1*	4.00	4.08	2.0
Person 2*	6.00	6.12	2.0
Person 3*	7.00	7.14	2.0
Person 4*	7.50	7.65	2.0
Person 5*	7.80	7.80	0.0
Person 6*	7.84	7.84	0.0
Person 7	8.00	-	-
Person 8*	8.16	8.50	4.2
Person 9*	9.00	9.36	4.0
Person 10*	9.50	9.69	2.0
Person 11*	10.00	10.20	2.0
Person 12*	11.00	11.22	2.0
Person 13*	12.50	12.75	2.0
Person 14*	14.00	14.28	2.0
Person 15*	20.00	20.40	2.0
Person 16	-	7.40	-
Person 17	-	7.80	-
<b>Median (all employees)</b>	<b>8.16</b>	<b>8.17</b>	<b>0.1</b>
<b>Median (continuous)</b>	<b>8.58</b>	<b>8.93</b>	<b>4.1</b>
<b>Mean (all employees)</b>	<b>9.49</b>	<b>9.51</b>	<b>0.3</b>
<b>Mean (continuous)</b>	<b>9.59</b>	<b>9.79</b>	<b>2.0</b>

**Source: Annual Survey of Hours and Earnings – Office for National Statistics**

1. Those employees who appear in consecutive samples, have a weekly earnings observation in both periods and are classified by their employer as being in the same job for at least 12 months. This group represented around 65% of the overall sample in 2014.

2. (\*) denotes that the person is continuously employed.

3. Data used is hypothetical and is created solely for illustrative purposes.

The median for all full-time employees moves from £8.16 per hour to £8.17 per hour, or an increase of 0.1%. The median for the continuously employed group moved from £8.58 to £8.93 per hour, or an increase of 4.1%. A similar, but less pronounced effect is seen for the mean growth rate for all employees being lower at 0.3% compared to 2.0% for the continuous group.

**For the continuously employed** - the change in median earnings for the continuously employed group shows how much a typical continuously employed person in the current year is earning compared with the typical employee at the middle of the distribution from the same group in the previous period.

Table 4 shows the group of continuously employed is a different sub-set of each year's sample. In this example, given the higher earnings growth experienced by those in the middle of the distribution (person 8 and 9), the growth in median earnings reported for the continuously employed group is higher than that experienced by the majority of the individuals in the group. Care should therefore be taken not to interpret this change in median earnings as necessarily typical of the change in wages experienced by the majority of the continuously employed group.

It should also be noted that the change in median earnings does not mean that half of the employees in the continuous group received an increase in weekly earnings of more than 4.1% and half less than 4.1%. There will be a range of changes in earnings between years for the individuals in the continuously employed group, and an alternative statistic would be to calculate the median for this distribution<sup>1</sup>.

**In summary:** Comparing the change in median full-time earnings over time for all employees therefore captures a number of factors:

- changes in earnings for each employee who was working in both periods in the same full-time job. This can be brought about by changes in rates of pay, changes in hours worked through overtime or flexibility in hours, and bonus or performance pay
- changes in earnings for each employee who was working in both periods but had moved full-time job or employer. Separate analysis of earnings growth including employees who have moved between jobs has been produced by ONS in recent Economic Reviews (ONS 2015)
- the earnings of employees new to the sample each period (the remainder group). These new employees may have been previously self-employed, inactive, recently graduated students, unemployed or new migrants to the UK. Numbers retiring, becoming unemployed or inactive, becoming part-time or leaving employee labour market will also have an effect. The combined changes in labour composition for example, by age, skill level and occupation, will alter the wage distribution in each period and hence affect the value of the median earnings point
- non-response to the ASHE data collection in either period from employers that should have returned an earnings figure for the sampled employees<sup>2</sup>

## Median growth in earnings

An alternative statistic – the median growth rate in earnings - can also be produced from ASHE data. This statistic compares the earnings levels on an individual basis for those who have remained employed between two time periods. This can be set to be those in the same job for at least 12 months, as in the analysis presented in the ASHE bulletin, or set wider to include those employees who have moved jobs between periods. The set of growth rates in full-time earnings for the employees in this group can be ordered and the median growth rate chosen to represent a typical earnings growth rate for that year.

This is the approach taken in recent editions of the ONS Economic Review, using hourly rather than weekly earnings, and including those employees who have moved jobs as well as those in the same job for at least 12 months. The statistics can be used to help provide evidence of the effect of job mobility, and how earnings growth may differ across groups, e.g. by employment tenure, by gender, or by sector of the economy.

