New methodology for low pay estimates

By Julie Milton, Employment, Earnings and Productivity Division, ONS

Key points

- A new methodology has been created for low pay estimates that uses data from the new Annual Survey of Hours and Earnings (ASHE), which replaces the New Earnings Survey (NES) as the first major survey to benefit from ONS' wide-ranging modernisation programme.
- In 2004, supplementary surveys are included in the ASHE to improve coverage at the low end of the pay distribution, so that ASHE can appropriately be used as the sole basis for low pay estimates.
- The ASHE methodology includes imputation and a weighting methodology that provides more accurate weights than those previously used for low pay estimates derived from the NES.
- Except for a fall in the estimate for the number of low paid jobs in 1998, there is little impact of the changes to methodology on the annual estimates for 1998-2003.

Introduction

The Office for National Statistics (ONS) is undergoing a significant modernisation programme of its statistical systems in the UK to make them world class in the 21st century. The objectives of this Statistical Modernisation Programme (SMP) are:

- to re-engineer key statistical systems;
- to move ONS surveys and other data onto a corporate database system;
- to introduce a set of standard tools;
- to standardise and systematise the processing and presentation of statistical outputs.

The development of a new annual earnings survey, the Annual Survey of Hours and Earnings (ASHE), to replace the New Earnings Survey (NES) is ONS' first major survey redesign as part of this modernisation programme. The NES was designed to meet the policy needs of the 1970s and has changed little over the past thirty years. ASHE provides an opportunity to meet users' requirements in the 21st century, to improve the methodology of the survey and to make use of the new statistical tools that ONS will be using in its modernisation programme.

The ASHE provides more accurate earnings information than the NES, including better estimates of the number of jobs affected by low pay. Accurate estimates of earnings at the low end of the pay distribution have been required, in particular since the introduction of the national minimum wage in 1999. This need was met initially by using the average of estimates taken from the New Earnings Survey (NES) and the Labour Force Survey (LFS), which were the best available sources at the time. However, the need to improve the methodology has always been recognised, and the ASHE has been developed in response to the National Statistics Quality Review of the Distribution of Earnings Statistics, in part to improve upon the coverage of the low end of the pay distribution previously offered by the NES.

The redesign has led to significant improvements in the methodology for the low pay estimates. This improvement causes a discontinuity in the series of low pay estimates, and this paper examines the impact of the changes. This report summarises the pre-2004 methodology (described in more detail in the paper Summary of the methodology for measuring low pay), describes the changes to the methodology introduced this year, and provides tables comparing results on the old basis with those on the new. Detailed comparisons between estimates of earnings and hours across the full pay distribution produced using the NES and ASHE methodologies are

provided and discussed in Annual Survey of Hours and Earnings: An analysis of historical data 1998-2003.

Pre-2004 low pay methodology

Previous low pay methodology drew on the results of two surveys in order to compensate for the deficiencies of each at the low end of the pay distribution. The NES was an annual survey conducted in April of 1 per cent of employees in the Pay-As-You-Earn tax system, which asked employers for earnings information about its employees. The information was likely to be reliable because employers referred to documentation. However, many people on low pay are likely to fall below the income tax threshold and hence to be missed by a PAYE sample. The LFS, in contrast, is a random sample of households and so the sample that it draws should be unbiased in its coverage of the low end of the pay distribution. However, differential non-response among respondents may mean that in practice, coverage is biased. The survey is quarterly and for the low pay estimates, the spring quarter was used because it includes the NES survey period. About 30 per cent of responses in the LFS are given by proxy by another adult in the household if a respondent is unavailable, and responses are commonly given without referring to payslips. The earnings information given is therefore likely to be less accurate than that in the NES.

The NES was unweighted, and data for missing items within questionnaires were not imputed. For the low pay estimates, NES data were assigned weights based on age band, gender, industry sector and the number of employees in the jobholder's firm. The weights summed to the total number of jobs in the population. The purpose of weighting was to attempt to correct for differential non-response among different subgroups in the population. Cases with loss of pay due to absence were excluded, to avoid distortions in their calculated hourly pay. The resulting estimates were then scaled back up to the number of jobs in the population to compensate for the removal of these cases.

The LFS data were weighted to represent the number of jobs in the job market. For main jobs, respondents provide an hourly rate of pay if they are paid by the hour. For the low pay estimates, those without an hourly rate of pay were assigned a rate that was imputed from their earnings and other information. The LFS also asks about earnings in second jobs, though until 2003 it did not ask for an hourly rate of pay, only for information that allowed an hourly rate to be calculated from weekly earnings and hours. The low pay LFS estimates were produced using the stated (or imputed) main job hourly rate, and the second job calculated hourly rate. The LFS and NES estimates were then averaged to produce the main low pay estimates (the central estimate).

New methodology

Because of the limitations described above of the LFS and NES at the low end of the pay distribution, the ONS has taken the approach of redesigning the NES as the ASHE, with a number of improvements to its methodology to give it the advantages both of accurate earnings estimates and fuller coverage of the earnings distribution. From 2004, the ASHE is expected to be the sole source for the low pay estimates with the LFS only needed for weighting. The changes to the ASHE methodology are described in detail in Methodology for the 2004 Annual Survey of Hours and Earnings but are summarised here in relation to low pay statistics.

