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The impact of the minimum wage on employment and hours

Final report

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Executive summary

Aims

The purpose of this report is to estimate the impact of the introduction of the NLW in April 2016 and its successive uprating on employment and hours worked. The main focus is on how the introduction and uprating of the NLW have affected employees aged 25 or more, but the research also touches on differences in impact for this group compared to younger employees. It also explores variations between men and women and part-time and full-time employees, as well as differences by other characteristics, such as the nature of the employer or employment contract.

Data

This report is based on analysis of both the Annual Survey of Hours and Earnings (ASHE) Panel data, covering the period from 2011 to 2018, and the longitudinal Labour Force Survey (LFS). The analysis of the longitudinal LFS explores the impact of the annual upratings of the minimum wage between the October to December quarter of 2010 and the January to March quarter of 2018.

ASHE is based on a 1 per cent sample of payroll records and is therefore likely to provide more accurate data on pay than the LFS. It also benefits from larger sample sizes which mean it is more likely to be possible to detect any impacts and is therefore better-suited to analyses of subgroups within this population than the LFS. However, the LFS has more detailed information on employee and employer characteristics.

Given the relative strengths and weaknesses of each dataset, the analysis presented in this report draws on both sources. However, the main focus is on the analysis of ASHE, given the greater potential for subgroup analyses and to detect statistically significant impacts.

Methods

A difference-in-differences (DiD) analysis is used to explore the impact of the introduction of the NLW in 2016 and upratings in 2017 and 2018 on employment retention and basic weekly working hours for part-time and full-time employees of either gender. The report explores the sensitivity of the findings to changes of specification, including using different comparison groups and to the inclusion or exclusion of control variables. It also assesses whether impacts vary depending on whether the employing organisation is in the public or private sector, by firm size and whether the employee has a permanent or a temporary or causal contract.

A difference-in-difference-in-differences (DDD) analysis is also used to assess whether the main findings of the research are corroborated when using a different approach to the analysis. This part of the analysis exploits the fact that minimum wage rates diverged for those aged 21 to 24 and those aged 25 or more following the introduction of the NLW in April 2016. This also makes it possible to assess whether the impact of the NLW on employment retention and hours varied for employees on either side of the age threshold.

We report minimum detectable effects (MDEs) for the main findings to provide an insight into the magnitude of effects that may be missed when focusing on statistically significant results alone. We also report elasticities to indicate the economic significance of the results. These show the percentage change in the main outcomes in response to a 1 per cent increase in the NLW.

Results

The analysis finds that the introduction of the NLW in April 2016 reduced employment retention for both male and female part-time employees. The finding for women was consistent with earlier analyses by Aitken et al. (2018), but they found no statistically significant impact on employment retention for men working part-time. This divergence is likely to be due to differences in the baseline time periods used in each of the reports.

For women working part-time a 1 per cent increase in the NLW at the time of its introduction resulted in a reduction in employment retention of around 0.56 per cent. Women working part-time in the public sector in particular appeared to experience the largest reductions in employment retention following the introduction of the NLW.

There was little evidence that the 2017 or 2018 upratings affected employment retention for men or women or those on part-time or full-time contracts and the findings for 2017 were consistent with the analysis carried out by Aitken et al. (2018). However, there were signs that the 2018 uprating did have a positive impact on employment retention for women who worked part-time for private sector firms compared to those in the public sector. Also men who worked part-time for larger firms were more likely to be retained following the 2018 uprating if they worked for a firm with 50 or more employees rather than a smaller organisation.

There was little evidence from either ASHE or the longitudinal LFS that the introduction or uprating of the NLW has affected working hours for any of the subgroups of employees by gender or full- or part-time working patterns. Again, this was consistent with the findings of Aitken et al. (2018). There was some evidence from the longitudinal LFS that men who worked full-time experienced a reduction in working hours following the introduction of the NLW in 2016, but this was not apparent in the analysis of ASHE, where larger sample sizes were available.

Men who worked full-time who were employed on a temporary contract experienced an increase in hours following the 2017 uprating of the NLW relative to those who were on permanent contracts. However, there was little evidence to suggest that any of the other characteristics considered had a bearing on the impact of the uprating of the NLW on working hours.

Policy implications

The findings suggest that since the introduction of the NLW in 2016, upratings to the NLW have had a limited impact on employment retention and working hours for directly affected employees. This is likely to be partly due to the fact that these upratings have been more modest in terms of their effect on real wage growth than the 2016 uprating. The fact that the larger increase for employees aged 25 or more did result in a reduction in employment retention for part-time employees (and most clearly for women who worked part-time) suggests that caution should be exercised in considering any future rises of a similar magnitude.

1 Introduction

1.1 Aims

The aim of the research is to assess the impact of the introduction of the NLW in April 2016 and its successive uprating on employment and hours worked. From October 2010 until the introduction of the NLW in April 2016, the adult rate of the NMW applied to all employees aged 21 or more, but since April 2016 those aged 25 or more have been eligible to receive the higher NLW. Those aged between 21 and 24 now receive the adult NMW, whilst a lower youth development rate applies to those aged between 18 and 20. There are also different rates for those aged 16 or 17 and apprentices who meet certain criteria.

The main questions to be addressed by the research are:

- What impact has the introduction of the NLW had on employment and hours for employees aged 25 years and over?
- Has the impact of recent upratings on employment and hours differed for employees of different ages and by whether they work full-time or part-time?
- Has the impact varied by any other types of employee or employer characteristics?

Dickens et al. (2015) highlighted the importance of considering impacts for women working part-time and full-time separately, since negative employment effects were found only for female part-time employees. For this reason, our analysis explores whether the impact of the NMW/NLW on employment and hours varies for both men and women working part-time and full-time. We also seek to explore variations in impact for other groups of employees depending on the size of their employer, whether they are on a permanent or temporary contract and whether they work in the public or private sector.

1.2 Previous research evidence

1.2.1 Evidence for adults

Since the introduction of the UK NMW in April 1999, extensive research has been conducted on its labour market effects. In common with findings on minimum wages in other countries, most notably the US (Card and Krueger (2000); Card and Krueger (1994); Hirsch et al. (2015); Dube et al. (2010)), the evidence for the UK suggests that the employment effects of the NMW have been negligible. This result holds across different methodologies and outcome measures. For instance, Dickens et al. (2009) found little evidence that large increases in the NMW had a negative impact on job retention, entry or employment rates. Dolton et al (2015) exploited the geographical variation in the bite of

the NMW to identify its impact on total employment in local areas. They found no effects of the introduction of the NMW on employment once the spatial correlation among local areas was taken into account. The most recent analyses of the impact of the NLW on employment retention, by Aitken et al. (2018) has also found no conclusive evidence that the introduction of the NLW has affected employment retention.

The link between increases in the NMW and the number of hours worked has also been found to be fairly weak, although Stewart and Swaffield (2008) found that the introduction of the NMW resulted in a reduction of between one and two hours a week in total and basic hours for low-paid employees. The most recent study by Aitken et al. (2018) found very limited evidence that the NLW had an impact on the number of hours worked by those who remained in employment following its introduction. The analysis of the LFS found some signs that the introduction of the NLW resulted in a slight reduction in hours for women working part-time. This was contradicted by the analysis of ASHE, but there were signs that when using ASHE the assumptions underlying the methodological approach were violated. There was no evidence that the introduction of the NLW was associated with a reduction in hours for any other groups of employees.

Meta-analyses, such as those conducted by de Linde Leonard et al. (2014) and Hafner et al. (2016) have also found no evidence of significant adverse effects from the NMW on employment, employment retention, or hours when aggregated across all groups of affected employees. Hafner et al. (2016) also demonstrated that there is no selection bias in publications on the NMW in the UK.

Although the effects might be negligible when measured across all employees affected by the NMW, statistically significant impacts can still be found for specific sub-groups of employees. For instance, Dickens et al. (2015) found negative effects on employment retention for part-time female employees in large firms. The meta analysis by Hafner et al. (2016) found that across the UK studies there is evidence that the NMW has had an adverse impact on employment retention for part-time employees, except during the most recent recession. Dickens et al. (2012) also found a negative effect on employment retention for female part-time employees in large firms.[1] There is evidence that some groups of employees experienced a reduction in hours in response to larger increases in the NMW in 2001 and 2003 (Dickens et al. (2009)).

1.2.2 Evidence for younger employees

The literature finds mixed results on the effects of minimum wages on young employees. Using a panel of 33 countries Dolton and Rosazza Bondibene (2011), found adverse employment effects, but these became statistically insignificant when the estimates were weighted by the size of the population in each country. Dickens et al. (2014) explored the impact on low-skilled young employees of moving from eligibility for the youth to the adult rate of the NMW and found a positive employment effect of around 5 percentage points,

[1] Note, however, that in Canada Brochu and Green (2013) found that low-skilled employees with shorter job-tenure (less than a year) were less likely to leave their job following an increase in the minimum wage, whilst this was not the case for those with longer job tenure.

which is likely to be explained by young employees increasing their labour supply in response to the higher NMW rate.

Fidrmuc and Tena (2013) used the same methodology as Dickens et al. (2010) to analyse the impact on young employees of all skill levels. They found no statistically significant effect on employment of turning 22 (i.e. moving from the youth to the adult rate of the NMW). However, they found a negative employment effect on young male and female employees turning 18 (hence moving from the lowest, to a higher, NMW rate). They also found that employment effects varied for firms of different sizes and in different sectors.

Using similar methodologies, Conlon et al. (2015) found no adverse employment effects on young employees after the introduction of a lower eligibility threshold for the NMW adult rate in 2010. The same study found positive employment effects of the freeze in the minimum wage in 2012 for eligible young employees. Brochu and Green (2013) found a generally negative employment effect of minimum wage increases along the whole age distribution, but a more pronounced negative effect on teenagers. Similarly, Bryan et al. (2012) found a more pronounced reduction in hours for young employees following the 2010 uprating of the NMW than for other groups.

The literature also considers whether the impact of the minimum wage on young employees varies depending on their age, labour market status and participation in education. Crawford et al. (2011) explored whether participation in education and employment by young people was affected by the youth rates and found a positive and statistically significant impact on the employment probability of full-time students aged 16-17 years old living in low-wage areas. However, they found little evidence to suggest that the NMW encouraged young people to leave education, or had a negative impact on their employment. This suggests that the youth rate created an incentive for teenagers to take-up part-time jobs whilst studying.[2]

To summarise, the existing literature points to the existence of different labour market effects of the minimum wage depending on individual and firm characteristics, such as education, gender, part-time or full-time status, firm size, job tenure and skill-level. This suggests that a comprehensive analysis of the impact of the minimum wage should ideally separate out the effects according to these characteristics.

1.3 Report structure

The paper begins by describing the datasets that will be used in the analysis, as well as the reasons why they are considered suitable. The following chapter provides details of the proposed approach and explains why we have chosen to focus on these methods.

[2] Crawford et al. (2011) used the Longitudinal Study of Young People in England (LSYPE) in addition to LFS and ASHE to explore the interaction between education and employment and the NMW for a cohort of young people who were in Year 9 in the 2003/2004 academic year. Whilst a new version of the survey has now been released for those in Year 9 in the 2013/14 academic year (LSYPE2), this is only currently available for the period up to September 2015 and so would not be suited to addressing the research questions at present.

The paper also sets out how we will seek to address some of the limitations of the past literature. We then present our headline findings and subgroup analysis and conclude by summarising the main findings.

2 Data

2.1 Overview

In common with many previous studies and most recently Aitken et al. (2018), we estimate the effect of the introduction of the NLW and the successive upratings of the NMW/NLW using an individual-level analysis of the Labour Force Survey (LFS) longitudinal data and the Annual Survey of Hours and Earnings (ASHE) microdata.

The following subsections describe the characteristics of each data source and the main variables of interest for our empirical analysis. We also set out the timeframe considered in the analysis.

2.2 Labour Force Survey

The LFS is conducted on a quarterly basis, with each sample household retained for five consecutive quarters, and a fifth of the sample replaced each quarter. Whilst respondents are tracked for a period of five successive quarters, wages are only observed in the first and last waves, so the timing of the observation in relation to the uprating of the NMW varies depending on when the individual enters the survey.

The LFS provides detailed background information on individuals. This can be used to improve the reliability of the impact estimates by controlling for characteristics which are likely to determine labour market outcomes. However, a relatively large proportion of responses (around one-third) are supplied by proxies, potentially affecting the accuracy of the data.

A number of studies (Frijters et al., 2005) have exploited the longitudinal dimension of the quarterly LFS and have linked information for the same individuals across up to five successive quarters. With this approach it is possible to observe the changes in wages, employment and hours experienced by individuals directly affected by a minimum wage uprating between the periods before and after each uprating. However, as noted by ONS (2017), linking the different quarters of the LFS might lead to two types of biases: non-response bias (due to attrition) and response error bias (which arises because individuals might give incorrect answers to the survey questions). Our analysis makes use of the longitudinal version of the LFS supplied by ONS. This includes weights which correct for non-response bias, including differential attrition by different subsets of respondents. This paper makes use of these weights.[3]

[3] The fact that the longitudinal LFS contains weights (LGWT) which correct for attrition represents a

2.3 Annual Survey of Hours and Earnings

Employers are required to complete the ASHE survey in April of each year and are asked to report on earnings for the pay period including the reference date. Until 2016 the NMW was uprated in October of each year. This meant that it was possible to observe earnings six months before the uprating and six months afterwards by comparing earnings from successive ASHE surveys. However, in 2016 the uprating for employees aged 25 or more occurred on 1 April and in the following year upratings shifted to 1 April for all employees covered by the minimum wage rates. This means that the reference date for ASHE occurs shortly after the uprating. As a result, for most employees, the pay period covered by ASHE from 2017 onwards is likely to reflect rates of pay following the annual uprating. ASHE 2016 would also reflect pay levels after the 1 April 2016 uprating for those aged 25 or more, but six months after the 1 Oct 2015 uprating for those under the age of 25, as these employees did not receive a further uprating in April 2016.

ASHE is essentially a 1 per cent sample of employees of working age. It is better-suited to analyses of subgroups within this population than the LFS, as there is a lower likelihood that estimates of the impact of the NMW/NLW will appear statistically insignificant because the number of cases for analysis is small.

Prior to April 2013 ASHE was drawn from PAYE records. The fact that employers were not obliged to complete the P14 for employees earning less than the PAYE threshold meant that some employers paying the NMW and with employees working few hours may not have been sampled for ASHE in earlier years. This deficiency was addressed with the introduction of a real time information reporting (RTI) system in April 2013. Subsequent analysis has found that in practice most jobs were already included in the PAYE returns made by employers. As a result, the discontinuity arising from the introduction of RTI is not considered by ONS to have any implications for the ASHE time series.

As ASHE is completed by employers and participation is mandatory, it is thought to provide a more reliable source of information on wages than the LFS, as it is likely to be drawn from payroll records, rather than relying on recall. However, it may still be subject to non-response and ASHE lacks the detailed information on employee characteristics which is available from the LFS. This reduces the likelihood of being able to control for employee characteristics to the same extent as in the analysis which uses the LFS when seeking to estimate the impact of the NMW on employment and hours.

significant advantage compared with an analysis based on combined wave 1 and wave 5 cases from the quarterly LFS. See beta.ukdataservice.ac.uk/datacatalogue/series/series?id=2000026 for details.

2.4 Key variables

2.4.1 Outcomes

Employment retention

In the LFS it is possible to observe whether an employee who is in work when they first join the survey is still employed one year later. This measure indicates whether the employee is with any employer, rather than whether they are in the same job or with the same employer.

ASHE can also be used to observe whether an employee is in employment in successive years. As with the LFS data, the employment retention measure includes those who were doing a different job, or were with a different employer. Due to the discontinuity in the timing of ASHE relative to the annual upratings from 2016 onwards, for those aged 25 or more who were employed in 2015, we consider whether they were still in work at the time of the 2016 ASHE to observe employment retention after the 2016 uprating. For earlier years, for example the 2014 uprating, we consider whether those who were employed at the time of the 2014 survey were still in work by the time of ASHE 2015 as the main measure of employment retention after the October 2014 uprating.

Whilst participation in ASHE is mandatory, some employers may not respond in a given year and so there is a risk that employment retention is under-estimated due to non-response. However, this would only be likely to affect the findings of the analysis if non-response was more common amongst employers of staff directly affected by the NLW than amongst those who employed staff slightly higher up the wage distribution. In practice, ASHE non-response is known to affect high-paying occupations (the first three SOC major groups) more than low-paying occupations and so it seems unlikely that this would affect the findings presented in this report (Daffin 2004: 4; ONS 2018a: 9).

Hours of work

The LFS records total usual hours worked in the main job, excluding overtime. This can be observed prior to the uprating of the minimum wage and one year after the first wave in which the individual appeared. Individuals may change jobs or employers between these two points in time. This means that a change in the number of hours worked could be due to the employee changing jobs, rather than an existing employer adjusting working hours.

ASHE captures basic weekly paid hours (excluding overtime) in the job in which the employee works most hours (BHR). For individuals who are employed in successive years, it is possible to observe basic weekly paid hours one year apart. Where an employee works the same number of hours in more than one job, the job identified as the main job was chosen. Again, the measure of hours worked includes employees who changed jobs or employers. We also adjust for whether the observation captures hours

before or after each annual uprating in the same way as previously described for employment retention.

2.4.2 Wages

The wage variable used to identify treatment and comparison groups in the LFS is gross hourly earnings at the basic hourly rate (HRRATE). This is considered the most accurate measure of hourly pay ONS (2017).The measure was used to distinguish between respondents who were paid the NMW/NLW or less and those who were paid more than the NMW/NLW, taking into account whether the respondent was eligible for the adult or youth rates, based on their age.

ASHE provides information on average gross weekly earnings, excluding overtime for the reference period (GPOX). This was divided by basic weekly paid hours worked (BHR) to compute hourly earnings excluding overtime (HEXO). Again this measure could be used to identify those likely to be directly affected by minimum wage upratings and those in each of the comparison groups.

2.4.3 Control variables

Whilst the LFS offers a much richer choice of control variables than are available from ASHE, the more limited sample sizes impose some practical constraints on the number of controls which can be included. The LFS analysis is therefore estimated in three different ways:

1. without controls;
2. with a basic set of controls; and
3. with a full set of controls.

All of these controls were observed at the pre-uprating observation.

The basic controls include age, age-squared, gender and the calendar year in which the fixed effects are observed. The full set of controls additionally include occupation, the number of months in employment, the region of residence, health status, education, ethnicity, whether the individual was a British national and the number of dependent children under the age of 16.

Age, age-squared and a series of dummies for occupation (SOC 2010 Major group), industry (SIC 2007 Section level) and Government Office Region at the pre-uprating observation were included as controls in the analysis of ASHE.[4]

[4] Those working for extraterritorial organisations and bodies at any point in time were excluded from the analysis due to the small numbers in this industrial section.

2.4.4 Subgroups

The analysis considers the impact of the introduction and uprating of the NLW on the following groups of eligible employees:

- men aged 25 to 64 working full-time;
- women aged 25 to 59 working full-time;
- women aged 25 to 59 working part-time.

In addition to these groups, the larger sample sizes provided by ASHE mean that for this dataset it is possible to explore impacts on men working part-time. Throughout the report the discussion of results focuses on the findings for each of these subgroups, rather than those for all low-paid employees due to the fact that findings for all employees may mask important differences in patterns between the subgroups. The larger sample sizes when the subgroups are pooled also increase the likelihood that findings for all employees are statistically significant when they are largely driven by stronger effects for particular subgroups.

We also explore whether the impact of the NMW varies for firms of different sizes, for those in the public and private sectors and for employees on temporary or permanent contracts. Neither the LFS nor ASHE contains a direct measure of firm size and the longitudinal LFS does not include workplace size which has previously been used as a proxy for firm size. We instead use the size of the enterprise as a proxy for firm size, as this is recorded in ASHE.

2.5 Reasons for using alternative data sources

By using alternative sources of data, as well as different specifications, we are able to minimize the risk that the conclusions drawn are affected by the number of cases for analysis and measurement error. LFS provides a wide range of background information on individuals. This can be used to improve the reliability of impact estimates by controlling for characteristics which might determine the outcomes experienced by the individual.

On the other hand, sample sizes are much smaller for the LFS than for ASHE and a relatively large proportion of responses (around one-third) are supplied by proxies. As ASHE is essentially a one per cent sample of employees of working age, it is better-suited to analyses of subgroups within this population, as there is a lower likelihood that estimates of the impact of the NMW will appear statistically insignificant because the number of cases for analysis is too small. As ASHE is completed by employers and participation is mandatory, the information collected is considered more reliable, as it is likely to be drawn from payroll records, rather than relying on recall.

2.6 Timeframe for analysis

To avoid potential confounding effects of the economic crisis on the outcomes of interest, we largely focus on the years from 2011 onwards. The pre-intervention period is defined as 2012 to 2014 in the analysis based on ASHE.[5] The approach is described in more detail in the following chapter.

[5] We also experimented with an alternative way of defining the pre-intervention periods for the 2017 and 2018 upratings. This involved using the years between 2013 and 2015 as the pre-intervention period for the 2017 uprating and between 2014 and 2016 for the 2018 uprating. As this made little difference to our main findings, it is not reported here.

3 Methods

3.1 Introduction

Both ASHE and the longitudinal LFS datasets follow individuals over time and hence make it possible to compare employment retention and hours before and after each minimum wage uprating for the group of employees affected by the policy (the treatment group) and similar employees not affected by the policy (the comparison group). Our main approach is to use a standard difference-in-differences (DiD) analysis to compare outcomes for employees directly affected by the incoming minimum wage rate against those for a comparison group, taking account of any difference in outcomes observed in earlier years. Throughout the text focuses on findings which were statistically significant at the five per cent level or better.

In addition to a standard DiD analysis, we estimate a difference-in-differences-in-differences (DDD) model using the ASHE data. This exploits the fact that the introduction of the NLW created two comparison groups:

- an age comparison group of individuals who were ineligible for the NMW due to their age i.e. they were under the age of 25, but earning less than £7.20 per hour (the NLW rate introduced in April 2016) and;
- a wage comparison group of individuals aged 25 or more but earning slightly more than the incoming NLW.

The following subsection provides further details on the empirical models.

3.2 Difference-in-differences analysis

3.2.1 Defining the treatment group

We experiment with two alternative ways of defining the treatment group, to explore the sensitivity of the findings to these alternative approaches. These two alternative treatment groups are as follows:

1. Employees who, before each uprating, earned more than the current NMW/NLW but less than the incoming NMW/NLW, i.e.:

$$T_{it} = 1[NMW_t \leq w_{it} < NMW_{t+1}]$$

where T_{it} is a dummy variable equal to 1 for the treatment group and 0 otherwise; w_{it} is the individual's wage rate prior to the uprating and NMW is the NMW/NLW rate prevailing either before or after an uprating i.e. at time t or time t + 1.

2. A wage-gap definition of the treatment group, as follows:

$$T_{it} = \frac{\ln\left(\frac{NMW_{t+1}}{w_{it}}\right)}{ln\left(\frac{NMW_{t+1}}{NMW_t}\right)}$$

The above expression is equal to 0 if the individual earns exactly the incoming NMW/NLW, and is equal to 1 if the individual earns exactly the current NMW/NLW. This gives greater weight to individuals who experienced larger pay rises as a result of the minimum wage uprating and who are therefore most likely to experience employment or hours effects from a change in their wage rate.

3.2.2 Defining the comparison group

In defining the comparison groups, we restrict our analysis to individuals who, both before and after each uprating, earn more than the incoming minimum wage. To allow meaningful comparison between the two groups, the first comparison group is restricted to those individuals whose earnings do not exceed a threshold of 10 per cent above the incoming NMW/NLW. This comparison group is used both for the main treatment group and the analysis which weights the treatment group by the wage gap from the incoming minimum wage. As a robustness check we use an alternative definition of the comparison group, which is employees earning between 10 per cent and 20 per cent above the incoming minimum wage.

3.2.3 The DiD model

The general specification of a DiD model with a single post-intervention period is:

$$Z_{it} = \alpha_0 + \alpha_1 Post + \alpha_2 T_{it} + \alpha_3 T_{it} \times Post + X'_{it}\alpha_4 + \varepsilon_{it} \qquad (1)$$

where Z_{it} is the outcome of interest i.e. employment retention or hours following the uprating; Post is a dummy variable equal to 1 in time 1 and 0 otherwise; Z_{it} is a vector of individual and time-specific controls; α_0a0 is a constant terms; and ϵ_{it} is the error term. With several years of data we can estimate a version of model (1) in which we pool all years together and control for year fixed effects.

$$Z_{it} = \alpha_0 + \alpha_1 Post + \alpha_2 T_{it} + \alpha_3 T_{it} \times Post + X'_{it}\alpha_4 + \sum_{t=2011}^{2018} \alpha_t Y_t + \varepsilon_{it} \qquad (2)$$

where Y_t captures the year fixed effects. The coefficient α_3 in the above model captures the average effect of a given uprating on the outcome of interest.