Table 5 summarises the differences between the two approaches, as published by ONS in March 2015 ( [ONS 2015b](#)).

**Table 5: Summary of differences in methods and measurements of earnings growth**

	<b>ASHE release (November 2014)</b>	<b>Economic Review (March 2015)</b>
Nominal growth	4.10%	2.30%
Real growth	2.30%	0.60%
Period	April 2013 to April 2014	April 2013 to April 2014
Measure	Growth of median earnings	Median earnings growth rate
Frequency	Weekly earnings	Hourly earnings
Coverage	All full-time employees in same job observed in both periods	Employees observed in both periods – both those in same job and those who have changed job
Coverage - status	Full-time	Full-time

**Source: Office for National Statistics**

## Notes for how to interpret growth of median earnings

1. This is the approach taken in recent ONS Economic Reviews (ONS 2015)
2. The effect of non-response within the ASHE data collection is difficult to assess consistently as these records can only be excluded from analysis of the remainder group. The counter-balancing effect which we would wish to add back into the sample of continuously employed group cannot be counted as there is no record for one of the years required to find a growth in earnings.

## 6. Changing composition of employees

It is important when comparing snap-shots of average earnings for all employees over time to be aware of any changes between the type of employees that are making up the average – or compositional effects.

### Evidence since 2011 of changes in the composition of employees

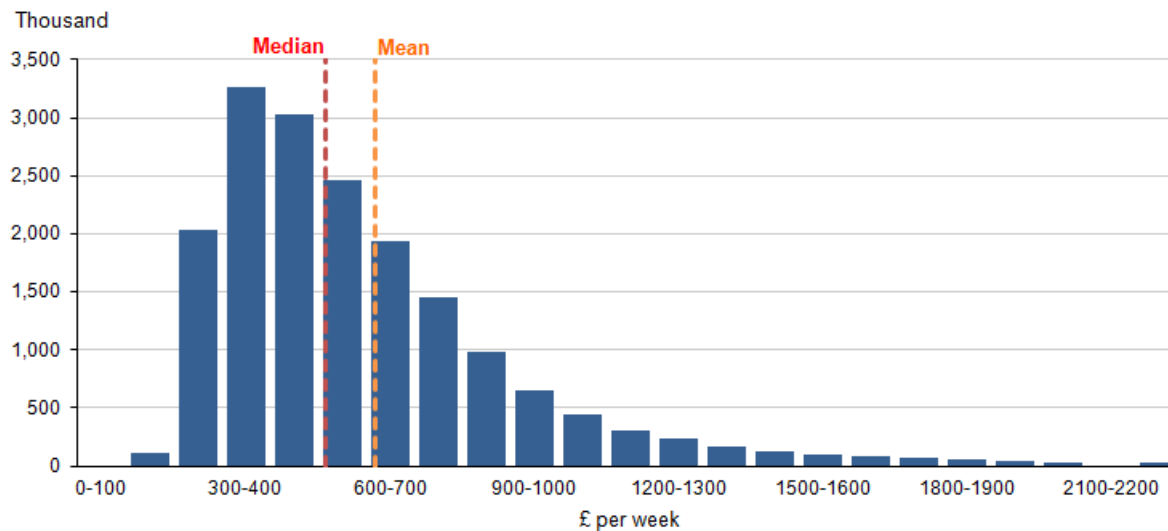
There is evidence that there have been some changes in the composition of the earnings distribution of the data – with some of the largest percentage point increases in the number of employee jobs in 2014 seen at pay-bands at and just above the median.

### Distribution of earnings

Figure 7 shows the earnings distribution for all full-time employees in 2014, where the frequency of employee jobs in each pay band<sup>1</sup> are shown. This shows the distribution is more concentrated towards lower earnings levels with the median of £518 below the mean of £620. This skewness is the common pattern of earnings distribution and is not specific to 2014, or the UK.



**Figure 7: Distribution of all full-time employees, by pay-band, 2014, current prices**



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

**Notes:**

- Earnings over £2,300 per week are excluded. The frequency shown represent over 99.9% of the whole sample.

Table 6 shows the proportions of full-time employees for the same pay bands in 2011 and the most recent years of 2013 and 2014. This is the period from which consistent ASHE data is available on a SOC 2010 (Standard Occupational Classification 2010) basis.

For example, the data show that there has been a 0.3 percentage point fall in the proportion of employees paid between £300-400 per week between 2013 and 2014, and this proportion is down 1.1 percentage points from the 2011 proportion of 19.4%.