A key improvement to the ASHE has been to extend the sampling frame, from 2004 onwards, beyond the NES PAYE sample to improve coverage of low paid employees. The ASHE adds three survey groups to the PAYE sample. First, ONS has extended the coverage of its annual earnings survey to include businesses with employees but without PAYE systems. Supplementary samples have been selected from the Inter-Departmental Business Register to cover such units. The other two groups arise from the fact that the survey is conducted in April each year but the sample is identified in February. Some employees move jobs after being identified for the sample or start jobs during this period, and were missed by the NES. However, these two groups are included in the ASHE. A higher proportion of employees in smaller businesses, and in the two latter groups of mobile employees, would be expected to be on low pay than others. Survey data for these additional samples are not available for years previous to 2004.

Another major improvement to the ASHE is the imputation of missing earnings information within questionnaires, except for those cases with loss of pay due to absence for which there are too few comparable donor cases. Weighting has also been introduced, so that the weights sum to the number of jobs in the labour market. Weighting is carried out based on 108 domains split according to age band, gender, occupation and region. This is another improvement on the previous methodology because occupation is a key variable in predicting pay and was not included in the previous weighting methodology. Both imputation and weighting tend to correct for differential non-response among certain population groups and thus increase the accuracy of the estimates. In order to calculate the low pay estimates, cases with loss of pay due to absence must be excluded because their hourly pay cannot be derived accurately from the survey information in this situation. Excluding these cases means that the weights of the remaining cases no longer sum to the total number of jobs in the economy and that estimates of the number of jobs paid below the minimum wage using these weights would be smaller than it should be. In order to correct for this, weights are calculated especially for the low pay analyses by first removing cases with loss of pay due to absence, and then calculating weights that sum to the number of jobs in the labour market. The weights used for the low pay analyses are thus slightly different from those used for the ASHE itself.

As with the NES, the ASHE asks for earnings information for the pay period that includes a particular date in April — the survey reference date — which varies from year to year in order to avoid Easter. In previous years, low pay estimates have been calculated for different age groups using the employee's age at 1 April rather than at the survey reference date. This could introduce some slight inaccuracy into the estimates of the number of jobs paid below the minimum wage, because the minimum wage depends on the employee's age. Until 2004, the minimum wage legislation applied only to those over 18 years old, with a lower Youth Development Rate for those aged 18-21 and a higher, adult rate for those aged 22 and over. If an employee's 18th or 22nd birthday fell between 1 April and the survey reference date, they would be eligible for a higher rate of pay than at 1 April, and the low pay estimates should reflect this. The ASHE has introduced calculation of age on the survey reference date in April, and this age is therefore also used in the low pay estimates.

Comparison of estimates using old and new methodologies

The tables below compare low pay estimates using the old and new methodologies, for the years 1998 to 2003. All of the estimates have been produced using the revised population estimates that were announced in February 2003 and incorporated in the latest LFS microdatasets released on 17 March 2004; the effect of the population revisions on previously published low pay estimates is negligible.

The NES and ASHE estimates use the annually revised UK data incorporating late returns.

It should be noted that the national minimum wage is raised periodically and that, as discussed above, different rates apply to those aged 18-21 and those aged 22 and over; the rates for spring from 1999 (when the national minimum wage was introduced) to 2003 are summarised in Table 1. As in previous publications, estimates are shown back to 1998, the year before the minimum wage was introduced, because of the interest in the impact of the minimum wage on pay. For 1998, the 1999 levels for the minimum wage are used as nominal values, as usual. It should further be noted that estimates of the number of jobs paid below the minimum wage do not necessarily indicate non-compliance with the legislation, because it is not possible in the surveys to identify which employees are eligible for the minimum wage. Apprentices and those undergoing training, for example, are not entitled to the full rate but cannot be identified in the NES or ASHE.

Under the old low pay methodology, estimates of fewer than 30,000 jobs were suppressed because the estimates were partly based on LFS data and this is the standard LFS policy for suppression of earnings estimates. Thus many of the central estimates were suppressed, particularly in disaggregated tables, which limits their usefulness at regional level in particular. However, the new ASHE methodology allows publication of smaller estimates, to a level as low as 10,000 jobs, as long as the coefficient of variation (the standard deviation of the estimate divided by the estimate itself) is 20 per cent or less. It is notable that in the tables that follow it is now possible with the new ASHE methodology to publish many more estimates at a disaggregated level than previously. As a further improvement, the ONS has introduced an indication of the quality of estimates based on their coefficient of variation, summarised in the key that appears with the tables below.

Table 2a shows the estimates of the number of jobs paid below the minimum wage held by those aged 18 and over according to the new methodology and the pre-2004 low pay methodology. The central estimate using the pre-2004 methodology is broken down into its LFS and NES components. Sampling variabilities for the estimates in Table 2a are given in Table 2b. Tables 3 and 4 show estimates of the number of jobs paid below the minimum wage by age group. The estimates using the new ASHE methodology show much lower sampling variability than those using the NES with the old low pay methodology.

The estimate of the number of jobs below the minimum wage in 1998 is 1.2 million using the new ASHE methodology, which is lower than the estimate of 1.4 million using the old central estimate methodology. Examination of the data shows that this is mainly due to improvements in the weighting methodology, which yielded smaller and much less volatile weights for the hotel and restaurant industry sector (Sector H) and the sector for other community, social and personal industries (Sector O) in 1998 for ASHE compared to NES and reduced the estimate of low paid jobs in these sectors by a total of 170,000 jobs. Being based partly on occupation (known to be a major factor in determining pay), the ASHE weights are more accurate and reliable. Improvements to the weights also caused a moderate rise from 80,000 to 120,000 in the estimates of the number of jobs paid below the minimum wage in 1998 in the education sector (Sector M). For subsequent years the estimates of the number of jobs paid below the minimum wage given by the ASHE and old central estimate methodology are within sampling variability.

