Office for National Statistics

Compendium

Distribution of earnings in the UK: 2017

Distribution of earnings analysis using Annual Survey of Hours and Earnings (ASHE) provisional 2017 data and previous ASHE datasets, with a focus on earnings growth for those in employment between two consecutive years.

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Table of contents

1 . Main points

- In 2017, there was a continuation of the trend for a growing concentration of pay at the lower end of the UK' s earnings distribution, clustered around the National Living Wage (NLW) of £7.50 per hour.
- The 2017 earnings distribution was positively skewed and centred around the NLW, with a steadily-falling share of employees earning higher wages.
- In 2017, of all employees, 31.6% experienced less than or equal to 1.0% nominal earnings growth, partially reflecting the wage restraint for public sector employees.
- Fewer employees experienced a pay decrease in real terms in the year to April 2016 compared with 2011 and 2017.

2 . Introduction

In recent years, the UK has experienced falling unemployment and a tightening of the labour market. Unusually, this has been accompanied by weak earnings growth. To understand changes in earnings in the context of inflation, this analysis focusses on data adjusted using the Consumer Prices Index including owner occupiers' housing costs (CPIH). This gives a measure of the “real” value of earnings, with a decrease meaning that earnings growth is below inflation. The results from the Annual Survey of Hours and Earnings (ASHE) suggest that nominal median gross weekly earnings for full-time employees grew only 2.2% in 2017 . Although this was a joint highest nominal growth since the economic downturn of 2008, it represented a fall in real earnings of 0.4%. This is the first time since 2014 that there has been a fall in real earnings.

While this article focuses on the 2017 provisional data, the most recent ASHE data (containing revised 2017 data) were published on 25 October 2018 in Employee earnings in the UK: 2018. The fall in real earnings for 2017 was revised to 0.5%.

An analysis of the variation in the levels of earnings provides useful insight into distributional outcomes in the UK. It yields information about how much more or less one group earns relative to another. Additionally, the ASHE datasets can be used to examine the typical experience of earnings growth through time. Analysis of this sort can be used to address questions about the degree of inflationary pressure and the extent of spare capacity remaining in the UK labour market, which in turn may help economists understand wage pressures. By necessity, this work focuses on employees who reported being in employment in consecutive periods – which permits the calculation of earnings growth rates.

Throughout the analysis on earning growth rates, changes to the National Living Wage (NLW) and National Minimum Wage (NMW) are referred to. Wage stickiness (0.0% nominal growth) and the public sector wage restraint are also referred to throughout in the context of each characteristic discussed.

3 . Definitions

The analysis in this article uses hourly pay as the variable of interest. This variable includes basic pay, incentive pay, shift premiums and overtime pay for all hours worked. It reflects the actual gross earnings of UK employees, independent of the number of hours worked and enables full comparisons between groups in each time period to be made. Pensions and benefits in kind are excluded from this analysis for consistency with the previous release using 2016 provisional data.

The main statistical bulletin of UK employee earnings based on the Annual Survey of Hours and Earnings uses a standard filter (that is, employees on adult rates of pay whose earnings have not been affected by absence) that has not been applied here. This is due to hourly pay being less affected by loss of pay during the period than weekly pay.

All employees aged 16 years and over – with no upper age limit – are included in the analysis.

This analysis highlights the National Living Wage (NLW), which increased on the year by 4.2% in nominal terms and 1.5% in real terms on 1 April 2017 from £7.20 to £7.50, and applies to all those aged 25 years and over. The increases in the National Minimum Wage (NMW) on 1 April 2017 are also referenced. These were:

- to £7.05 for those aged 21 to 24 years
- to £5.60 for those aged 18 to 20 years
- to £4.05 for those aged under 18 years
- to £3.50 for apprentices aged under 19 years or in the first year of their apprenticeship

Growth analysis captures changes to the April of each year, particularly emphasising growth in the year to April 2011, April 2016, and April 2017. Between April 2015 and April 2016, the NLW was introduced and applied to many employees previously paid the NMW. This resulted in an increase in nominal terms of 10.8% and in real terms of 10.0%. Between April 2010 and April 2011, the NMW increased in nominal terms by 2.2%, but in real terms it fell by 1.5%.

