

Calculating the proportion of employee jobs under the living wage - A methodology article

Key points

- The ONS publishes estimates of proportions of employee jobs paying less than the living wage; these estimates are based on micro data from its Annual Survey of Hours and Earnings (ASHE).
- The ONS has recently reviewed its methods for calculating these estimates and has recommended a single method for use in future.
- The recommended method is based on a consultation with key stakeholders to ensure that the choices reflect living wage definitions and entitlements.
- The recommended method is broadly consistent with the approach used for analysing the National Minimum Wage.
- The ONS will use this method to respond to requests for estimates of proportions of jobs below:
 - the London Living Wage,
 - the Out of London Living Wage, and
 - the National Living Wage announced in the Summer Budget 2015.
- All requests will continue to be produced using ASHE micro data because extrapolating from published tables produces unreliable estimates and results from such extrapolations would not be consistent with the recommended methodology.
- Estimates of numbers of jobs below the living wage (as well as proportions) can also be provided, with notes about their limitations.

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1. Background

The concept of a ‘living wage’ designed to cover the basic cost of living for UK employees is promoted by the Living Wage Foundation (LWF)¹ and, for the capital, by the Mayor of London². Their aim is to persuade employers to sign up voluntarily to paying a living wage to all employees aged 18 and over who are not apprentices, interns or trainees. There are separate living wage rates for London and the rest of the UK, known as the London Living Wage (LLW) and the Out of London Living Wage (OLLW) respectively.

In his Summer Budget of 8 July 2015, the Chancellor of the Exchequer announced a new National Living Wage (NLW). The NLW will be set in relation to median earnings rather than the cost of living, and is for employees aged 25 and over. Employers will be required to pay the NLW from April 2016. The Summer Budget 2015 document described it as a “new premium on top of the NMW” [National Minimum Wage]³. The NMW is a statutory requirement for employers and has been in place since 1999. For the NMW and for the new NLW, there are different wage rates for different groups defined by age and apprenticeship status, but for each group the same rate applies for the whole of the UK, including London.

2. Introduction

The Office for National Statistics (ONS) publishes estimates, on request, of proportions of employee jobs paying less than the hourly living wage. Users may request estimates in relation to any measure of the living wage. The LLW is calculated by the Greater London Authority (GLA) and is currently £9.15 per hour. The OLLW is calculated by the Centre for Research in Social Policy (CRSP) at Loughborough University and is currently £7.85 per hour. The government’s newly announced NLW is not yet in place, but it will be introduced at £7.20 in April 2016. It will be calculated in future by the Low Pay Commission (LPC), which is responsible for advising the government on the uprating of the NMW.

The ONS estimates of proportions of employee jobs paying less than the living wage are based on data from its Annual Survey of Hours and Earnings (ASHE)⁴, which is considered the best official data source for this purpose⁵. The estimates are calculated directly from the micro data because this is the only way to produce reliable figures. Extrapolating from published tables would produce unreliable estimates and their quality would be impossible to measure.

Several methods for calculating the proportions of employee jobs below the living wage are currently in use and this has caused some confusion. In the first half of 2015, the ONS examined the methods in use and consulted key stakeholders. It concluded that a single

¹ <http://www.livingwage.org.uk/>

² <https://www.london.gov.uk/priorities/business-economy/vision-and-strategy/focus-areas/london-living-wage>

³ Paragraph 1.121 of the Summer Budget 2015 document (pdf), available at <https://www.gov.uk/government/publications/summer-budget-2015>

⁴ ASHE is an ONS survey 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. The reference period for the survey is in April of each year.

⁵ The ONS publication ‘A Guide to Sources of Data on Earnings and Income’ (January 2015) explains why ASHE is the best source for this kind of analysis. This guide is available to download from www.ons.gov.uk/ons/guide-method/method-quality/specific/labour-market/articles-and-reports/index.html

method for calculating the proportion of jobs under the living wage should be used in future.