Table 6 shows that since 2011 there have been increases in the proportion of employees earning between £400 and £1400 per week, and falls in the proportion of the population earning less than £400 per week. There have also been small falls in the proportion of employees at the very top of the earnings distribution of over £2300 per week.

**Table 6: Percentage of full-time employees at selected pay-bands in 2011, 2013 and 2014, and percentage point difference.**

	%			Percentage Point Difference	
	2011	2013	2014	Change 2011-2014	Change 2013-2014
0-100	0.0	0.0	0.0	0.0	0.0
100-200	1.0	0.7	0.7	-0.3	0.0
200-300	13.4	11.6	11.4	-2.0	-0.2
300-400	19.4	18.6	18.3	-1.1	-0.3
400-500	16.6	16.9	17.0	0.5	0.1
500-600	13.5	13.6	13.8	0.3	0.2
600-700	10.5	11.0	10.9	0.4	-0.1

700-800	7.5	8.1	8.2	0.7	0.1
800-900	5.1	5.5	5.5	0.5	0.0
900-1000	3.2	3.6	3.6	0.4	0.1
1000-1100	2.3	2.5	2.5	0.2	0.0
1100-1200	1.6	1.7	1.7	0.1	0.1
1200-1300	1.1	1.3	1.3	0.2	0.1
1300-1400	0.9	0.9	0.9	0.0	0.1
1400-1500	0.7	0.7	0.7	-0.0	0.0
1500-1600	0.5	0.6	0.6	0.0	-0.0
1600-1700	0.5	0.5	0.5	0.0	-0.0
1700-1800	0.4	0.4	0.4	0.0	-0.0
1800-1900	0.3	0.3	0.3	0.0	-0.0
1900-2000	0.3	0.3	0.3	0.0	-0.0
2000-2100	0.2	0.2	0.2	0.0	0.0
2100-2200	0.2	0.2	0.1	-0.0	-0.0
2200-2300	0.1	0.1	0.1	0.0	0.0
>2300	1.0	0.9	0.9	-0.1	-0.1

**Source: Annual Survey of Hours and Earnings – Office for National Statistics**

1. 2014 data are provisional.
2. Figures rounded to one decimal place.
3. Figures may not sum to total due to rounding.

While some of this movement will be due to inflation and increases in the minimum wage bringing more people into higher weekly earnings brackets, there is likely to be some underlying movement in the labour market as well.

For example, we have seen changes in the share of occupational groups for all full-time employees and the continuously employed group which control for pay and inflation effects. Comparing the ratio of the earnings of the person at the 80th percentile and the person at the 20th percentile over time also controls for changes in pay and inflation. This ratio has fallen slightly from 2.4 to 2.3 (rounded to 1 decimal place) since 2011, but has fluctuated at around this level since 2004. There has therefore not been much change in the relationship of those earning near the top of the distribution compared to those near the bottom of the distribution.