To compare the effects of each uprating we can estimate a multi-period difference-in-differences model, which includes separate interactions between the treatment variable and the periods spanning a minimum wage uprating. For instance, with the quarterly longitudinal LFS data, denoting with W_t the periods affected by an uprating occurring in year t, the DiD model in equation (1) becomes:

$$Z_{it} = \alpha_0 + \sum_{t=2011}^{2018} \alpha_{1t} Post \times W_t + \alpha_2 T_{it} + \sum_{t=2011}^{2018} \alpha_{3t} T_{it} \times Post \times W_t + X'_{it}\alpha_4 + \varepsilon_{it} \qquad (3)$$

For the analysis which seeks to estimate the impact of the introduction of the NLW in April 2016 using ASHE, we follow the approach used by Aitken et al. (2018).The years from 2016 onwards are taken as the treatment period and the years 2012 to 2014 (when the upratings were smaller) as the pre-intervention period. In 2016, the introduction of the NLW resulted in the wage floor for those aged 25 or more increasing by 10.8 percent (from £6.50 an hour to £7.20 an hour) between ASHE 2015 and ASHE 2016. In identifying the treatment group in the period before the introduction of the NLW, we therefore select those earning between the minimum wage rate applying prior to each annual uprating and up to 10.8 per cent above this wage. For example, at the time of ASHE 2012, the NMW rate for those aged 25 or more was £6.08. Therefore, in this period the treatment group was defined as those earning between £6.08 and £6.69. Those earning between £6.69 and £7.36 prior to the 2012 uprating were then chosen as the main comparison group. This process of identifying the treatment and comparison groups was repeated for the other pre-intervention years.

Identification assumptions in the DiD model.

There is a risk that the treatment and comparison groups experience different trends in the outcome variables over the period of analysis. If this is the case, the DiD model will not provide an accurate estimate of the impact of the NMW/NLW on the outcomes of interest. We explore whether the assumption of common trends is valid by carrying out a pre-programme test using the ASHE data to establish whether there is any evidence that the treatment and comparison groups were experiencing diverging trends in the period before the NLW was introduced. In this analysis, the treatment and comparison groups are identified in a similar way for the pre-intervention years of 2011 and 2012, whilst 2014 is treated as a placebo intervention year.

3.3 Difference-in-differences-in-differences

As mentioned previously, a DDD approach exploits the fact that only employees aged 25 and older were eligible for the NLW, while the adult rate of the NMW was not increased for those aged between 21 and 24 until October 2016. This creates two comparison groups whose outcomes can be compared to treated individuals. Using two different comparison groups improves the chances of identifying the true effect of the introduction of the NLW as it is possible to compare the effect on the treatment group relative to the age comparison group and relative to the wage comparison group. The difference between the two relative effects captures the impact of the introduction of the NLW.

The DDD model is:

$$Z_{it} = \alpha_0 + \alpha_1 Post + \alpha_2 T_{Ait} + \alpha_3 T_{Wit} + \alpha_4 T_{Ait} \times T_{Wit} + \alpha_5 T_{Ait} \times Post + \alpha_6 T_{Wit} \times Post + \alpha_7 T_{Wit} \times T_{Ait} \times Post + \alpha_8 X_{it} \sum_{t=2011}^{2018} \alpha_t Y_t + \varepsilon_{it} \qquad (6)$$

where T_{Ait} takes the value of 1 where the individual belongs to the treated age group and T_{Wit} takes the value of 1 if the individual belongs to the treated wage group. The effect of the introduction of the NLW is then captured by the coefficient α_7. The DDD analysis is based solely on analysis of ASHE, where the larger sample sizes increase the likelihood of detecting any statistically significant impacts when stratifying the comparison group. Rather than using all employees over the age of 25 as the treated age group, the focus is on those under the age of 30, to aid comparability with the younger age group.

3.4 Further methodological issues

Brewer et al. 2015 showed that DiD analysis using the LFS has low power to detect any negative effect of the NMW on those aged 22 or more. In calculating confidence intervals, they demonstrate that both large negative and large positive effects on employment retention cannot be ruled out. They also computed minimum detectable effects (MDE) and found that when using Donald and Lang's two-step estimator, the average impact of a NMW uprating on the job retention rate would need to be around 8.6 percentage points for men or 5.4 percentage points for women to have an 80 per cent chance of being detected. They suggest a number of adjustments to improve upon the standard DiD approach:

1. Reporting 95 per cent confidence intervals associated with the null hypothesis that the NLW/NMW has no effect on employment. This indicates the magnitude of effects that can be ruled out. Related to this point, they also suggest placing less weight on statistical significance.
2. Reporting minimum detectable effects (MDE). These show how large the true elasticity of the outcome to a change in the minimum wage must be to be detected with a given probability (conventionally 80 per cent). The expression for the MDE is:

$$MDE(\pi) = \sigma(b)\left[c_{1-\frac{\alpha}{2}} - p^{t}_{(1-\pi)}\right] \qquad (4)$$

   where $\sigma(b)$ is the standard error of the estimated coefficient, $c_{1-\frac{\alpha}{2}}$ is the critical value of the $1-\frac{\alpha}{2}$ th percentile of the t-distribution with $N-1$ degrees of freedom (where α denotes the significance level and N is the number of observations). $p^{t}_{(1-\pi)}$ is the $p^{t}_{(1-\pi)}$th percentile of the t-distribution with $N-1$ degrees of freedom, under the null hypothesis of no treatment effect.
3. Placing greater emphasis on the economic significance of results. In particular, they suggest that elasticities should be reported rather than the average impact of a given NMW uprating so that it is easier to interpret the importance of findings. Hafner et al. (2016) also note the value of computing elasticities.

We take account of recent critiques by reporting 95 per cent confidence intervals and minimum detectable effects (MDE) for our main findings based on analysis of ASHE, as well as ensuring that results focus on economic significance by reporting elasticities.

A number of approaches are taken to assess the robustness of the results, including producing estimates using both ASHE and the LFS, considering the impact of including and excluding control variables and varying the choice of the comparison group.

4 Descriptive analysis and pre-programme tests

4.1 Introduction

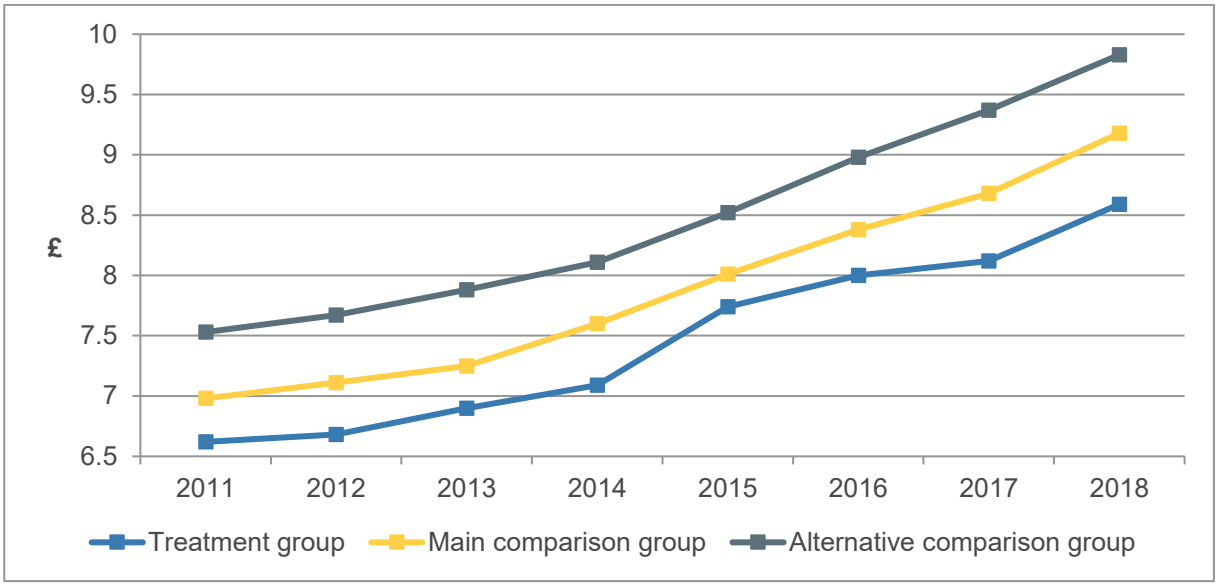
This chapter starts by providing a descriptive analysis of hourly wages, employment retention and basic weekly working hours prior to each annual uprating of the minimum wage. It shows the trend in wages, employment retention and hours followed by the treatment group and the two alternative comparison groups between 2011 and 2018. This provides an insight into whether each of the groups followed a similar trend in outcomes over time. It also reports mean hourly wages in each decile of the wage distribution over time to explore whether the increases experienced by the lowest paid employees as a result of minimum wage upratings resulted in similar rises further up the wage distribution in order to maintain wage differentials.

Following the descriptive analysis, the chapter moves on to report the results of pre-programme tests which provide a formal test of whether the treatment and comparison groups followed a similar trend in each of the outcomes of interest prior to the introduction of the NLW, controlling for individual-level characteristics. These tests are presented both for the DiD analysis and for the DDD analysis. Finally the chapter concludes by presenting covariance balance statistics which indicate the closeness of the match between the treatment and comparison groups on a range of individual-level characteristics prior to each uprating. This provides an insight into the likelihood that the analysis provides a robust estimate of how minimum wage upratings affected the outcomes of interest for the treatment group, given the particular characteristics of low wage employees. Throughout the focus is on employees eligible for the NLW i.e. those aged 25 or more at the pre-uprating observation.

4.2 Wages

Figure 1 reports mean hourly wages (excluding overtime) following each minimum wage uprating between 2011 and 2018 for the main treatment group, the main comparison group and the alternative comparison group. All three groups tended to follow a similar trend in hourly wages over the period from 2011 to 2014. However, there was a notable difference in the trend in wages between the treatment and comparison groups between 2014 and 2015. This is likely to reflect the fact that the timing of the minimum wage uprating moved from 1 October to 1 April. This meant that between ASHE 2015 and ASHE 2016 the treatment group experienced two changes in the NLW (from £6.50 to £6.70 on 1 October 2015 and to £7.20 on 1 April 2016). As a result, post-intervention wages for the 2015 uprating effectively captured the impact of both the 2015 and the 2016 upratings, given that they were not observed until ASHE 2016.

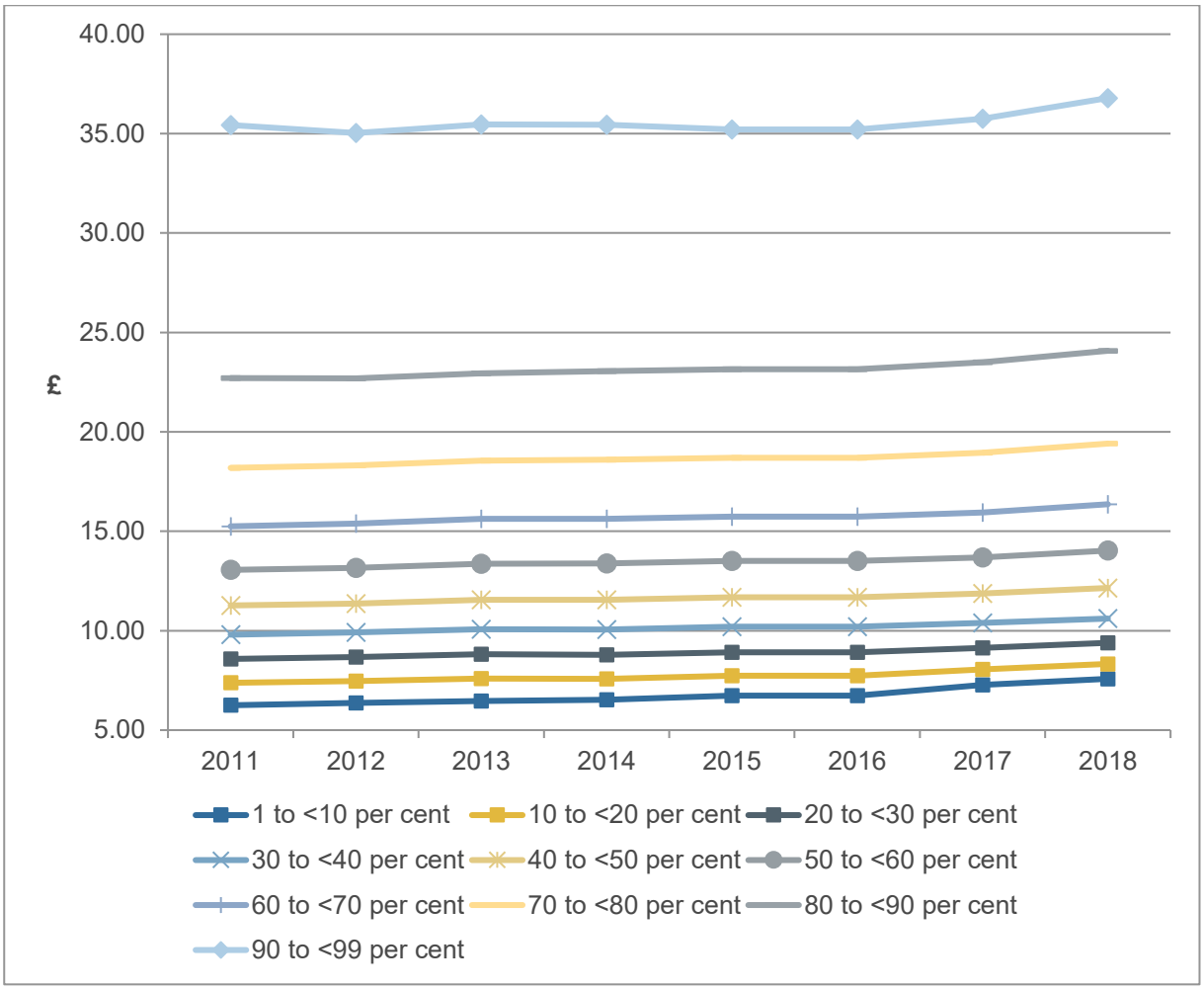
Figure 1 Mean hourly wages for treatment and comparison groups after each uprating



Notes: Based on a minimum of 2,361 observations for the treatment group; 4,170 observations for the main comparison group and 4,151 observations for the alternative comparison group. Authors' own calculations from ASHE.

Figure 2 reports mean hourly wages for employees aged 25 or more in each decile of the wage distribution prior to each annual uprating, excluding those in the top and bottom 1 per cent of the wage distribution. There is a general upward trend in hourly wages over time (with the exception of those in the top decile), and a more marked increase in wages is apparent for all parts of the wage distribution from 2016 onwards. However, the figure does suggest that those in the lowest decile of the wage distribution experienced a sharper increase in hourly wages between the period prior to the 2016 uprating and the period prior to the 2017 uprating. This is consistent with the introduction of the NLW in 2016 raising wages for the lowest page employees by more than for other groups and thus narrowing the wage gap with those higher up the wage distribution. This suggests that there was little evidence of spillover from the introduction of the NLW to the wages of those higher up the wage distribution, at least in the period immediately following the introduction of the NLW. As a result, the main comparison group or the alternative comparison group appear likely to follow a similar trend in wages to that which would have been followed by the treatment group if the NLW had not been introduced.

Figure 2 Mean hourly wages (£) in each decile of the wage distribution prior to each annual uprating

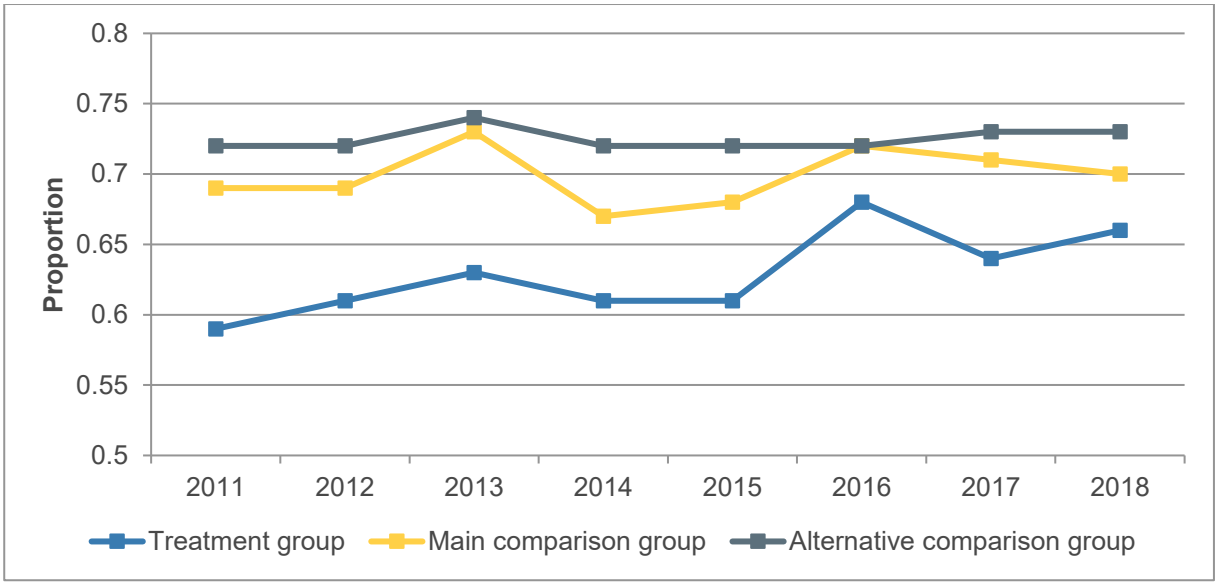


Notes: Based on analysis of a minimum of 109,033 cases in any year. Authors' own calculations from ASHE.

4.3 Employment retention

Turning to changes in employment retention over time (Figure 3) it is apparent that employment retention was fairly stable for those higher up the wage distribution (the alternative comparison group). It was more volatile both for the treatment group and the main comparison group. For those directly affected by the uprating of the minimum wage, there was a sizeable increase in employment retention following the introduction of the NLW in 2016. For the main comparison group, there was a sizeable drop in employment retention following the 2014 uprating of the NMW.

Figure 3 Mean employment retention for treatment and comparison groups after each uprating

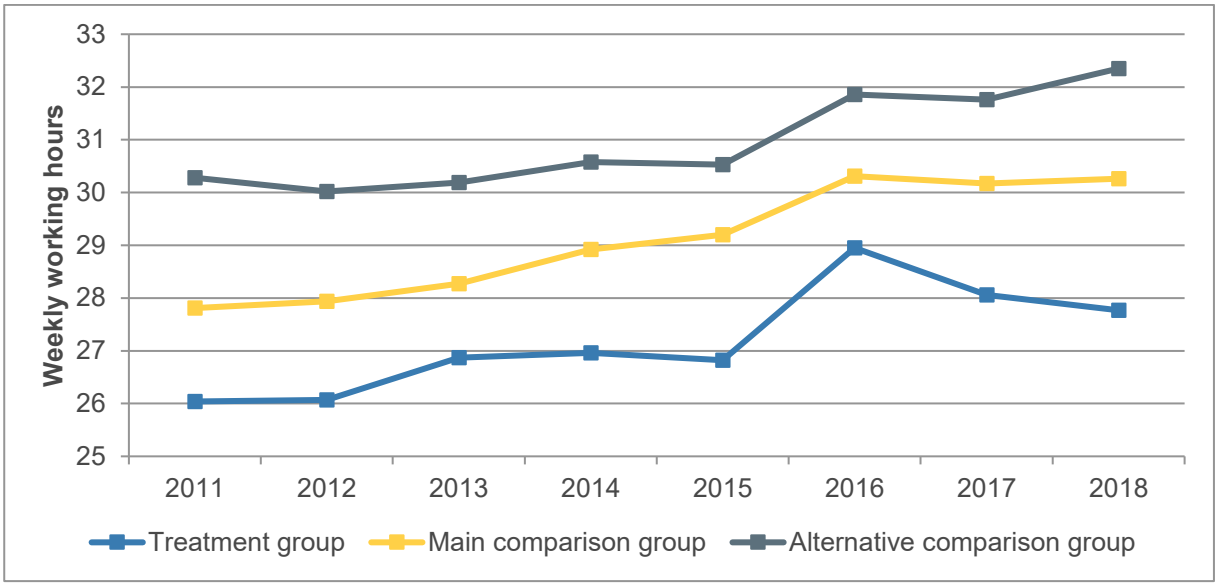


Notes: Based on a minimum of 3,856 observations for the treatment group; 6,074 observations for the main comparison group and 5,739 observations for the alternative comparison group. Authors' own calculations from ASHE.

4.4 Basic weekly working hours

Figure 4 shows mean basic weekly working hours following each uprating. It is apparent that minimum wage employees tended to work fewer hours than those on higher hourly wages. There was an increase in working hours for all groups following the 2016 uprating, but this change was most pronounced for those directly affected by the introduction of the NLW.

Figure 4 Mean working hours for treatment and comparison groups after each uprating



Notes: Based on a minimum of 2,361 observations for the treatment group; 4,179 observations for the main comparison group and 4,151 observations for the alternative comparison group. Authors' own calculations from ASHE.

4.5 Meeting the common trends assumption

4.5.1 Difference-in-differences analysis

Real wage growth

Table 4.1 reports the results of a pre-programme test, designed to assess whether the common trends assumption underlying the DiD analysis is valid. In these models, the impact of a placebo uprating in 2014, of similar magnitude to the 2016 increase, is explored on real wage growth. If the treatment and comparison group follow a similar trend in real wage growth prior to the introduction of the NLW, the impact coefficients would be close to zero and statistically insignificant. This provides a more formal test of the descriptive analysis set out in section 4.2. All the pre-programme tests are based on analysis of ASHE.

Table 4.1 shows that there was very little evidence that the treatment and comparison groups experienced different trends in wages in the period prior to the introduction of the NLW. The only statistically significant difference in trends was for men working full-time and this was only apparent in one of the three specifications.

Table 4.1 Placebo test for change in real wages following 2014 uprating

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Main comparison group					
Impact	0.007*	0.002	-0.009	0.006	0.032**
Standard error	0.004	0.005	0.009	0.009	0.013
Lower confidence interval	-0.001	-0.009	-0.026	-0.011	0.007
Upper confidence interval	0.015	0.012	0.008	0.023	0.056
Alternative comparison group					
Impact	0.006	0.007	-0.002	-0.004	0.024*
Standard error	0.004	0.006	0.009	0.008	0.014
Lower confidence interval	-0.002	-0.004	-0.019	-0.021	-0.002
Upper confidence interval	0.014	0.018	0.015	0.012	0.051
Wage gap definition					
Impact	0.009	0.003	0.011	0.017	0.018
Standard error	0.006	0.008	0.015	0.015	0.018
Lower confidence interval	-0.003	-0.013	-0.018	-0.013	-0.018
Upper confidence interval	0.021	0.019	0.040	0.047	0.054
Base (i) and (iii)	28,431	14,945	3,428	5,815	4,243
Base (ii)	28,611	14,142	3,868	6,588	4,013

Employment retention

There was a statistically significant difference in outcomes between the treatment and comparison groups in two of the three specifications when considering the outcome of employment retention for the full sample of individuals on low pay. However, this appeared to have been largely driven by the findings for men working full-time, as the only other subgroup which experienced a statistically significant divergence in trends prior to the introduction of the NLW was women working full-time and this was only evident in one of the three specifications. The common trends assumption was not violated for the other subgroups when considering impacts statistically significant at the 5 per cent level or better, suggesting that for these groups the estimate of the impact of the introduction of the NLW in 2016 and the subsequent upratings would be likely to be reliable.

Table 4.2 Employment retention pre-programme test

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	0.031***	0.020	0.028	0.036*	0.059**
Standard error	0.009	0.013	0.027	0.021	0.024
Lower confidence interval	0.013	-0.006	-0.024	-0.006	0.011
Upper confidence interval	0.050	0.045	0.081	0.077	0.107
(ii) Alternative comparison group					
Impact	0.012	0.009	0.014	-0.002	0.043*
Standard error	0.009	0.013	0.026	0.020	0.026
Lower confidence interval	-0.006	-0.017	-0.037	-0.042	-0.007
Upper confidence interval	0.030	0.035	0.064	0.038	0.093
(iii) Wage gap definition					
Impact	0.043***	0.016	0.091**	0.035	0.094***
Standard error	0.014	0.019	0.044	0.034	0.034
Lower confidence interval	0.016	-0.020	0.005	-0.032	0.026
Upper confidence interval	0.071	0.053	0.176	0.103	0.161
Base (i) and (iii)	41,222	20,956	4,878	8,588	6,800
Base (ii)	40,920	19,618	5,360	9,590	6,352

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Working hours

In the case of working hours (

Table 4.3), the common trends assumption was violated for women working full-time when using the alternative comparison group, and for women working part-time when using the weighted wage gap version of the treatment group. In all other cases it appeared that the trends in working hours between the treatment and comparison groups were similar in the period before the introduction of the NLW, suggesting that the assumptions underlying the analysis of impact are valid.

Table 4.3 Change in weekly working hours - pre-programme test

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	0.167	0.413	-0.539*	0.142	-0.226
Standard error	0.185	0.260	0.321	0.265	0.713
Lower confidence interval	-0.197	-0.096	-1.169	-0.377	-1.623
Upper confidence interval	0.530	0.922	0.090	0.662	1.171
(ii) Alternative comparison group					
Impact	0.129	0.245	-0.625**	0.375	-0.339
Standard error	0.178	0.267	0.274	0.239	0.730
Lower confidence interval	-0.221	-0.279	-1.164	-0.093	-1.770
Upper confidence interval	0.478	0.769	-0.087	0.844	1.091
(iii) Wage gap definition					
Impact	0.397	0.808**	-0.695	0.401	-0.527
Standard error	0.283	0.387	0.518	0.453	1.016
Lower confidence interval	-0.158	0.050	-1.710	-0.486	-2.520
Upper confidence interval	0.952	1.566	0.319	1.288	1.465
Base (i) and (iii)	28,431	14,945	3,428	5,815	4,243
Base (ii)	28,611	14,142	3,868	6,588	4,013

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

4.5.2 Difference-in-difference-in-differences analysis

Real wage growth

Table 4.4 shows that each of the subgroups of interest experienced a similar trend in real wage growth prior to the introduction of the NLW. Older female employees were more likely to experience a downward trend compared to younger women however, regardless of their initial pay level.