Tables 5 to 8 show further breakdowns by gender, full-time and part-time work, industry, occupation and government office region, comparing the new ASHE-based

low pay estimates with central estimates calculated using the old methodology of averaging the NES and LFS estimates. Apart from the 1998 industry sector differences already discussed, no differences of importance between NES and ASHE estimates arise in the other disaggregations by gender, full-time/part-time work, occupation or region. Therefore, the differences between the ASHE and central estimates in Tables 5 to 8, apart from 1998, are essentially due to differences between the LFS component of the central estimate and the ASHE estimates.

The effect of moving to the ASHE as the sole basis of the estimate is relatively small at the aggregate level, apart from in 1998 as we have seen. At a disaggregated level, we can see (Table 3) that for those aged 18-21, the ASHE estimates are slightly higher than the central estimates whereas for those aged 22 and over (Table 4) the ASHE estimates are lower. The falls in the estimates, when they occur, apply roughly equally to men and women but affect part-timers rather than full-timers, and part-time men to a disproportionate degree; some of these falls in part-timers' estimates are offset by a rise in the estimates for full-timers, particularly full-time women.

Estimates disaggregated by major industry sector (Table 6) are similar for the ASHE and old central estimate methodology, except for differences in 1998 already discussed. Estimates broken down by Government Office Region (Table 7) are similar for the central and ASHE estimates. Estimates are also similar for occupation groups (Table 8) except for an increase in 2003 from a central estimate of 50,000 jobs to an ASHE estimate of 90,000 jobs below the minimum wage in Occupation Group 9 (elementary and other occupations).

Tables 9 to 12 provide NES and ASHE estimates to allow comparison between them. NES-based estimates using the old low pay methodology, unlike the ASHE estimates, are not designed to stand alone to measure the low pay distribution, and are given for information only. The ASHE and NES estimates are very close (within 95 per cent confidence intervals) for all years except for 1998.

October 2004 publication

On 28 October, ONS will publish low pay estimates for 2004 using the new methodology, including the additional samples to improve coverage, particularly of low paid jobs. The estimates for 2004 will also be provided without the new, additional samples to enable easier comparison with previous years. The estimates for all years will also be provided on the basis of the old methodology, again to facilitate comparison.

The 2004 estimates are being produced with an improved editing methodology which cannot be applied to back series for comparison, but will yield estimates based on data of better quality. Any further methodological issues which prove significant in the assessment of 2004 results will be discussed in the 28 October publication.

Further information

For further information on the low pay estimates, please contact:

Julie Milton
Office for National Statistics
Cardiff Road
Newport NP10 8XG

Tel.: 01633 819039
email: julie.milton@ons.gov.uk

Table 1	National minimum wage hourly rates, April 1999 to October 2003	
Survey Date	National minimum wage hourly rate	
	Age 18-21	Age 22 and over
Spring 1998[a]	£3.00	£3.60
Spring 1999	£3.00	£3.60
Spring 2000	£3.00	£3.60
Spring 2001	£3.20	£3.70
Spring 2002	£3.50	£4.10
Spring 2003	£3.60	£4.20

[a]The national minimum wage had not been introduced in 1998 and so the Spring 1999 values are used

Table 2a Jobs[1] paid below the national minimum wage held by those aged 18 and over

Year	LFS[2] '000s	LFS[2] %	NES[3] '000s	NES[3] %	Central estimate[4] '000s	Central estimate[4] %	ASHE[5] '000s	ASHE[5] %
1998	1380	6.0	1400	6.1	1390	6.0	1210	5.2
1999	520	2.2	500	2.1	510	2.2	470	2.0
2000	240	1.0	230	0.9	230	1.0	230	0.9
2001	270	1.1	220	0.9	240	1.0	230	0.9
2002	360	1.5	300	1.2	330	1.4	320	1.3
2003	250	1.0	260	1.1	250	1.1	250	1.0

[1] Estimates of jobs are given as counts and as the percentage of jobs in the labour market

[2] Using revised weights consistent with the population estimates published in Spring 2003

[3] Using revised weights consistent with the population estimates published in Spring 2003 and including annual revisions to the NES data

[4] Average of the LFS and NES estimates

[5] Using the new ASHE methodology with weights for low pay data

Key
Precise CV <= 5%
Reasonably precise CV > 5% and <= 10%
Acceptable CV > 10% and <= 20%
x = unreliable CV > 20% or unavailable
.. = disclosive n/a = not applicable

Table 2b Sampling variability for jobs paid below the national minimum wage held by those aged 18 and over

	LFS[1,5]		NES[2,5]		Central estimate[3,5]		ASHE[4]	
Year	Standard error[6] of count '000s	Standard error[6] of percentage %	Standard error[6] of count '000s	Standard error[6] of percentage %	Standard error[6] of count '000s	Standard error[6] of percentage %	Standard error[6] of count '000s	Standard error[6] of percentage %
1998	*	*	30	0.13	*	*	10	0.06
1999	*	*	20	0.08	*	*	10	0.04
2000	60	0.23	10	0.05	30	0.12	10	0.03
2001	60	0.26	10	0.05	30	0.13	10	0.03
2002	70	0.30	10	0.06	40	0.15	10	0.03
2003	60	0.26	10	0.05	30	0.13	10	0.03