This article presents recommendations from this review and consultation process (Section 3) and compares the recommended approach with previous methods and with the NMW approach (Section 4). All comparisons in the article relate to the LLW and the OLLW because the government's newly announced NLW is not yet in place. However, the recommended approach should also be applicable to the NLW from April 2016. The article concludes with a note on what the ONS will provide in future (Section 5).

3. The review and its recommendations

The reference points for the review of methods were the two main methods currently employed by the ONS when using data from the ASHE to calculate the proportion of employee jobs below the living wage:

- The first method is used to produce the ASHE 'standard tables' and provides estimates of average pay as well as distributions of pay. It uses a measure of gross pay which excludes overtime pay but does not exclude shift premium pay.
- The second method is used to produce the ASHE 'low pay tables' and provides estimates of employee jobs below particular low pay thresholds, including the NMW. It uses a measure of gross pay which excludes shift premium pay as well as overtime pay, known as the 'derived hourly rate of pay'. Estimates of the proportion of employee jobs under the LLW in the Mayor of London's annual report⁶ use a variant of the 'low pay' method.

As part of its review of the methods currently in use, the ONS consulted a number of key stakeholders about their requirements. These included the LWF, the GLA Economics team, the CRSP at Loughborough University and the LPC.

The resulting recommendation was that in future the ONS's method for producing estimates of the proportion of jobs under the living wage should be based on the 'low pay' method. Specifically, it should:

1. Use the **measure of pay** known as the 'derived hourly rate of pay'
2. Exclude anyone not on **adult rates of pay**⁷
3. Apply to jobs of employees **aged 18 and over**
4. Be on a **workplace** basis
5. Relate to the living wage that was **in place at the time of the survey**

The advantage of this approach is that estimates of proportions of employee jobs paying less than the living wage will be broadly comparable with those produced for other low pay estimates, e.g. for the NMW (see section 4).

Table 1 shows what options were considered and explains the reasons for the chosen outcome for each of the five components of the recommended method.

⁶ The latest London Living Wage report is available at <http://www.london.gov.uk/priorities/business-economy/publications/gla-economics/living-wage-2014>

⁷ These are people identified by a 'yes' response to the question on the ASHE questionnaire: "Was the employee paid at a reduced rate in the pay period for reasons of apprenticeship, training or age?"

Table 1: Points covered by the consultation

Options considered	Outcome	Rationale for the choice
Measure of pay: gross ⁸ pay per hour excluding overtime (standard tables) OR ‘derived hourly rate of pay’ – as above but also excludes shift premium pay (low pay tables)	Derived hourly rate of pay	The derived hourly rate of pay measure is closest to the concept of ‘basic’ or ‘guaranteed’ pay. The living wage calculations only take into account guaranteed pay. Overtime and shift premium pay are not normally part of guaranteed pay packages.
Use of ‘adult rates of pay’ (ADR) filter or apprentices filter: Should the analysis exclude all employees not on adult rates of pay? Or should it exclude apprentices?	Use ADR filter to exclude employees not on adult rates of pay	Employers seeking living wage accreditation are not asked to pay the living wage to apprentices, interns and trainees because the value of training is taken into account. Including them would inflate the estimates of the proportion of jobs not paying the living wage by including employees who are not eligible to receive it. The apprentices filter does not remove interns and trainees (so some ineligible cases are included) and is not available before 2013. The ADR filter excludes some eligible cases, but is available for time series analysis (comparisons over time).
Age: 16 and over OR 18 and over	18 and over	The living wage applies to those aged 18 and over.
Should sub-national breakdowns be on a workplace basis (where people work) OR residence basis (where people live)?	Workplace basis	The wage paid and the living wage rate that applies is determined by the location of the job, not by the employee's place of residence. For instance, the LLW applies to people commuting into London to work but not to people living in London and commuting out of London for work.
Should the living wage be the one in place when the survey took place (for the 2014 ASHE, the rate announced in November 2013 which came into effect in April 2014) OR one announced after the survey (for the 2014 ASHE, the rate announced in November 2014 and implemented in April 2015)?	The living wage in place when the survey took place	The living wage which employers are being measured against is the current living wage (the one in place when the survey data is collected). Using a living wage which has not yet come into effect would give an inflated estimate of the proportion of jobs that did not pay the living wage at the time of the survey. Also, time series analysis would be difficult to present on this basis.