Unlike previous nominal analysis, this analysis is based on real earnings data. The inflation rates applied are the average 12-month growth rate for April due to the ASHE data collection occurring in April. For 2017, the 12-month growth rate is 2.6%. Inflation data are available. For the distributional figures, all data are presented in constant prices (2017 prices), to compare earnings after inflation.

The statistics on the distribution of growth rates illustrate the distribution of hourly earnings growth across years. For example, April 2011 corresponds to employees in employment at the time of the survey in both 2010 and 2011, and April 2017 corresponds to employees in employment at the time of the survey in both 2016 and 2017.

For consistency over time, employees of those banks classified to the public sector in 2008 have been treated as if they were in the private sector throughout.

Caution should be taken when drawing any conclusion from comparisons across the time series because ASHE was the subject of a discontinuity in 2011 when new occupation codes were introduced.

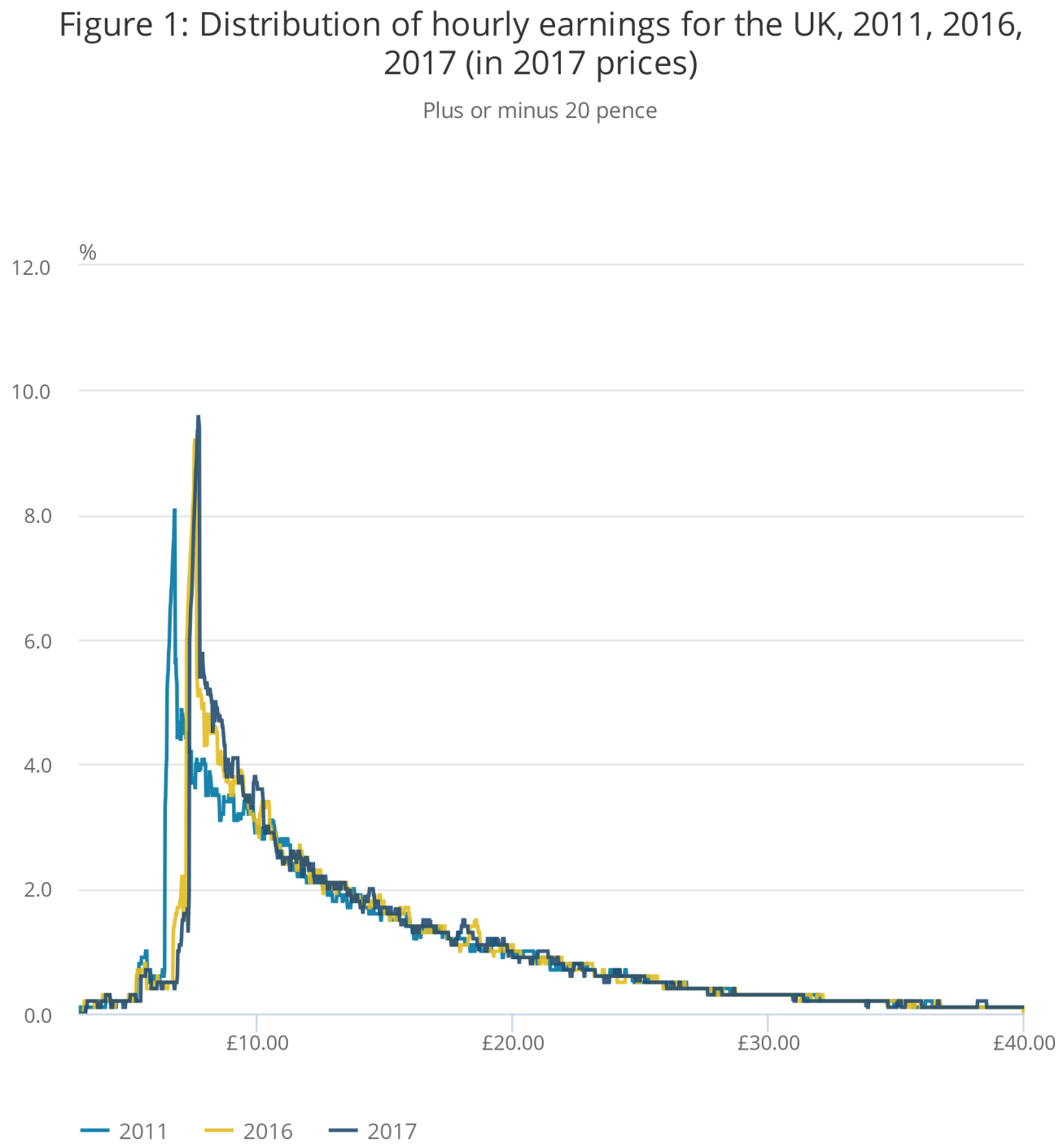
4 . UK earnings

Distribution

Figure 1 shows the distributions of hourly earnings in 2017 prices for all employees in 2011, 2016 and 2017. The distribution chart shows the density in percentage terms (y-axis) of jobs receiving within 20 pence of the hourly earnings (x-axis).