[1] Using revised weights consistent with the population estimates published in Spring 2003

[2] Using revised weights consistent with the population estimates published in Spring 2003 and including annual revisions to the NES data

[3] Average of the LFS and NES estimates

[4] Using the new ASHE methodology with weights for low pay data

[5] For the central estimates using the pre-2004 methodology, a method developed in 2001 for producing sampling variabilities has been used that takes into account the fact that many hourly rates of pay on the LFS have been donated rather than directly observed. The method is experimental and the sampling variabilities do not have National Statistic status. In 1998 and 1999, LFS respondents were not asked for their hourly rate of pay and so this method does not apply. No sampling variabilities are therefore given for these years for the LFS and central estimates. The sampling variability is estimated by a combination of the standard error from the LFS and NES.

[6] The above counts and percentages (statistics) are estimated from a specific sample. These estimates are subject to sample-to-sample variation. The standard error is a measure of this variation for a given statistic, and is estimated from the selected sample.

Table 3 Jobs[1] paid below the national minimum wage held by those aged 18-21

Year	LFS[2] '000s	LFS[2] %	NES[3] '000s	NES[3] %	Central estimate[4] '000s	Central estimate[4] %	ASHE[5] '000s	ASHE[5] %
1998	110	7.0	130	8.1	120	7.6	130	7.3
1999	30	1.8	50	3.1	40	2.5	50	2.8
2000	30	2.0	40	2.5	40	2.2	40	2.3
2001	40	2.2	30	1.9	40	2.1	40	2.0
2002	50	2.7	40	2.4	40	2.6	50	2.6
2003	30	1.7	50	2.8	40	2.2	50	2.9

[1] Estimates of jobs are given as counts and as the percentage of jobs in the labour market

[2] Using revised weights consistent with the population estimates published in Spring 2003

[3] Using revised weights consistent with the population estimates published in Spring 2003 and including annual revisions to the NES data

[4] Average of the LFS and NES estimates

[5] Using the new ASHE methodology with weights for low pay data

Key
Precise CV <= 5%
Reasonably precise CV > 5% and <= 10%
Acceptable CV > 10% and <= 20%
x = unreliable CV > 20% or unavailable
.. = disclosive n/a = not applicable

Table 4 Jobs[1] paid below the national minimum wage held by those aged 22 and over

Year	LFS[2] '000s	LFS[2] %	NES[3] '000s	NES[3] %	Central estimate[4] '000s	Central estimate[4] %	ASHE[5] '000s	ASHE[5] %
1998	1270	5.9	1280	5.9	1270	5.9	1080	5.0
1999	490	2.3	450	2.1	470	2.2	420	1.9
2000	210	0.9	190	0.8	200	0.9	180	0.8
2001	230	1.0	190	0.8	210	0.9	190	0.8
2002	310	1.4	260	1.2	280	1.3	270	1.2
2003	220	1.0	210	0.9	220	1.0	200	0.9

[1] Estimates of jobs are given as counts and as the percentage of jobs in the labour market

[2] Using revised weights consistent with the population estimates published in Spring 2003

[3] Using revised weights consistent with the population estimates published in Spring 2003 and including annual revisions to the NES data

[4] Average of the LFS and NES estimates

[5] Using the new ASHE methodology with weights for low pay data

Key
Precise CV <= 5%
Reasonably precise CV > 5% and <= 10%
Acceptable CV > 10% and <= 20%
x = unreliable CV > 20% or unavailable
.. = disclosive n/a = not applicable

Table 5 Jobs[1] paid below the national minimum wage held by ageband, gender, and full-time vs part-time work; Central Estimate (LFS/NES) vs ASHE comparison*

	1998				1999				2000				2001				2002				2003			
	Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE	
	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%
Category																								
All 18-21	120	7.6	130	7.3	40	2.5	50	2.8	40	2.2	40	2.3	40	2.1	40	2.0	40	2.6	50	2.6	40	2.2	50	2.9
All 22+	1270	5.9	1080	5.0	470	2.2	420	1.9	200	0.9	180	0.8	210	0.9	190	0.8	280	1.3	270	1.2	220	1.0	200	0.9
All men	390	3.3	340	2.9	180	1.5	160	1.3	80	0.7	80	0.6	90	0.7	70	0.6	100	0.8	100	0.8	90	0.7	90	0.7
All women	1010	9.0	860	7.6	330	2.9	320	2.7	150	1.3	150	1.3	160	1.3	150	1.3	230	1.9	220	1.8	170	1.4	160	1.3
Full-time men	220	2.1	230	2.1	100	0.9	110	1.0	40	0.3	50	0.5	30	0.3	50	0.4	50	0.5	60	0.6	40	0.4	60	0.6
Part-time men	160	15.7	110	12.8	80	7.2	40	4.8	40	3.9	30	2.8	50	4.4	30	2.8	50	4.1	30	3.4	50	3.8	30	2.4
Full-time women	240	3.9	280	4.1	80	1.2	100	1.5	*	*	50	0.7	*	*	40	0.6	50	0.7	60	0.9	30	0.5	50	0.8
Part-time women	770	15.0	580	12.5	250	4.9	210	4.4	120	2.3	100	2.0	130	2.4	110	2.2	180	3.4	160	3.1	130	2.5	110	2.1
All full-time	460	2.7	510	2.9	170	1.0	220	1.2	70	0.4	100	0.6	60	0.4	90	0.5	100	0.6	120	0.7	70	0.4	120	0.6
All part-time	930	15.1	700	12.6	340	5.3	250	4.4	170	2.6	130	2.1	180	2.8	140	2.3	230	3.5	200	3.2	180	2.7	130	2.2
All (18+)	1390	6.0	1210	5.2	510	2.2	470	2.0	230	1.0	230	0.9	240	1.0	230	0.9	330	1.4	320	1.3	250	1.1	250	1.0