## Notes for changing composition of employees

1. Earnings over £2300 per week are excluded. The frequencies shown represent over 99% of the whole sample.

## 7. Quantifying the effect of changes in labour composition on average full-time earnings for all employees

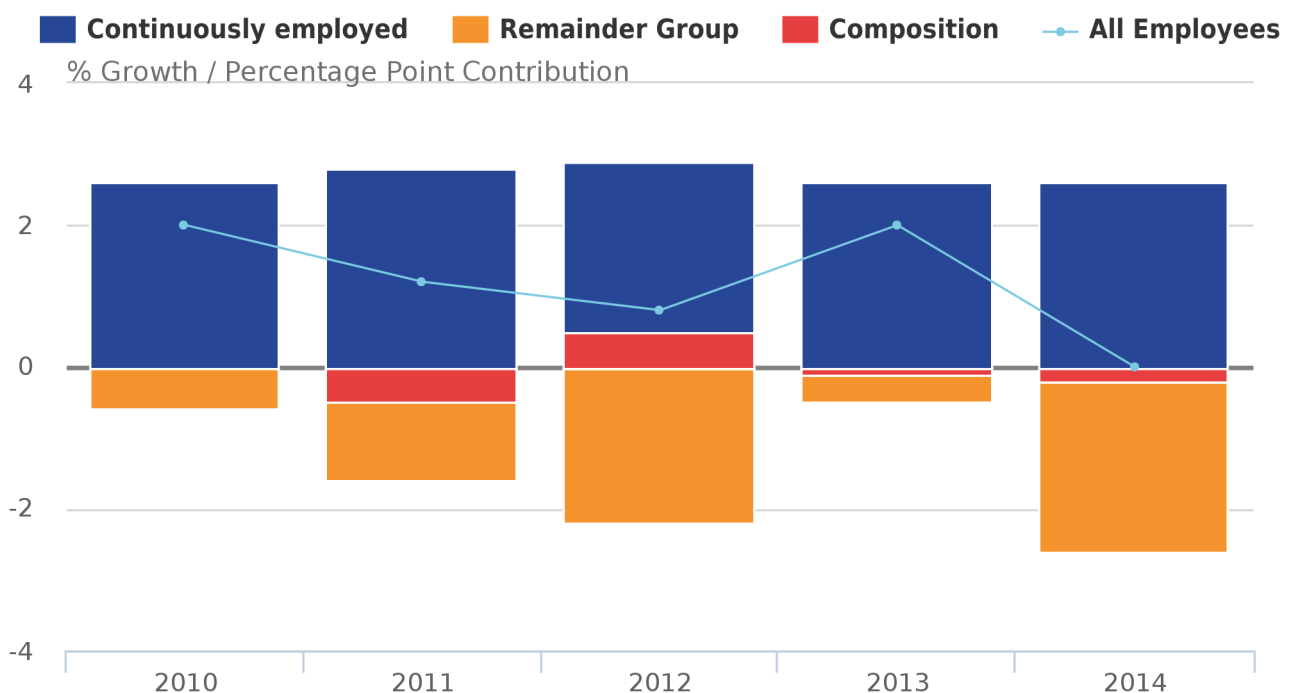
It is possible to break down growth in the mean (not median) weekly full-time earnings <sup>1</sup> for all employees into:

- the contribution from the continuously employed group
- the contribution from the remaining group (everyone else in the sample) and
- a residual contribution from a shift in the population weights between the two groups

Annex A provides more information on the methodology for calculating these results.

Figure 8 shows that the contribution to growth in average weekly earnings from the continuously employed group each year from 2010 is positive at around 2.4 to 2.8 percentage points. The remainder group has a consistently negative contribution to growth each year, although the size of the contribution varies more than for the continuous group. The largest negative contribution from the remainder group was seen in 2014 at -2.4 percentage points.

**Figure 8: Contributions to the growth in full-time mean weekly earnings by component, 2010 to 2014.**



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

The negative contribution of the remainder group reflects the fact that a large amount of the pay change for this group involves comparing the pay of retirees (who would respond only in e.g. 2013) with the pay of new entrants (who would only respond in 2014). It is also likely that this group includes those who have taken lower paid jobs following a period of inactivity or unemployment, or new employees who are taking lower-skilled and lower-paid employment as a starting point for their career or period of employment in the UK.

Figure 8 also shows a relatively small negative contribution from changes in labour composition between the groups for most years, apart from in 2012 when the compensation effect was positive.

Taken together, the negative contribution from the remainder group and negative compositional changes tend to offset positive growth from the continuously employed group. In 2014, these effects combined to completely offset growth in the continuously employed group to bring growth in mean full-time earnings for all employees down to zero.

Using the same de-compositional technique, Annex A also shows how the growth in mean weekly earnings of the continuously employed group is broken down into contributions by age group and skill group over time. This shows that the majority of earnings growth for the continuously employed group comes from higher and upper-middle skill groups, and from the 30-39 and 40-49 year age-bands.

## **Notes for quantifying the effect of changes in labour composition on average full-time earnings for all employees**

1. This analysis is not possible with growth in median earnings as the results are not additive.

## **8. Conclusions**

This article has provided information and guidance on the interpretation of changes in median full-time earnings for all employees and the continuously employed group. It has had a particular focus on the difference between the published rate of growth in median gross weekly full-time earnings for all employees of 0.1% in 2014 compared with those identified as being in continuous employment of 4.1% (ONS 2014).

Growth in median earnings – this statistic appears in headline ONS statistics, and is useful to gain an understanding of changes in average earnings the labour market as a whole has experienced over time. Short-term measures of wages such as Average Weekly Earnings (AWE) commonly use a change in the mean to represent how earnings for the average of the distribution over time have changed. ASHE bulletins similarly use headline measures of changes in the median earnings of all full-time employees to represent how earnings at the middle of the distribution in one year have changed compared with earnings at the middle of the distribution in the previous year.

The ASHE methodology has been designed to provide comprehensive snap-shots of earnings and employment data for a given period in April each year. This paper has shown entry and exit of employees to the dataset can affect comparisons of median and mean earnings over time.

