

Guide to interpreting Annual Survey of Hours and Earnings (ASHE) estimates

A guide to help users understand estimates from the Annual Survey of Hours and Earnings (ASHE) and aid interpretation by addressing common questions about the data.

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1 . What does ASHE measure?

Annual Survey of Hours and Earnings (ASHE) information 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 (that is, excluding annual earnings) relate to 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.

2 . Who is selected in the ASHE survey?

Annual Survey of Hours and Earnings (ASHE) is based on a 1% sample of employee jobs taken from HM Revenue and Customs Pay As You Earn (PAYE) records. Consequently, individuals with more than one job may appear in the sample more than once. Information on earnings and paid hours worked is obtained from employers and treated confidentially. ASHE does not cover the self-employed or employees not paid during the reference period.

3 . What is the difference between ASHE and NES?

Annual Survey of Hours and Earnings (ASHE) replaced the New Earnings Survey (NES) as our main source of information on the distribution of earnings in 2004. [Articles describing the ASHE methodology and the impact of its introduction on 1997 to 2003 data can be found on the ONS website](#). The main differences between ASHE and NES are:

- ASHE results are weighted to the number of jobs given by the Labour Force Survey (LFS)
- ASHE imputes for item non-response
- the coverage of employees for ASHE is greater than that of NES; for ASHE, the median replaces the mean as the headline statistic

While ASHE was first run in 2004, NES data have been used to create estimates for 1997 to 2003 comparable to those estimated on ASHE. Thus ASHE estimates are available from 1997 (except annual earnings, which are available back to 1999 only).

4 . Why is the median used as the main measure of earnings?

There are several methods of calculating an average; most Annual Survey of Hours and Earnings (ASHE) analyses focus on the median, that is, the data value at which 50% of data values are above it and 50% of data values are below it.

We use the median because the distribution of earnings is skewed, with more people earning lower salaries than higher salaries. When using the mean to calculate the average of a skewed distribution, it is highly influenced by those values at the upper end of the distribution and thus may not be truly representative of the average earnings of a typical person. By taking the middle value of the data after sorting in ascending order, the median avoids this issue and is consequently considered a better indicator of “typical” average earnings.

5 . What is the difference between the growth in median earnings and the median growth in earnings?

In the Annual Survey of Hours and Earnings (ASHE) bulletin we use the growth in the median (that is, how much the median grows year-on-year), as opposed to the median growth (that is, the median of the growths in each individual's earnings between years). This is because of the sampling variability and the changes to survey response each year.

The difference between these two measures is illustrated by the theoretical example of five employee jobs shown in Table 1.

The growth in median earnings would be the percentage change between the median values in 2016 and 2017, equalling 5.6%, while the median growth in earnings would be 1.1%. It is the former measure that is used in the ASHE bulletin.

Table 1: A theoretical example of five employee jobs in 2016 and 2017

	Employee 1	Employee 2	Employee 3	Employee 4	Employee 5	Employee 6	Employee 7	Median	UK
Gross Weekly Pay in 2016 (£)	400	440	450†	475	490	-	-	450	
Gross Weekly Pay in 2017 (£)	412	-	455	475†	-	486	498	475	
Change between 2016 and 2017 (%)	3.0	N/A	1.0†	0.0	N/A	N/A	N/A	5.6	

Source: Office for National Statistics

Notes:

1. † indicates the median.

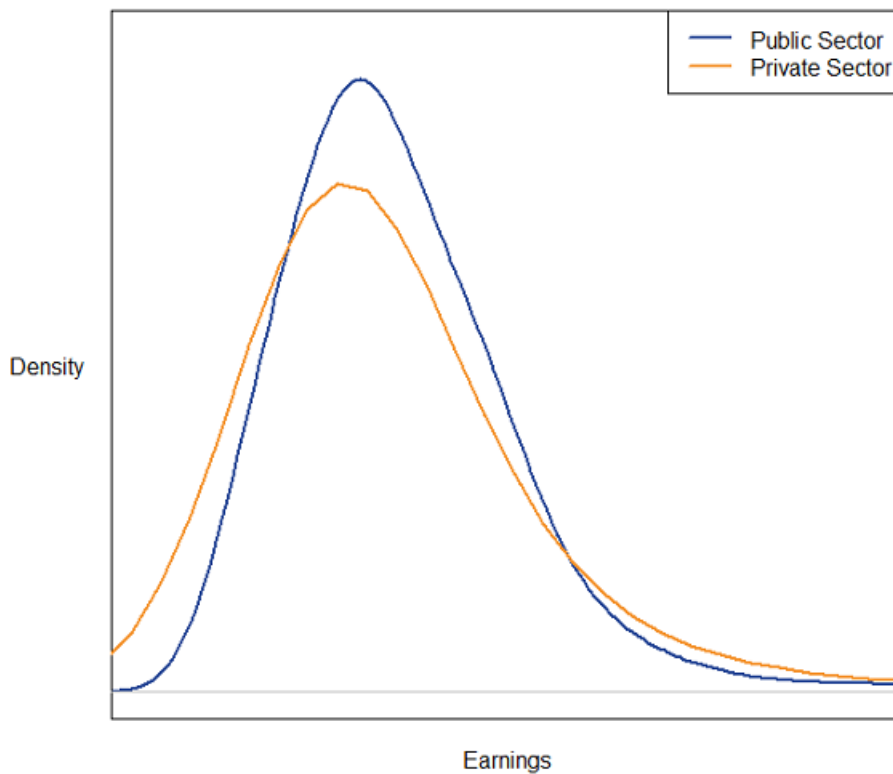
2. This is a fictitious example designed to illustrate a concept and is not considered real data.

An article titled [Understanding average earnings for the continuously employed](#), published in 2016 on our website, gives further guidance on how to interpret these statistics.