The low pay method involves using a special survey weight. All low pay analyses exclude cases where pay for the survey pay-period was affected by absence and cases that are not in the main sectors of the economy: sections A-S of Standard Industrial Classification (SIC)

⁸ Gross pay means pay before tax or other deductions; net pay or ‘take-home’ pay is pay after such deductions.

2007⁹. The ‘low pay weight’ attempts to adjust for these exclusions so that the remaining cases sum to the total number of employee jobs in these sectors of the economy¹⁰. In the method recommended in this article, the use of the ADR filter means that the remaining cases sum – using the low pay weight – to the total number of employee jobs in these sectors *excluding* those that are not on adult rates of pay.

It should be noted that there are some aspects of the recommended method which are common to all analyses using ASHE data. These are:

1. Proportions are calculated excluding anybody reporting zero earnings in the relevant pay period and anyone whose pay was affected by absence in this period.
2. Incentive pay is included in measures of pay from ASHE if paid and earned in the relevant pay period for the survey. ASHE is known to underestimate payment of bonuses because one-off or irregular bonus payments may not coincide with the survey pay period. However, these would be less likely than regular bonus payments to count as part of ‘guaranteed’ pay in the context of living wage calculations.
3. The survey measures proportions of jobs below certain wage thresholds, not proportions of employees as individuals. Part-time employees may have more than one job which, if added together, may mean that they are not below the standard of living which the living wage aims to achieve. On the other hand, an employee with one part-time job that pays the living wage will have total earnings below this level, as will one employee with multiple part-time jobs all paying less than the living wage (unless they work long hours). This is because the living wage is designed as the hourly rate of pay that would potentially allow employees to reach a certain standard of living if they worked full time. It is nevertheless valid to assess whether the hourly pay for a particular job is below the recommended level, and what proportion of total jobs are paid at rates below this level. This is what the estimates from ASHE do.

The recommended method will be used in future in all cases except where there is a specific need which justifies using a variant of it. For instance, there may be cases where someone needs estimates on a residence basis or in relation to the forthcoming living wage, even though this living wage was not applicable at the time that the data was collected. In such cases, a note will be included in the table stating how the estimates differ from the recommended method.

4. How the recommended method compares

Comparison with previous methods

This section compares the approach that the ONS recommends for use in future – a variant of the ‘low pay’ method – with previous methods used by the ONS and with the approach used for NMW analyses.

⁹ The excluded SIC 2007 sections are T (mainly activities of households as employers) and U (activities of extraterritorial organisations and bodies). Further information is available at www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/standard-industrial-classification/index.html

¹⁰ It should be noted that, even with this adjustment, ASHE estimates of total UK employee jobs are slightly lower than those from the Workforce Jobs series which provides the estimates in the ONS’s monthly Labour Market Statistics releases. See www.ons.gov.uk/ons/taxonomy/index.html?nscl=Labour+Market#tab-overview

Table 2: Estimates of the proportion of employee jobs below the living wage in April 2014 using different methods

London	% below LLW					CV for % below LLW				
	All employee jobs	Full-time jobs	Part-time jobs	Male employee jobs	Female employee jobs	All employee jobs	Full-time jobs	Part-time jobs	Male employee jobs	Female employee jobs
Standard method, age 16+ (old method used by ONS for standard data requests)	18.3	11.4	43.8	15.7	21.4	1.3	1.9	1.5	1.9	1.7
Standard method, age 18+ (same as above but excludes 16-17 year olds)	18.1	11.3	43.1	15.4	21.1	1.3	1.9	1.5	1.9	1.7
Low pay method, age 16+ (method used in Mayor of London's annual report)	19.4	11.9	46.0	16.7	22.3	1.2	1.9	1.4	1.9	1.6
Low pay method, age 18+ (method recommended in this article)	19.1	11.9	45.3	16.5	22.0	1.2	1.9	1.4	1.9	1.6