Changes in median earnings for continuously employed group in the same job for at least 12 months control for the same group of employees but will only capture the experiences of individuals at the middle of the distribution in each period. Care should therefore be taken in the interpretation of changes in median earnings as being representative of the range of experiences of the continuously employed group of employees.

An alternative approach to assessing earnings changes for those that are continuously employed is to calculate the median growth in earnings. ONS has published analysis of this kind, for those in the same job and those moving jobs in recent editions of the ONS Economic Review. (ONS 2015)

This paper has also shown that there are changes in the distribution of employees across the earnings distribution, and it would be useful to investigate this further and how it affects measures of average full-time earnings.

## 9. References

ONS (2014) [Annual Survey of Hours and Earnings, 2014 Provisional Results](#)

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ONS (2015b) Note on TUC blog: '[ONS now say that nominal pay growth is 2 not 4 per cent for those in continuous employment – with real pay stagnating](#)'

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Stewart, Mark B. (2011) [The Changing Picture of Earnings Inequality in Britain and the Role of Regional and Sectoral Differences](#), National Institute Economic Review No.218

IFS Green Budget (2015) [IFS Green Budget 2015](#)

Gardiner, Laura (2015), [Who's been getting a pay rise? Resolution Foundation Briefing](#)

## 10. Annex A

### Methodology

The change in mean weekly full-time earnings<sup>1</sup> for all employees over time can be decomposed by holding the proportion of the continuously employed group constant between pairs of years and calculating how much they contribute to overall growth in mean weekly earnings.

The contribution of the remainder group who are new to the sample in one of the years is calculated in a similar way. The difference between the sum of these two contributions to growth and the overall growth in mean weekly full-time pay is the effect of a compositional change between the two groups of employees.

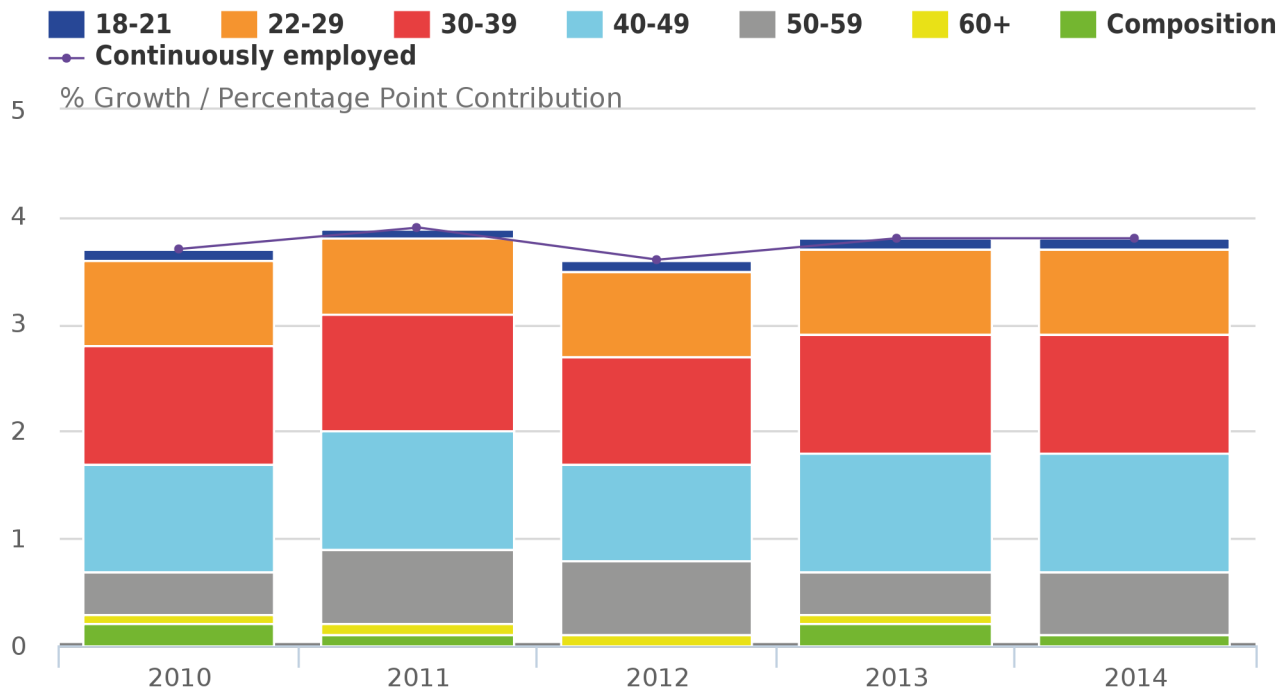
### Continuously employed:

In a similar way, the change in mean weekly earnings for the continuously employed can be decomposed by holding the proportion of components of the group constant between pairs of years. The difference between the sum of these contributions to growth and the actual change in mean weekly earnings represents the effect of changes in the components e.g. by age or skill group.