Figure 1: Distribution of hourly earnings for the UK, 2011, 2016, 2017 (in 2017 prices)

Plus or minus 20 pence



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

Notes:

1. 2017 data are provisional.

2. Each point on the x-axis represents a rolling sum of the density of jobs receiving greater than or equal to 20 pence below, and strictly less than 20 pence above, the stated hourly earnings.

3. As the density records the rolling sum of jobs paid within 20 pence of the stated amount at each point on the x-axis, jobs paid the April 2017 adult National Living Wage (£7.50) will appear between the x-axis values of £7.30 and £7.70.

4. The 2017 NLW refers to the April 2017 Adult National Living Wage of £7.50.

In 2011, the earnings distribution was positively skewed and centred around the April 2011 National Minimum Wage (NMW) rate of £6.56 an hour in 2017 prices (or £5.93 an hour in 2011 prices). The long, thinning right-hand tail of each distribution indicates the steadily falling share of employees earning higher wages. The left-hand tail suggests relatively few jobs were paid less than the NMW, and includes employees aged under 25 years and paid according to alternative NMWs.

By 2016, the spike of the distribution had shifted and was more defined around the 2016 National Living Wage (NLW) rate of £7.39 an hour in 2017 prices (or £7.20 in 2016 prices). Above this level of pay the density of the distribution was less affected but it shifted slightly to the right.