Table 4.4 Placebo change in real wages following 2014 uprating – DDD for main comparison group

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Impact	0.010	0.021	0.071	-0.017	-0.005
Standard error	0.019	0.027	0.049	0.041	0.038
Lower CI	-0.027	-0.032	-0.026	-0.097	-0.081
Upper CI	0.047	0.074	0.168	0.064	0.070
Age	-0.030***	-0.028*	-0.061***	-0.023	-0.018
Standard error	0.010	0.015	0.022	0.022	0.018
Lower CI	-0.049	-0.058	-0.104	-0.066	-0.054
Upper CI	-0.010	0.001	-0.018	0.019	0.018
Wage	0.012	0.003	-0.025	0.030	0.016
Standard error	0.014	0.020	0.039	0.030	0.031
Lower CI	-0.016	-0.036	-0.101	-0.028	-0.046
Upper CI	0.039	0.043	0.051	0.089	0.077
Base	4,636	1,978	502	1,340	816

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Employment retention

The lack of statistically significant estimates on the impact variable in

Table 4.5 demonstrates that the treatment and comparison groups experienced a similar trend in employment retention in the period prior to the introduction of the NLW. This suggests that the approach to estimation is likely to result in an accurate estimate of the impact of the NLW.

Table 4.5 Placebo change in employment retention following 2014 uprating – DDD for main comparison group

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Impact	-0.014	-0.032	0.214*	-0.008	-0.067
Standard error	0.036	0.054	0.120	0.065	0.091
Lower CI	-0.085	-0.138	-0.022	-0.136	-0.247
Upper CI	0.056	0.073	0.450	0.120	0.112
Age	0.005	0.020	-0.140**	0.007	0.061
Standard error	0.019	0.029	0.057	0.035	0.046
Lower CI	-0.032	-0.037	-0.252	-0.061	-0.028
Upper CI	0.042	0.077	-0.028	0.075	0.151
Wage	-0.003	0.033	-0.167*	0.001	-0.044
Standard error	0.027	0.040	0.094	0.047	0.075
Lower CI	-0.056	-0.045	-0.351	-0.092	-0.190
Upper CI	0.050	0.111	0.018	0.093	0.102
Base	7,770	3,218	804	2,264	1,484

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Working hours

Table 4.6 shows that in the period prior to the introduction of the NLW the treatment and comparison groups experienced a similar trend in working hours. This again suggests that the DDD estimates for the period from 2016 onwards would be likely to provide a robust estimate of the impact of the introduction and uprating of the NLW. Older women working part-time did appear to experience a downward trend in working hours compared to younger women working part-time, irrespective of their starting wages.

Table 4.6 Placebo change in weekly working hours following 2014 uprating – DDD for main comparison group

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Impact	-0.546	3.153	-0.263	-5.255*	-0.843
Standard error	1.536	2.225	2.303	2.836	1.902
Lower CI	-3.558	-1.210	-4.789	-10.818	-4.577
Upper CI	2.465	7.516	4.263	0.308	2.891
Age	-2.062**	-4.058***	0.005	-0.928	0.919
Standard error	0.803	1.222	1.033	1.505	0.906
Lower CI	-3.636	-6.455	-2.025	-3.881	-0.861
Upper CI	-0.488	-1.662	2.036	2.026	2.698
Wage	0.819	-1.398	-0.743	3.369	0.964
Standard error	1.153	1.641	1.817	2.056	1.552
Lower CI	-1.442	-4.617	-4.314	-0.664	-2.084
Upper CI	3.079	1.820	2.828	7.401	4.011
Base	4,636	1,978	502	1,340	816

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

4.6 Balance statistics

This section reports the balance in covariates between the treatment and comparison groups prior to each uprating for the analysis based on the longitudinal LFS. The aim is to explore the level of similarity in working hours between the treatment and comparison groups prior to each uprating. The analysis uses the LFS data, due to the wider range of covariates.[6]

Table 4.7 shows balance statistics for weekly working hours, computed over the quarters before each uprating. It reports the mean, variance and skewness of the hours of work outcome measure for the treatment and comparison groups. It includes two measures of balance, the standardised difference and the variance ratio. The balance statistics show whether the treatment and comparison groups appear similar on this particular outcome

[6] Table 8.1 in Appendix A shows the sample sizes for the treatment and comparison groups, before and after each change in the NMW/NLW rates. For both the treatment and comparison groups only a very small number of individuals move from employment to non-employment between the first and fifth waves and no systematic differences in patterns between the treatment and comparison groups are apparent. Only a maximum of seven individuals left the sample between the before and after periods in any given year. Sample sizes for the treatment group in particular fluctuate from year to year, but this is likely to be largely explained by the number of individuals earning between the current and incoming NMW being greater in years when the increases in the NMW/NLW were higher. For example, the size of the treatment group is greatest in 2016 when there was a 50p rise due to the introduction of the NLW and smallest in 2012 and 2013 when the increases were 11p and 12p respectively.

prior to each uprating. If this is the case, it is more credible to believe that hours of work for the comparison group provide a good proxy for hours of work for the treatment group, had the treatment group not been subject to the uprating. The expression for the standardised difference for a continuous variable is: $= \frac{\bar{x}_t - \bar{x}_c}{\sqrt{\frac{s_t^2 - s_c^2}{2}}}$, where $\bar{x}_t$ and $\bar{x}_c$ are the sample means of variable x in the treatment and comparison groups respectively and s_t^2 and s_c^2 are the standard deviations of x in the treatment and comparison groups respectively. The standardised difference for a dummy variable is $d = \frac{\hat{p}_t - \hat{p}_c}{\sqrt{\frac{\hat{p}_t(1-\hat{p}_t)+\hat{p}_c(1-\hat{p}_c)}{2}}}$, where $\hat{p}_t$ and $\hat{p}_c$ denote the mean of the dummy variable in the treatment and comparison groups respectively (Flury and Riedwyl, 1986). The standardised differences should be as low as possible and the literature suggests that this should take a value no larger than ± 0.25 (Rubin, 2001). The variance ratio is simply the ratio of the variances between the treatment and comparison groups. Ideally this should be as close as possible to unity.

Table 4.7 Balance statistics for weekly working hours, before each uprating

Year of uprating	Treated			Comparison			Balance	
	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
2011	25.87	143.46	0.25	26.56	134.20	0.25	-0.06	1.07
2012	26.60	133.92	0.55	26.67	146.21	0.26	-0.01	0.92
2013	24.85	108.01	0.27	26.10	139.82	0.37	-0.11	0.77
2014	25.50	139.27	0.43	26.60	132.29	0.04	-0.09	1.05
2015	24.47	119.81	0.06	26.23	93.04	-0.02	-0.17	1.29
2016	26.65	128.83	-0.15	28.48	117.06	-0.16	-0.17	1.10
2017	26.59	123.63	0.09	28.01	128.66	0.21	-0.13	0.96
2018	26.70	134.65	0.34	27.95	116.99	-0.06	-0.11	1.15

Balance statistics are weighted using the longitudinal weights in the LFS (variable lgwt).

The magnitude of the standardised difference statistic does not exceed 0.25 prior to any uprating (Table 4.7). As for the variance ratio, the largest deviations from 1 are in 2013, 2015 and 2018. This suggests that the treatment and comparison groups are well-matched on weekly working hours in most cases prior to each uprating and so hours of work for the comparison group are likely to provide a reasonable estimate of what hours of work would have been for the treatment group if the minimum wage had not been uprated.

Appendix B shows covariate balance statistics for a wider range of pre-intervention characteristics. These are calculated for the full list of covariates included in the regressions. The results of the covariate balance statistics generally suggest that the treatment and comparison groups are similar. The standardised difference rarely has an absolute value in excess of 0.25. The regional and occupational variables show the highest imbalance when measured in terms of the variance ratio. Also some of the educational variables appear imbalanced in particular years. Although the treatment and comparison groups are fairly similar in many pre-intervention characteristics, the low

balance on some key covariates supports their inclusion as controls in the difference-in-differences analysis.

5 Findings

5.1 ASHE

This section reports the impact of the introduction of the NLW on real wage growth, employment retention and basic working hours based on analysis of ASHE panel data. Real wage growth is considered first, on the basis that if the introduction or uprating of the NLW does not result in greater wage growth for the treatment group than for the comparison group, it is unlikely to affect employment retention or working hours.

Each table shows the estimated difference-in-difference coefficient, standard error, the 95 per cent lower and upper confidence intervals and the sample size (base). In addition to this, the tables which explore the impact of the NLW on employment retention and working hours report the minimum detectable effect (MDE) and elasticity. The models include controls for age, age-squared, industry (SIC 2007 section level), occupation (SOC 2010 major group level) and government office region as well as year dummies. The tables report the impact of the introduction of the National Living Wage in 2016 and upratings in 2017 and 2018 on eligible employees of working age (those aged between 25 and 58 for women and between 25 and 63 for men). Findings for an alternative version of the analysis which omits the control variables are reported in Appendix C and any key differences are highlighted in the text.

5.1.1 Real wage growth

The first column in

Table 5.1 reports the impact of the introduction of the NLW on real wages for all those directly affected. Successive columns report impact estimates for women working part-time, women working full-time and men working full time. The table shows that the introduction of the NLW clearly raised real wages for all of the subgroups, aside from men who worked part-time. This was apparent across each of the three specifications. Since the introduction of the NLW did appear to have a positive impact on wages for the lowest paid, it is credible to expect it to affect the main outcomes of interest – namely employment retention and working hours.

Table 5.1 Change in real wages following introduction of the NLW in 2016

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Main comparison group					
Impact	0.035***	0.039***	0.043***	0.016	0.028***
Standard error	0.004	0.005	0.008	0.011	0.007
Lower CI	0.028	0.029	0.028	-0.006	0.014
Upper CI	0.042	0.048	0.059	0.037	0.042
Alternative comparison group					
Impact	0.037***	0.039***	0.048***	0.025**	0.026***
Standard error	0.003	0.005	0.007	0.011	0.007
Lower CI	0.030	0.029	0.033	0.003	0.012
Upper CI	0.044	0.049	0.062	0.047	0.040
Wage gap definition					
Impact	0.040***	0.045***	0.046***	0.013	0.044***
Standard error	0.005	0.007	0.011	0.013	0.011
Lower CI	0.031	0.033	0.024	-0.013	0.023
Upper CI	0.049	0.058	0.068	0.039	0.065
Base (i) and (iii)	43,022	22,739	5,004	6,936	8,343
Base (ii)	43,024	21,370	5,615	6,559	9,480

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 5.2 reports the change in real wages following the uprating of the NLW in 2017. Compared with the introduction of the NLW in 2016, there was much less evidence that the 2017 uprating raised real wages for those directly affected compared with employees who were higher up the wage distribution. This suggests that pay differentials with those higher up the wage distribution may have been restored following the 2017 uprating. Only wages for women working full-time appeared to be affected by the 2017 uprating and this was only apparent in the specification which used the alternative comparison group.

Table 5.2 Change in real wages following uprating of the NLW in 2017

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Main comparison group					
Impact	0.001	-0.001	0.018*	0.000	-0.001
Standard error	0.004	0.006	0.010	0.014	0.009
Lower CI	-0.007	-0.012	-0.001	-0.027	-0.019
Upper CI	0.010	0.011	0.036	0.027	0.017
Alternative comparison group					
Impact	0.004	0.001	0.024**	-0.008	0.002
Standard error	0.004	0.006	0.009	0.015	0.009
Lower CI	-0.004	-0.011	0.005	-0.037	-0.015
Upper CI	0.013	0.013	0.042	0.021	0.020
Wage gap definition					
Impact	0.009	0.011	0.023	0.010	-0.002
Standard error	0.007	0.009	0.015	0.021	0.015
Lower CI	-0.004	-0.007	-0.007	-0.031	-0.032
Upper CI	0.023	0.029	0.053	0.051	0.028
Base (i) and (iii)	39,393	20,614	4,738	6,156	7,885
Base (ii)	39,023	19,133	5,227	5,652	9,011

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 5.3 reports the change in log real wages following the uprating of the NLW in 2018. The 2018 uprating appeared to increase wages for women working full-time both in the main specification and the specification using the alternative comparison group. There was no evidence that the 2018 uprating had a statistically significant impact on wages for any of the other subgroups.

Table 5.3 Change in real wages following uprating of the NLW in 2018

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Main comparison group					
Impact	0.002	0.001	0.017**	-0.013	0.002
Standard error	0.004	0.005	0.008	0.012	0.007
Lower CI	-0.006	-0.009	0.001	-0.037	-0.013
Upper CI	0.009	0.012	0.033	0.010	0.016
Alternative comparison group					
Impact	0.001	-0.007	0.024***	-0.011	0.003
Standard error	0.004	0.006	0.008	0.012	0.007
Lower CI	-0.007	-0.018	0.008	-0.035	-0.011
Upper CI	0.008	0.004	0.039	0.013	0.018
Wage gap definition					
Impact	-0.008*	-0.007	0.000	-0.025*	-0.007
Standard error	0.005	0.007	0.011	0.014	0.010
Lower CI	-0.018	-0.020	-0.021	-0.053	-0.026
Upper CI	0.001	0.006	0.021	0.002	0.012
Base (i) and (iii)	43,324	22,655	5,067	7,089	8,513
Base (ii)	42,603	20,977	5,530	6,541	9,555

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Difference-in-difference-in-differences analysis

The coefficient on being low paid (wage) in Table 5.4 suggests that real wages grew by 6.1 per cent overall and by over 7.5 per cent for part-time employees of either gender following the introduction of the NLW in 2016, irrespective of age. In addition to this, wages rose by 4.5 per cent for men who worked full-time, regardless of their age. The age variable indicates that male employees who were working part-time when the NLW was introduced were more likely to experience an increase in real wages if they were aged 25 or more compared to younger men who worked part-time, regardless of whether they were earning less than the incoming NLW, or slightly above it. However, despite the evidence that the introduction of the NLW did result in higher wages for part-time employees and men working full-time across the age bands, the DDD analysis suggests that if anything the introduction of the NLW appeared to reduce growth in real wages for part-time employees those who were directly affected. This would be consistent with employers raising wages for low-paid employees regardless of their age following the introduction of the NLW for those aged 25 or more.

Table 5.4 Change in real wages following introduction of NLW in 2016 – DDD for main comparison group

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Impact	-0.030**	-0.050**	0.043	-0.060**	0.002
Standard error	0.014	0.024	0.032	0.028	0.022
Lower CI	-0.056	-0.097	-0.019	-0.115	-0.041
Upper CI	-0.003	-0.003	0.105	-0.004	0.045
Age	0.025**	0.028	-0.016	0.064***	0.013
Standard error	0.011	0.020	0.023	0.024	0.016
Lower CI	0.004	-0.011	-0.062	0.018	-0.019
Upper CI	0.047	0.066	0.029	0.111	0.045
Wage	0.061***	0.075***	-0.007	0.079***	0.046**
Standard error	0.011	0.019	0.025	0.022	0.018
Lower CI	0.040	0.038	-0.056	0.036	0.010
Upper CI	0.082	0.113	0.042	0.121	0.083
Base	8,618	3,508	1,008	2,364	1,738

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

As with the DiD analysis, the DDD analysis suggested that there was little evidence that the 2017 uprating of the NLW affected real wages for those who were directly affected (

Table 5.5). However, the lowest paid men who worked part-time did experience an increase in real wages relative to those higher up the wage distribution, irrespective of age.

Table 5.5 Change in real wages following uprating of NLW in 2017 – DDD for main comparison group

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Impact	-0.020	-0.018	0.032	-0.025	-0.026
Standard error	0.016	0.027	0.033	0.033	0.028
Lower CI	-0.051	-0.072	-0.032	-0.089	-0.081
Upper CI	0.011	0.036	0.096	0.040	0.029
Age	0.003	-0.007	0.005	0.007	0.016
Standard error	0.009	0.015	0.018	0.018	0.015
Lower CI	-0.014	-0.037	-0.031	-0.028	-0.014
Upper CI	0.020	0.022	0.040	0.043	0.045
Wage	0.032**	0.013	0.007	0.060**	0.031
Standard error	0.013	0.022	0.028	0.025	0.024
Lower CI	0.007	-0.031	-0.047	0.011	-0.016
Upper CI	0.057	0.057	0.061	0.109	0.078
Base	5,432	2,096	678	1,478	1,180

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

The 2018 uprating of the NLW had little discernible impact on real wages for those who were directly affected (

Table 5.6). There was also little evidence that real wage growth varied depending on starting wages or age.

Table 5.6 Change in real wages following uprating of NLW in 2018 – DDD for main comparison group

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Impact	0.000	0.002	0.001	-0.015	0.041*
Standard error	0.017	0.029	0.031	0.040	0.025
Lower CI	-0.034	-0.055	-0.059	-0.092	-0.007
Upper CI	0.034	0.060	0.062	0.063	0.090
Age	-0.011	-0.003	0.010	-0.021	-0.025
Standard error	0.011	0.019	0.019	0.028	0.015
Lower CI	-0.033	-0.041	-0.027	-0.075	-0.055
Upper CI	0.011	0.035	0.048	0.033	0.005
Wage	0.010	-0.007	0.004	0.038	-0.018
Standard error	0.015	0.025	0.026	0.033	0.022
Lower CI	-0.019	-0.056	-0.046	-0.026	-0.060
Upper CI	0.039	0.042	0.055	0.102	0.025
Base	7,148	2,930	870	1,922	1,426

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

5.1.2 Employment retention

DiD analysis

Table 5.7 shows that for the main comparison group (i), the introduction of the NLW appeared to reduce the likelihood of directly affected male and female employees who worked part-time being retained in employment. The elasticity for women working part-time indicates that for every 1 per cent increase in the minimum wage rate in 2016 there was a reduction of 0.56 percent in the likelihood of a minimum wage employee remaining in employment. For men working part-time, the negative impact of the 2017 uprating on employment retention was even more pronounced, equating to a 0.72 per cent reduction in the likelihood of being retained in work for every 1 per cent increase in the minimum wage rate.

Table 5.7 Employment retention following the introduction of the NLW in 2016

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	-0.030***	-0.044***	0.026	-0.048**	-0.014
Standard error	0.008	0.011	0.024	0.021	0.018
Lower CI	-0.046	-0.066	-0.020	-0.089	-0.051
Upper CI	-0.014	-0.022	0.073	-0.007	0.022
Minimum detectable effect	0.010	0.014	0.031	0.026	0.024
Elasticity	-0.42	-0.56	0.37	-0.72	-0.21
(ii) Alternative comparison group					
Impact	-0.009	-0.009	0.004	-0.015	-0.006
Standard error	0.008	0.012	0.022	0.022	0.018
Lower CI	-0.025	-0.032	-0.039	-0.058	-0.041
Upper CI	0.007	0.014	0.047	0.027	0.028
Minimum detectable effect	0.011	0.015	0.029	0.028	0.023
Elasticity	-0.12	-0.12	0.05	-0.24	-0.09
(iii) Wage gap definition					
Impact	-0.026**	-0.036**	-0.013	-0.050**	0.027
Standard error	0.010	0.014	0.033	0.024	0.026
Lower CI	-0.047	-0.064	-0.077	-0.098	-0.024
Upper CI	-0.006	-0.008	0.050	-0.003	0.078
Minimum detectable effect	0.011	0.015	0.033	0.026	0.028
Elasticity	-0.36	-0.47	-0.18	-0.75	0.43
Base (i) and (iii)	62,325	31,697	7,086	11,220	12,322
Base (ii)	61,730	29,692	7,728	10,615	13,695

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

There was less evidence that the introduction of the NLW in 2016 had a negative impact on employment retention for full-time employees of either gender, although the much smaller sample sizes suggest that impacts for these groups would need to be substantial in order to be detected. The pre-programme tests also suggested that the impact estimates may not be reliable for men working full-time.

Turning to the alternative definition of the comparison group (ii), it is apparent that when drawing the comparison group from higher up the wage distribution, there was less evidence to suggest that the introduction of the NLW had a negative impact on employment retention for directly affected employees. None of the impact estimates for any of the subgroups were statistically significant, and the elasticities indicate that even for men working part-time, a 1 percent increase in the minimum wage resulted in a modest reduction in the likelihood of remaining in work of 0.24 per cent.

The version of the analysis which weighted members of the treatment group by the gap between their wage prior to the uprating and the incoming NLW (iii) showed a very similar pattern of results to version (i). Again, employment retention for men and women working part-time appeared to fall in response to the introduction of the NLW, whilst this was not evident for male or female full time employees.

Given the limited evidence that the uprating of the NLW in 2017 raised wages for those directly affected compared to those higher up the wage distribution, it is unsurprising to see that there was little evidence that the 2017 uprating affected employment retention for any of the subgroups considered (

Table 5.8).

Table 5.8 Employment retention following the uprating of the NLW in 2017

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	0.008	0.006	0.021	-0.021	0.024
Standard error	0.010	0.014	0.028	0.026	0.023
Lower CI	-0.011	-0.020	-0.035	-0.071	-0.020
Upper CI	0.028	0.033	0.076	0.029	0.068
Minimum detectable effect	0.011	0.015	0.031	0.027	0.025
Elasticity	0.30	0.22	0.73	-0.82	0.93
(ii) Alternative comparison group					
Impact	0.012	0.003	0.055**	-0.028	0.019
Standard error	0.010	0.014	0.028	0.027	0.022
Lower CI	-0.008	-0.024	0.000	-0.081	-0.025
Upper CI	0.032	0.031	0.109	0.025	0.062
Minimum detectable effect	0.011	0.015	0.031	0.029	0.024
Elasticity	0.44	0.11	2.02	-1.07	0.71
(iii) Wage gap definition					
Impact	0.025	0.006	0.031	0.009	0.080**
Standard error	0.016	0.021	0.046	0.038	0.037
Lower CI	-0.006	-0.035	-0.058	-0.066	0.008
Upper CI	0.055	0.048	0.121	0.084	0.152
Minimum detectable effect	0.012	0.016	0.037	0.029	0.031
Elasticity	0.90	0.22	1.12	0.36	3.38
Base (i) and (iii)	56,488	28,505	6,647	9,779	11,557
Base (ii)	55,086	26,146	7,178	8,909	12,853

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

The uprating of the NLW in 2018 did not have a clear impact on employment retention for any of the subgroups of employees considered (Table 5.9). Again, this is unsurprising given the limited evidence that the 2018 uprating affected real wage growth. The only statistically significant impacts for particular subgroups of employees were apparent in just one of the three specifications (the weighted wage gap version of the analysis) and in the case of men working full-time, the pre-programme tests suggested that the apparent increase in employment retention following the 2018 uprating was unlikely to be robust.

Table 5.9 Employment retention following the uprating of the NLW in 2018

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	0.019**	0.018	0.004	0.031	0.016
Standard error	0.008	0.011	0.024	0.020	0.019
Lower CI	0.003	-0.004	-0.043	-0.009	-0.021
Upper CI	0.035	0.041	0.052	0.070	0.053
Minimum detectable effect	0.011	0.015	0.031	0.026	0.024
Elasticity	0.68	0.62	0.16	1.18	0.58
(ii) Alternative comparison group					
Impact	0.010	-0.008	0.023	-0.015	0.030
Standard error	0.008	0.012	0.024	0.022	0.018
Lower CI	-0.006	-0.032	-0.024	-0.058	-0.006
Upper CI	0.026	0.016	0.069	0.028	0.065
Minimum detectable effect	0.011	0.015	0.030	0.027	0.023
Elasticity	0.35	-0.26	0.83	-0.53	1.09
(iii) Wage gap definition					
Impact	0.035***	0.033**	-0.030	0.042*	0.064***
Standard error	0.010	0.014	0.031	0.023	0.024
Lower CI	0.015	0.006	-0.091	-0.003	0.017
Upper CI	0.054	0.060	0.031	0.087	0.111
Minimum detectable effect	0.011	0.015	0.033	0.026	0.027
Elasticity	1.25	1.13	-1.00	1.65	2.49
Base (i) and (iii)	62,588	31,577	7,245	11,296	12,470
Base (ii)	60,550	28,831	7,716	10,295	13,708

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Difference-in-difference-in-differences analysis

Table 5.10 shows that the introduction of the NLW resulted in a reduction in employment retention for directly affected men who worked part-time of 11.7 per cent. The coefficient on being low paid (wage) indicates that the introduction of the NLW reduced employment retention for low paid female employees who worked part-time, regardless of their age.