[1] Estimates of jobs are given as counts and as the percentage of jobs in the labour market

*For the central estimate using the previous low pay methodology, data are suppressed if the estimated number falls below 30,000

Key
Precise CV <= 5%
Reasonably precise CV > 5% and <= 10%
Acceptable CV > 10% and <= 20%
x = unreliable CV > 20% or unavailable
.. = disclosive n/a = not applicable

Table 6 Jobs[1] paid below the national minimum wage by industry sector; Central Estimate (LFS/NES) vs ASHE comparison*

	1998				1999				2000				2001				2002				2003			
	Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE	
	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%
Industry Sector																								
A: Agriculture, hunting & forestry	*	*	10	8.8	*	*	10	3.7	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x
B: Fishing	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x
C: Mining, quarrying	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x
D: Manufacturing	110	2.6	110	2.5	40	0.9	30	0.7	*	*	20	0.4	*	*	10	0.3	*	*	20	0.6	*	*	10	0.4
E: Electricity, gas & water supply	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x
F: Construction	*	*	20	3.2	*	*	10	1.5	*	*	10	1.1	*	*	10	1.0	*	*	10	1.0	*	*	10	1.2
G: Wholesale, retail& motor trade	330	8.9	260	7.2	100	2.7	110	2.9	40	1.0	40	1.2	50	1.2	50	1.3	70	1.9	60	1.6	60	1.7	50	1.5
H: Hotels & restaurants	300	23.7	180	21.2	100	7.7	50	6.1	50	3.5	20	2.8	50	3.5	20	2.6	70	5.4	50	5.3	30	3.2	30	3.3
I: Transport, storage & communication	40	2.8	30	2.1	*	*	10	0.9	*	*	10	0.5	*	*	10	0.5	*	*	10	0.7	*	*	10	0.5
J: Financial intermediation	*	*	10	0.9	*	*	-	-	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x
K: Real estate, renting & business activity	180	5.8	170	6.8	70	2.1	70	2.7	*	*	30	0.9	*	*	20	0.7	*	*	30	1.0	*	*	40	1.1
L: Public administration & defence	30	1.5	20	1.4	*	*	10	0.6	*	*	x	x	*	*	x	x	*	*	10	0.6	*	*	x	x
M: Education	80	3.8	120	4.0	50	1.9	60	2.0	40	1.2	40	1.1	*	*	40	1.1	30	1.1	60	1.7	*	*	30	0.9
N: Health & social work	160	6.9	170	6.1	50	2.4	70	2.4	*	*	40	1.4	30	1.3	40	1.4	*	*	40	1.4	50	1.5	40	1.3
O: Other community, social & personal	120	13.0	100	12.6	40	4.4	30	3.7	*	*	20	2.4	*	*	20	2.1	*	*	20	2.3	*	*	20	1.9
All (18+)	1,390	6.0	1210	5.2	510	2.2	470	2.0	230	1.0	230	0.9	240	1.0	230	0.9	330	1.4	320	1.3	250	1.1	250	1.0

[1] Estimates of jobs are given as counts and as the percentage of jobs in the labour market

*For the central estimate using the previous low pay methodology, data are suppressed if the estimated number falls below 30,000

-Negligible, less than half the final digit shown

Key
Precise CV <= 5%
Reasonably precise CV > 5% and <= 10%
Acceptable CV > 10% and <= 20%
x = unreliable CV > 20% or unavailable
.. = disclosive n/a = not applicable

Table 7 Jobs[1] paid below the national minimum wage by government office region; Central Estimate (LFS/NES) vs ASHE comparison*

	1998				1999				2000				2001				2002				2003			
	Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE	
	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%
Government Office Region																								
North East	90	9.3	70	7.6	*	*	30	2.7	*	*	10	1.4	*	*	20	1.5	*	*	20	1.7	*	*	10	1.4
North West (including Merseyside)	160	6.4	150	5.8	50	2.0	50	2.1	*	*	20	1.0	*	*	20	0.9	40	1.6	30	1.3	30	1.1	30	1.1
Yorks & Humber	140	7.4	130	6.2	50	2.7	40	1.9	*	*	10	1.1	*	*	20	1.0	30	1.5	30	1.5	*	*	20	1.1
East Midlands	120	7.3	110	6.6	40	2.3	40	2.5	*	*	20	1.4	*	*	20	1.1	*	*	20	1.5	*	*	20	1.2
West Midlands	140	6.5	130	5.8	60	2.7	50	2.2	*	*	20	1.1	*	*	20	0.9	*	*	30	1.4	*	*	30	1.2
Eastern	120	5.2	100	4.9	50	2.0	50	2.4	*	*	20	1.1	*	*	20	1.1	*	*	30	1.6	40	1.5	20	1.1
London	70	2.5	80	2.3	40	1.3	40	1.1	*	*	20	0.4	*	*	10	0.4	*	*	30	0.7	*	*	20	0.5
South East	150	4.5	120	4.0	70	1.9	50	1.7	*	*	10	0.7	*	*	30	0.8	40	1.2	40	1.3	*	*	30	0.9
South West	140	7.1	110	5.7	40	2.0	40	2.2	*	*	20	1.1	*	*	20	1.1	*	*	30	1.4	40	1.8	30	1.3
Wales	80	8.2	70	7.0	30	2.9	20	2.3	*	*	20	1.1	*	*	10	1.1	*	*	10	1.2	*	*	10	0.9
Scotland	140	6.7	110	5.1	40	2.2	40	2.0	*	*	10	0.8	*	*	20	0.8	*	*	30	1.3	*	*	20	1.0
Northern Ireland	40	7.4	40	7.1	*	*	20	2.8	*	*	20	1.4	*	*	10	1.2	*	*	10	0.9	*	*	10	0.8
All (18+)	1,390	6.0	1210	5.2	510	2.2	470	2.0	230	1.0	230	0.9	240	1.0	230	0.9	330	1.4	320	1.3	250	1.1	250	1.0