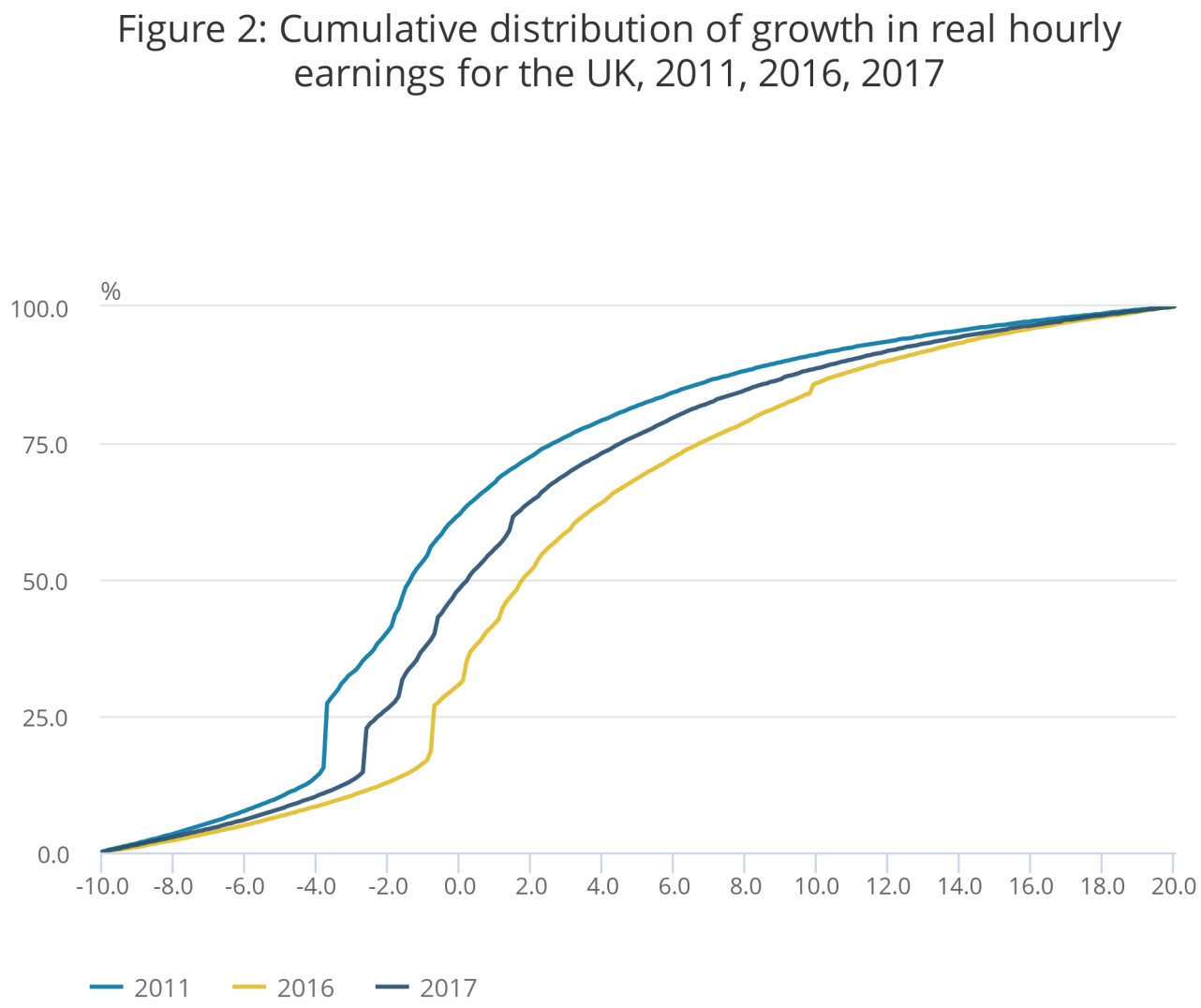
The 2017 earnings distribution mirrored that seen in 2016, with the spike centred again around the NLW rate of £7.50 an hour in 2017 prices. This was the NLW required to be paid for those employees who were aged 25 years and over, although there was a higher share of employees paid at this rate. Above this level of pay, the density again shifted slightly to the right.

Examining the distribution of earnings in this manner exposes several characteristics of the UK’s recent experience. The growing concentration of employees experiencing pay at the lower end of the UK’s earnings distribution can be observed, along with the increasing proportion of those earning the NLW. This growing concentration has implications for living standards. While in 2011 the modal rate of hourly pay was £6.76 in 2017 prices (or £6.11 in 2011 prices) and covered 8.1% of all jobs within its plus or minus 20 pence range, in 2017 the modal rate of hourly pay was £7.68 and covered 9.6% of all jobs within its plus or minus 20 pence range. Both modal rates of pay lie within range of the NLW.

Growth

Analysis of the growth of earnings provides further insight into the distributional outcomes for employees. Figure 2 presents the distributions of growth in real hourly earnings as a cumulative percentage frequency chart in 2011, 2016 and 2017.

Figure 2: Cumulative distribution of growth in real hourly earnings for the UK, 2011, 2016, 2017



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

Notes:

1. 2017 data are provisional.

2. For each growth rate on the horizontal axis, the curve indicates the proportion of employees who experienced earnings growth at that rate.

3. This figure uses individual level data from the Annual Survey of Hours and Earnings (ASHE) to calculate the growth of nominal weekly earnings for employees observed in pairs of years in 2010 and 2011, 2015 and 2016, and 2016 and 2017. Note that the ASHE methodology is not specifically designed to model earnings growth for employees over time.