Table 5.10 Employment retention following introduction of NLW in 2016 – DDD for main comparison group

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Impact	-0.027	0.032	0.009	-0.117**	-0.017
Standard error	0.025	0.040	0.070	0.048	0.054
Lower CI	-0.075	-0.046	-0.128	-0.211	-0.124
Upper CI	0.021	0.109	0.146	-0.023	0.089
Age	0.036*	0.006	0.027	0.052	0.074*
Standard error	0.020	0.033	0.053	0.040	0.041
Lower CI	-0.004	-0.059	-0.076	-0.027	-0.006
Upper CI	0.075	0.071	0.130	0.131	0.155
Wage	-0.046**	-0.081***	-0.063	0.000	-0.051
Standard error	0.019	0.031	0.055	0.037	0.045
Lower CI	-0.084	-0.142	-0.171	-0.071	-0.140
Upper CI	-0.008	-0.020	0.044	0.072	0.037
Base	14,950	6,048	1,690	4,174	3,038

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 5.11 shows that the uprating of the NLW in 2017 did not have a statistically significant impact on employment retention for any of the subgroups of employees (

Table 5.11).

Table 5.11 Employment retention following uprating of NLW in 2017 – DDD for main comparison group

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Impact	-0.023	-0.016	0.018	-0.007	-0.135*
Standard error	0.033	0.053	0.096	0.061	0.079
Lower CI	-0.088	-0.119	-0.170	-0.126	-0.290
Upper CI	0.042	0.087	0.206	0.113	0.021
Age	0.048***	0.062*	0.056	0.021	0.080*
Standard error	0.018	0.029	0.054	0.035	0.039
Lower CI	0.012	0.005	-0.049	-0.047	0.003
Upper CI	0.083	0.119	0.161	0.089	0.157
Wage	-0.002	-0.015	-0.025	-0.056	0.141*
Standard error	0.027	0.042	0.080	0.046	0.068
Lower CI	-0.054	-0.098	-0.181	-0.146	0.008
Upper CI	0.050	0.068	0.131	0.035	0.274
Base	8,954	3,414	1,190	2,346	2,004

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 5.12 shows that the 2018 uprating of the NLW appeared to reduce employment retention amongst men working part-time when using DDD methods. As this finding was not evident in the DiD analysis and there was also no evidence that the 2018 uprating had an impact on real wages for this group, this finding must be treated with caution. The coefficient on the age variable indicates that for men working part-time the 2018 uprating increased employment retention for older employees compared to younger employees irrespective of their earnings prior to the uprating. For women the 2018 uprating appeared to reduce employment retention for low paid employees, irrespective of age.

Table 5.12 Employment retention following uprating of NLW in 2018 – DDD for main comparison group

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Impact	0.010	0.064	0.117	-0.105**	0.001
Standard error	0.027	0.043	0.077	0.051	0.066
Lower CI	-0.044	-0.021	-0.035	-0.205	-0.128
Upper CI	0.064	0.149	0.268	-0.005	0.130
Age	0.026	0.027	-0.090*	0.086**	0.012
Standard error	0.019	0.030	0.052	0.035	0.043
Lower CI	-0.010	-0.031	-0.193	0.017	-0.071
Upper CI	0.063	0.085	0.012	0.154	0.096
Wage	-0.047**	-0.083**	-0.200***	0.068	-0.058
Standard error	0.023	0.036	0.065	0.041	0.057
Lower CI	-0.092	-0.155	-0.327	-0.013	-0.170
Upper CI	-0.001	-0.012	-0.073	0.149	0.055
Base	12,240	4,886	1,532	3,306	2,516

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

5.1.3 Weekly working hours

Table 5.13 reports the impact of the introduction of the NLW in 2016 on the number of hours worked by directly affected employees who were in work both before and after the change. Restricting the sample to those who were employed both before and after the uprating does reduce the sample size and this may partly explain why none of the impact estimates are statistically significant. However, on the face of it, the analysis suggests that across each of the different specifications and for each of the subgroups considered the introduction of the NLW did not affect the working hours of low-paid employees who were in employment at both points in time. Generally speaking the elasticities are small, suggesting that when the subgroups are combined a 1 per cent increase in the NLW would result in a change in working hours ranging from a reduction of 0.02 per cent to an increase of 0.03 per cent depending on the specification. It is notable that between the different specifications there is variation in whether the estimated impact of the introduction of the NLW for a particular subgroup of employees raised or reduced working hours.

Table 5.13 Change in working hours following the introduction of the NLW in 2016

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	-0.066	-0.261	-0.060	0.569	0.064
Standard error	0.166	0.234	0.279	0.606	0.240
Lower CI	-0.392	-0.720	-0.606	-0.618	-0.406
Upper CI	0.260	0.198	0.487	1.756	0.535
Minimum detectable effect	0.211	0.300	0.342	0.742	0.295
Elasticity	-0.02	-0.09	-0.01	0.45	0.02
(ii) Alternative comparison group					
Impact	0.094	0.172	0.290	-0.456	0.214
Standard error	0.160	0.244	0.235	0.624	0.209
Lower CI	-0.219	-0.306	-0.171	-1.680	-0.194
Upper CI	0.406	0.649	0.750	0.767	0.623
Minimum detectable effect	0.204	0.310	0.293	0.778	0.267
Elasticity	0.03	0.09	0.10	-0.11	0.06
(iii) Wage gap definition					
Impact	0.051	-0.049	0.147	0.585	0.073
Standard error	0.215	0.301	0.377	0.711	0.337
Lower CI	-0.371	-0.639	-0.593	-0.808	-0.587
Upper CI	0.474	0.541	0.888	1.978	0.733
Minimum detectable effect	0.226	0.316	0.386	0.743	0.346
Elasticity	0.02	-0.02	0.04	0.48	0.02
Base (i) and (iii)	43,022	22,739	5,004	6,936	8,343
Base (ii)	43,024	21,370	5,615	6,559	9,480

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Again, there was no clear evidence that the uprating of the NLW in 2017 had an impact on working hours for each of the subgroups of employees directly affected by the uprating (Table 5.14). This is unsurprising given the earlier evidence that the 2017 uprating did not result in a divergence in wages between the treatment and comparison groups.

Table 5.14 Change in working hours following the uprating of the NLW in 2017

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	-0.371*	-0.352	-0.326	-0.622	0.150
Standard error	0.201	0.282	0.320	0.746	0.292
Lower CI	-0.764	-0.905	-0.952	-2.085	-0.422
Upper CI	0.022	0.202	0.301	0.841	0.722
Minimum detectable effect	0.207	0.303	0.327	0.737	0.305
Elasticity	-0.23	-0.27	-0.15	-0.33	0.11
(ii) Alternative comparison group					
Impact	-0.273	-0.149	-0.096	-0.888	0.263
Standard error	0.195	0.291	0.279	0.775	0.257
Lower CI	-0.655	-0.719	-0.643	-2.407	-0.240
Upper CI	0.108	0.421	0.450	0.631	0.767
Minimum detectable effect	0.198	0.312	0.267	0.792	0.258
Elasticity	-0.18	-0.14	-0.05	-0.40	0.21
(iii) Wage gap definition					
Impact	-0.528*	-0.587	-0.410	-0.359	0.204
Standard error	0.317	0.446	0.511	1.127	0.474
Lower CI	-1.149	-1.461	-1.412	-2.568	-0.725
Upper CI	0.093	0.287	0.592	1.850	1.133
Minimum detectable effect	0.235	0.336	0.386	0.792	0.373
Elasticity	-0.29	-0.39	-0.18	-0.22	0.15
Base (i) and (iii)	39,393	20,614	4,738	6,156	7,885
Base (ii)	39,023	19,133	5,227	5,652	9,011

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 5.15 also finds no evidence that the uprating of the NLW had a clear impact on working hours for each of the subgroups considered across any of the three specifications.

Table 5.15 Change in working hours following the uprating of the NLW in 2018

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	-0.127	-0.315	-0.184	0.589	-0.019
Standard error	0.165	0.235	0.280	0.575	0.239
Lower CI	-0.451	-0.775	-0.733	-0.537	-0.488
Upper CI	0.197	0.146	0.365	1.715	0.449
Minimum detectable effect	0.203	0.291	0.350	0.693	0.295
Elasticity	-0.09	-0.24	-0.09	1.27	-0.01
(ii) Alternative comparison group					
Impact	-0.024	0.116	-0.160	-0.313	0.132
Standard error	0.161	0.245	0.245	0.606	0.208
Lower CI	-0.339	-0.364	-0.639	-1.501	-0.275
Upper CI	0.291	0.597	0.320	0.876	0.540
Minimum detectable effect	0.197	0.302	0.298	0.731	0.251
Elasticity	-0.02	0.13	-0.08	-0.21	0.09
(iii) Wage gap definition					
Impact	0.076	-0.035	0.172	0.764	0.235
Standard error	0.204	0.288	0.363	0.665	0.311
Lower CI	-0.324	-0.600	-0.539	-0.540	-0.374
Upper CI	0.477	0.530	0.883	2.069	0.845
Minimum detectable effect	0.219	0.309	0.397	0.701	0.342
Elasticity	0.07	-0.03	0.12	2.87	0.17
Base (i) and (iii)	43,324	22,655	5,067	7,089	8,513
Base (ii)	42,603	20,977	5,530	6,541	9,555

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Difference-in-difference-in-differences analysis

The DDD analysis was consistent with the DiD analysis in finding that the introduction of the NLW in 2016 did not have a statistically significant impact on weekly hours for directly affected employees (Table 5.16).

Table 5.16 Change in weekly working hours following introduction of NLW in 2016 – DDD for main comparison group

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Impact	-0.167	-0.791	-0.695	2.076	-0.319
Standard error	1.031	1.634	1.156	2.022	1.091
Lower CI	-2.188	-3.995	-2.963	-1.889	-2.459
Upper CI	1.853	2.413	1.573	6.041	1.821
Age	-1.364*	-1.951	-0.071	-1.599	-0.607
Standard error	0.825	1.337	0.850	1.683	0.807
Lower CI	-2.981	-4.573	-1.740	-4.899	-2.189
Upper CI	0.253	0.670	1.598	1.701	0.975
Wage	1.136	1.740	0.790	0.012	-0.092
Standard error	0.820	1.290	0.916	1.550	0.919
Lower CI	-0.471	-0.789	-1.006	-3.028	-1.893
Upper CI	2.742	4.269	2.587	3.053	1.710
Base	8,618	3,508	1,008	2,364	1,738

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

The DDD analysis also found that the uprating of the NLW in 2017 did not have a clear impact on working hours for directly affected employees from any of the subgroups considered (

Table 5.17). Older women working part-time did appear to work fewer hours following the uprating compared to younger women working part-time, but this was apparent irrespective of their wages prior to the uprating.

Table 5.17 Change in weekly working hours following uprating of NLW in 2017 – DDD for main comparison group

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Impact	-1.169	-2.081	-1.608	-1.839	1.645
Standard error	1.340	2.217	1.726	2.511	1.547
Lower CI	-3.796	-6.430	-4.998	-6.766	-1.391
Upper CI	1.458	2.268	1.782	3.087	4.681
Age	-1.748**	-2.559**	0.059	-1.385	-1.225
Standard error	0.734	1.219	0.955	1.377	0.822
Lower CI	-3.187	-4.949	-1.817	-4.087	-2.838
Upper CI	-0.309	-0.169	1.934	1.317	0.388
Wage	1.230	1.932	2.032	1.174	-0.722
Standard error	1.089	1.814	1.461	1.895	1.320
Lower CI	-0.904	-1.626	-0.837	-2.543	-3.312
Upper CI	3.365	5.489	4.901	4.891	1.869
Base	5,432	2,096	678	1,478	1,180

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Again, the DDD analysis suggested that the uprating of the NLW in 2018 did not have a clear impact on working hours for any of the subgroups considered (Table 5.18).

Table 5.18 Change in weekly working hours following uprating of NLW in 2018 – DDD for main comparison group

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Impact	0.171	0.987	-2.095	-0.321	1.069
Standard error	1.158	1.841	1.460	2.099	1.398
Lower CI	-2.100	-2.622	-4.960	-4.438	-1.674
Upper CI	2.442	4.597	0.770	3.796	3.812
Age	-0.751	-1.197	-0.295	-0.691	-0.058
Standard error	0.767	1.220	0.912	1.458	0.877
Lower CI	-2.254	-3.589	-2.085	-3.550	-1.779
Upper CI	0.751	1.194	1.494	2.168	1.664
Wage	0.415	-0.428	1.038	1.605	-0.680
Standard error	0.981	1.569	1.218	1.722	1.226
Lower CI	-1.507	-3.504	-1.353	-1.772	-3.086
Upper CI	2.338	2.649	3.428	4.981	1.725
Base	7,148	2,930	870	1,922	1,426

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

5.2 LFS

This section describes the results of the analysis using the LFS five-quarters longitudinal datasets. The results are based on data spanning the period from the October to December quarter of 2010 to the January to March quarter of 2018. As with the ASHE analysis, the tables in this section report results from the model with full controls, but the versions with basic controls and no controls are reported in Appendix C and differences between each of the models are described in the text.

5.2.1 Employment retention

Table 5.19 reports the difference-in-differences estimates for the employment retention equation for individual years between 2011 and 2018 for the main specification of the treatment and comparison groups. An important caveat when interpreting these results is that they are based on a very low number of observations per year, as is apparent from Appendix A. The small number of individuals in the treatment and comparison groups who move from employment to non-employment between each pre-uprating and post-uprating observation makes the impact estimates sensitive to changes of specification. These findings should therefore be treated with caution.

Table 5.19 Employment retention. DiD results using LFS longitudinal data, 2011-2018, main specification

	All	Women working part-time	Women working full-time	Men working full-time
NMW 2011	-0.023	-0.025	0.022	-0.028
Standard error	(0.033)	(0.048)	(0.071)	(0.061)
Confidence intervals	[-0.087, 0.042]	[-0.119, 0.069]	[-0.118, 0.162]	[-0.148, 0.092]
NMW 2012	-0.026	-0.040	-0.019	0.018
Standard error	(0.034)	(0.054)	(0.041)	(0.071)
Confidence intervals	[-0.094, 0.041]	[-0.146, 0.065]	[-0.099, 0.060]	[-0.120, 0.157]
NMW 2013	0.024	0.026	0.011	0.029
Standard error	(0.035)	(0.053)	(0.069)	(0.044)
Confidence intervals	[-0.044, 0.092]	[-0.078, 0.131]	[-0.123, 0.146]	[-0.058, 0.115]
NMW 2014	0.051**	0.024	0.102*	0.089*
Standard error	(0.024)	(0.035)	(0.054)	(0.047)
Confidence intervals	[0.005, 0.098]	[-0.045, 0.092]	[-0.003, 0.208]	[-0.003, 0.180]
NMW 2015	-0.025	-0.012	0.039	-0.134*
Standard error	(0.033)	(0.041)	(0.072)	(0.071)
Confidence intervals	[-0.089, 0.039]	[-0.093, 0.069]	[-0.103, 0.180]	[-0.274, 0.005]
NMW 2016	-0.056**	-0.083**	0.026	-0.109**
Standard error	(0.028)	(0.042)	(0.044)	(0.048)
Confidence intervals	[-0.112, -0.001]	[-0.165, -0.000]	[-0.059, 0.112]	[-0.204, -0.015]
NMW 2017	0.020	0.042	-0.017	-0.005
Standard error	(0.019)	(0.038)	(0.014)	(0.036)
Confidence intervals	[-0.017, 0.057]	[-0.033, 0.117]	[-0.044, 0.009]	[-0.075, 0.065]
NMW 2018	0.023	0.026	0.011	0.037
Standard error	(0.021)	(0.029)	(0.036)	(0.056)
Confidence intervals	[-0.018, 0.063]	[-0.030, 0.082]	[-0.060, 0.083]	[-0.072, 0.146]
Controls	Full	Full	Full	Full
R-squared	0.061	0.078	0.104	0.103
Observations	8,100	3,792	1,802	1,688

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

The only year in which the NMW/NLW had a clear effect on employment retention for particular subgroups of employees which was not sensitive to the inclusion of controls was 2016. In this year, the introduction of the NLW appeared to reduce employment retention for women working part-time, but this was not the case in the versions of the analysis which used the alternative comparison group (

Table 5.20), or used a weighted wage gap definition of the treatment group (

Table 5.21). It also did not hold when the control variables were excluded. The finding that men working full-time experienced a reduction in employment retention following the 2016 uprating is also brought into question by the earlier finding that this particular subgroup may have experienced different trends in employment retention compared to the comparison group prior to the 2016 uprating. Overall, the analysis of the longitudinal LFS provides only weak evidence that the introduction of the NLW in 2016 resulted in a reduction in employment retention for any of the subgroups considered. Also, the 2017 and 2018 upratings of the NLW did not have a clear impact on employment retention for any of the subgroups.

Table 5.20 Employment retention. DiD results using LFS longitudinal data, 2011-2018, alternative comparison group

	All	Women working part-time	Women working full-time	Men working full-time
NMW 2011	-0.052*	-0.053	-0.046	-0.096*
Standard error	(0.029)	(0.043)	(0.065)	(0.057)
Confidence intervals	[-0.109, 0.006]	[-0.137 - 0.032]	[-0.173 - 0.081]	[-0.208 - 0.016]
NMW 2012	-0.044	-0.054	0.040	-0.048
Standard error	(0.036)	(0.057)	(0.073)	(0.048)
Confidence intervals	[-0.114, 0.025]	[-0.165 - 0.057]	[-0.103 - 0.183]	[-0.142 - 0.046]
NMW 2013	0.010	0.064	-0.041	0.038
Standard error	(0.032)	(0.058)	(0.048)	(0.046)
Confidence intervals	[-0.053, 0.074]	[-0.050 - 0.177]	[-0.135 - 0.054]	[-0.052 - 0.128]
NMW 2014	-0.012	-0.039	0.010	0.017
Standard error	(0.018)	(0.028)	(0.027)	(0.030)
Confidence intervals	[-0.047, 0.022]	[-0.094 - 0.017]	[-0.043 - 0.063]	[-0.042 - 0.075]
NMW 2015	-0.038	-0.049	0.016	-0.118*
Standard error	(0.027)	(0.034)	(0.053)	(0.070)
Confidence intervals	[-0.091, 0.016]	[-0.115 - 0.017]	[-0.089 - 0.120]	[-0.256 - 0.020]
NMW 2016	-0.027	-0.005	0.027	-0.040
Standard error	(0.030)	(0.057)	(0.041)	(0.056)
Confidence intervals	[-0.086, 0.033]	[-0.117 - 0.108]	[-0.052 - 0.107]	[-0.151 - 0.070]
NMW 2017	0.017	0.055	-0.005	-0.019
Standard error	(0.021)	(0.054)	(0.020)	(0.039)
Confidence intervals	[-0.024, 0.058]	[-0.051 - 0.161]	[-0.043 - 0.034]	[-0.095 - 0.057]
NMW 2018	-0.013	-0.011	0.020	-0.036
Standard error	(0.021)	(0.037)	(0.043)	(0.040)
Confidence intervals	[-0.053, 0.028]	[-0.083 - 0.062]	[-0.064 - 0.104]	[-0.115 - 0.042]
Controls	Full	Full	Full	Full
R-squared	0.056	0.089	0.072	0.086
Observations	7,122	3,050	1,642	1,710

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

Table 5.21 Employment retention. DiD results using LFS longitudinal data, 2011-2018, weighted wage gap

	All	Women working part-time	Women working full-time	Men working full-time
NMW 2011	-0.037	-0.016	-0.050	0.002
Standard error	(0.042)	(0.054)	(0.119)	(0.066)
Confidence intervals	[-0.119, 0.045]	[-0.121 - 0.090]	[-0.284 - 0.183]	[-0.127 - 0.131]
NMW 2012	-0.031	-0.036	-0.021	-0.003
Standard error	(0.038)	(0.060)	(0.042)	(0.081)
Confidence intervals	[-0.105, 0.043]	[-0.153 - 0.081]	[-0.103 - 0.062]	[-0.163 - 0.157]
NMW 2013	0.031	0.020	0.013	0.006
Standard error	(0.042)	(0.076)	(0.073)	(0.058)
Confidence intervals	[-0.052, 0.113]	[-0.130 - 0.170]	[-0.130 - 0.155]	[-0.109 - 0.120]
NMW 2014	0.056**	0.029	0.101*	0.087*
Standard error	(0.025)	(0.037)	(0.056)	(0.048)
Confidence intervals	[0.008, 0.104]	[-0.043 - 0.102]	[-0.009 - 0.211]	[-0.008 - 0.182]
NMW 2015	-0.026	-0.018	0.039	-0.109
Standard error	(0.036)	(0.048)	(0.077)	(0.082)
Confidence intervals	[-0.098, 0.045]	[-0.111 - 0.075]	[-0.112 - 0.191]	[-0.270 - 0.052]
NMW 2016	-0.049	-0.052	0.055	-0.147**
Standard error	(0.034)	(0.047)	(0.039)	(0.070)
Confidence intervals	[-0.116, 0.018]	[-0.145 - 0.041]	[-0.022 - 0.132]	[-0.283 - -0.010]
NMW 2017	0.020	0.051	-0.021	-0.012
Standard error	(0.020)	(0.038)	(0.016)	(0.042)
Confidence intervals	[-0.018, 0.059]	[-0.024 - 0.126]	[-0.052 - 0.011]	[-0.094 - 0.070]
NMW 2018	0.033	0.040	0.066**	-0.007
Standard error	(0.022)	(0.029)	(0.032)	(0.065)
Confidence intervals	[-0.010, 0.076]	[-0.017 - 0.097]	[0.005 - 0.128]	[-0.135 - 0.120]
Controls	Full	Full	Full	Full
R-squared	0.060	0.077	0.108	0.099
Observations	8,100	3,792	1,802	1,688

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

5.2.2 Weekly working hours

Table 5.22 shows the difference-in-differences results for weekly working hours for the main specification. Here the coefficients can be interpreted as the effect of each uprating on the change in the number of hours worked by individuals affected by the uprating relative to the comparison group. The only subgroup which experienced a clear change in

hours across more than one of the three specifications was men who worked full-time. They appeared to work fewer hours following the introduction of the NLW in 2016 and this was the case in both the main specification and in the version which used the weighted wage gap definition of the treatment group (Table 5.23). This finding was also evident when the control variables were excluded.

