How common is low pay in Britain and is it declining? New findings from linked data

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This Data Insight examines the incidence of low pay in Britain over the period 2004-2021 using two indicators that are the focus of government policy. The analyses use data developed as part of the Wage and Employment Dynamics project¹, funded by ADR England. We use the data to identify and adjust for biases in estimates of the incidence of low pay. We show that the incidence of minimum wage employment is underestimated. We also show that the incidence of low pay has been falling faster than previously thought.

Summary

Identifying the incidence of low pay, and understanding how and why it changes over time, are vital components in decision making over the future level of the minimum wage and broader decisions about how best to support living standards. The Annual Survey of Hours and Earnings (ASHE) is the main source of information on the incidence of low pay.⁵ Completing the survey is a statutory requirement under the Statistics of Trade Act 1974, but some employers do not respond.⁶

Background

Policymakers and others are concerned about the welfare of low earners towards the bottom of the earnings distribution who are struggling to make ends meet. The government has tried to tackle low earnings through the National Minimum Wage (NMW) – first introduced in 1999 – and the National Living Wage (NLW) which came into force in 2016 to replace the NMW for employees aged 25 and over.² Recognising the difficulties workers face in achieving wage growth, government has set a target to ensure that the minimum wage a 25-year-old can earn by 2024 is two-thirds of median hourly earnings.³ In seeking to meet this target, the government has been progressively raising the level of the NLW relative to median earnings since its introduction.⁴

When exploring the incidence of low pay and examining the impact of minimum wages, analysts tend to use the Annual Survey of Hours and Earnings (ASHE), conducted by the Office for National Statistics. ASHE is based on a one per cent sample of employee jobs. Employees are selected into the sample by virtue of the last two digits of their National Insurance number, although the survey itself is completed by their employer.
ONS generates weights for each annual ASHE dataset which make the achieved sample representative of the population of employee jobs in Britain in terms of gender, age, occupation and region. We linked data from ASHE to the Business Structure Database – a research-ready version of the ONS business register – in order to investigate whether certain types of organisations remain under or over-represented in the achieved ASHE sample, even after applying the original ASHE weights.

We found that jobs in smaller organisations, younger organisations and those in the private sector were under-represented in the annual weighted samples from ASHE, relative to their prevalence in the wider economy. We constructed new weights to remove these biases and used these to re-estimate the incidence of low pay among employees aged 25 or more.

We also used the employee identifiers in ASHE to link records over time and examined rates of attrition in the survey from year-to-year. We found that younger employees, those on low wages and those working relatively few hours were less likely to remain in the ASHE sample over time, even after accounting for their likelihood of leaving employment – which we estimated from Annual Population Survey. We constructed weights to remove this attrition bias and used these to examine the extent to which employees move between low and higher pay from year-to-year.

The percentage of jobs paid at or below the NMW has been rising over time, but we found that this percentage is under-estimated by around one fifth if one does not take account of the response biases that we identified in ASHE. In contrast, the percentage of employees on low pay (defined as two-thirds median earnings) has been falling over time, but the rate of decline is faster once response biases are accounted for.

The fall in low pay is assumed by many to be a direct result of the rise in the wage floor but, in our new estimates, the share of low paid jobs begins to fall before the substantial increase in the NMW in 2015. We found that the main driver of the decline in low pay has been an increase in the share of employees who transition to higher pay in a given year. We did not find that estimates of transitions are subject to notable attrition biases.

What we did

The work reported here involved investigation and correction of observable patterns of non-response in the achieved ASHE sample.

To explore which employers respond to ASHE in a given year (i.e. cross-sectional non-response), we first took the population of enterprises recorded in the Business Structure Database in each year.
The Business Structure Database is an annual snapshot of the Inter-Departmental Business Register – the UK’s official register of businesses. We linked these enterprises to those responding to ASHE using the Enterprise Reference Number, which is present on both datasets. We used the linked dataset to identify which types of employers were more or less likely to respond to ASHE.9

We found that jobs in smaller organisations, younger organisations and those in the private sector were under-represented in the annual weighted samples from ASHE, relative to their prevalence in the wider economy. We constructed a new set of weights to remove this bias. The new weights are based on the standard ASHE weights but include an adjustment to boost the representation of jobs in smaller, younger and private sector organisations.10 As an illustration, the share of employee jobs in public sector organisations stands at 22 per cent in the 2019 ASHE using the standard weights, whereas the equivalent figure in the 2019 Business Structure Database is 16 per cent.11 Using our new weights, the share is 17 per cent.