[1] Estimates of jobs are given as counts and as the percentage of jobs in the labour market

*For the central estimate using the previous low pay methodology, data are suppressed if the estimated number falls below 30,000

Key
Precise CV <= 5%
Reasonably precise CV > 5% and <= 10%
Acceptable CV > 10% and <= 20%
x = unreliable CV > 20% or unavailable
.. = disclosive n/a = not applicable

Table 8 Jobs[1] paid below the national minimum wage by occupation; Central Estimate (LFS/NES) vs ASHE comparison*

	1998				1999				2000				2001				2002				2003			
	Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE		Central Estimate (LFS/NES)		ASHE	
	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%
Occupation																								
Managers & administrators	40	1.3	50	1.5	*	*	30	1.0	*	*	10	0.2	*	*	10	0.3	*	*	10	0.4	*	*	x	x
Professional	*	*	30	1.1	*	*	20	0.7	*	*	10	0.2	*	*	10	0.2	*	*	10	0.4	*	*	x	x
Associated professionals & technical	30	1.4	40	1.4	*	*	20	0.9	*	*	10	0.4	*	*	10	0.4	*	*	20	0.5	30	0.9	10	0.2
Clerical & secretarial	110	2.8	100	2.5	40	1.0	40	1.1	*	*	20	0.6	*	*	10	0.4	*	*	20	0.6	*	*	20	0.5
Craft & related	70	3.0	70	3.3	30	1.4	30	1.5	*	*	20	1.0	*	*	20	0.9	*	*	20	1.1	*	*	20	1.1
Personal & protective services	430	15.2	370	12.7	160	5.4	120	4.2	80	2.6	80	2.5	40	1.9	50	2.6	40	2.3	50	2.9	60	3.0	50	2.5
Sales	240	13.5	200	9.8	70	3.4	80	3.7	30	1.6	30	1.2	30	1.6	30	1.6	60	2.9	40	2.2	50	2.6	40	2.1
Plant & machine operatives	100	4.7	80	3.6	40	1.6	20	0.9	*	*	10	0.4	*	*	10	0.6	*	*	20	0.8	*	*	10	0.7
Other	340	18.6	290	15.6	100	5.8	100	5.6	40	2.4	50	2.5	80	2.6	70	2.2	130	4.0	120	3.6	50	1.8	90	3.0
All (18+)	1390	6.0	1210	5.2	510	2.2	470	2.0	230	1.0	230	0.9	240	1.0	230	0.9	330	1.4	320	1.3	250	1.1	250	1.0

[1] Estimates of jobs are given as counts and as the percentage of jobs in the labour market

*For the central estimate using the previous low pay methodology, data are suppressed if the estimated number falls below 30,000

Note that up to and including 2000, occupation is based on the SOC 1990 classification.

From 2001 onwards, occupation is based on the SOC 2000 classification.

Key
Precise CV <= 5%
Reasonably precise CV > 5% and <= 10%
Acceptable CV > 10% and <= 20%
x = unreliable CV > 20% or unavailable
.. = disclosive n/a = not applicable

Table 9 Jobs[1] paid below the national minimum wage held by ageband, gender, and full-time vs part-time work; NES vs ASHE comparison*

	1998				1999				2000				2001				2002				2003			
	NES		ASHE		NES		ASHE		NES		ASHE		NES		ASHE		NES		ASHE		NES		ASHE	
	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%
Category																								
All 18-21	130	8.1	130	7.3	50	3.1	50	2.8	40	2.5	40	2.3	30	1.9	40	2.0	40	2.4	50	2.6	50	2.8	50	2.9
All 22+	1280	5.9	1080	5.0	450	2.1	420	1.9	190	0.8	180	0.8	190	0.8	190	0.8	260	1.1	270	1.2	210	0.9	200	0.9
All men	430	3.6	340	2.9	190	1.5	160	1.3	80	0.7	80	0.6	80	0.6	70	0.6	100	0.8	100	0.8	90	0.7	90	0.7
All women	970	8.7	860	7.6	320	2.7	320	2.7	140	1.2	150	1.3	140	1.2	150	1.3	200	1.7	220	1.8	160	1.4	160	1.3
Full-time men	300	2.7	230	2.1	140	1.2	110	1.0	60	0.5	50	0.5	50	0.4	50	0.4	70	0.6	60	0.6	60	0.5	60	0.6
Part-time men	140	16.2	110	12.8	50	5.4	40	4.8	30	2.9	30	2.8	30	2.9	30	2.8	30	2.8	30	3.4	30	2.9	30	2.4
Full-time women	320	4.7	280	4.1	110	1.6	100	1.5	50	0.7	50	0.7	40	0.6	40	0.6	60	0.9	60	0.9	60	0.8	50	0.8
Part-time women	650	14.8	580	12.5	200	4.4	210	4.4	100	2.0	100	2.0	100	2.1	110	2.2	140	2.8	160	3.1	110	2.2	110	2.1
All full-time	620	3.5	510	2.9	250	1.4	220	1.2	100	0.6	100	0.6	90	0.5	90	0.5	130	0.7	120	0.7	110	0.6	120	0.6
All part-time	790	15.0	700	12.6	250	4.6	250	4.4	120	2.1	130	2.1	130	2.2	140	2.3	170	2.8	200	3.2	140	2.4	130	2.2
All (18+)	1410	6.1	1210	5.2	500	2.1	470	2.0	230	1.0	230	0.9	220	0.9	230	0.9	300	1.2	320	1.3	260	1.1	250	1.0