4. This figure only looks at employees whose pay growth between 2016 and 2017 fell between negative 10% and positive 20%. As such, the proportion of employees on the y-axis should not be interpreted as the entire population of employees.

Figure 2 suggests fewer employees experienced a pay decrease or freeze in real terms in the year to April 2016 compared with 2011 and 2017. The year 2011 saw the fewest number of employees who experienced positive pay growth in real terms. The growth in earnings improved in 2016, represented by the curve shifting rightwards, and it worsened in 2017 with the curve shifting leftwards.

Figure 2 highlights wage stickiness (0.0% nominal growth) represented by spikes in the proportions of employees experiencing real growth of around negative 3.7% in 2011, negative 0.7% in 2016 and negative 2.5% in 2017. This is particularly prominent in 2011 with 27.3% of employees experiencing pay growth of less than or equal to negative 3.7%, as many public sector employees experienced the pay freeze announced in the 2010 Budget. Earnings growth in 2016 and 2017 responded weakly to changes in macroeconomic indicators such as the inflation rate.

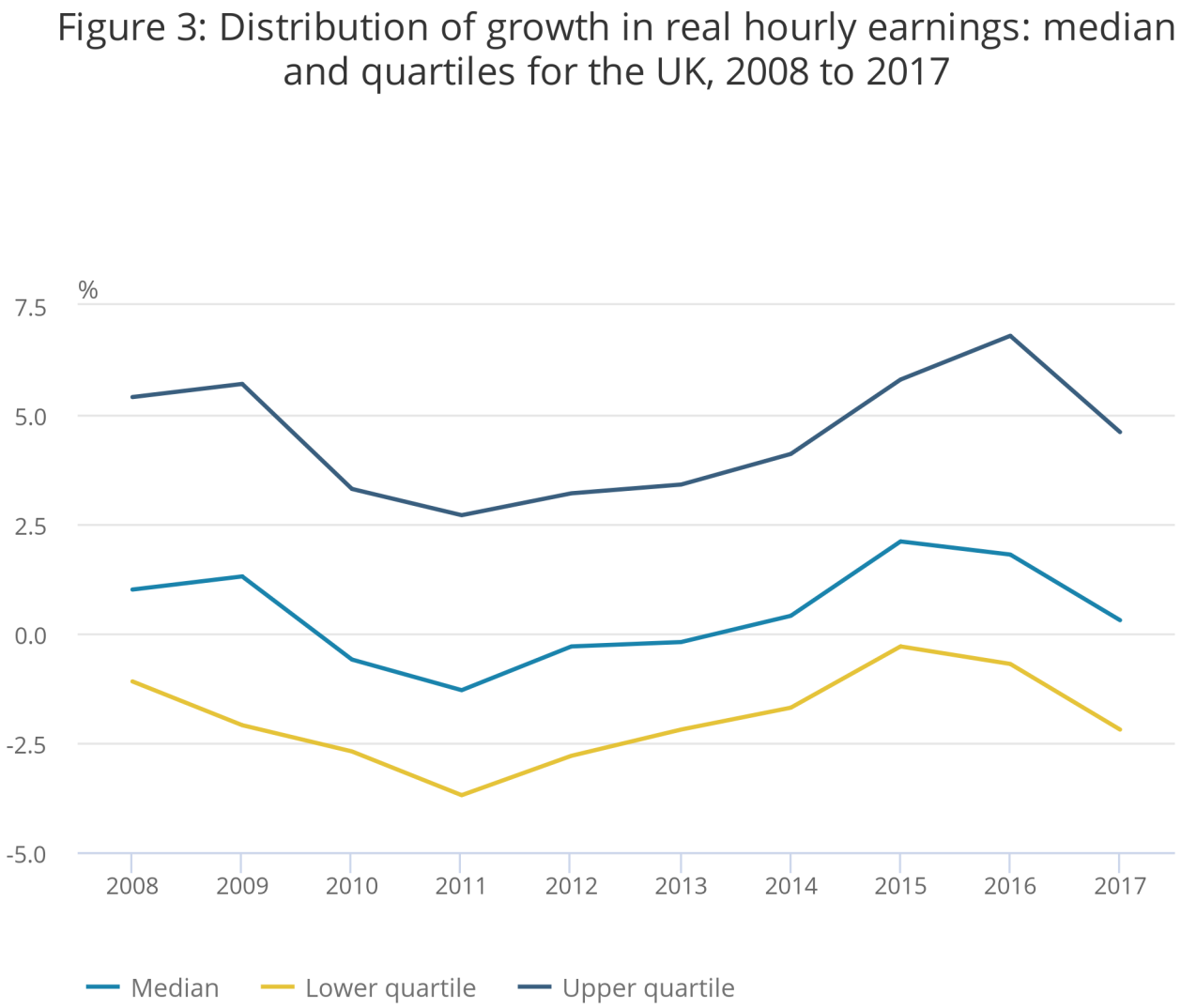
Pay growth of less than or equal to 1.0% in nominal terms partially reflects the wage restraint for public sector employees (excluding police and prison officers for whom the cap was lifted in September 2017), whose pay growth was capped at 1.0% from 2013 onwards. Figure 2 shows that in 2016, there were 36.7% of employees, and in 2017 there were 31.6% of employees experiencing less than or equal to 1.0% nominal earnings growth.