## Continuously employed, by age group

Figure 9 shows the greatest contribution to mean weekly earnings for the continuously employed group is from the 40-49 year old and 30-39 age group. The weight of these groups is generally higher than the other age bands, and so could be expected to generate the largest contribution to average earnings growth. There is a positive contribution to average earnings growth from a net shift between the age groups over time.

**Figure 9: Contributions to the growth in full-time mean weekly earnings of the continuously employed by age group, 2010 to 2014.**



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

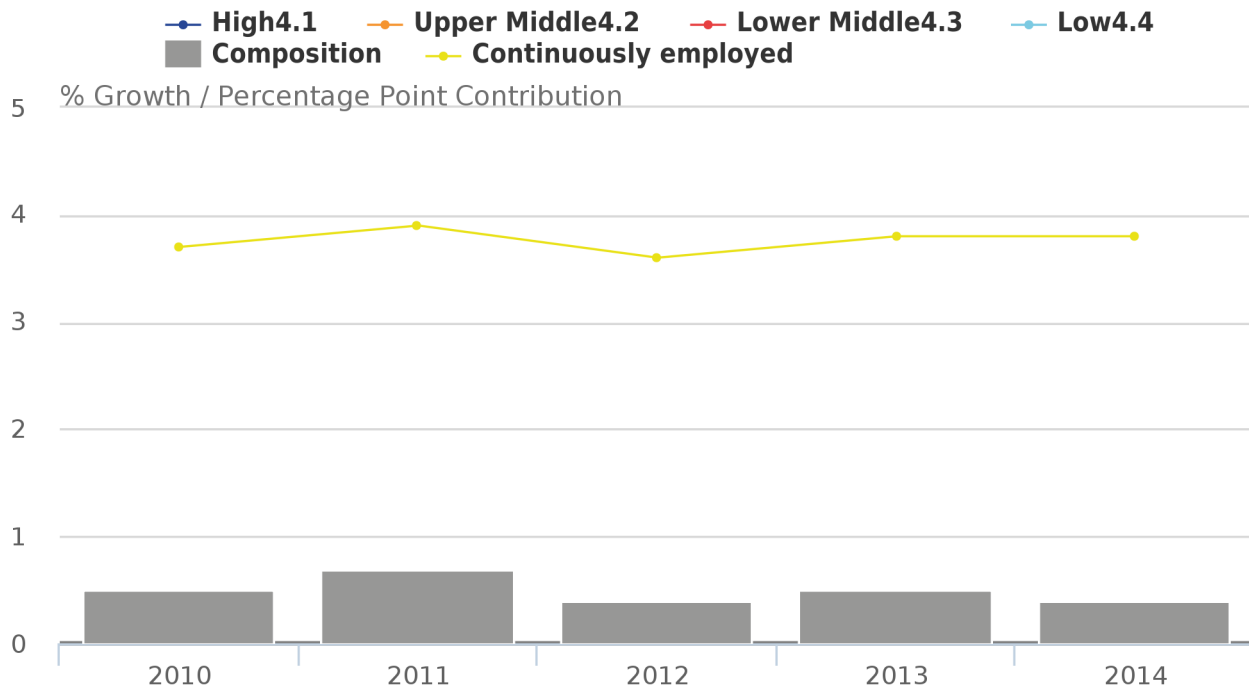
**Notes:**

1. The 16-17 age group has been excluded due to the limited sample size of those within this group being defined as Continuously Employed.

## Continuously employed, by skill group

Figure 10 shows that the greatest contribution to mean weekly earnings for the continuously employed group is from high and upper middle skilled workers. There is also a positive contribution from the movement between skill groups. The weights of the higher skilled earnings will tend to be higher than other groups, and so they would be expected to generate a higher contribution to growth in average earnings.