[1] Estimates of jobs are given as counts and as the percentage of jobs in the labour market

*For the NES, estimates are suppressed if they are based on fewer than 30 records

Key
Precise CV <= 5%
Reasonably precise CV > 5% and <= 10%
Acceptable CV > 10% and <= 20%
x = unreliable CV > 20% or unavailable
.. = disclosive n/a = not applicable

Table 10 Jobs[1] paid below the national minimum wage by industry sector; NES vs ASHE comparison*

	1998				1999				2000				2001				2002				2003			
	NES		ASHE		NES		ASHE		NES		ASHE		NES		ASHE		NES		ASHE		NES		ASHE	
	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%
Industry Sector																								
A: Agriculture, hunting & forestry	20	9.3	10	8.8	10	3.8	10	3.7	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x
B: Fishing	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x
C: Mining, quarrying	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x
D: Manufacturing	130	3.0	110	2.5	40	0.8	30	0.7	20	0.4	20	0.4	10	0.3	10	0.3	20	0.6	20	0.6	20	0.5	10	0.4
E: Electricity, gas & water supply	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x
F: Construction	30	3.4	20	3.2	10	1.5	10	1.5	10	0.9	10	1.1	10	1.0	10	1.0	10	1.0	10	1.0	10	1.1	10	1.2
G: Wholesale, retail& motor trade	270	7.4	260	7.2	90	2.4	110	2.9	40	1.1	40	1.2	50	1.3	50	1.3	60	1.6	60	1.6	60	1.5	50	1.5
H: Hotels & restaurants	310	24.5	180	21.2	90	7.1	50	6.1	40	2.9	20	2.8	40	2.7	20	2.6	70	5.1	50	5.3	40	3.2	30	3.3
I: Transport, storage & communication	30	2.6	30	2.1	10	1.1	10	0.9	10	0.4	10	0.5	*	*	10	0.5	10	0.4	10	0.7	10	0.5	10	0.5
J: Financial intermediation	10	1.1	10	0.9	10	0.6	-	-	*	*	x	x	*	*	x	x	*	*	x	x	*	*	x	x
K: Real estate, renting & business activity	210	7.0	170	6.8	90	3.0	70	2.7	30	0.9	30	0.9	30	0.8	20	0.7	40	1.0	30	1.0	30	0.9	40	1.1
L: Public administration & defence	20	1.2	20	1.4	10	0.5	10	0.6	*	*	x	x	*	*	x	x	*	*	10	0.6	*	*	x	x
M: Education	80	4.0	120	4.0	50	1.7	60	2.0	20	0.8	40	1.1	20	0.7	40	1.1	30	1.0	60	1.7	20	0.8	30	0.9
N: Health & social work	150	6.4	170	6.1	60	2.5	70	2.4	30	1.4	40	1.4	30	1.3	40	1.4	30	1.3	40	1.4	30	1.3	40	1.3
O: Other community, social & personal	140	15.0	100	12.6	40	4.1	30	3.7	20	2.4	20	2.4	20	1.9	20	2.1	20	2.2	20	2.3	20	1.8	20	1.9
All (18+)	1410	6.1	1210	5.2	500	2.1	470	2.0	230	1.0	230	0.9	220	0.9	230	0.9	300	1.2	320	1.3	260	1.1	250	1.0

[1] Estimates of jobs are given as counts and as the percentage of jobs in the labour market

*For the NES, estimates are suppressed if they are based on fewer than 30 records

-Negligible, less than half the final digit shown

Key
Precise CV <= 5%
Reasonably precise CV > 5% and <= 10%
Acceptable CV > 10% and <= 20%
x = unreliable CV > 20% or unavailable
.. = disclosive n/a = not applicable

Table 11 Jobs[1] paid below the national minimum wage by government office region; NES vs ASHE comparison*