In 2017, the median real wage growth rate was 0.2%. Note this is different from the real growth rate for the median earner of negative 0.4% in 2017, representing the middle employee’s (ordered by earnings) earnings growth. The median real wage growth rate refers to the middle growth rate once ordered. This difference is partially due to sample differences and the distribution of growth rates not following the distribution of earnings.

The 2017 median real wage growth rate was higher than for 2011 and lower than for 2016.

The median, upper and lower quartile real wage growth rates over time are shown in Figure 3.

Figure 3: Distribution of growth in real hourly earnings: median and quartiles for the UK, 2008 to 2017



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

Notes:

1. 2017 data are provisional.
2. Each line on the figure indicates the lower quartile, median and upper quartile growth rates over time.
3. This figure uses individual level data from ASHE to calculate the growth of nominal weekly earnings for employees observed in pairs of years. For example, in 2010 and 2011, 2011 and 2012, 2016 and 2017. Note that the ASHE methodology is not specifically designed to model earnings growth for employees over time.

Figure 3 shows that the lower and upper quartile real wage growth rates follow a similar trend to that of the median real wage growth rate. Real wage growth rates followed a decreasing trend throughout the economic downturn and until 2011, before increasing until 2015 (except the upper quartile, whose real wage growth rate increased until 2016). More recently, the real wage growth rates have followed a decreasing trend again.

The lower quartile real wage growth rate for all years was negative, where each year's earnings decreased on the year prior. The 25th percentile real wage growth rate was lowest at negative 3.7% in 2011, during stagnation in the economic downturn. The lowest annual decline of the lower quartile real wage growth rate was in 2015, at 0.3%.

Fluctuating between negative 2.0% and positive 2.1% growth, the median real wage growth rate follows a similar trend to the lower quartile real wage growth rate, though was only negative between 2010 and 2013. In 2017, the median real wage growth rate was 0.3%.

The upper quartile real wage growth rate is the most volatile of the growth rates presented, fluctuating between its trough of 2.7% in 2011 and its peak of 6.8% in 2016. For the upper quartile, the 2017 real wage growth rate of 4.6% was a decrease on the 2016 upper quartile real wage growth rate of 6.8%.

5 . Background information

The 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. Information on earnings and hours is obtained from employers and treated confidentially. ASHE does not cover the self-employed or employees not paid during the reference period. The information for 2017 pay period included 26 April 2016.

This article contains analysis of the provisional results from the 2017 survey and revised results from the series up to 2016. More detailed information is available.