**Figure 10: Contributions to the growth in full-time mean weekly earnings of the continuously employed by skill group, 2010 to 2014.**



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

### Notes:

1. The skill level groups are created by grouping jobs together based on their occupation according to the Standard Occupation Classification (SOC) 2010 lower level groups.
2. Occupations were grouped by the skill level required according to the following guidelines:
3. High – This skill level is normally acquired through a degree or an equivalent period of work experience. Occupations at this level are generally termed 'professional' or managerial positions, and are found in corporate enterprises or governments. Examples include senior government officials, financial managers, scientists, engineers, medical doctors, teachers and accountants.
4. Upper-middle – This skill level equates to competence acquired through post-compulsory education but not to degree level. Occupations found at this level include a variety of technical and trades occupations, and proprietors of small business. For the latter, significant work experience may be typical. Examples of occupations at this level include catering managers, building inspectors, nurses, police officers (sergeant and below), electricians and plumbers.
5. Lower-middle – This skill level covers occupations that require the same competence acquired through compulsory education, but involve a longer period of work-related training and experience. Examples of occupations at this level include machine operation, driving, caring occupations, retailing, and clerical and secretarial occupations.
6. Low – This skill level equates to the competence acquired through compulsory education. Job-related competence involves knowledge of relevant health and safety regulations and may be acquired through a short period of training. Examples of occupations at this level include postal workers, hotel porters, cleaners and catering assistants.

## Notes for annex A

1. This analysis is not possible with growth in median earnings as the results are not additive.

## 11. Background notes

### 1. ASHE survey details (published in ASHE Bulletin 2014)

The Annual Survey of Hours and Earnings (ASHE) is based on a 1% sample of employee jobs taken from HM Revenue and Customs PAYE records. Information on earnings and hours is obtained from employers and treated confidentially. ASHE does not cover the self-employed nor does it cover employees not paid during the reference period. In 2014 information relates to the pay period which included 09 April.

A large number of characteristics of these employees are identifiable such as age, gender, occupational group, industrial sector, and job tenure. The ASHE sample is weighted by population figures used in the Labour Force Survey which enables any change in the size of the labour force using PAYE to be taken into account.

The earnings information presented relates to gross pay before tax, National Insurance or other deductions, and excludes payments in kind. With the exception of annual earnings, the results are restricted to earnings relating to the survey pay period and so exclude payments of arrears from another period made during the survey period; any payments due as a result of a pay settlement but not yet paid at the time of the survey will also be excluded.

For particular groups of employees, changes in median earnings between successive surveys may be affected by changes in the timing of pay settlements, in some cases reflecting more than one settlement and, in others, no settlement at all.

Most of the published ASHE analyses, including in this article (that is, excluding annual earnings) relate to full-time employees on adult rates whose earnings for the survey pay period were not affected by absence. They do not include the earnings of those who did not work a full week, and whose earnings were reduced for other reasons, such as sickness. Also, they do not include the earnings of employees not on adult rates of pay, most of whom will be young people. More information on the earnings of young people and part-time employees is available in the main survey results.

Full-time employees are defined as those who work more than 30 paid hours per week or those in teaching professions working 25 paid hours or more per week.



## 2. Data changes (published in ASHE bulletin 2014)

**i. Standard Occupational Classification (SOC) change:** In March 2012 the 2011 ASHE estimates were published on a Standard Occupational Classification (SOC) 2010 basis (they had previously been published on a SOC 2000 basis). Since the SOC forms part of the methodology by which ASHE data are weighted to produce estimates for the UK, this release marked the start of a new time series and therefore care should be taken when making comparisons with earlier years.

Similarly for those continuously employed, estimates would be based on the methodology used in the year previous. Therefore estimates of levels, for those continuously employed, in 2011 would use SOC2000 for the basis of their weighting.

Methodological changes in 2004 and 2006 also resulted in discontinuities in the ASHE time series.

### ii. ASHE coverage change in 2014

In 2013 HM Revenue and Customs (HMRC) changed the criteria which determine how businesses are obliged to report employees' earnings via their Pay as You Earn (PAYE) schemes. The PAYE system is the frame for the ASHE sample.

Until this change, businesses were only required to operate PAYE for employees whose earnings were above the Lower Earnings Limit (LEL) for National Insurance contributions, currently £111 per week, and they did not report all new jobs until the end of the tax year. The new rules require employers to report the details of all of their employee jobs via their PAYE schemes, whatever their earnings, provided that they have at least one employee earning above the LEL.

In addition, employers must report for all jobs in 'real-time', meaning that they cannot wait until the end of the tax year. This new system is known as 'Real-Time Information' (RTI). In theory, it is possible that the move to RTI results in a coverage change for the ASHE sample.

It should be noted that 2014 is not the first year in which the ASHE sample includes the types of jobs that are affected by RTI. This is because many employers, particularly large businesses, which account for a large proportion of the labour market, chose to report many or all such jobs on their PAYE schemes in previous years.