Rest of the UK	% below OLLW					CV for % below OLLW				
	All employee jobs	Full-time jobs	Part-time jobs	Male employee jobs	Female employee jobs	All employee jobs	Full-time jobs	Part-time jobs	Male employee jobs	Female employee jobs
Standard method, age 16+ (old method used by ONS for standard data requests)	22.2	13.8	42.1	17.0	27.5	0.5	0.8	0.5	0.8	0.6
Standard method, age 18+ (same as above but excludes 16-17 year olds)	21.6	13.7	40.6	16.4	26.8	0.5	0.8	0.6	0.8	0.6
Low pay method, age 18+ (method recommended in this article)	23.2	14.9	43.2	17.8	28.5	0.5	0.8	0.5	0.8	0.6

Source: Annual Survey of Hours and Earnings – 2014 provisional, Office for National Statistics

Notes:

1. The living wage rates are those in place at the time of the survey in April 2014: for London, the LLW of £8.80; for the rest of the UK, the OLLW of £7.65.
2. For the standard method, the measure of pay is gross hourly pay excluding overtime; the estimates are for employees on adult rates of pay whose pay for the survey pay-period was not affected by absence. All industry sectors are included.
3. For the method recommended in this article, the measure of pay is gross hourly pay excluding overtime and shift premium payments; the estimates are for all employees on adult rates of pay whose pay for the survey pay-period was not affected by absence. The analysis is for sections A-S of the SIC 2007.
4. The recommended method is the same as the method used in the Mayor of London's annual report except that it is for employees aged 18 and over.
5. The quality of an estimate is measured by its coefficient of variation (CV), which is the ratio of the standard error of an estimate to the estimate, expressed as a percentage. CVs range from <= 5% (precise) to > 20% (unreliable).

First, the results of the recommended approach were compared with results from the ‘standard tables’ method used in the past by the ONS to respond to requests for estimates of proportions of jobs below the living wage. For the standard tables method, pay includes shift premium pay and the calculations use the standard weights and the ‘adult rates of pay’ (ADR) filter. Table 2 shows estimates of proportions of jobs paying less than the living wage in 2014 using this method:

- For all employee jobs (people aged 18 and over), the estimates were 18.1% for London and 21.6% for the rest of the UK. This compares with 19.1% and 23.2% respectively using the recommended method.
- For full-time employee jobs¹¹ (people aged 18 and over), the estimates were 11.3% for London and 13.7% for the rest of the UK. This compares with 11.9% and 14.9% respectively using the recommended method.

¹¹ In ASHE, 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.

The estimates from the standard tables method are lower than those from the recommended method because of the use of the standard survey weights and the inclusion of shift premium pay (not normally considered part of guaranteed pay packages), which increases hourly rates in some cases so that fewer employee jobs are classed as paying less than the living wage. Therefore extrapolation from the ASHE standard tables published on the ONS website is likely to produce lower estimates than those produced using the recommended methodology.

For London, comparisons can also be made between the recommended approach and the method used to calculate estimates for the Mayor of London's annual report on the LLW. Both use the derived hourly rate of pay (excluding shift premium pay), the low pay weights and the ADR filter. The only difference between the two approaches is that jobs of employees aged 16 to 17 are included in the Mayor of London's annual report estimates but not in the estimates produced using the recommended method. Table 2 compares proportions of jobs paying less than the living wage in 2014 using these two approaches:

- For all employee jobs in London, the estimates were 19.4% on the Mayor of London's annual report basis, compared with 19.1% using the recommended method.
- For full-time employee jobs in London, the estimates were 11.9% on the Mayor of London's annual report basis and the same using the recommended method.

Comparison with NMW approach

It is also worth comparing the new living wage method with the approach used for estimating jobs below the NMW in the low pay tables published by the ONS¹². The NMW applies to employees aged 16 and over. There are special rates for those aged 16 to 20 and for apprentices (Table 3).