Table 5.22 Weekly working hours. DiD results using LFS longitudinal data, 2011-2018, main specification

	All	Women working part-time	Women working full-time	Men working full-time
NMW 2011	0.564	-0.159	2.908**	1.093
Standard error	(1.028)	(1.002)	(1.357)	(1.367)
Confidence intervals	[-1.451, 2.580]	[-2.123, 1.806]	[0.244, 5.571]	[-1.590, 3.777]
NMW 2012	0.699	1.308	-1.767	-0.043
Standard error	(1.042)	(0.949)	(1.580)	(1.621)
Confidence intervals	[-1.344, 2.742]	[-0.554, 3.170]	[-4.868, 1.334]	[-3.225, 3.139]
NMW 2013	0.787	0.665	3.917**	-3.047
Standard error	(1.346)	(1.452)	(1.561)	(2.350)
Confidence intervals	[-1.852, 3.425]	[-2.183, 3.514]	[0.853, 6.981]	[-7.661, 1.567]
NMW 2014	0.645	0.237	-1.195	0.496
Standard error	(0.989)	(1.230)	(1.918)	(1.368)
Confidence intervals	[-1.295, 2.585]	[-2.176, 2.650]	[-4.960, 2.569]	[-2.189, 3.181]
NMW 2015	-0.672	0.077	2.870	-1.272
Standard error	(1.290)	(1.392)	(1.802)	(1.741)
Confidence intervals	[-3.202, 1.858]	[-2.652, 2.807]	[-0.665, 6.406]	[-4.689, 2.145]
NMW 2016	-1.645*	-1.173	-2.478**	-2.614**
Standard error	(0.983)	(1.214)	(1.201)	(1.167)
Confidence intervals	[-3.572, 0.282]	[-3.555, 1.209]	[-4.834, -0.121]	[-4.904, -0.324]
NMW 2017	-0.141	0.188	-0.172	1.498
Standard error	(0.829)	(1.040)	(1.248)	(1.374)
Confidence intervals	[-1.766, 1.485]	[-1.852, 2.228]	[-2.621, 2.277]	[-1.199, 4.195]
NMW 2018	-0.644	-1.466	-0.256	0.701
Standard error	(0.835)	(0.966)	(1.324)	(1.337)
Confidence intervals	[-2.281, 0.994]	[-3.361, 0.429]	[-2.855, 2.344]	[-1.924, 3.326]
Controls	Full	Full	Full	Full
R-squared	0.260	0.108	0.153	0.106
Observations	7,524	3,516	1,722	1,558

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

Table 5.23 Weekly working hours. DiD results using LFS longitudinal data, 2011-2018, weighted wage gap

	All	Women working part-time	Women working full-time	Men working full-time
NMW 2011	0.830	0.030	3.301**	1.402
Standard error	(1.305)	(1.146)	(1.575)	(1.622)
Confidence intervals	[-1.728, 3.389]	[-2.218 - 2.279]	[0.209 - 6.393]	[-1.782 - 4.587]
NMW 2012	1.133	1.233	-1.212	-0.909
Standard error	(1.107)	(1.009)	(1.859)	(1.758)
Confidence intervals	[-1.037, 3.303]	[-0.747 - 3.213]	[-4.861 - 2.438]	[-4.360 - 2.542]
NMW 2013	2.572	1.852	4.647**	-1.719
Standard error	(1.889)	(2.457)	(2.291)	(2.659)
Confidence intervals	[-1.133, 6.276]	[-2.968 - 6.671]	[0.150 - 9.144]	[-6.938 - 3.500]
NMW 2014	0.913	0.632	-0.689	-0.178
Standard error	(1.077)	(1.353)	(2.182)	(1.464)
Confidence intervals	[-1.199, 3.025]	[-2.022 - 3.286]	[-4.972 - 3.594]	[-3.053 - 2.697]
NMW 2015	-0.538	-0.486	3.124	-0.999
Standard error	(1.398)	(1.362)	(1.916)	(1.902)
Confidence intervals	[-3.278, 2.203]	[-3.156 - 2.185]	[-0.637 - 6.885]	[-4.733 - 2.734]
NMW 2016	-2.572**	-1.831	-2.348	-3.347**
Standard error	(1.294)	(1.399)	(1.603)	(1.647)
Confidence intervals	[-5.109, -0.035]	[-4.574 - 0.913]	[-5.495 - 0.799]	[-6.581 - -0.113]
NMW 2017	-0.318	-0.008	-0.406	1.213
Standard error	(0.887)	(1.113)	(1.374)	(1.462)
Confidence intervals	[-2.058, 1.421]	[-2.192 - 2.176]	[-3.102 - 2.290]	[-1.657 - 4.083]
NMW 2018	-0.558	-0.713	0.021	0.253
Standard error	(0.872)	(1.020)	(1.306)	(1.356)
Confidence intervals	[-2.267, 1.151]	[-2.713 - 1.287]	[-2.542 - 2.585]	[-2.409 - 2.916]
Controls	Full	Full	Full	Full
R-squared	0.261	0.107	0.152	0.104
Observations	7,524	3,516	1,722	1,558

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

Table 5.24 Weekly working hours. DiD results using LFS longitudinal data, 2011-2018, alternative comparison group

	All	Women working part-time	Women working full-time	Men working full-time
NMW 2011	1.483	0.722	2.753*	-0.096*
Standard error	(1.036)	(0.941)	(1.542)	(0.057)
Confidence intervals	[-0.549, 3.514]	[-1.124 - 2.569]	[-0.273 - 5.780]	[-0.208 - 0.016]
NMW 2012	1.759	0.981	-3.594**	-0.048
Standard error	(1.086)	(1.059)	(1.533)	(0.048)
Confidence intervals	[-0.371, 3.888]	[-1.097 - 3.060]	[-6.603 - -0.585]	[-0.142 - 0.046]
NMW 2013	0.345	0.323	2.417	0.038
Standard error	(1.314)	(1.703)	(1.494)	(0.046)
Confidence intervals	[-2.231, 2.922]	[-3.018 - 3.664]	[-0.516 - 5.351]	[-0.052 - 0.128]
NMW 2014	-0.442	-0.395	-1.857	0.017
Standard error	(0.887)	(1.205)	(1.480)	(0.030)
Confidence intervals	[-2.181, 1.297]	[-2.759 - 1.969]	[-4.763 - 1.048]	[-0.042 - 0.075]
NMW 2015	-1.376	1.713	-0.766	-0.118*
Standard error	(1.284)	(1.435)	(1.599)	(0.070)
Confidence intervals	[-3.893, 1.141]	[-1.102 - 4.529]	[-3.905 - 2.373]	[-0.256 - 0.020]
NMW 2016	-0.115	-0.996	-1.844	-0.040
Standard error	(0.963)	(1.254)	(1.452)	(0.056)
Confidence intervals	[-2.004, 1.774]	[-3.455 - 1.463]	[-4.694 - 1.007]	[-0.151 - 0.070]
NMW 2017	0.093	2.550**	-1.656	-0.019
Standard error	(0.908)	(1.179)	(1.133)	(0.039)
Confidence intervals	[-1.688, 1.874]	[0.237 - 4.864]	[-3.879 - 0.567]	[-0.095 - 0.057]
NMW 2018	-1.097	-2.282	-0.861	-0.036
Standard error	(0.959)	(1.438)	(1.210)	(0.040)
Confidence intervals	[-2.978, 0.784]	[-5.103 - 0.540]	[-3.237 - 1.516]	[-0.115 - 0.042]
Controls	Full	Full	Full	Full
R-squared	0.292	0.118	0.184	0.086
Observations	6,638	2,826	1,576	1,710

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

6 Subgroup analysis

6.1 Introduction

This chapter reports the findings of an analysis of the impact of the NLW on employees working for particular types of enterprise and on different types of contract. The purpose of the analysis is to identify whether the estimated impact of the NLW on employment retention and hours masks more pronounced differences in impact between employees in different sectors, in different types of employment or working for firms of different sizes.

The chapter reports the estimated impact of the NLW on those working for public sector organisations and for those working in the private sector. It also considers whether there was a clear, statistically significant, difference in impact between the two sectors. Similarly, it explores how the impact of the NLW varies depending on whether employees have a permanent or either temporary or causal contract. Finally, it considers how the impact of the NLW on employment retention and working hours varied with the size of the employing organisation. The tables report the expected rate of employment retention or the number of working hours for employees affected by the NLW in each sector had the NLW not been introduced or uprated at each point in time (known as the counterfactual). This provides an indication of the differences in outcomes for those working in different sectors, firms or on different types of contracts prior to each adjustment to the NLW.

6.2 Employment retention

Table 6.1 shows that amongst private sector employees, only women who worked part-time experienced a reduction in employment retention following the introduction of the NLW in 2016. It is noticeable however that this group also had the highest rate of employment retention (at 67.2 per cent) of all the subgroups of private sector employees. Women who worked part-time were also unique amongst public sector employees in experiencing a clear reduction in employment retention following the introduction of the NLW. The size of this reduction was much greater in the public sector than the private sector however, although this is likely to be partly explained by the fact that rates of employment retention are much higher in the public sector. For example, if the NLW had not been introduced, the expected rate of employment retention for women working part-time in the public sector would have been 86.4 per cent.

Table 6.1 Employment retention following introduction of NLW in 2016, by sector

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Private sector					
Impact	-0.016*	-0.029**	0.050*	-0.029	-0.014
Standard error	0.009	0.014	0.025	0.023	0.019
Counterfactual	0.649	0.672	0.623	0.616	0.645
Public sector					
Impact	-0.106***	-0.109***	-0.117	-0.155	-0.027
Standard error	0.027	0.032	0.115	0.102	0.146
Counterfactual	0.862	0.864	0.815	0.913	0.705
Difference	-0.090***	-0.080***	-0.167	-0.126	-0.013
Standard error	0.025	0.029	0.112	0.100	0.145
Base	58,308	29,134	6,681	10,529	11,964

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 6.2 shows that whilst counterfactual rates of employment retention were much higher for those on permanent contracts than for those engaged in either temporary or causal work, the impact of the introduction of the NLW did not vary by contract type. Indeed there was no evidence that the introduction of the NLW had any impact on employment retention for any of the subgroups considered once the sample was split by contract type.

Table 6.2 Employment retention following introduction of NLW in 2016, by contract type

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Temporary					
Impact	-0.020	-0.030	0.035	-0.078	0.052
Standard error	0.026	0.037	0.084	0.057	0.059
Counterfactual	0.547	0.601	0.487	0.570	0.427
Permanent					
Impact	-0.028	-0.042	0.026	-0.036	-0.018
Standard error	0.037	0.053	0.121	0.084	0.085
Counterfactual	0.691	0.708	0.676	0.657	0.686
Difference	-0.008	-0.013	-0.009	0.042	-0.070
Standard error	0.027	0.038	0.087	0.061	0.061
Base	61,786	31,435	7,033	11,099	12,219

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Generally speaking, without the introduction of the NLW, low wage employees could have expected to experience lower rates of employment retention in small firms than in larger organisations (

Table 6.3). The only exception to this was men who worked full time, who experienced a higher rate of employment retention in firms with fewer than 50 employees than in larger organisations. The impact of the introduction of the NLW on employment retention was to reduce employment retention amongst men who worked full time in small firms however, whilst employment retention fell for women who worked part-time in larger organisations. Overall, the only clear difference in the impact of the introduction of the NLW on employment retention between small and larger organisations was than men working full-time were more likely to experience a reduction in employment retention if they worked for a small organisation. An analysis of the impact of the introduction of the NLW in firms with fewer than 10 employees (reported in Appendix A) suggested that this finding was driven by firms with between 10 and 49 employees, rather than the very smallest firms.

At the opposite end of the spectrum of firm size, the impact of the introduction of the NLW on employment retention did not appear to differ between firms with 250 or more employees and those which were smaller, despite the fact that the largest firms tended to have higher rates of employment retention for minimum wage employees, for all but men who worked full-time.

Table 6.3 Employment retention following introduction of NLW in 2016, by firm size

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Larger					
Impact	-0.019**	-0.042***	0.029	-0.038	0.019
Standard error	0.010	0.013	0.027	0.025	0.022
Counterfactual	0.694	0.726	0.661	0.679	0.643
Small					
Impact	-0.042**	-0.030	0.022	-0.041	-0.093**
Standard error	0.021	0.029	0.063	0.054	0.047
Counterfactual	0.626	0.626	0.615	0.578	0.676
Difference	-0.023	0.013	-0.007	-0.003	-0.112***
Standard error	0.019	0.026	0.056	0.047	0.042
Smaller					
Impact	-0.031**	-0.028	0.020	-0.047	-0.045*
Standard error	0.012	0.018	0.035	0.032	0.026
Counterfactual	0.635	0.640	0.626	0.602	0.661
Large					
Impact	-0.023	-0.046	0.034	-0.038	0.017
Standard error	0.021	0.029	0.059	0.053	0.046
Counterfactual	0.703	0.737	0.668	0.686	0.643
Difference	0.009	-0.018	0.014	0.009	0.061
Standard error	0.017	0.023	0.048	0.043	0.038
Base	62,289	31,682	7,080	11,210	12,317

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 6.4 shows that there was little evidence that the uprating of the NLW in 2017 had any impact on employment retention for any of the subgroups considered, even when those working in the public and private sectors were considered separately.

Table 6.4 Employment retention following uprating of NLW in 2017, by sector

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Private sector					
Impact	0.011	0.011	0.026	-0.025	0.024
Standard error	0.011	0.016	0.030	0.027	0.023
Counterfactual	0.653	0.659	0.669	0.650	0.638
Public sector					
Impact	-0.007	-0.007	0.044	-0.134	0.099
Standard error	0.032	0.037	0.127	0.126	0.159
Counterfactual	0.821	0.827	0.748	0.829	0.733
Difference	-0.017	-0.018	0.017	-0.109	0.076
Standard error	0.030	0.034	0.124	0.123	0.157
Base	52,715	26,150	6,227	9,135	11,203

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

There were also no clear differences in the impact of the 2017 uprating of the NLW between those on temporary or casual and permanent contracts for any of the subgroups considered (Table 6.5).

Table 6.5 Employment retention following uprating of NLW in 2017, by contract type

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Temporary					
Impact	0.027	0.047	0.004	-0.073	0.128*
Standard error	0.032	0.048	0.094	0.071	0.071
Counterfactual	0.493	0.557	0.527	0.486	0.329
Permanent					
Impact	0.006	0.003	0.022	-0.014	0.011
Standard error	0.047	0.069	0.135	0.103	0.102
Counterfactual	0.692	0.697	0.704	0.677	0.686
Difference	-0.021	-0.044	0.018	0.059	-0.117
Standard error	0.034	0.050	0.097	0.075	0.074
Base	56,008	28,270	6,598	9,674	11,466

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Low-wage men working full-time for large firms experienced an increase in employment retention following the 2017 uprating of the NLW, whereas this was not the case for those working for smaller organisations (Table 6.6). This pattern was most evident when the very largest firms (those with 1000 or more employees) were compared against smaller firms (reported in Appendix A). However, as noted previously, the pre-programme tests suggested that the impact estimates may not be reliable for this group. In other respects, the impact of the uprating of the NLW in 2017 did not differ between employees working for firms of different sizes.

Table 6.6 Employment retention following uprating of NLW in 2017, by firm size

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Larger					
Impact	0.008	-0.005	0.022	-0.012	0.048*
Standard error	0.012	0.016	0.032	0.031	0.026
Counterfactual	0.697	0.710	0.696	0.689	0.660
Small					
Impact	0.003	0.034	0.004	-0.036	-0.047
Standard error	0.026	0.035	0.079	0.064	0.057
Counterfactual	0.609	0.621	0.645	0.570	0.615
Difference	-0.005	0.039	-0.018	-0.023	-0.095*
Standard error	0.023	0.032	0.072	0.056	0.051
Smaller					
Impact	0.007	0.033	0.020	-0.027	-0.044
Standard error	0.015	0.022	0.044	0.039	0.033
Counterfactual	0.617	0.619	0.655	0.593	0.619
Large					
Impact	0.005	-0.012	0.017	-0.021	0.075
Standard error	0.025	0.036	0.072	0.064	0.056
Counterfactual	0.714	0.731	0.703	0.703	0.670
Difference	-0.002	-0.045	-0.003	0.007	0.118***
Standard error	0.020	0.028	0.058	0.051	0.046
Base	56,458	28,493	6,640	9,771	11,554

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Women working part-time for private sector organisations experienced an increase in employment retention following the uprating of the NLW in 2018 compared to those in the

public sector (Table 6.7). Working in either the public or the private sector did not appear to determine the impact of the 2018 uprating for any of the other subgroups considered.

Table 6.7 Employment retention following uprating of NLW in 2018, by sector

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Private sector					
Impact	0.025***	0.034**	0.001	0.025	0.019
Standard error	0.009	0.014	0.026	0.022	0.019
Counterfactual	0.628	0.632	0.629	0.607	0.634
Public sector					
Impact	-0.049*	-0.055	0.064	-0.069	-0.067
Standard error	0.028	0.034	0.114	0.104	0.140
Counterfactual	0.796	0.801	0.735	0.740	0.791
Difference	-0.075***	-0.089***	0.063	-0.094	-0.087
Standard error	0.027	0.031	0.111	0.102	0.139
Base	58,505	28,995	6,807	10,608	12,095

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Low wage men who worked full time who were employed on temporary contracts appeared to experience an increase in employment retention following the 2018 uprating of the NLW (

Table 6.8). However, as noted previously, the pre-programme tests suggested that this finding may not be robust.

Table 6.8 Employment retention following uprating of NLW in 2018, by contract type

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Temporary					
Impact	0.032	0.011	-0.015	0.043	0.134**
Standard error	0.026	0.037	0.083	0.053	0.059
Counterfactual	0.440	0.506	0.432	0.429	0.277
Permanent					
Impact	0.021	0.021	0.008	0.032	0.015
Standard error	0.037	0.053	0.120	0.078	0.085
Counterfactual	0.670	0.672	0.668	0.641	0.687
Difference	-0.011	0.010	0.023	-0.011	-0.119*
Standard error	0.027	0.039	0.086	0.057	0.062
Base	62,069	31,334	7,190	11,182	12,363

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Men working part-time for larger firms experienced an increase in employment retention following the 2018 uprating, whereas this was not the case in organisations with fewer than 50 employees (

Table 6.9). Again, a subgroup analysis for very small firms (with fewer than 10 employees) suggested that this finding was driven by the impact of the NLW in firms with between 10 and 49 employees, rather than for micro-employers (see Appendix D). There were no other clear differences between any of the other subgroups in terms of the impact of the 2018 uprating on employment retention when using broad firm size categories. However, low paid women who worked full-time for very large employers (with 1000 or more employees) were more likely to be retained in work compared to those who worked for smaller firms following the 2018 uprating (Appendix D).

Table 6.9 Employment retention following uprating of NLW in 2018, by firm size

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Larger					
Impact	0.028***	0.023*	0.020	0.057**	0.021
Standard error	0.010	0.014	0.028	0.025	0.022
Counterfactual	0.647	0.664	0.634	0.608	0.632
Small					
Impact	-0.004	0.010	-0.048	-0.040	0.008
Standard error	0.021	0.029	0.064	0.051	0.048
Counterfactual	0.651	0.645	0.656	0.655	0.681
Difference	-0.032*	-0.013	-0.068	-0.097**	-0.013
Standard error	0.019	0.026	0.057	0.044	0.042
Smaller					
Impact	0.003	0.009	-0.033	-0.005	0.006
Standard error	0.012	0.018	0.037	0.031	0.027
Counterfactual	0.651	0.651	0.646	0.635	0.678
Large					
Impact	0.031	0.026	0.034	0.051	0.025
Standard error	0.021	0.029	0.061	0.051	0.047
Counterfactual	0.644	0.664	0.631	0.611	0.618
Difference	0.027	0.017	0.068	0.057	0.019
Standard error	0.017	0.023	0.049	0.041	0.038
Base	62,555	31,561	7,240	11,289	12,465

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

6.3 Weekly working hours

As well as the fact that the introduction of the NLW in 2016 had no impact on weekly working hours for any of the subgroups considered, Table 6.10 shows that impacts were not evident when those working in the public and private sectors were considered separately.

Table 6.10 Change in weekly working hours following introduction of NLW in 2016, by sector

	All	Women	Women	Men working	Men working

		working part-time	working full-time	part-time	full-time
Private sector					
Impact	-0.167	-0.421	-0.130	0.273	0.056
Standard error	0.191	0.291	0.306	0.674	0.250
Counterfactual	0.433	0.710	0.032	0.253	-0.301
Public sector					
Impact	0.334	0.110	-0.221	3.417	-0.404
Standard error	0.526	0.647	1.278	2.764	1.849
Counterfactual	0.266	0.300	0.336	-0.243	-0.320
Difference	0.501	0.531	-0.091	3.144	-0.460
Standard error	0.491	0.578	1.240	2.680	1.832
Base	40,110	20,890	4,698	6,443	8,079

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Employees on temporary or permanent contract from each of the subgroups considered also experienced little impact on working hours following the introduction of the NLW in 2016 (

Table 6.11).

Table 6.11 Change in weekly working hours following introduction of NLW in 2016, contract type

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Temporary					
Impact	0.499	0.403	-0.131	1.473	1.120
Standard error	0.573	0.809	1.136	1.749	0.877
Counterfactual	0.466	1.493	-0.436	-0.705	-1.406
Permanent					
Impact	-0.171	-0.351	-0.043	0.196	-0.047
Standard error	0.827	1.170	1.632	2.553	1.266
Counterfactual	0.383	0.453	0.025	0.490	-0.170
Difference	-0.670	-0.754	0.089	-1.278	-1.167
Standard error	0.597	0.845	1.172	1.860	0.912
Base	42,702	22,569	4,971	6,875	8,287

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

There is no evidence that the impact of the introduction of the NLW in 2016 on weekly working hours varied between employees working for firms of different sizes (

Table 6.12). This was also the case when looking at differences between those working for the very smallest and largest of firms (reported in Appendix D).

Table 6.12 Change in weekly working hours following introduction of NLW in 2016, by firm size

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Larger					
Impact	0.023	-0.225	0.016	0.934	0.122
Standard error	0.194	0.271	0.318	0.716	0.283
Counterfactual	0.408	0.607	-0.098	0.173	-0.302
Small					
Impact	-0.290	-0.362	-0.306	-0.106	-0.089
Standard error	0.431	0.615	0.735	1.558	0.604
Counterfactual	0.273	0.349	0.228	0.042	-0.201
Difference	-0.313	-0.137	-0.322	-1.040	-0.211
Standard error	0.385	0.553	0.663	1.384	0.534
Smaller					
Impact	-0.227	-0.476	0.120	0.347	-0.027
Standard error	0.261	0.388	0.421	0.960	0.343
Counterfactual	0.177	0.294	-0.082	-0.290	-0.174
Large					
Impact	0.067	-0.101	-0.204	0.825	0.140
Standard error	0.427	0.622	0.702	1.569	0.591
Counterfactual	0.503	0.699	0.024	0.443	-0.357
Difference	0.294	0.375	-0.323	0.478	0.167
Standard error	0.339	0.487	0.562	1.241	0.481
Base	43,010	22,733	5,001	6,934	8,342

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

The 2017 uprating of the NLW did not have a clear impact on working hours for any of the subgroups of employees considered in either the public or the private sector (

Table 6.13).

Table 6.13 Change in weekly working hours following uprating of NLW in 2017, by sector

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Private sector					
Impact	-0.392*	-0.394	-0.090	-0.647	0.133
Standard error	0.227	0.344	0.347	0.808	0.303
Counterfactual	0.053	-0.182	-0.220	0.558	-0.345
Public sector					
Impact	0.053	-0.100	-1.343	2.068	2.327
Standard error	0.613	0.757	1.373	3.538	1.893
Counterfactual	0.477	0.472	0.328	0.656	-0.031
Difference	0.445	0.294	-1.254	2.715	2.193
Standard error	0.569	0.674	1.328	3.445	1.869
Base	36,667	18,906	4,420	5,712	7,629

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Men working full time who were on temporary contracts experienced an increase in hours in response to the 2017 uprating of the NLW, but this was not the case for those on permanent contracts (Table 6.14).

Table 6.14 Change in weekly working hours following uprating of NLW in 2017, by contract type

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Temporary					
Impact	0.404	0.524	0.620	-0.931	3.046***
Standard error	0.738	1.061	1.234	2.437	1.125
Counterfactual	0.331	0.123	0.031	2.039	-2.148
Permanent					
Impact	-0.453	-0.429	-0.433	-0.782	-0.019
Standard error	1.062	1.527	1.777	3.529	1.619
Counterfactual	0.177	0.069	-0.118	0.546	-0.220
Difference	-0.857	-0.953	-1.053	0.149	-3.066***
Standard error	0.764	1.098	1.278	2.552	1.164
Base	39,100	20,455	4,707	6,102	7,836

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

The impact of the 2017 uprating of the NLW on working hours did not vary between those working form firms of different sizes once their gender and working pattern was taken into account (Table 6.15).

Table 6.15 Change in weekly working hours following uprating of NLW in 2017, by firm size

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Larger					
Impact	-0.328	-0.371	-0.211	-0.448	0.223
Standard error	0.230	0.324	0.357	0.876	0.336
Counterfactual	0.289	0.279	-0.322	0.527	-0.227
Small					
Impact	-0.544	-0.313	-0.759	-1.031	-0.185
Standard error	0.526	0.743	0.880	1.903	0.757
Counterfactual	-0.259	-0.664	0.573	0.393	-0.685
Difference	-0.216	0.058	-0.548	-0.584	-0.409
Standard error	0.473	0.668	0.804	1.689	0.678
Smaller					
Impact	-0.199	0.066	-0.606	-0.667	0.105
Standard error	0.325	0.476	0.507	1.193	0.447
Counterfactual	-0.439	-0.745	0.189	-0.461	-0.759
Large					
Impact	-0.517	-0.596	-0.149	-0.592	0.075
Standard error	0.525	0.758	0.828	1.937	0.741
Counterfactual	0.538	0.504	-0.362	1.115	-0.002
Difference	-0.319	-0.662	0.458	0.075	-0.030
Standard error	0.412	0.589	0.654	1.526	0.591
Base	39,383	20,609	4,734	6,155	7,885

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

The impact of the 2018 uprating of the NLW did not vary between each of the subgroups of employees depending on whether they worked for the public or private sector (Table 6.16), whether they had a permanent or a temporary contract (Table 6.17) or the size of firm that they worked for (

Table 6.18)

Table 6.16 Change in weekly working hours following uprating of NLW in 2018, by sector

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Private sector					
Impact	-0.027	-0.223	-0.123	0.716	0.006
Standard error	0.188	0.288	0.306	0.632	0.250
Counterfactual	0.251	0.481	0.052	-0.266	-0.187
Public sector					
Impact	-0.654	-0.450	-0.454	-2.780	-2.788
Standard error	0.562	0.687	1.226	2.925	1.753
Counterfactual	0.592	0.465	0.578	1.411	0.031
Difference	-0.627	-0.227	-0.331	-3.496	-2.795
Standard error	0.529	0.624	1.187	2.856	1.735
Base	40,319	20,764	4,737	6,587	8,231

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 6.17 Change in weekly working hours following uprating of NLW in 2018, by contract type

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Temporary					
Impact	0.191	-0.329	-0.685	1.705	1.671*
Standard error	0.591	0.840	1.147	1.709	0.959
Counterfactual	1.049	1.684	0.926	0.298	-1.387
Permanent					
Impact	-0.231	-0.350	-0.188	0.159	-0.201
Standard error	0.852	1.212	1.647	2.490	1.378
Counterfactual	0.338	0.474	0.027	0.120	-0.073
Difference	-0.422	-0.021	0.496	-1.546	-1.873*
Standard error	0.614	0.873	1.183	1.812	0.989
Base	43,001	22,487	5,033	7,029	8,452

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 6.18 Change in weekly working hours following uprating of NLW in 2018, by firm size

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Larger					
Impact	-0.181	-0.374	-0.253	0.494	0.097
Standard error	0.196	0.278	0.318	0.698	0.283
Counterfactual	0.381	0.574	0.116	-0.085	-0.210
Small					
Impact	-0.043	-0.250	0.077	0.669	-0.313
Standard error	0.421	0.603	0.738	1.438	0.601
Counterfactual	0.296	0.549	-0.119	-0.143	-0.108
Difference	0.138	0.124	0.330	0.175	-0.410
Standard error	0.373	0.536	0.666	1.257	0.530
Base	43,312	22,648	5,065	7,088	8,511
Smaller					
Impact	0.016	-0.168	-0.212	0.721	0.107
Standard error	0.252	0.373	0.427	0.875	0.341
Counterfactual	0.146	0.309	0.141	-0.305	-0.302
Large					
Impact	-0.235	-0.402	-0.156	0.452	-0.151
Standard error	0.418	0.607	0.707	1.456	0.588
Counterfactual	0.507	0.736	-0.002	0.064	-0.070
Difference	-0.251	-0.234	0.056	-0.269	-0.257
Standard error	0.334	0.479	0.564	1.163	0.479
Base	43,312	22,648	5,065	7,088	8,511

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

7 Summary and conclusions

7.1 Summary

7.1.1 Real wage growth

The pre-programme tests for the DiD analysis carried out using ASHE found that the treatment and comparison groups followed a similar trend in real wage growth in the period prior to the introduction of the NLW. This suggested that the DiD analysis would be likely to provide an unbiased estimate of the impact of the introduction of the NLW and its subsequent upratings.