6 . Why is median public sector pay above median private sector pay?

The public and private sectors have workforces that are composed quite differently, with private sector earnings typically more variable than public sector earnings. This can be seen in Figure 1, with public sector earnings more concentrated (a higher density peak) around a certain point along the distribution of earnings than the private sector, which contains more very low and very high-paid employees. Consequently, differences in average weekly earnings do not reveal differences in rates of pay for comparable jobs.

Figure 1: An illustrative distribution of public and private sector earnings, UK, April 2017



7 . How does ASHE measure the gender pay gap?

While there is no single measure that fully deals with the complex issue of the differences between men's and women's pay, in the Annual Survey of Hours and Earnings (ASHE) bulletins we use median hourly earnings (excluding overtime). Including overtime can skew the results because men work relatively more overtime than women, and using hourly earnings better accounts for the fact that men work, on average, more hours per week than women. The median is less affected by a relatively small number of very high earners than the mean, and therefore gives a better indication of typical pay. A paper further [explaining our position on this topic](#) is available.

It should be noted that the ASHE gender pay gap figures do not show differences in rates of pay for comparable jobs, as they are affected by factors such as the proportion of men and women in different occupations. For example, a higher proportion of women work in occupations such as administration and caring, which tend to offer lower salaries.

8 . How is the gender pay gap calculated?

The gender pay gap is calculated as the difference between average hourly earnings (excluding overtime) of men and women as a proportion of average hourly earnings (excluding overtime) of men's earnings. For example, a 4% gender pay gap denotes that women earn 4% less, on average, than men. Conversely, a negative 4% gender pay gap denotes that women earn 4% more, on average, than men.

9 . How can the gender pay gap for all employees be higher than the gender pay gap for full-time employees?

The gender pay gap estimate is calculated as a differential proportion of two median estimates, the middle points of the data, one for female and one for males. The composition of the male and female employee workforces are quite different, with more women working part-time than men (42% compared with 12% respectively – source: Labour Force Survey, Quarter 2 (April to June) 2017, Table EMP04). Because the hourly earnings of part-time employees tend to be less, on average, than the earnings of full-time employees, this means women are more likely to receive lower hourly rates of pay. It's this fact that helps explain why the gender pay gap for all full-time and part-time employees is greater than the gender pay gap for full-time employees only.

Consider the following fictitious example (shown in Table 2) representing the male and female samples collected on the Annual Survey of Hours and Earnings (ASHE).

The male sample contains more full-time employees, while the female sample contains more part-time employees. When considering the full-time employees only, the majority of the male sample is used, whilst typically only the higher earners of the female sample are considered. Due to this, when taking the medians, that is, the middle point of the selected sample, the gender pay gap is relatively small.

When all employees are considered, the typically lower-paid part-time workers are included, of which there are more lower-paid female workers than male. As a consequence, this causes the gap to increase (usually as a result of the female median decreasing).

Table 2: A fictitious example of the ASHE sample representing the hourly earnings (excluding overtime) for men and women by work pattern

Men		Women	
Work Pattern	Hourly Earnings (£)	Work Pattern	Hourly Earnings (£)
Part-time	7	Part-time	7
Full-time	9	Part-time	8
Full-time	12	Full-time	10
Part-time	12	Part-time	13
Full-time	21	Part-time	16
Full-time	22	Full-time	16
Full-time	25	Part-time	20
Part-time	30	Full-time	20
Full-time	40	Full-time	25
Full-time	45	Full-time	30

Source: Office for National Statistics

Notes:

1. This is a fictitious example designed to illustrate a concept and is not considered real data

Table 3: The calculated gender pay gap for the fictitious ASHE sample shown in Table 2

	Male Median (£)	Female Median (£)	Gender Pay Gap (%)
Full-Time	22	20	9
Part-Time	12	13	-8
All employees	22	16	27

Source: Office for National Statistics

Notes:

1. This is a fictitious example designed to illustrate a concept and is not considered real data.

10 . What do the different components of pay mean?

The Annual Survey of Hours and Earnings (ASHE) collects detailed information about the earnings of employee jobs; this includes the various components comprising an employee's earnings before tax and National Insurance deductions. The definitions of these components are as follows:

- basic pay is the amount paid to an employee before any extras are added or taken off, such as reductions because of salary sacrifice schemes or an increase due to overtime or a bonus
- overtime pay is the amount paid to an employee as a result of working overtime hours
- incentive pay is the amount paid to an employee as a result of meeting a performance or productivity objective, including profit sharing, bonus, piecework and commission payments
- shift premium pay is the extra amount paid to an employee as a result of working a non-regular shift, such as a weekend or night shift
- other pay is the amount received by the employee for the work they carry out which is not included in any of the other components, such as car or on-call allowances

11 . How does ASHE compare with other measures of hours and earnings?

The Average Weekly Earnings (AWE) statistic, based on the Monthly Wages and Salaries Survey of about 9,000 employers, is the lead measure of short-term changes in average earnings in Great Britain. Figures are available with industrial breakdowns and public and private sector splits. No information is available on occupation, hours worked, and other characteristics of the workforce. [An article comparing AWE with the Annual Survey of Hours and Earnings \(ASHE\)](#) was published on the ONS website in September 2017.

The Labour Force Survey (LFS) collects information on the earnings and normal and actual hours worked of about 15,000 people aged 16 and over each quarter. In addition it collects data on a wide range of personal characteristics, including education level and ethnic origin. This enables the preparation of statistics on levels and distribution of earnings similar to the ASHE but with lower precision due to the much smaller sample size. The LFS collects information from employees, relying on respondent memory of pay amounts. This is different from both ASHE and AWE, which collect their pay information from companies.