It is not possible to precisely quantify the impact of this change since it is not possible to identify the specific jobs that are included in the ASHE sample as a direct result of the move to RTI. However, compositional differences between 2013 and 2014 are not unusual when considered in historical context. This is because, as noted above, many of the RTI-type jobs were already being reported by employers in previous years, meaning that the composition of the sample was not substantially distorted as a result of RTI.

Consequently, ONS judges that the impact of the move to RTI on the estimates for ASHE in 2014 is negligible. It is possible that at some lower levels of disaggregation, there may be a more pronounced effect, perhaps because RTI has resulted in different behavioural changes for employers in particular regions or in particular sectors.

### iii. Re-weighting of the Labour Force Survey

Returned data from ASHE are weighted to UK population totals from the Labour Force Survey (LFS). The LFS itself has recently been reweighted, using revised UK and sub-national population estimates consistent with the 2011 Census and updated population projections. ONS has found there to be negligible impact of this on the ASHE results. Further information on the LFS reweighting can be found on the [ONS website](#).

[Further information about the quality of ASHE \(57.5 Kb Pdf\)](#) , including a more detailed discussion of coverage and non-response errors, is available on the ONS website.

### 3. Uses of ASHE data

The headline statistics for ASHE are based on the median rather than the mean. The median is the value below which 50% of employees fall. It is ONS's preferred measure of average earnings as it is less affected by a relatively small number of very high earners and the skewed distribution of earnings. It therefore gives a better indication of typical pay than the mean.

The main use of measures of the average earnings for the employees using PAYE is to provide information on employee earnings, and to analyse this by the variables in the dataset, such as gender, occupational group, age, job tenure, public or private sector. Cross-sectional differences can be described and modelled using this data.

**Micro-data:** the ASHE sample can also be analysed at the micro-level, given appropriate research access – meaning individual returns by companies for their employees can be studied. Micro-data is a valuable resource as bespoke break-downs and cross-tabulations can be constructed from the source data. Individuals can also be tracked over the time they are present in the sample, or between pairs of years, enabling different types of earnings growth analysis to be undertaken. In recent editions of ONS Economic Reviews, ONS has developed analysis of real earnings growth for employees, using this approach (ONS 2015).

It should be noted that current year weights are used for this analysis as longitudinal weights are not available. Analysis of earnings growth is therefore restricted to pairs of years, rather than longer time-periods.

#### Users of ASHE

As well as being extensively used within central Government, Local Governments and Authorities are key users of ASHE, where the survey is used in a number of ways such as for monitoring purposes, occupation based analyses of the local labour market and economy briefing notes. Further to this, ASHE is used by county councils to produce Local Economic Assessments in order to highlight variations in resident and workplace earnings across particular areas. As an example, city councils, such as Nottingham and Manchester, have used ASHE data to compare the differences in resident and workplace wages against a number of “core” cities.

ASHE also has a wide-range of users outside of the Government. Professional bodies, such as trade unions, use ASHE data in order to support pay negotiations, as well as to research issues such as the gender pay gap and pay distributions in the public and private sectors. As an example, Incomes Data Services used both ASHE and AWE to produce a research report in 2014 for the TUC analysing the relationship between pay settlements and earnings growth. Other professional bodies, such as the IFS and the Resolution Foundation, have also carried out research into earnings growth using ASHE, highlighting the differences in full-time earnings growth between all employees and those defined as “continuously employed”.

Another key user of ASHE data is academics, where a common area of academic research is investigations into the impact of the national minimum wage, as well as assessing earnings trends at both a national and regional level. As an example, Sabine D'Costa and Henry Overman (2014) produced an academic paper using ASHE results in order to analyse the evidence for the existence of an urban wage premium. Similarly, Stewart (2011) produced an academic paper to assess the impact of regional and sectoral differences on earnings inequality. Further areas of use for ASHE include within legal and finance areas, the careers, skills and teaching sector, as well as by the general public. ASHE headline statistics are also widely covered in the media, with stories particularly focusing on the gender pay gap, public and private sector pay and the number of people earning below the minimum wage.

[Further information about the uses of ASHE statistics \(81 Kb Pdf\)](#) can also be found on the ONS website.

### 4. Quality and Methodology Information (QMI)

A [Quality and Methodology Information report for ASHE releases](#) is available.

This report describes the intended uses of the statistics presented in this publication, their general quality and the methods used to produce them.

## 5. Release information

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

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This document is also available on our website at [www.ons.gov.uk](http://www.ons.gov.uk).

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