The DiD analysis using ASHE showed that the introduction of the NLW in 2016 raised real wages for all of the subgroups of employees considered, except for men who worked part-time. This was evident in each of the three specifications used. Given that the introduction of the NLW increased real wages for low paid employees it therefore seems plausible that it would potentially have an impact on employment retention and working hours.

There was much less evidence that either the 2017 or the 2018 upratings of the NLW raised real wages for each of the subgroups of employees. Aside from the fact that the 2018 uprating increased wages for women working full-time in two of the three specifications, there was little to suggest that these two upratings resulted in real wage growth. This may have been because in these years wages for the comparison groups caught up with the growth in wages for those who were the direct targets of the NLW increases.[7]

The DDD analysis suggested that whilst the introduction of the NLW raised real wages for all subgroups of low-paid employees apart from women working full-time, employers tended to apply the wage rise to all low-paid employees, rather than just those aged 25 or more. This was largely consistent with the findings of Aitken et al. (2018), who found that the NLW raised wages for low paid employees irrespective of age. The DDD analysis also suggested that the 2017 and 2018 upratings of the NLW did not have a strong effect on real wage growth for those who were directly affected.

[7] Further analysis of ASHE, reported in Appendix E, shows that when findings for the period from 2016 to 2018 were pooled, the introduction and uprating of the NLW did clearly raise real wages for low-paid female employees regardless of whether they worked part-time or full-time. The NLW also resulted in higher wages for men who worked full-time in two of the three specifications, but had little impact on wages for low-paid men who worked part-time.

7.1.2 Employment retention

Pre-programme tests based on a DiD analysis of the 2014 uprating using ASHE cast doubt on the reliability of estimates of the impact of the NLW on employment retention for men who worked full-time. As a result, the report focused on impact estimates for the other subgroups of employees where the impact estimates were likely to be more accurate.

The analysis of ASHE suggested that the introduction of the NLW in 2016 reduced employment retention for part-time employees of either gender. This was evident in two of the three specifications used. There was some evidence to corroborate this finding for women who worked part-time from the longitudinal LFS, but this was only apparent in one of the three specifications and was sensitive to the inclusion or exclusion of control variables. Sample sizes were insufficient to explore whether this finding held in the LFS for men who worked part-time.

The DDD analysis also found that the introduction of the NLW reduced employment retention for men who worked part-time, but the evidence was inconclusive for female part-time employees. There was no consistent evidence that either the 2017 or the 2018 upratings affected employment retention for the subgroups of employees considered in the analysis. The DDD analysis also supported the finding that the 2017 uprating had little impact on employment retention for any of the subgroups considered. The 2018 uprating did appear to reduce employment retention for men who worked part-time in the DDD analysis, but this finding must be treated with caution given that it was not corroborated by any of the other analysis.

Women who worked part-time in both the public and private sectors experienced a reduction in employment retention following the introduction of the NLW in 2016. The size of this reduction was much greater in the public sector than in the private sector, but this is likely to be partly due to the much higher rates of employment retention in the public sector in general.

Men working full-time experienced lower rates of employment retention following the introduction of the NLW in 2016 if they worked for an organisation with fewer than 50 employees rather than a larger one, although the pre-programme tests suggest that this finding may not be robust. The impact of the introduction of the NLW in 2016 on employment retention did not vary by whether the employee was on a permanent or a temporary contract.

The impact of the 2017 uprating of the NLW on employment retention did not vary by whether the employee was in the public or private sector or whether they were employed on a temporary or a permanent contract. Whilst men who were employed on a full-time basis appeared to experience higher rates of employment retention following the 2017 uprating if they worked for a firm with 250 or more employee compared to those working for smaller firms, again, this finding should be treated with caution as the pre-programme tests suggested that the impact estimates may not be reliable for this group.

The 2018 uprating of the NLW appeared to increase employment retention for women who worked part-time for private sector organisations, compared to those in the public sector. Men who worked part-time for larger firms also experienced an increase in employment retention following the 2018 uprating. This was not apparent for men who worked part-time for firms with fewer than 50 employees. The only other apparent variation in the impact of the 2018 uprating of the NLW on particular subgroups of employees was that men who worked full-time and who were on temporary contracts appeared to experience an increase in rates of employment retention compared with those on permanent contracts following the 2018 uprating. However, the pre-programme tests suggested that this finding may not be robust.

Men working part-time for larger firms experienced an increase in employment retention following the 2018 uprating, whereas this was not the case in organisations with fewer than 50 employees (

Table 6.9). There were no other clear differences between any of the other subgroups in terms of the impact of the 2018 uprating on employment retention.[8]

7.1.3 Working hours

The pre-programme tests for both the DiD and the DDD analysis indicated that the treatment and comparison groups did follow a similar trend in working hours outcomes in the period prior to the introduction of the NLW for all of the subgroups considered. This suggests that the estimated impact of the NLW on working hours is likely to be robust.

The analysis largely suggested that the introduction of the NLW in 2016 and the subsequent upratings in 2017 and 2018 did not affect working hours for any of the subgroups of directly affected employees.[9] This was apparent in the ASHE analyses using both DiD and DDD methods. The only exception to this finding was that the analysis of the longitudinal LFS found that men who worked full-time experienced a reduction in working hours following the introduction of the NLW in 2016. This was apparent in two of the three specifications and was robust to the inclusion or exclusion of control variables. However, as this finding was only evident in the analysis of the longitudinal LFS, it should be treated with some caution.

As well as finding that the introduction of the NLW in 2016 and the subsequent upratings had little impact on working hours for the main subgroups of employees, an analysis of the impact on those working for firms in the public and private sectors, on temporary or permanent contracts or for firms of different sizes found no evidence of hours effects by firm or contract type. The only difference that emerged was that men who worked full-time who were employed on a temporary contract experienced an increase in hours following the 2017 uprating of the NLW relative to those who were on permanent contracts. In other respects there was little to suggest that the type of contract or firm that the employee worked for affected the number of hours that they worked following changes to the NLW.

7.2 Conclusions

The analysis suggests that the introduction of the NLW in April 2016 reduced employment retention for both male and female part-time employees. The finding for women is consistent with earlier analyses by Aitken et al. (2018), but they found no statistically significant impact on employment retention for men working part-time. The reasons for this difference in findings is unclear, but it may be due to the fact that Aitken et al. (2018) use four control years in their analyses, compared to the three that we use here.[10] The

[8] An analysis of the impact of the introduction and uprating of the NLW over the whole period from 2016 to 2018 (reported in Appendix E), using the ASHE data found little evidence that employment retention was affected for any of the main subgroups of employees.

[9] Appendix E reports the findings of a pooled analysis of ASHE which shows that the introduction and uprating of the NLW had no impact on working hours for any of the main subgroups of employees over the period from 2016 to 2018.

[10] The ASHE panel used in this report is only available for the period from 2011 to 2018 to avoid discontinuities which were introduced with the introduction of SOC 2010 in the 2011 dataset. Aitken et al.

fact that the finding for men working part-time is sensitive to the approach to estimation means that it should be treated with greater caution than the conclusion that women working part-time experienced a reduction in employment retention as a result of the introduction of the NLW in 2016. Nevertheless, there is evidence to suggest that part-time employees were more likely to be negatively affected by the introduction of the NLW than full-time employees. For women working part-time a 1 per cent increase in the NLW resulted in a reduction in employment retention of around 0.56 per cent. Women working part-time in the public sector in particular appeared to experience the largest reductions in employment retention following the introduction of the NLW.

There was little evidence that the 2017 or 2018 upratings affected employment retention for men or women or those on part-time or full-time contracts and the findings for 2017 were consistent with the analysis carried out by Aitken et al. (2018). However, there were signs that the 2018 uprating did have a positive impact on employment retention for women who worked part-time for private sector firms compared to those in the public sector. Also men who worked part-time for larger firms were more likely to be retained following the 2018 uprating if they worked for a firm with 50 or more employees rather than a smaller organisation.

There was little evidence from either ASHE or the longitudinal LFS that the introduction or uprating of the NLW has affected working hours for any of the subgroups of employees considered. This was consistent with the findings of Aitken et al. (2018). There was some evidence from the longitudinal LFS that men who worked full-time experienced a reduction in working hours following the introduction of the NLW in 2016, but this was not apparent in the analysis of ASHE, where larger sample sizes were available. When exploring whether impacts on working hours were apparent when looking at particular types of firms or contracts, it appeared that men who worked full-time who were employed on a temporary contract experienced an increase in hours following the 2017 uprating of the NLW relative to those who were on permanent contracts. However, there was little evidence to suggest that any of the other characteristics considered had a bearing on the impact of the uprating of the NLW on working hours.

additionally use ASHE 2007 to 2010, but we chose to focus on the period after the 2008 recession, as well as one free of the discontinuities introduced with the change of SOC codes.

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Appendix A – Sample sizes for the Longitudinal LFS

Table 8.1 Sample sizes for employment retention

Year of uprating		Treatment Group			Comparison group		
		Not employed	Employed	Total	Not employed	Employed	Total
2011	Before	0	239	239	0	294	294
	After	20	219	239	21	273	294
2012	Before	0	177	177	0	337	337
	After	11	166	177	21	316	337
2013	Before	0	91	91	0	227	227
	After	8	83	91	16	211	227
2014	Before	0	231	231	0	282	282
	After	12	219	231	24	258	282
2015	Before	0	135	135	0	153	153
	After	10	125	135	5	148	153
2016	Before	0	265	265	0	245	245
	After	21	244	265	7	238	245
2017	Before	0	349	349	0	369	369
	After	14	335	349	18	351	369
2018	Before	0	342	342	0	314	314
	After	14	328	342	20	294	314

Source: LFS five quarter longitudinal datasets. Men aged between 25 and 64, women aged between 25 and 59. The pre-intervention groups are observed at wave 1 of the five quarter longitudinal LFS file whilst the post-intervention groups are observed at wave 5. The sample is restricted to individuals employed in the pre-intervention period.

Appendix B Covariate balance statistics for the Longitudinal LFS

Table 8.2 Covariate balance statistics, 2011

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Age	40.16	100.83	0.15	41.46	106.34	0.03	-0.13	0.95
Married	0.44	0.25	0.24	0.53	0.25	-0.11	-0.18	0.99
Part time	0.57	0.25	-0.27	0.55	0.25	-0.18	0.04	0.99
Permanent job	0.91	0.08	-2.87	0.95	0.04	-4.33	-0.17	1.86
SOC 2010: Group 1	0.02	0.02	7.25	0.01	0.01	8.51	0.04	1.35
SOC 2010: Group 2	0.00	0.00	0.00	0.01	0.01	8.71	-0.16	0.00
SOC 2010: Group 3	0.01	0.01	9.70	0.01	0.01	11.05	0.02	1.29
SOC 2010: Group 4	0.08	0.07	3.18	0.07	0.07	3.29	0.02	1.05
SOC 2010: Group 5	0.06	0.05	3.83	0.06	0.05	3.89	0.01	1.02
SOC 2010: Group 6	0.12	0.11	2.32	0.20	0.16	1.48	-0.22	0.66
SOC 2010: Group 7	0.19	0.16	1.57	0.23	0.18	1.29	-0.09	0.88
SOC 2010: Group 8	0.11	0.10	2.45	0.10	0.09	2.73	0.05	1.14
SOC 2010: Group 9	0.41	0.24	0.35	0.31	0.21	0.83	0.22	1.14
Tyne & Wear	0.02	0.02	6.46	0.01	0.01	8.30	0.06	1.60
Rest of Northern region	0.04	0.04	4.73	0.04	0.04	4.73	0.00	1.00
South Yorkshire	0.03	0.03	5.53	0.03	0.03	5.49	0.00	0.99
West Yorkshire	0.03	0.03	5.94	0.07	0.07	3.27	-0.22	0.37
Rest of Yorks & Humberside	0.04	0.04	4.95	0.03	0.03	5.71	0.05	1.29
East Midlands	0.14	0.12	2.12	0.08	0.07	3.18	0.19	1.66
East Anglia	0.08	0.07	3.21	0.04	0.04	4.59	0.15	1.76
Inner London	0.05	0.05	4.02	0.00	0.00	0.00	0.33	0.00

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Outer London	0.03	0.03	5.87	0.05	0.05	4.12	-0.12	0.55
Rest of South East	0.14	0.12	2.06	0.11	0.10	2.43	0.08	1.21
South West	0.08	0.07	3.08	0.11	0.10	2.49	-0.10	0.76
West Midlands (met county)	0.04	0.04	4.92	0.07	0.06	3.40	-0.14	0.55
Rest of West Midlands	0.03	0.03	5.08	0.05	0.04	4.36	-0.05	0.77
Greater Manchester	0.06	0.06	3.72	0.07	0.06	3.43	-0.03	0.88
Merseyside	0.04	0.03	5.02	0.02	0.02	7.71	0.12	2.17
Rest of North West	0.05	0.05	4.26	0.04	0.04	4.56	0.03	1.12
Wales	0.05	0.05	4.06	0.09	0.08	2.85	-0.15	0.59
Strathclyde	0.02	0.02	7.90	0.01	0.01	11.12	0.07	1.93
Rest of Scotland	0.04	0.04	4.82	0.07	0.06	3.47	-0.13	0.59
Northern Ireland	0.01	0.01	8.31	0.02	0.02	7.72	-0.02	0.87
Health condition	0.35	0.23	0.61	0.34	0.22	0.69	0.04	1.03
Degree or equivalent	0.07	0.07	3.23	0.08	0.07	3.17	-0.01	0.97
Higher education	0.02	0.02	7.14	0.04	0.04	4.74	-0.12	0.48
GCE A level or equivalent	0.15	0.13	1.96	0.23	0.18	1.26	-0.21	0.71
GCSE grades A*-C or equivalent	0.39	0.24	0.47	0.34	0.22	0.69	0.10	1.06
Other qualification	0.18	0.15	1.68	0.17	0.14	1.76	0.02	1.04
No qualification	0.19	0.16	1.56	0.14	0.12	2.04	0.13	1.27
Number of children under 16	0.83	1.21	1.56	0.83	0.93	1.05	0.01	1.30
White	0.86	0.12	-2.03	0.87	0.11	-2.21	-0.04	1.10
British national	0.31	0.22	0.80	0.33	0.22	0.71	-0.04	0.97
Months in employment	53.05	3614.12	1.90	64.08	4375.69	2.04	-0.17	0.83
Public sector	0.06	0.06	3.72	0.15	0.13	1.93	-0.31	0.43

Balance statistics are weighted using the longitudinal weights in the Longitudinal Labour Force Survey (variable lgwt). "-" indicates that there are no observations for the indicated variable/groups.

Table 8.3 Covariate balance statistics, 2012

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Age	42.13	96.20	-0.08	41.27	101.89	0.08	0.09	0.94
Married	0.53	0.25	-0.13	0.54	0.25	-0.17	-0.02	1.01
Part time	0.58	0.24	-0.34	0.52	0.25	-0.09	0.12	0.98
Permanent job	0.92	0.07	-3.14	0.96	0.04	-4.50	-0.15	1.76
SOC 2010: Group 1	0.01	0.01	8.42	0.02	0.02	6.90	-0.05	0.69
SOC 2010: Group 2	0.00	0.00	0.00	0.01	0.01	9.99	-0.14	0.00
SOC 2010: Group 3	0.04	0.04	4.82	0.02	0.02	6.98	0.11	1.94
SOC 2010: Group 4	0.05	0.05	4.27	0.05	0.05	4.05	-0.02	0.92
SOC 2010: Group 5	0.08	0.07	3.21	0.05	0.05	4.06	0.10	1.44
SOC 2010: Group 6	0.09	0.08	2.86	0.18	0.15	1.65	-0.27	0.55
SOC 2010: Group 7	0.21	0.17	1.42	0.26	0.19	1.09	-0.12	0.87
SOC 2010: Group 8	0.10	0.09	2.66	0.08	0.07	3.14	0.08	1.25
SOC 2010: Group 9	0.42	0.25	0.31	0.33	0.22	0.74	0.20	1.11
Tyne & Wear	0.01	0.01	8.56	0.03	0.03	5.83	-0.10	0.49
Rest of Northern region	0.04	0.04	4.55	0.05	0.04	4.31	-0.02	0.91
South Yorkshire	0.04	0.04	4.74	0.04	0.03	5.03	0.02	1.11
West Yorkshire	0.05	0.05	4.04	0.06	0.05	3.88	-0.02	0.94
Rest of Yorks & Humberside	0.03	0.03	5.59	0.03	0.03	5.30	-0.02	0.91
East Midlands	0.12	0.10	2.38	0.10	0.09	2.69	0.06	1.17
East Anglia	0.03	0.03	5.22	0.04	0.04	4.91	-0.02	0.90
Inner London	0.00	0.00	0.00	0.03	0.02	6.03	-0.23	0.00
Outer London	0.06	0.05	3.87	0.04	0.04	4.52	0.06	1.30
Rest of South East	0.17	0.14	1.72	0.18	0.15	1.63	-0.03	0.96
South West	0.11	0.10	2.51	0.13	0.11	2.21	-0.06	0.87
West Midlands (met county)	0.01	0.01	9.53	0.02	0.02	6.89	-0.07	0.54
Rest of West Midlands	0.05	0.04	4.37	0.04	0.04	4.47	0.01	1.04

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Greater Manchester	0.03	0.03	5.42	0.07	0.06	3.46	-0.17	0.48
Merseyside	0.03	0.03	5.81	0.01	0.01	11.30	0.15	3.50
Rest of North West	0.09	0.08	2.95	0.03	0.03	5.72	0.25	2.90
Wales	0.06	0.05	3.88	0.05	0.05	4.13	0.02	1.11
Strathclyde	0.05	0.05	4.09	0.01	0.01	8.37	0.21	3.58
Rest of Scotland	0.01	0.01	9.33	0.03	0.03	5.54	-0.13	0.38
Northern Ireland	0.02	0.02	7.40	0.03	0.03	5.89	-0.06	0.66
Health condition	0.29	0.21	0.93	0.30	0.21	0.88	-0.02	0.99
Degree or equivalent	0.07	0.06	3.47	0.12	0.10	2.40	-0.17	0.61
Higher education	0.05	0.05	4.25	0.06	0.06	3.61	-0.07	0.77
GCE A level or equivalent	0.12	0.11	2.33	0.20	0.16	1.50	-0.22	0.66
GCSE grades A*-C or equivalent	0.36	0.23	0.57	0.37	0.23	0.55	0.00	1.00
Other qualification	0.20	0.16	1.52	0.16	0.14	1.83	0.09	1.17
No qualification	0.20	0.16	1.48	0.09	0.08	2.80	0.31	1.92
Number of children under 16	0.82	1.07	1.15	0.77	1.00	1.36	0.05	1.07
White	0.89	0.10	-2.49	0.90	0.09	-2.71	-0.04	1.12
British national	0.39	0.24	0.47	0.36	0.23	0.60	0.06	1.04
Months in employment	59.57	3854.74	1.77	71.96	5713.84	1.64	-0.18	0.67
Public sector	0.04	0.04	4.55	0.09	0.08	2.91	-0.19	0.51

Balance statistics are weighted using the longitudinal weights in the Longitudinal Labour Force Survey (variable lgwt). "-" indicates that there are no observations for the indicated variable/groups.

Table 8.4 Covariate balance statistics, 2013

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Age	38.88	113.77	0.33	40.80	103.50	0.25	-0.18	1.10
Married	0.42	0.25	0.32	0.46	0.25	0.17	-0.08	0.99
Part time	0.62	0.24	-0.51	0.59	0.24	-0.35	0.08	0.98
Permanent job	0.93	0.06	-3.48	0.95	0.05	-3.98	-0.06	1.25
SOC 2010: Group 1	0.00	0.00	0.00	0.01	0.01	11.26	-0.12	0.00
SOC 2010: Group 2	0.01	0.01	12.18	0.01	0.01	12.27	0.00	1.02
SOC 2010: Group 3	0.03	0.03	6.02	0.01	0.01	8.27	0.08	1.81
SOC 2010: Group 4	0.07	0.07	3.32	0.04	0.04	4.77	0.14	1.80
SOC 2010: Group 5	0.02	0.02	7.84	0.07	0.06	3.48	-0.26	0.25
SOC 2010: Group 6	0.27	0.20	1.06	0.17	0.14	1.77	0.24	1.41
SOC 2010: Group 7	0.25	0.19	1.17	0.23	0.18	1.26	0.03	1.05
SOC 2010: Group 8	0.08	0.07	3.18	0.09	0.09	2.78	-0.06	0.84
SOC 2010: Group 9	0.29	0.21	0.93	0.37	0.23	0.54	-0.17	0.89
Tyne & Wear	0.00	0.00	0.00	0.01	0.01	8.71	-0.16	0.00
Rest of Northern region	0.04	0.03	5.02	0.03	0.03	5.27	0.02	1.10
South Yorkshire	0.05	0.05	4.10	0.04	0.04	4.66	0.05	1.25
West Yorkshire	0.09	0.08	2.86	0.05	0.05	4.00	0.14	1.65
Rest of Yorks & Humberside	0.04	0.04	4.93	0.06	0.05	3.81	-0.10	0.66
East Midlands	0.08	0.08	3.03	0.09	0.08	2.94	-0.01	0.97
East Anglia	0.05	0.05	3.97	0.05	0.04	4.37	0.04	1.18
Inner London	0.04	0.04	4.45	0.00	0.00	0.00	0.30	0.00
Outer London	0.08	0.08	2.98	0.04	0.04	4.58	0.18	1.95
Rest of South East	0.20	0.16	1.47	0.18	0.15	1.68	0.07	1.12
South West	0.04	0.04	4.63	0.10	0.09	2.73	-0.22	0.45
West Midlands (met county)	0.02	0.02	7.64	0.04	0.03	5.00	-0.12	0.47
Rest of West Midlands	0.01	0.01	8.70	0.05	0.05	3.98	-0.23	0.25

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Greater Manchester	0.06	0.06	3.69	0.05	0.05	4.12	0.04	1.20
Merseyside	0.00	0.00	0.00	0.04	0.04	4.90	-0.28	0.00
Rest of North West	0.06	0.06	3.77	0.01	0.01	9.74	0.26	5.46
Wales	0.04	0.04	4.74	0.08	0.08	3.03	-0.18	0.50
Strathclyde	0.04	0.04	4.61	0.02	0.02	6.11	0.09	1.65
Rest of Scotland	0.04	0.03	5.06	0.05	0.05	4.09	-0.08	0.71
Northern Ireland	0.01	0.01	8.36	0.01	0.01	9.79	0.03	1.36
Health condition	0.36	0.23	0.59	0.27	0.20	1.01	0.18	1.16
Degree or equivalent	0.14	0.12	2.09	0.09	0.08	2.91	0.16	1.50
Higher education	0.05	0.05	4.18	0.06	0.06	3.61	-0.06	0.80
GCE A level or equivalent	0.22	0.18	1.32	0.22	0.17	1.35	0.01	1.02
GCSE grades A*-C or equivalent	0.29	0.21	0.93	0.33	0.22	0.70	-0.10	0.93
Other qualification	0.19	0.16	1.56	0.16	0.13	1.88	0.09	1.18
No qualification	0.11	0.10	2.54	0.14	0.12	2.10	-0.09	0.81
Number of children under 16	0.95	1.13	1.27	0.91	1.36	1.37	0.04	0.83
White	0.79	0.17	-1.46	0.87	0.11	-2.19	-0.20	1.45
British national	0.41	0.24	0.38	0.44	0.25	0.26	-0.06	0.99
Months in employment	53.30	4451.39	2.09	63.40	3979.73	1.42	-0.16	1.12
Public sector	0.06	0.06	3.61	0.10	0.09	2.76	-0.12	0.69

Balance statistics are weighted using the longitudinal weights in the Longitudinal Labour Force Survey (variable lgwt). "-" indicates that there are no observations for the indicated variable/groups.