We calculate our headline measure of "real" wage growth using the Consumer Prices Index including owner occupiers' housing costs (CPIH) to remove the effects of inflation. CPIH is our lead measure of inflation, which gives the best estimate of the changing costs of living as it measures the full range of price changes that affect households, including Council Tax and the costs associated with owning a home, which are a substantial proportion of household expenditure.

While the Consumer Prices Index (CPI) is a good, internationally comparable, measure of inflation, which is used by the Bank of England to target inflation, it does not contain either Council Tax nor an estimate of owner occupier housing costs. It is therefore not as comprehensive a measure of consumer inflation as CPIH. As such, this analysis calculates changes in real wages using CPIH.

6 . Quality and methodology

The Annual Survey of Hours and Earnings, Low Pay and Annual Survey of Hours and Earnings Pension Results Quality and Methodology Information report updated for the 2018 data contains important information on:

- the strengths and limitations of the data and how it compares with related data
- users and uses of the data
- how the output was created
- the quality of the output including the accuracy of the data

More specific information about our low pay methodology is also available.

Relevance

The earnings information presented relates to gross pay before tax, National Insurance or other deductions, and excludes payments in kind. 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.

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.

Accuracy

Revisions

In line with normal practice this release contains revised estimates from the 2016 survey results, which were published on 26 October 2016. These results take account of some corrections to the original 2016 data that were identified during the validation of the results for 2017, as well as late returns. Both the 2017 Annual Survey of Hours and Earnings (ASHE) provisional results and the revised estimates for 2016 were made available from 26 October 2017.

Sampling error

ASHE aims to provide high quality statistics on the structure of earnings for various industrial, geographical, occupational and age-related breakdowns. However, the quality of these statistics varies depending on various sources of error.

Sampling error results from differences between a target population and a sample of that population. Sampling error varies partly according to the sample size for any particular breakdown or “domain”. Indications of the quality of ASHE estimates are provided in the form of coefficients of variation (CV). The coefficient of variation is the ratio of the standard error (SE) of an estimate to the estimate, expressed as a percentage. Generally, if all other factors are constant, the smaller the CV the higher the quality of the estimate. Tables of CVs corresponding to estimates are published alongside the estimates themselves.

It should be noted that at low levels of disaggregation high coefficients of variation imply estimates of low quality. For example, for an estimate of £400 with a CV of 10%, the true value is likely to lie between £321.60 and £478.40. This range is given by the estimate plus or minus 1.96*SE. Where these ranges for different estimates overlap, interpretation of differences between the relevant domains becomes more difficult.

Non-sampling error

ASHE statistics are also subject to non-sampling errors. For example, there are known differences between the coverage of the ASHE sample and the target population (that is, all employee jobs). Jobs that are not registered on Pay As You Earn (PAYE) schemes are not surveyed. These jobs are known to be different to the PAYE population in the sense that they typically have low levels of pay. Consequently, ASHE estimates of average pay are likely to be biased upwards with respect to the actual average pay of the employee population. Non-response bias may also affect ASHE estimates. This may happen if the jobs for which respondents do not provide information are different to the jobs for which respondents do provide information. For ASHE, this is likely to be a downward bias on earnings estimates since non-response is known to affect high-paying occupations more than low-paying occupations.

Finally, ASHE results tables do not account for differences in the composition of different “slices” of the employee workforce. For example, figures for the public and private sectors include all jobs in those sectors and are not adjusted to account for differences in the age, qualifications or seniority of the employees or the nature of their jobs, all factors that may affect how much employees earn.

Further information about the quality of ASHE, including a more detailed discussion of coverage and non-response errors, is available.

ASHE coverage change in 2014

The rules covering which employments employers were required to report via PAYE changed in April 2013, effectively extending the coverage of the ASHE sample to include employments that were not covered under the previous rules. The new reporting system is known as “Real Time Information” (or RTI).

Analysis on 2014 results showed that the composition of the ASHE sample was not substantially distorted as a consequence of the move to RTI. This is because the majority of the RTI-type jobs were already being reported through PAYE by employers in previous years. Consequently, we judge that the impact of the move to RTI on the estimates for ASHE is negligible.

7 . Authors

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