To explore whether attrition over time was affecting the representativeness of ASHE when the dataset is used to follow employees from one year to the next, we used the unique personal identifier on ASHE to link observations across years. We then compared patterns of attrition in ASHE with patterns of employment exit seen in the Annual Population Survey.12 The Annual Population Survey provides a good reference point as it is the largest research-ready dataset capturing the annual labour market transitions of successive cross-sections of the British population.

The comparison showed that the share of employees exiting the ASHE sample from one year to the next (around 25 per cent, on average) is considerably higher than the share exiting employee status estimated from the Annual Population Survey (around 8 per cent, on average). Moreover, younger employees, those on low wages and those working relatively few hours are more likely to exit the ASHE sample than one would anticipate, based on employment transitions seen in the Annual Population Survey. The ONS do not provide a longitudinal weight with ASHE, but we constructed weights that correct for attrition present in longitudinal samples of ASHE employees observed in two successive years.13

We used the two new sets of weights to estimate the share of low paid jobs among employees aged 25 or more, and to estimate the extent to which employees transition between low and high pay from year-to-year.

What we found

The share of jobs paid at or below the National Minimum Wage

Using the standard, annual ASHE weights supplied by ONS, the share of jobs paid at or below the NMW among adults aged 25 or more rose from 2.4 per cent in 2004 to 4.1 per cent in 2015.14
The introduction of the NLW then pushed the incidence upwards, reaching 6.5 per cent in 2016 (Figure 1). There was a further spike in 2020, when many low-wage workers saw a decline in their pay due to the Coronavirus Job Retention Scheme which allowed employers to furlough employees on 80 per cent of their earnings.

Figure 1. Percentage of employees in Britain aged 25 and above with gross hourly earnings at or below the National Minimum Wage + 5 pence, under alternative weighting schemes by year (2004-2021)

Note: Dots identify the 95 per cent confidence interval around each point estimate.
Base: Main job held by employees aged 25 and above, where employee is paid on an adult rate and earnings are not affected by absence (except in the case of furlough).
Source: Annual Survey of Hours and Earnings

Applying our revised annual weights which account for the lower response rates from small, young and private sector organisations, the share of jobs paid at or below the NMW or NLW increases by around one fifth in each year. This takes the share up from 6.5 per cent to 7.8 per cent in 2016 and from 6.1 per cent to 7.7 per cent in 2021. The differences between the two sets of estimates are statistically significant from zero in every year of the series. The share of jobs paid at or below the NMW or NLW increases under the revised weighting scheme because wages in smaller, younger and private sector organisations tend to be lower than those in larger, older and public sector organisations.
The share of jobs that are low paid

Under the original ASHE weights the share of jobs that are low paid (paid below two-thirds median hourly earnings) is fairly stable from 2004-2014, standing at around 21 per cent (Figure 2). Thereafter the share begins to fall, reaching a low of 15.2 per cent by 2021. The share of low paid jobs falls because the bottom half of the hourly wage distribution becomes more compressed over this period: fewer jobs then fall below the low-pay threshold of two-thirds median earnings.