Table 8.5 Covariate balance statistics, 2014

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Age	40.67	107.56	0.12	40.18	107.34	0.25	0.05	1.00
Married	0.40	0.24	0.40	0.46	0.25	0.18	-0.11	0.97
Part time	0.58	0.24	-0.34	0.55	0.25	-0.21	0.06	0.98
Permanent job	0.91	0.09	-2.77	0.94	0.05	-3.85	-0.15	1.61
SOC 2010: Group 1	0.00	0.00	19.76	0.02	0.02	6.58	-0.18	0.12
SOC 2010: Group 2	0.01	0.01	13.38	0.00	0.00	16.43	0.03	1.50
SOC 2010: Group 3	0.02	0.02	6.73	0.03	0.03	5.71	-0.05	0.74
SOC 2010: Group 4	0.04	0.04	4.83	0.09	0.08	2.82	-0.22	0.44
SOC 2010: Group 5	0.08	0.07	3.22	0.10	0.09	2.64	-0.09	0.77
SOC 2010: Group 6	0.14	0.12	2.08	0.15	0.13	1.96	-0.03	0.94
SOC 2010: Group 7	0.24	0.19	1.19	0.24	0.18	1.22	0.01	1.01
SOC 2010: Group 8	0.08	0.07	3.13	0.08	0.07	3.18	0.01	1.02
SOC 2010: Group 9	0.40	0.24	0.42	0.29	0.21	0.94	0.23	1.17
Tyne & Wear	0.03	0.03	5.61	0.01	0.01	8.29	0.10	2.05
Rest of Northern region	0.06	0.05	3.83	0.04	0.04	4.47	0.06	1.29
South Yorkshire	0.03	0.03	5.75	0.04	0.03	5.04	-0.04	0.79
West Yorkshire	0.07	0.06	3.41	0.07	0.06	3.43	0.00	1.01
Rest of Yorks & Humberside	0.05	0.05	4.17	0.05	0.05	4.18	0.00	1.00
East Midlands	0.13	0.11	2.18	0.06	0.06	3.71	0.25	2.03
East Anglia	0.03	0.03	5.89	0.05	0.04	4.36	-0.10	0.59
Inner London	0.02	0.02	7.78	0.03	0.03	5.30	-0.11	0.50
Outer London	0.03	0.03	5.79	0.06	0.05	3.89	-0.14	0.51
Rest of South East	0.12	0.10	2.39	0.12	0.10	2.37	0.00	0.99
South West	0.06	0.05	3.88	0.08	0.07	3.15	-0.09	0.73
West Midlands (met county)	0.09	0.08	2.83	0.06	0.06	3.58	0.11	1.41
Rest of West Midlands	0.02	0.01	7.98	0.04	0.04	4.46	-0.17	0.35

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Greater Manchester	0.03	0.03	5.85	0.04	0.04	4.76	-0.07	0.70
Merseyside	0.03	0.03	5.09	0.01	0.01	8.96	0.15	2.82
Rest of North West	0.05	0.05	4.26	0.07	0.07	3.34	-0.10	0.69
Wales	0.10	0.09	2.59	0.03	0.03	5.86	0.32	3.58
Strathclyde	0.03	0.03	5.31	0.05	0.04	4.30	-0.07	0.70
Rest of Scotland	0.03	0.03	5.21	0.06	0.05	3.81	-0.12	0.60
Northern Ireland	0.01	0.01	10.13	0.04	0.04	4.59	-0.20	0.24
Health condition	0.35	0.23	0.61	0.36	0.23	0.57	-0.02	0.99
Degree or equivalent	0.08	0.07	3.22	0.11	0.10	2.54	-0.11	0.73
Higher education	0.04	0.04	4.50	0.09	0.08	2.85	-0.19	0.50
GCE A level or equivalent	0.17	0.14	1.78	0.25	0.19	1.18	-0.19	0.75
GCSE grades A*-C or equivalent	0.37	0.23	0.55	0.31	0.21	0.84	0.13	1.09
Other qualification	0.21	0.17	1.42	0.14	0.12	2.05	0.18	1.36
No qualification	0.14	0.12	2.12	0.11	0.10	2.54	0.09	1.23
Number of children under 16	0.85	0.97	0.84	0.87	1.00	0.75	-0.02	0.97
White	0.90	0.09	-2.66	0.93	0.07	-3.35	-0.11	1.37
British national	0.42	0.24	0.33	0.43	0.25	0.27	-0.03	0.99
Months in employment	50.30	4089.71	2.60	68.15	5833.06	1.85	-0.25	0.70
Public sector	0.04	0.04	4.52	0.06	0.06	3.54	-0.10	0.68

Balance statistics are weighted using the longitudinal weights in the Longitudinal Labour Force Survey (variable lgwt). "-" indicates that there are no observations for the indicated variable/groups.

Table 8.6 Covariate balance statistics, 2015

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Age	40.10	119.75	0.22	40.24	103.88	0.08	-0.01	1.15
Married	0.41	0.24	0.36	0.43	0.25	0.27	-0.04	0.99
Part time	0.63	0.24	-0.54	0.54	0.25	-0.15	0.19	0.94
Permanent job	0.90	0.09	-2.74	0.98	0.02	-6.55	-0.32	4.09
SOC 2010: Group 1	0.01	0.01	9.53	0.01	0.01	10.31	0.02	1.16
SOC 2010: Group 2	0.00	0.00	0.00	0.01	0.01	12.70	-0.11	0.00
SOC 2010: Group 3	0.00	0.00	0.00	0.02	0.02	7.07	-0.20	0.00
SOC 2010: Group 4	0.04	0.04	4.55	0.08	0.08	3.06	-0.16	0.54
SOC 2010: Group 5	0.05	0.05	4.26	0.04	0.04	4.58	0.03	1.13
SOC 2010: Group 6	0.12	0.11	2.35	0.29	0.21	0.90	-0.44	0.51
SOC 2010: Group 7	0.22	0.17	1.39	0.25	0.19	1.15	-0.09	0.90
SOC 2010: Group 8	0.09	0.08	2.84	0.08	0.08	3.06	0.03	1.11
SOC 2010: Group 9	0.47	0.25	0.10	0.22	0.17	1.38	0.56	1.48
Tyne & Wear	0.04	0.04	4.51	0.03	0.03	5.08	0.04	1.23
Rest of Northern region	0.07	0.06	3.43	0.02	0.02	7.11	0.24	3.47
South Yorkshire	0.01	0.01	9.17	0.03	0.03	5.86	-0.11	0.44
West Yorkshire	0.07	0.07	3.25	0.04	0.04	4.83	0.16	1.88
Rest of Yorks & Humberside	0.07	0.07	3.28	0.02	0.02	7.42	0.27	4.00
East Midlands	0.09	0.08	2.89	0.12	0.11	2.35	-0.10	0.77
East Anglia	0.03	0.03	5.14	0.06	0.05	3.82	-0.11	0.61
Inner London	0.01	0.01	8.88	0.05	0.05	4.20	-0.21	0.26
Outer London	0.07	0.07	3.32	0.03	0.03	5.21	0.17	2.07
Rest of South East	0.15	0.13	1.96	0.19	0.15	1.62	-0.10	0.84
South West	0.09	0.08	2.95	0.09	0.09	2.80	-0.02	0.93
West Midlands (met county)	0.04	0.04	4.48	0.06	0.05	3.83	-0.06	0.78
Rest of West Midlands	0.02	0.02	7.74	0.04	0.04	4.48	-0.16	0.38

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Greater Manchester	0.04	0.04	4.96	0.06	0.06	3.64	-0.12	0.61
Merseyside	0.03	0.03	5.85	0.03	0.03	5.58	-0.01	0.92
Rest of North West	0.03	0.03	5.62	0.06	0.05	3.81	-0.14	0.52
Wales	0.07	0.06	3.43	0.04	0.04	4.46	0.11	1.52
Strathclyde	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rest of Scotland	0.01	0.01	10.79	0.02	0.02	6.89	-0.10	0.43
Northern Ireland	0.06	0.06	3.72	0.02	0.01	7.96	0.24	3.78
Health condition	0.36	0.23	0.56	0.36	0.23	0.59	0.01	1.01
Degree or equivalent	0.15	0.13	1.96	0.11	0.10	2.55	0.13	1.34
Higher education	0.08	0.08	3.06	0.08	0.07	3.18	0.02	1.06
GCE A level or equivalent	0.14	0.12	2.04	0.27	0.20	1.04	-0.31	0.62
GCSE grades A*-C or equivalent	0.26	0.20	1.08	0.30	0.21	0.90	-0.07	0.93
Other qualification	0.26	0.19	1.09	0.17	0.14	1.79	0.23	1.39
No qualification	0.10	0.09	2.63	0.09	0.08	2.94	0.05	1.16
Number of children under 16	0.75	0.91	0.94	0.85	1.35	2.90	-0.10	0.67
White	0.86	0.12	-2.13	0.84	0.13	-1.90	0.06	0.90
British national	0.48	0.25	0.09	0.48	0.25	0.09	0.00	1.00
Months in employment	49.62	3060.24	1.78	72.48	5750.86	2.06	-0.34	0.53
Public sector	0.07	0.07	3.28	0.11	0.10	2.53	-0.12	0.70

Balance statistics are weighted using the longitudinal weights in the Longitudinal Labour Force Survey (variable lgwt). "-" indicates that there are no observations for the indicated variable/groups.

Table 8.7 Covariate balance statistics, 2016

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Age	40.75	115.79	0.17	42.01	115.40	0.01	-0.12	1.00
Married	0.49	0.25	0.03	0.43	0.25	0.27	0.12	1.02
Part time	0.47	0.25	0.11	0.47	0.25	0.11	0.00	1.00
Permanent job	0.97	0.03	-5.79	0.92	0.07	-3.15	0.23	0.37
SOC 2010: Group 1	0.02	0.02	6.71	0.00	0.00	14.91	0.15	4.61
SOC 2010: Group 2	0.01	0.01	9.63	0.01	0.01	8.28	-0.03	0.75
SOC 2010: Group 3	0.01	0.01	13.65	0.01	0.01	11.21	-0.03	0.68
SOC 2010: Group 4	0.05	0.05	4.24	0.12	0.11	2.35	-0.26	0.43
SOC 2010: Group 5	0.05	0.05	4.10	0.05	0.05	4.12	0.00	1.01
SOC 2010: Group 6	0.20	0.16	1.52	0.22	0.17	1.38	-0.04	0.94
SOC 2010: Group 7	0.23	0.18	1.26	0.19	0.16	1.56	0.10	1.15
SOC 2010: Group 8	0.08	0.08	3.06	0.10	0.09	2.67	-0.06	0.83
SOC 2010: Group 9	0.35	0.23	0.62	0.30	0.21	0.89	0.12	1.09
Tyne & Wear	0.03	0.03	5.48	0.01	0.01	8.71	0.12	2.35
Rest of Northern region	0.03	0.03	5.55	0.05	0.05	4.10	-0.11	0.60
South Yorkshire	0.02	0.02	6.64	0.03	0.02	6.05	-0.03	0.85
West Yorkshire	0.07	0.06	3.45	0.04	0.04	4.56	0.11	1.56
Rest of Yorks & Humberside	0.02	0.02	6.22	0.03	0.03	5.60	-0.03	0.83
East Midlands	0.13	0.12	2.15	0.07	0.07	3.24	0.19	1.68
East Anglia	0.04	0.04	4.85	0.06	0.06	3.57	-0.12	0.61
Inner London	0.02	0.02	7.59	0.00	0.00	0.00	0.18	0.00
Outer London	0.02	0.02	6.43	0.06	0.06	3.62	-0.20	0.38
Rest of South East	0.10	0.09	2.73	0.18	0.15	1.68	-0.24	0.59
South West	0.11	0.09	2.57	0.11	0.10	2.46	-0.02	0.95
West Midlands (met county)	0.04	0.04	4.55	0.03	0.03	5.07	0.04	1.20
Rest of West Midlands	0.05	0.04	4.32	0.04	0.04	4.57	0.02	1.10

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Greater Manchester	0.07	0.07	3.30	0.04	0.03	5.02	0.16	1.97
Merseyside	0.01	0.01	8.35	0.01	0.01	9.71	0.03	1.33
Rest of North West	0.02	0.02	6.58	0.04	0.04	4.92	-0.09	0.60
Wales	0.07	0.07	3.33	0.04	0.04	4.57	0.13	1.65
Strathclyde	0.01	0.01	9.00	0.03	0.03	5.29	-0.14	0.38
Rest of Scotland	0.06	0.06	3.61	0.08	0.08	2.98	-0.08	0.76
Northern Ireland	0.07	0.07	3.29	0.03	0.03	5.46	0.19	2.28
Health condition	0.42	0.24	0.32	0.31	0.21	0.82	0.23	1.14
Degree or equivalent	0.12	0.11	2.35	0.11	0.10	2.52	0.04	1.09
Higher education	0.10	0.09	2.61	0.06	0.06	3.53	0.14	1.52
GCE A level or equivalent	0.22	0.17	1.34	0.22	0.17	1.38	0.01	1.02
GCSE grades A*-C or equivalent	0.29	0.21	0.94	0.33	0.22	0.74	-0.09	0.93
Other qualification	0.17	0.14	1.74	0.18	0.15	1.69	-0.01	0.97
No qualification	0.10	0.09	2.71	0.11	0.10	2.55	-0.03	0.92
Number of children under 16	0.82	0.96	1.02	0.73	0.92	1.15	0.10	1.04
White	0.84	0.14	-1.82	0.92	0.08	-3.03	-0.25	1.80
British national	0.36	0.23	0.57	0.46	0.25	0.15	-0.20	0.93
Months in employment	64.17	4916.61	1.44	72.69	6215.43	1.87	-0.11	0.79
Public sector	0.08	0.07	3.23	0.21	0.17	1.43	-0.39	0.42

Balance statistics are weighted using the longitudinal weights in the Longitudinal Labour Force Survey (variable lgwt). "-" indicates that there are no observations for the indicated variable/groups.

Table 8.8 Covariate balance statistics, 2017

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Age	41.93	117.98	0.08	40.17	118.88	0.31	0.16	0.99
Married	0.49	0.25	0.05	0.44	0.25	0.25	0.10	1.01
Part time	0.55	0.25	-0.20	0.50	0.25	0.01	0.10	0.99
Permanent job	0.93	0.06	-3.45	0.97	0.03	-5.09	-0.15	1.88
SOC 2010: Group 1	0.00	0.00	19.56	0.04	0.04	4.79	-0.26	0.07
SOC 2010: Group 2	0.00	0.00	19.02	0.01	0.01	10.23	-0.08	0.30
SOC 2010: Group 3	0.01	0.01	8.14	0.04	0.04	4.73	-0.15	0.38
SOC 2010: Group 4	0.06	0.06	3.66	0.08	0.07	3.09	-0.07	0.78
SOC 2010: Group 5	0.04	0.04	4.89	0.05	0.05	4.06	-0.07	0.73
SOC 2010: Group 6	0.21	0.16	1.45	0.26	0.19	1.10	-0.12	0.85
SOC 2010: Group 7	0.20	0.16	1.52	0.21	0.17	1.39	-0.04	0.94
SOC 2010: Group 8	0.14	0.12	2.13	0.07	0.06	3.46	0.23	1.87
SOC 2010: Group 9	0.34	0.23	0.67	0.24	0.18	1.22	0.23	1.24
Tyne & Wear	0.02	0.02	7.71	0.02	0.02	6.95	-0.03	0.82
Rest of Northern region	0.06	0.05	3.89	0.04	0.04	4.45	0.05	1.24
South Yorkshire	0.04	0.04	4.67	0.03	0.03	5.89	0.08	1.50
West Yorkshire	0.03	0.03	5.31	0.05	0.04	4.29	-0.08	0.69
Rest of Yorks & Humberside	0.03	0.03	5.20	0.04	0.04	4.60	-0.04	0.81
East Midlands	0.08	0.07	3.09	0.07	0.07	3.35	0.04	1.13
East Anglia	0.04	0.04	4.65	0.07	0.06	3.51	-0.11	0.64
Inner London	0.04	0.03	5.01	0.02	0.02	6.42	0.08	1.55
Outer London	0.04	0.04	4.92	0.08	0.07	3.22	-0.17	0.51
Rest of South East	0.12	0.10	2.41	0.15	0.13	1.97	-0.10	0.80
South West	0.07	0.06	3.38	0.09	0.08	2.80	-0.09	0.77
West Midlands (met county)	0.04	0.04	4.54	0.02	0.02	7.47	0.15	2.43
Rest of West Midlands	0.07	0.06	3.50	0.06	0.05	3.82	0.04	1.15

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Greater Manchester	0.09	0.08	2.87	0.05	0.05	3.98	0.14	1.62
Merseyside	0.02	0.02	7.08	0.01	0.01	11.01	0.09	2.32
Rest of North West	0.07	0.07	3.28	0.04	0.04	4.49	0.13	1.64
Wales	0.06	0.05	3.82	0.04	0.04	4.96	0.10	1.54
Strathclyde	0.01	0.01	9.87	0.04	0.04	4.52	-0.21	0.24
Rest of Scotland	0.04	0.04	4.65	0.05	0.05	4.22	-0.04	0.85
Northern Ireland	0.05	0.04	4.29	0.04	0.04	4.68	0.03	1.16
Health condition	0.37	0.23	0.52	0.28	0.20	0.96	0.19	1.15
Degree or equivalent	0.12	0.11	2.34	0.16	0.13	1.88	-0.11	0.79
Higher education	0.05	0.05	4.11	0.12	0.11	2.32	-0.25	0.45
GCE A level or equivalent	0.22	0.17	1.35	0.22	0.17	1.36	0.00	1.00
GCSE grades A*-C or equivalent	0.31	0.21	0.82	0.30	0.21	0.85	0.01	1.01
Other qualification	0.18	0.15	1.70	0.10	0.09	2.70	0.23	1.64
No qualification	0.12	0.11	2.28	0.10	0.09	2.66	0.08	1.21
Number of children under 16	0.78	0.91	0.94	0.81	1.08	1.18	-0.03	0.84
White	0.87	0.11	-2.26	0.88	0.11	-2.32	-0.01	1.03
British national	0.40	0.24	0.42	0.47	0.25	0.13	-0.14	0.96
Months in employment	58.21	4217.44	1.52	67.98	5124.62	2.21	-0.14	0.82
Public sector	0.05	0.05	3.95	0.13	0.11	2.21	-0.26	0.45

Balance statistics are weighted using the longitudinal weights in the Longitudinal Labour Force Survey (variable lgwt). "-" indicates that there are no observations for the indicated variable/groups.

Table 8.9 Covariate balance statistics, 2018

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Age	40.76	115.73	0.19	42.05	108.39	-0.10	-0.12	1.07
Married	0.40	0.24	0.40	0.44	0.25	0.25	-0.07	0.98
Part time	0.55	0.25	-0.20	0.56	0.25	-0.23	-0.02	1.00
Permanent job	0.94	0.06	-3.76	0.94	0.06	-3.64	0.01	0.95
SOC 2010: Group 1	0.01	0.01	8.39	0.03	0.03	5.18	-0.13	0.41
SOC 2010: Group 2	0.00	0.00	17.02	0.03	0.03	5.11	-0.23	0.10
SOC 2010: Group 3	0.02	0.02	6.75	0.03	0.03	5.72	-0.05	0.74
SOC 2010: Group 4	0.05	0.05	4.27	0.13	0.11	2.25	-0.28	0.41
SOC 2010: Group 5	0.06	0.06	3.72	0.04	0.04	4.43	0.07	1.33
SOC 2010: Group 6	0.14	0.12	2.04	0.27	0.20	1.06	-0.31	0.63
SOC 2010: Group 7	0.24	0.18	1.21	0.16	0.13	1.86	0.20	1.36
SOC 2010: Group 8	0.12	0.11	2.29	0.06	0.05	3.89	0.24	2.07
SOC 2010: Group 9	0.35	0.23	0.64	0.25	0.19	1.14	0.21	1.20
Tyne & Wear	0.04	0.04	4.86	0.02	0.02	6.37	0.09	1.62
Rest of Northern region	0.05	0.05	4.05	0.04	0.04	4.93	0.07	1.39
South Yorkshire	0.03	0.03	5.46	0.03	0.03	5.19	-0.02	0.92
West Yorkshire	0.04	0.04	4.96	0.05	0.04	4.28	-0.05	0.78
Rest of Yorks & Humberside	0.05	0.04	4.35	0.04	0.04	4.91	0.04	1.23
East Midlands	0.10	0.09	2.73	0.08	0.07	3.07	0.05	1.17
East Anglia	0.03	0.03	5.24	0.03	0.03	5.33	0.01	1.03
Inner London	0.01	0.01	9.86	0.03	0.02	6.05	-0.12	0.40
Outer London	0.04	0.04	4.84	0.05	0.05	4.22	-0.05	0.79
Rest of South East	0.15	0.13	1.95	0.17	0.14	1.79	-0.04	0.92
South West	0.07	0.06	3.40	0.14	0.12	2.12	-0.22	0.55
West Midlands (met county)	0.08	0.07	3.09	0.04	0.04	4.40	0.15	1.72
Rest of West Midlands	0.02	0.02	6.20	0.06	0.06	3.70	-0.18	0.42

	Treatment group			Comparison group			Balance	
Variable	Mean	Variance	Skewness	Mean	Variance	Skewness	Standardised difference	Variance ratio
Greater Manchester	0.05	0.05	4.27	0.04	0.04	4.81	0.04	1.22
Merseyside	0.03	0.02	6.05	0.01	0.01	10.03	0.12	2.58
Rest of North West	0.05	0.04	4.36	0.02	0.02	6.87	0.14	2.22
Wales	0.07	0.07	3.36	0.05	0.05	4.07	0.08	1.35
Strathclyde	0.03	0.03	5.75	0.03	0.03	5.23	-0.03	0.84
Rest of Scotland	0.05	0.04	4.37	0.04	0.04	4.63	0.02	1.10
Northern Ireland	0.04	0.03	5.05	0.04	0.04	4.93	-0.01	0.96
Health condition	0.34	0.23	0.66	0.34	0.22	0.70	0.02	1.01
Degree or equivalent	0.09	0.08	2.95	0.12	0.11	2.30	-0.12	0.73
Higher education	0.07	0.07	3.30	0.13	0.11	2.25	-0.18	0.61
GCE A level or equivalent	0.22	0.17	1.33	0.28	0.20	0.96	-0.14	0.85
GCSE grades A*-C or equivalent	0.31	0.21	0.83	0.28	0.20	0.97	0.06	1.05
Other qualification	0.15	0.13	1.94	0.11	0.10	2.45	0.12	1.29
No qualification	0.16	0.13	1.87	0.07	0.07	3.27	0.27	1.97
Number of children under 16	0.83	1.40	2.43	0.86	1.00	0.75	-0.03	1.40
White	0.86	0.12	-2.10	0.86	0.12	-2.08	0.00	0.99
British national	0.43	0.25	0.30	0.45	0.25	0.20	-0.05	0.99
Months in employment	55.52	4277.36	1.85	80.35	8509.67	1.97	-0.31	0.50
Public sector	0.05	0.05	4.09	0.20	0.16	1.53	-0.45	0.31

Balance statistics are weighted using the longitudinal weights in the Longitudinal Labour Force Survey (variable lgwt). "-" indicates that there are no observations for the indicated variable/groups.