Table 3: NMW rates in place from October each year

	21 and over	18 to 20	Under 18	Apprentice*
2013	£6.31	£5.03	£3.72	£2.68
2014	£6.50	£5.13	£3.79	£2.73

Source: Gov.uk

* This rate is for apprentices aged 16 to 18 and those aged 19 or over who are in their first year. All other apprentices are entitled to the NMW for their age.

The ONS provides estimates of proportions of jobs below the NMW from ASHE data, using a similar approach to the one recommended in this article for the living wage: it uses the derived hourly rate of pay and the low pay weights and presents results on a workplace basis and in relation to the rate in place at the time of the survey. However, there are some differences. Whereas future living wage calculations will be for employees aged 18 and over excluding those who are not on adult rates of pay, the NMW calculations include all employees aged 16 and over and the analysis is differentiated by age group and – from 2013 – by apprenticeship status:

- The data for younger people is divided by age group, with proportions calculated in relation to the NMW rates for each age group (see Table 3).

¹² <http://www.ons.gov.uk/ons/rel/ashe/low-pay/index.html>

- The NMW has specific rates for apprentices aged 16 to 18 and year one apprentices aged 19 and over (see Table 3), so they are included in the analysis and proportions are calculated in relation to the rates that they are entitled to.

The LPC also produces estimates in relation to the NMW. It uses ASHE micro data and the same basic method as that used by the ONS for its NMW calculations. However, while the ONS only provides estimates of jobs paying less than the NMW, the LPC also estimates ‘minimum wage jobs’, defined as jobs which pay an hourly rate of no more than five pence above the appropriate NMW rate¹³. This measure includes those paid less than the NMW as well as those paid at the NMW.

For the NMW analysis it is possible to estimate numbers of employee jobs as well as proportions below NMW thresholds because of the use of the low pay weights (see Section 3). The recommended living wage methodology uses the low pay weights, but it also uses the ADR filter to exclude employees who are paid on youth, training and apprentice rates, most of whom would not be entitled to the living wage (see Table 1, Section 3). Therefore the new living wage method can be used to sum to the total number of jobs in the main sectors of the economy *excluding* such employees and to estimate numbers of employee jobs below the living wage. However, the results should be treated with a degree of caution because the low pay weights in ASHE produce estimates of total jobs which are slightly lower than those from ONS’s Workforce Jobs series. In addition, these weights were not designed to be used with the ADR filter.

In conclusion, the methodology recommended here for estimating jobs below the living wage is broadly consistent with the approach used for the NMW. There are, however, some differences in the treatment of employees who are on youth, training and apprentice rates.

5. What the ONS will provide in future

Now that a methodology for calculating proportions of employee jobs under the living wage using ASHE micro data has been recommended, the ONS will use it to respond to requests for estimates of jobs below the LLW, the OLLW and (from April 2016) the NLW. The recommended method will always be used in future unless there is a specific need for a variant of it, such as an estimate which relates to a forthcoming living wage rate. Estimates of numbers of jobs as well as proportions below the living wage can also be provided, with notes about their limitations.

For London and the rest of the UK, it may also be possible to provide breakdowns by age group, industry sector, occupation, regions and countries within the UK, Local Authority and Parliamentary Constituency. In some cases it may be possible to split some of these breakdowns further, e.g. by full-time vs. part-time work or by male vs. female employees.

Simple breakdowns will usually be supplied free of charge as part of the ONS’s commitment to respond to requests for data which is of policy or public interest¹⁴. However, a charge will be made for complex analyses¹⁵. All of the estimates provided by the ONS will be calculated directly from the micro data because this is the only way to produce reliable figures.

¹³ See Chapter 2 of the latest LPC report available at www.gov.uk/government/publications/national-minimum-wage-low-pay-commission-report-2015

¹⁴ See <http://www.ons.gov.uk/ons/about-ons/business-transparency/freedom-of-information/what-can-i-request/published-ad-hoc-data/index.html>

¹⁵ For further details, see <http://www.ons.gov.uk/ons/guide-method/best-practice/open-data/index.html>