	1998				1999				2000				2001				2002				2003			
	NES		ASHE		NES		ASHE		NES		ASHE		NES		ASHE		NES		ASHE		NES		ASHE	
	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%
Government Office Region																								
North East	90	8.9	70	7.6	30	2.7	30	2.7	10	1.3	10	1.4	10	1.5	20	1.5	20	1.7	20	1.7	10	1.5	10	1.4
North West (including Merseyside)	170	6.8	150	5.8	60	2.4	50	2.1	30	1.1	20	1.0	20	1.0	20	0.9	40	1.4	30	1.3	30	1.2	30	1.1
Yorks & Humber	140	7.2	130	6.2	40	2.0	40	1.9	20	1.1	10	1.1	20	1.0	20	1.0	30	1.4	30	1.5	20	1.1	20	1.1
East Midlands	130	7.8	110	6.6	40	2.5	40	2.5	20	1.4	20	1.4	20	1.2	20	1.1	20	1.4	20	1.5	20	1.2	20	1.2
West Midlands	140	6.6	130	5.8	50	2.3	50	2.2	20	1.1	20	1.1	20	0.9	20	0.9	30	1.4	30	1.4	20	1.1	30	1.2
Eastern	110	5.5	100	4.9	50	2.4	50	2.4	20	1.1	20	1.1	20	1.1	20	1.1	30	1.2	30	1.6	20	1.2	20	1.1
London	100	2.9	80	2.3	40	1.2	40	1.1	10	0.3	20	0.4	10	0.4	10	0.4	20	0.7	30	0.7	20	0.7	20	0.5
South East	140	4.7	120	4.0	60	1.8	50	1.7	20	0.6	10	0.7	20	0.8	30	0.8	40	1.1	40	1.3	30	0.9	30	0.9
South West	120	6.5	110	5.7	40	2.3	40	2.2	20	1.1	20	1.1	20	1.2	20	1.1	30	1.3	30	1.4	30	1.4	30	1.3
Wales	80	8.1	70	7.0	30	2.7	20	2.3	10	1.2	20	1.1	10	1.2	10	1.1	10	1.3	10	1.2	10	0.8	10	0.9
Scotland	130	6.7	110	5.1	40	2.2	40	2.0	20	1.0	10	0.8	10	0.7	20	0.8	30	1.3	30	1.3	20	1.0	20	1.0
Northern Ireland	50	7.8	40	7.1	20	3.0	20	2.8	10	1.6	20	1.4	10	1.3	10	1.2	10	1.0	10	0.9	10	1.0	10	0.8
All (18+)	1410	6.1	1210	5.2	500	2.1	470	2.0	230	1.0	230	0.9	220	0.9	230	0.9	300	1.2	320	1.3	260	1.1	250	1.0

[1] Estimates of jobs are given as counts and as the percentage of jobs in the labour market

*For the NES, estimates are suppressed if they are based on fewer than 30 records

Key
Precise CV <= 5%
Reasonably precise CV > 5% and <= 10%
Acceptable CV > 10% and <= 20%
x = unreliable CV > 20% or unavailable
.. = disclosive n/a = not applicable

Table 12	Jobs[1] paid below the national minimum wage by occupation; NES vs ASHE comparison*																			
	1998				1999				2000				2001				2002			
	NES		ASHE		NES		ASHE		NES		ASHE		NES		ASHE		NES		ASHE	
	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%	'000s	%
Occupation																				
Managers & administrators	60	1.9	50	1.5	40	1.2	30	1.0	*	*	10	0.2	10	0.3	10	0.3	10	0.5	10	0.4
Professional	30	1.3	30	1.1	20	0.8	20	0.7	*	*	10	0.2	*	*	10	0.2	10	0.2	10	0.4
Associated professionals & technical	30	1.6	40	1.4	20	1.1	20	0.9	10	0.3	10	0.4	10	0.3	10	0.4	10	0.3	20	0.5
Clerical & secretarial	130	2.8	100	2.5	60	1.2	40	1.1	30	0.6	20	0.6	20	0.4	10	0.4	30	0.7	20	0.6
Craft & related	90	4.0	70	3.3	30	1.5	30	1.5	20	1.0	20	1.0	20	0.9	20	0.9	30	1.2	20	1.1
Personal & protective services	410	15.6	370	12.7	130	5.0	120	4.2	70	2.6	80	2.5	70	2.4	50	2.6	40	2.6	50	2.9
Sales	190	10.5	200	9.8	60	3.0	80	3.7	30	1.4	30	1.2	30	1.7	30	1.6	40	2.3	40	2.2
Plant & machine operatives	100	4.3	80	3.6	20	1.0	20	0.9	10	0.5	10	0.4	10	0.6	10	0.6	20	0.9	20	0.8
Other	360	18.2	290	15.6	120	5.9	100	5.6	50	2.6	50	2.5	50	2.4	70	2.2	110	3.2	120	3.6
All (18+)	1410	6.1	1210	5.2	500	2.1	470	2.0	230	1.0	230	0.9	220	0.9	230	0.9	300	1.2	320	1.3

	2003			
	NES		ASHE	
	'000s	%	'000s	%
Occupation				
Managers & administrators	*	*	x	x
Professional	*	*	x	x
Associated professionals & technical	10	0.2	10	0.2
Clerical & secretarial	30	0.6	20	0.5
Craft & related	20	1.1	20	1.1
Personal & protective services	40	2.6	50	2.5
Sales	40	2.1	40	2.1
Plant & machine operatives	10	0.6	10	0.7
Other	100	2.9	90	3.0
All (18+)	260	1.1	250	1.0

[1] Estimates of jobs are given as counts and as the percentage of jobs in the labour market

*For the NES, estimates are suppressed if they are based on fewer than 30 records

Note that up to and including 2000, occupation is based on the SOC 1990 classification.
From 2001 onwards, occupation is based on the SOC 2000 classification.

Key
Precise CV <= 5%
Reasonably precise CV > 5% and <= 10%
Acceptable CV > 10% and <= 20%
x = unreliable CV > 20% or unavailable
.. = disclosive n/a = not applicable