Figure 2. Percentage of employees aged 25 and above in Britain who are low paid, under alternative weighting schemes by year (2004-2021)

Note: Low pay defined as less than two-thirds median gross hourly earnings. Dots identify the 95 per cent confidence interval around each point estimate
Base: Main job held by employees aged 25 and above, where employee is paid on an adult rate and earnings are not affected by absence (except in the case of furlough).
Source: Annual Survey of Hours and Earnings

We saw in the previous section that the revised annual weights shift the wage distribution to the left. However, they also compress the bottom half of the wage distribution. This effect is very small in the first decade of our observation period, so the share of jobs that are low paid is very similar under both weighting schemes until around 2011 (Figure 2).
After that point, the revised weights compress the bottom half of the wage distribution to a greater degree, so the share of low paid jobs begins to fall at a faster rate, dropping from 21.1 per cent in 2011 to just 13.6 per cent in 2021. The revised estimate for 2021 is 1.6 percentage points lower than the estimate produced under the original ASHE weighting scheme.

This pattern of results is noteworthy for two reasons. The first reason is that the decline predates the introduction of the NLW in 2015. Others have asserted that the fall in the share of jobs that are low paid has been driven by the NLW.\textsuperscript{15} The introduction and subsequent uprating of the NLW since 2015 is certain to have played some part. But other factors appear to be at play, since we estimate that the decline begins around 3-4 years earlier, in around 2011-12. This is around the time that the bite of the National Minimum Wage (the precursor of the NLW) began to increase, but also when the economy began to grow again after the financial crisis. The second point of note is that the incidence of low pay is lower, and has fallen faster, than previous estimates have suggested. This is important because the extent of low paid employment is a key measure of job quality and labour market inequality.

The probability of escaping the National Minimum Wage

One might expect the increase in the level of the NMW or NLW to mean that it has become harder for those paid at the NMW or NLW to escape into higher paid work. To investigate this issue, we use a balanced panel of employees who appear in ASHE in adjacent years and estimate the share of minimum wage workers in each year who transition to a better paid job 12 months later. We generate estimates using the original ASHE weight and our attrition weight (see Figure 3).\textsuperscript{16}

The final two periods in our series (2019-20 and 2020-21) are unusual because the pay of many employees was affected by the Covid-19 pandemic. If we set these aside, the probability of escaping the NMW or NLW exhibits a downward trend from 2004-5 to 2011-12, then recovers slightly over the subsequent 6-7 years. The exception is 2015-16, when there is a sharp drop at the time of the introduction of the NLW.\textsuperscript{17} The choice of weight makes little difference to the estimates, indicating that there are no substantial attrition biases.

The small improvement in the probability of moving off the NMW or NLW to a better-paid job after 2011-12 did not lead to a fall in the share of employees on the NMW or NLW (Figure 1) because, over the same period, as the wage floor rose, there was also an increase in the share of employees who moved from better-paid work onto the NMW or NLW.\textsuperscript{18}
Figure 3. Percentage of employees aged 25 and above escaping pay at the NMW + 5 pence across one year, under alternative weighting schemes by year (2004/5-2020/21)

Base: Balanced panel of main jobs held by employees aged 25 and above, where employee is paid on an adult rate and earnings are not affected by absence (except in the case of furlough) in either year. 
Source: Annual Survey of Hours and Earnings

The probability of escaping low pay

Finally, we examine the probability of escaping low pay altogether (Figure 4). Here we find some deviation between the two series. Focusing on the estimates produced with the attrition weight, we see a decline from 2004-5 through to 2012-13 in the probability of escaping low pay, but this decline is shallower than that seen in the probability of escaping the NMW or NLW. Since 2012-13, the probability of escape has been increasing rapidly. In 2012, an employee on low pay had roughly a one-in-six chance of escaping into higher-paid work 12 months later. By 2018, the chance was roughly one-in-three.

The probability of moving from higher-pay to low pay was quite stable over the period 2004-2012. The increase in the share of low paid employees moving into higher-pay was therefore the main driver of the fall in the overall share of employees on low pay seen in Figure 2.
Figure 4. Percentage of employees aged 25 and above escaping low pay across one year, under alternative weighting schemes by year (2004/5-2020/21)

Base: Balanced panel of main jobs held by employees aged 25 and above in Britain, where employee is paid on an adult rate and earnings are not affected by absence (except in the case of furlough) in either year.

Source: Annual Survey of Hours and Earnings

Why it matters

The findings indicate that there are observable response biases in existing estimates produced from the UK’s official source of earnings statistics (ASHE). By linking ASHE to the Business Structure Database we have been able to show that the ASHE dataset for Britain under-represents jobs in smaller, younger and private sector organisations. By generating adjusted weights which remove this under-representation, we have shown that the response biases have a substantive impact on our view of the bottom end of the wage distribution.

This is relevant to a key area of government labour market policy, since estimates of the shares of jobs paid at or below the NMW or NLW and the incidence of low pay are key indicators for the Low Pay Commission when it advises the government on the operation and future uprating of the NMW or NLW.
We are making our work available to the Low Pay Commission, and our code is being made available to all researchers via the ONS Secure Research Service. This will enable government analysts and others to examine the construction of our new weights and to explore the sensitivity of any estimates to the choice of weighting scheme.

**What next?**

The project is now moving on to investigate the factors that improve one’s chances of escaping the NMW or low pay. We are particularly interested to understand the extent to which one’s chances of moving off low pay are determined by one’s personal characteristics (e.g. age), job characteristics (e.g. choice of occupation) or employer characteristics (e.g. size of business). And we are interested to understand how the relative importance of these factors vary over time, particularly with changes in economic conditions.

The project is also now linking ASHE to data from HMRC’s Real Time Information (RTI) system. The RTI data can tell us whether a person sampled for ASHE is in employment at any given point in the year. The link between ASHE and the RTI data will therefore enable us to evaluate the representativeness of the cross-sectional and longitudinal ASHE samples in a different (and in some respects, more complete) manner than has been possible to date. It will be a particular advantage in validating the representativeness of the longitudinal sample.

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This work was produced using statistical data owned by ONS and accessed through the ONS Secure Research Service. The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analyses of the statistical data. The work uses research datasets which may not exactly reproduce National Statistics aggregates.
References

1. Source: http://www.wagedynamics.com/

2. In 2021 the age threshold for the NLW was reduced to age 23. It is set to fall to age 21 in April 2024.


6. The issued sample for ASHE in Britain comprises around 250,000 jobs but the achieved sample typically stands at around 170,000 jobs, implying a response rate of around two-thirds. Response rates have been lower during the Covid-19 pandemic. We focus solely on Britain, as ASHE responses from Northern Ireland are held in a separate dataset.


9. ASHE is a based on a 1 per cent sample of employee jobs, so the probability that an employer will be sampled for ASHE increases the more employees they have. Our analysis of the probability of responding to ASHE takes account of the expected probability of selection, based on the number of employees at the enterprise.


11. The Office for National Statistics’ Public Sector Employment estimates also give a figure of 16 per cent for Britain in 2019. See Table 6 and Table 7 in ONS (2023) Public Sector Employment UK: September 2022, London: Office for National Statistics.

12. An ASHE employee will justifiably exit the achieved sample from year-to-year if they exit employment. If they remain an employee, they should appear in the sample, unless their employer does not respond to the survey.


14. Estimates are generated using the cross-sectional low pay weight supplied with the ASHE data and a measure of gross hourly earnings which includes basic pay, bonus or incentive pay and pay received for other reasons, but excludes overtime and shift premium pay. We follow the Low Pay Commission in measuring the employee’s wage against the NMW or NLW rate that applied in April of the relevant year, even if (from 2016 onwards) the NLW may have been uprated part-way through the pay period reported in ASHE. Our estimates are not directly comparable to those published by the Low Pay Commission, as we focus only on employed aged 25 and above.


16. Recall that the ONS do not supply a longitudinal weight with the ASHE data

17. The broad pattern has previously been observed by Cominetti N et al (2022) Low Pay Britain 2022, London: Resolution Foundation (page 63).

18. Figures available on request.
About ADR England

ADR England is a portfolio of data linking and research projects, delivered by a range of academic and government partners to provide policy-relevant insights using data held by UK Government departments and public bodies. The geographic scope of ADR England projects varies depending on the data holder, but is typically England-only, England and Wales, Great Britain or UK-wide. ADR England is part of ADR UK, an ESRC investment and part of UKRI.

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