Appendix C – Results for alternative specifications

ASHE employment retention, no controls

Table 8.10 Employment retention pre-programme test, 2014

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	0.040***	0.029**	0.033	0.041*	0.069***
Standard error	0.009	0.013	0.028	0.021	0.024
Lower CI	0.021	0.003	-0.021	0.000	0.021
Upper CI	0.058	0.055	0.087	0.083	0.117
(ii) Alternative comparison group					
Impact	0.016	0.017	0.023	0.000	0.045*
Standard error	0.010	0.014	0.026	0.021	0.026
Lower CI	-0.003	-0.009	-0.028	-0.040	-0.006
Upper CI	0.034	0.044	0.075	0.041	0.095
(iii) Wage gap definition					
Impact	0.052***	0.028	0.096**	0.030	0.107***
Standard error	0.014	0.019	0.045	0.035	0.035
Lower CI	0.024	-0.010	0.008	-0.039	0.039
Upper CI	0.080	0.065	0.184	0.098	0.175
Base (i) and (iii)	41,222	20,956	4,878	8,588	6,800
Base (ii)	40,920	19,618	5,360	9,590	6,352

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 8.11 Employment retention following the introduction of the NLW in 2016

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	-0.038***	-0.050***	0.021	-0.055***	-0.020
Standard error	0.008	0.011	0.024	0.021	0.019
Lower CI	-0.054	-0.072	-0.027	-0.097	-0.057
Upper CI	-0.022	-0.028	0.068	-0.014	0.017
Minimum detectable effect	0.011	0.014	0.031	0.026	0.024
(ii) Alternative comparison group					
Impact	-0.013	-0.015	-0.001	-0.008	-0.009
Standard error	0.008	0.012	0.023	0.022	0.018
Lower CI	-0.029	-0.039	-0.046	-0.051	-0.044
Upper CI	0.003	0.008	0.043	0.035	0.026
Minimum detectable effect	0.011	0.015	0.030	0.028	0.023
(iii) Wage gap definition					
Impact	-0.033***	-0.042***	-0.019	-0.052**	0.021
Standard error	0.011	0.015	0.034	0.024	0.027
Lower CI	-0.054	-0.071	-0.085	-0.100	-0.032
Upper CI	-0.012	-0.014	0.046	-0.004	0.073
Minimum detectable effect	0.011	0.015	0.034	0.026	0.028
Base (i) and (iii)	62,325	31,697	7,086	11,220	12,322
Base (ii)	61,730	29,692	7,728	10,615	13,695

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 8.12 Employment retention following the uprating of the NLW in 2017

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	0.016	0.015	0.024	-0.019	0.032
Standard error	0.010	0.014	0.029	0.026	0.023
Lower CI	-0.004	-0.012	-0.033	-0.070	-0.013
Upper CI	0.035	0.042	0.081	0.031	0.077
Minimum detectable effect	0.011	0.015	0.032	0.028	0.026
(ii) Alternative comparison group					
Impact	0.015	0.007	0.045	-0.019	0.023
Standard error	0.010	0.014	0.028	0.027	0.023
Lower CI	-0.005	-0.021	-0.011	-0.072	-0.021
Upper CI	0.035	0.035	0.100	0.034	0.068
Minimum detectable effect	0.011	0.016	0.032	0.029	0.025
(iii) Wage gap definition					
Impact	0.040**	0.021	0.041	0.009	0.100***
Standard error	0.016	0.021	0.047	0.039	0.037
Lower CI	0.009	-0.021	-0.051	-0.067	0.027
Upper CI	0.071	0.064	0.134	0.085	0.173
Minimum detectable effect	0.013	0.017	0.038	0.029	0.031
Base (i) and (iii)	56,488	28,505	6,647	9,779	11,557
Base (ii)	55,086	26,146	7,178	8,909	12,853

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 8.13 Employment retention following the uprating of the NLW in 2018

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	0.009	0.009	-0.005	0.021	0.014
Standard error	0.008	0.012	0.025	0.020	0.019
Lower CI	-0.007	-0.014	-0.054	-0.019	-0.024
Upper CI	0.026	0.031	0.044	0.061	0.052
Minimum detectable effect	0.011	0.015	0.031	0.026	0.024
(ii) Alternative comparison group					
Impact	-0.002	-0.020	0.002	-0.012	0.026
Standard error	0.009	0.012	0.024	0.022	0.019
Lower CI	-0.019	-0.044	-0.045	-0.055	-0.010
Upper CI	0.015	0.004	0.049	0.032	0.063
Minimum detectable effect	0.011	0.015	0.031	0.028	0.024
(iii) Wage gap definition					
Impact	0.029***	0.025*	-0.032	0.037	0.072***
Standard error	0.010	0.014	0.032	0.023	0.025
Lower CI	0.009	-0.003	-0.095	-0.009	0.024
Upper CI	0.049	0.052	0.031	0.082	0.120
Minimum detectable effect	0.011	0.016	0.034	0.026	0.028
Base (i) and (iii)	62,588	31,577	7,245	11,296	12,470
Base (ii)	60,550	28,831	7,716	10,295	13,708

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

LFS employment retention, no controls

Table 8.14 Employment retention. DiD results using LFS longitudinal data with no controls, main specification

	All	Female part-time employees	Female full-time employees	Male full-time employee
NMW 2011	-0.023	-0.024	0.023	-0.055
Standard error	(0.033)	(0.051)	(0.075)	(0.064)
Confidence intervals	[-0.087, 0.042]	[-0.123, 0.075]	-0.125, 0.171	[-0.181, 0.070]
NMW 2012	-0.026	-0.042	-0.017	0.026
Standard error	(0.034)	(0.056)	(0.045)	(0.074)
Confidence intervals	[-0.094, 0.041]	[-0.151, 0.067]	[-0.104, 0.071]	[-0.119, 0.172]
NMW 2013	0.024	0.024	0.025	0.037
Standard error	(0.035)	(0.056)	(0.070)	(0.046)
Confidence intervals	[-0.044, 0.092]	[-0.086, 0.133]	-0.111, 0.162	[-0.052, 0.127]
NMW 2014	0.051**	0.019	0.102*	0.080*
Standard error	(0.024)	(0.035)	(0.056)	(0.045)
Confidence intervals	[0.005, 0.098]	[-0.049, 0.087]	-0.008, 0.212	[-0.009, 0.169]
NMW 2015	-0.025	-0.010	0.028	-0.131*
Standard error	(0.033)	(0.040)	(0.074)	(0.072)
Confidence intervals	[-0.089, 0.039]	[-0.089, 0.069]	[-0.117, 0.173]	[-0.273, 0.010]
NMW 2016	-0.056**	-0.084*	0.028	-0.086*
Standard error	(0.028)	(0.043)	(0.045)	(0.048)
Confidence intervals	[-0.112, -0.001]	[-0.168, 0.000]	-0.060, 0.116	[-0.180, 0.008]
NMW 2017	0.020	0.050	-0.013	-0.011
Standard error	(0.019)	(0.039)	(0.012)	(0.037)
Confidence intervals	[-0.017, 0.057]	[-0.026, 0.127]	-0.038, 0.011	[-0.083, 0.061]
NMW 2018	0.023	0.024	-0.000	0.033
Standard error	(0.021)	(0.029)	(0.038)	(0.057)
Confidence intervals	[-0.018, 0.063]	[-0.032, 0.081]	-0.074, 0.073	[-0.079, 0.145]
Controls	No	No	No	No
R-squared	0.042	0.049	0.047	0.052
Observations	8,100	3,792	1,802	1,688

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

Table 8.15 Employment retention. DiD results using LFS longitudinal data with no controls, weighted wage gap definition

	All	Female part-time employees	Female full-time employees	Male full-time employee
NMW 2011	-0.039	-0.016	-0.054	-0.028
Standard error	(0.043)	(0.054)	(0.127)	(0.065)
Confidence intervals	[-0.123, 0.045]	[-0.121 - 0.090]	-0.304 - 0.196	[-0.156 - 0.100]
NMW 2012	-0.032	-0.036	-0.016	0.006
Standard error	(0.039)	(0.060)	(0.047)	(0.086)
Confidence intervals	[-0.108, 0.044]	[-0.153 - 0.081]	-0.108 - 0.075	[-0.162 - 0.173]
NMW 2013	0.040	0.020	0.043	0.030
Standard error	(0.043)	(0.076)	(0.072)	(0.061)
Confidence intervals	[-0.044, 0.125]	[-0.130 - 0.170]	-0.098 - 0.184	[-0.089 - 0.149]
NMW 2014	0.053**	0.029	0.098*	0.076
Standard error	(0.025)	(0.037)	(0.058)	(0.047)
Confidence intervals	[0.005, 0.101]	[-0.043 - 0.102]	-0.016 - 0.212	[-0.015 - 0.168]
NMW 2015	-0.025	-0.018	0.024	-0.104
Standard error	(0.036)	(0.048)	(0.078)	(0.084)
Confidence intervals	[-0.096, 0.046]	[-0.111 - 0.075]	-0.130 - 0.178	[-0.269 - 0.061]
NMW 2016	-0.045	-0.052	0.066*	-0.116*
Standard error	(0.034)	(0.047)	(0.040)	(0.068)
Confidence intervals	[-0.111, 0.021]	[-0.145 - 0.041]	-0.012 - 0.143	[-0.249 - 0.018]
NMW 2017	0.021	0.051	-0.018	-0.019
Standard error	(0.020)	(0.038)	(0.015)	(0.043)
Confidence intervals	[-0.017, 0.060]	[-0.024 - 0.126]	-0.048 - 0.011	[-0.103 - 0.064]
NMW 2018	0.032	0.040	0.057*	-0.009
Standard error	(0.022)	(0.029)	(0.031)	(0.067)
Confidence intervals	[-0.010, 0.075]	[-0.017 - 0.097]	-0.004 - 0.118	[-0.140 - 0.123]
Controls	No	No	No	No
R-squared	0.041	0.048	0.051	0.048
Observations	8,100	3,792	1,802	1,688

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

Table 8.16 Employment retention. DiD results using LFS longitudinal data with no controls, alternative comparison group

	All	Female part-time employees	Female full-time employees	Male full-time employee
NMW 2011	-0.053*	-0.056	-0.053	-0.100*
Standard error	(0.030)	(0.044)	(0.065)	(0.060)
Confidence intervals	[-0.112, 0.006]	[-0.143 - 0.031]	-0.181 - 0.075	[-0.218 - 0.018]
NMW 2012	-0.044	-0.056	0.039	-0.059
Standard error	(0.036)	(0.059)	(0.080)	(0.054)
Confidence intervals	[-0.116, 0.027]	[-0.171 - 0.060]	-0.118 - 0.197	[-0.164 - 0.047]
NMW 2013	0.008	0.053	-0.039	0.046
Standard error	(0.032)	(0.059)	(0.047)	(0.045)
Confidence intervals	[-0.056, 0.071]	[-0.062 - 0.169]	-0.131 - 0.053	[-0.043 - 0.135]
NMW 2014	-0.013	-0.036	0.009	0.011
Standard error	(0.018)	(0.029)	(0.026)	(0.032)
Confidence intervals	[-0.048, 0.021]	[-0.092 - 0.020]	-0.041 - 0.060	[-0.051 - 0.073]
NMW 2015	-0.041	-0.047	0.014	-0.120
Standard error	(0.027)	(0.032)	(0.053)	(0.073)
Confidence intervals	[-0.094, 0.012]	[-0.109 - 0.015]	-0.090 - 0.118	[-0.264 - 0.023]
NMW 2016	-0.027	-0.015	0.031	-0.033
Standard error	(0.030)	(0.059)	(0.040)	(0.056)
Confidence intervals	[-0.086, 0.032]	[-0.130 - 0.101]	-0.047 - 0.110	[-0.143 - 0.077]
NMW 2017	0.017	0.062	-0.000	-0.014
Standard error	(0.021)	(0.055)	(0.018)	(0.038)
Confidence intervals	[-0.024, 0.058]	[-0.047 - 0.170]	-0.035 - 0.034	[-0.090 - 0.061]
NMW 2018	-0.013	-0.009	0.012	-0.039
Standard error	(0.021)	(0.038)	(0.045)	(0.041)
Confidence intervals	[-0.053, 0.028]	[-0.083 - 0.065]	-0.077 - 0.100	[-0.120 - 0.042]
Controls	No	No	No	No
R-squared	0.040	0.056	0.032	0.048
Observations	7,122	3,050	1,642	1,710

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

LFS employment retention, basic controls

Table 8.17 Employment retention. DiD results using LFS longitudinal data, with basic controls, main specification

	All	Female part-time employees	Female full-time employees	Male full-time employees
NMW 2011	-0.021	-0.026	0.029	-0.056
Standard error	(0.032)	(0.050)	(0.074)	(0.062)
Confidence intervals	[-0.085, 0.042]	[-0.123, 0.072]	[-0.117, 0.174]	[-0.179, 0.066]
NMW 2012	-0.027	-0.040	-0.019	0.026
Standard error	(0.034)	(0.055)	(0.043)	(0.074)
Confidence intervals	[-0.094, 0.040]	[-0.147, 0.067]	[-0.103, 0.065]	[-0.119, 0.171]
NMW 2013	0.024	0.024	0.025	0.025
Standard error	(0.035)	(0.056)	(0.068)	(0.041)
Confidence intervals	[-0.044, 0.091]	[-0.087, 0.134]	[-0.108, 0.159]	[-0.056, 0.106]
NMW 2014	0.052**	0.018	0.105*	0.085*
Standard error	(0.024)	(0.035)	(0.056)	(0.046)
Confidence intervals	[0.005, 0.098]	[-0.050, 0.087]	[-0.005, 0.216]	[-0.004, 0.175]
NMW 2015	-0.024	-0.009	0.021	-0.125*
Standard error	(0.033)	(0.041)	(0.071)	(0.073)
Confidence intervals	[-0.088, 0.040]	[-0.089, 0.071]	[-0.119, 0.160]	[-0.268, 0.017]
NMW 2016	-0.057**	-0.087**	0.026	-0.088*
Standard error	(0.028)	(0.043)	(0.044)	(0.047)
Confidence intervals	[-0.112, -0.002]	[-0.171, -0.002]	[-0.061, 0.114]	[-0.181, 0.005]
NMW 2017	0.019	0.049	-0.014	-0.009
Standard error	(0.019)	(0.039)	(0.013)	(0.037)
Confidence intervals	[-0.018, 0.056]	[-0.028, 0.125]	[-0.039, 0.011]	[-0.082, 0.064]
NMW 2018	0.024	0.026	0.005	0.034
Standard error	(0.020)	(0.029)	(0.036)	(0.057)
Confidence intervals	[-0.016, 0.064]	[-0.031, 0.082]	[-0.067, 0.076]	[-0.078, 0.145]
Controls	Basic	Basic	Basic	Basic
R-squared	0.048	0.056	0.057	0.065
Observations	8,100	3,792	1,802	1,688

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

Table 8.18 Employment retention. DiD results using LFS longitudinal data, with basic controls, weighted wage gap definition

	All	Female part-time employees	Female full-time employees	Male full-time employees
NMW 2011	-0.038	-0.019	-0.047	-0.031
Standard error	(0.042)	(0.055)	(0.124)	(0.065)
Confidence intervals	[-0.121, 0.044]	[-0.127 - 0.089]	[-0.291 - 0.197]	[-0.158 - 0.096]
NMW 2012	-0.033	-0.037	-0.019	0.005
Standard error	(0.039)	(0.060)	(0.044)	(0.085)
Confidence intervals	[-0.108, 0.043]	[-0.155 - 0.081]	[-0.106 - 0.067]	[-0.163 - 0.172]
NMW 2013	0.039	0.019	0.041	0.014
Standard error	(0.043)	(0.078)	(0.070)	(0.056)
Confidence intervals	[-0.045, 0.123]	[-0.135 - 0.172]	[-0.097 - 0.179]	[-0.096 - 0.124]
NMW 2014	0.055**	0.020	0.103*	0.081*
Standard error	(0.024)	(0.037)	(0.059)	(0.047)
Confidence intervals	[0.007, 0.103]	[-0.051 - 0.092]	[-0.012 - 0.218]	[-0.010 - 0.173]
NMW 2015	-0.025	-0.017	0.017	-0.097
Standard error	(0.036)	(0.047)	(0.076)	(0.085)
Confidence intervals	[-0.095, 0.046]	[-0.108 - 0.075]	[-0.133 - 0.166]	[-0.264 - 0.070]
NMW 2016	-0.046	-0.057	0.064	-0.120*
Standard error	(0.034)	(0.048)	(0.040)	(0.068)
Confidence intervals	[-0.113, 0.021]	[-0.151 - 0.038]	[-0.014 - 0.143]	[-0.254 - 0.014]
NMW 2017	0.020	0.059	-0.019	-0.018
Standard error	(0.020)	(0.039)	(0.015)	(0.043)
Confidence intervals	[-0.019, 0.058]	[-0.018 - 0.136]	[-0.049 - 0.011]	[-0.102 - 0.067]
NMW 2018	0.032	0.040	0.059*	-0.010
Standard error	(0.022)	(0.029)	(0.032)	(0.067)
Confidence intervals	[-0.011, 0.075]	[-0.017 - 0.097]	[-0.004 - 0.123]	[-0.141 - 0.120]
Controls	Basic	Basic	Basic	Basic
R-squared	0.048	0.054	0.061	0.061
Observations	8,100	3,792	1,802	1,688

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

Table 8.19 Employment retention. DiD results using LFS longitudinal data, with basic controls, alternative comparison group

	All	Female part-time employees	Female full-time employees	Male full-time employees
NMW 2011	-0.053*	-0.052	-0.050	-0.104*
Standard error	(0.030)	(0.043)	(0.065)	(0.059)
Confidence intervals	[-0.112, 0.005]	[-0.137 - 0.032]	[-0.178 - 0.079]	[-0.221 - 0.012]
NMW 2012	-0.045	-0.053	0.039	-0.056
Standard error	(0.036)	(0.057)	(0.080)	(0.052)
Confidence intervals	[-0.115, 0.026]	[-0.166 - 0.060]	[-0.118 - 0.196]	[-0.158 - 0.046]
NMW 2013	0.009	0.056	-0.039	0.038
Standard error	(0.032)	(0.060)	(0.046)	(0.043)
Confidence intervals	[-0.055, 0.073]	[-0.061 - 0.174]	[-0.130 - 0.051]	[-0.047 - 0.122]
NMW 2014	-0.013	-0.038	0.013	0.009
Standard error	(0.018)	(0.029)	(0.026)	(0.029)
Confidence intervals	[-0.047, 0.022]	[-0.095 - 0.018]	[-0.039 - 0.064]	[-0.048 - 0.067]
NMW 2015	-0.040	-0.049	0.016	-0.118
Standard error	(0.027)	(0.033)	(0.053)	(0.072)
Confidence intervals	[-0.094, 0.013]	[-0.113 - 0.015]	[-0.089 - 0.120]	[-0.259 - 0.023]
NMW 2016	-0.027	-0.010	0.028	-0.037
Standard error	(0.030)	(0.059)	(0.041)	(0.056)
Confidence intervals	[-0.086, 0.033]	[-0.127 - 0.106]	[-0.053 - 0.108]	[-0.146 - 0.072]
NMW 2017	0.017	0.055	0.001	-0.015
Standard error	(0.021)	(0.054)	(0.018)	(0.039)
Confidence intervals	[-0.024, 0.058]	[-0.051 - 0.160]	[-0.035 - 0.037]	[-0.091 - 0.061]
NMW 2018	-0.009	-0.004	0.015	-0.033
Standard error	(0.021)	(0.037)	(0.045)	(0.039)
Confidence intervals	[-0.049, 0.031]	[-0.077 - 0.069]	[-0.073 - 0.103]	[-0.110 - 0.044]
Controls	Basic	Basic	Basic	Basic
R-squared	0.046	0.067	0.041	0.056
Observations	7,122	3,050	1,642	1,710

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

ASHE weekly working hours, no controls

Table 8.20 Change in working hours pre-programme test, 2014

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	0.154	0.392	-0.576*	0.158	-0.174
Standard error	0.186	0.260	0.319	0.264	0.715
Lower CI	-0.210	-0.118	-1.202	-0.359	-1.575
Upper CI	0.518	0.902	0.051	0.675	1.227
(ii) Alternative comparison group					
Impact	0.096	0.207	-0.614**	0.357	-0.411
Standard error	0.178	0.268	0.273	0.238	0.729
Lower CI	-0.254	-0.318	-1.149	-0.110	-1.841
Upper CI	0.446	0.731	-0.080	0.824	1.019
(iii) Wage gap definition					
Impact	0.380	0.818**	-0.717	0.408	-0.431
Standard error	0.284	0.388	0.515	0.451	1.020
Lower CI	-0.177	0.058	-1.726	-0.475	-2.430
Upper CI	0.936	1.578	0.293	1.292	1.568
Base (i) and (iii)	28,431	14,945	3,428	5,815	4,243
Base (ii)	28,611	14,142	3,868	6,588	4,013

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 8.21 Change in working hours following the introduction of the NLW in 2016

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	-0.054	-0.256	-0.056	0.587	0.085
Standard error	0.166	0.234	0.278	0.605	0.239
Lower CI	-0.380	-0.715	-0.601	-0.600	-0.384
Upper CI	0.273	0.204	0.490	1.773	0.554
Minimum detectable effect	0.209	0.295	0.347	0.763	0.299
(ii) Alternative comparison group					
Impact	0.096	0.170	0.300	-0.549	0.233
Standard error	0.160	0.244	0.234	0.623	0.208
Lower CI	-0.217	-0.308	-0.159	-1.770	-0.175
Upper CI	0.409	0.648	0.758	0.672	0.641
Minimum detectable effect	0.200	0.305	0.296	0.789	0.261
(iii) Wage gap definition					
Impact	0.053	-0.065	0.135	0.608	0.084
Standard error	0.216	0.301	0.376	0.711	0.336
Lower CI	-0.370	-0.656	-0.603	-0.786	-0.574
Upper CI	0.475	0.526	0.873	2.002	0.742
Minimum detectable effect	0.224	0.310	0.392	0.765	0.352
Base (i) and (iii)	43,022	22,739	5,004	6,936	8,343
Base (ii)	43,024	21,370	5,615	6,559	9,480

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 8.22 Change in working hours following the uprating of the NLW in 2017

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	-0.389*	-0.381	-0.327	-0.726	0.189
Standard error	0.201	0.283	0.319	0.747	0.291
Lower CI	-0.782	-0.935	-0.951	-2.191	-0.381
Upper CI	0.005	0.174	0.298	0.739	0.759
Minimum detectable effect	0.215	0.304	0.355	0.788	0.314
(ii) Alternative comparison group					
Impact	-0.316	-0.213	-0.102	-1.167	0.280
Standard error	0.195	0.291	0.277	0.774	0.256
Lower CI	-0.697	-0.784	-0.645	-2.683	-0.223
Upper CI	0.066	0.357	0.442	0.350	0.782
Minimum detectable effect	0.206	0.313	0.304	0.821	0.270
(iii) Wage gap definition					
Impact	-0.559*	-0.614	-0.398	-0.575	0.268
Standard error	0.317	0.447	0.509	1.127	0.472
Lower CI	-1.181	-1.489	-1.397	-2.784	-0.657
Upper CI	0.063	0.261	0.600	1.634	1.193
Minimum detectable effect	0.243	0.338	0.419	0.846	0.385
Base (i) and (iii)	39,393	20,614	4,738	6,156	7,885
Base (ii)	39,023	19,133	5,227	5,652	9,011

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 8.23 Change in working hours following the uprating of the NLW in 2018

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
(i) Main comparison group					
Impact	-0.145	-0.324	-0.150	0.487	-0.002
Standard error	0.165	0.235	0.278	0.574	0.238
Lower CI	-0.469	-0.784	-0.695	-0.639	-0.469
Upper CI	0.179	0.136	0.395	1.612	0.465
Minimum detectable effect	0.206	0.291	0.349	0.736	0.299
(ii) Alternative comparison group					
Impact	-0.029	0.106	-0.079	-0.489	0.159
Standard error	0.161	0.245	0.242	0.605	0.207
Lower CI	-0.343	-0.374	-0.554	-1.675	-0.247
Upper CI	0.286	0.587	0.396	0.697	0.566
Minimum detectable effect	0.199	0.302	0.300	0.771	0.257
(iii) Wage gap definition					
Impact	0.023	-0.096	0.221	0.596	0.251
Standard error	0.204	0.288	0.360	0.665	0.310
Lower CI	-0.377	-0.661	-0.485	-0.707	-0.357
Upper CI	0.423	0.469	0.926	1.899	0.859
Minimum detectable effect	0.222	0.309	0.395	0.745	0.346
Base (i) and (iii)	43,324	22,655	5,067	7,089	8,513
Base (ii)	42,603	20,977	5,530	6,541	9,555

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

LFS weekly working hours, no controls

Table 8.24 Change in working hours following the uprating of the minimum wage, main specification

	All	Women working part-time	Women working full-time	Men working full-time
NMW 2011	0.976	-0.140	3.255**	0.994
Standard error	(1.195)	(1.042)	(1.656)	(1.372)
Confidence intervals	[-1.366, 3.318]	[-2.183, 1.904]	[0.006, 6.505]	[-1.698, 3.687]
NMW 2012	0.528	1.095	-1.690	0.580
Standard error	(1.169)	(0.964)	(1.587)	(1.670)
Confidence intervals	[-1.763, 2.820]	[-0.795, 2.985]	[-4.805, 1.426]	[-2.698, 3.857]
NMW 2013	-0.275	0.977	4.309**	-4.984*
Standard error	(1.560)	(1.459)	(1.757)	(2.692)
Confidence intervals	[-3.334, 2.784]	[-1.884, 3.839]	[0.861, 7.758]	[-10.269, 0.302]
NMW 2014	0.022	-0.077	-1.527	0.567
Standard error	(1.135)	(1.232)	(2.045)	(1.366)
Confidence intervals	[-2.204, 2.247]	[-2.494, 2.340]	[-5.540, 2.487]	[-2.114, 3.249]
NMW 2015	-1.011	-0.441	2.152	-0.422
Standard error	(1.454)	(1.452)	(1.932)	(1.801)
Confidence intervals	[-3.862, 1.841]	[-3.290, 2.407]	[-1.640, 5.944]	[-3.957, 3.113]
NMW 2016	-1.736	-1.062	-2.155*	-2.886**
Standard error	(1.136)	(1.303)	(1.287)	(1.235)
Confidence intervals	[-3.964, 0.491]	[-3.617, 1.492]	[-4.681, 0.370]	[-5.310, -0.461]
NMW 2017	-0.301	0.048	-0.178	1.766
Standard error	(0.901)	(1.057)	(1.293)	(1.458)
Confidence intervals	[-2.068, 1.466]	[-2.024, 2.121]	[-2.716, 2.360]	[-1.096, 4.628]
NMW 2018	-0.490	-1.769*	-0.470	0.787
Standard error	(0.947)	(0.992)	(1.465)	(1.374)
Confidence intervals	[-2.347, 1.367]	[-3.715, 0.177]	[-3.345, 2.405]	[-1.911, 3.485]
Controls	No	No	No	No
R-squared	0.007	0.023	0.028	0.020
Observations	7,524	3,516	1,722	1,558

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

Table 8.25 Treatment effects of yearly upratings on weekly working hours, weighted wage gap definition of treatment group

	All	Women	Women	Men working

		working part-time	working full-time	full-time
NMW 2011	1.438	0.247	3.948**	1.127
Standard error	(1.501)	(1.185)	(1.798)	(1.630)
Confidence intervals	[-1.504, 4.380]	[-2.077 - 2.570]	[0.419 - 7.476]	[-2.072 - 4.326]
NMW 2012	0.399	0.855	-1.261	-0.543
Standard error	(1.266)	(1.027)	(1.812)	(1.773)
Confidence intervals	[-2.082, 2.880]	[-1.159 - 2.869]	[-4.818 - 2.296]	[-4.023 - 2.938]
NMW 2013	2.208	2.456	5.511**	-3.637
Standard error	(2.161)	(2.485)	(2.631)	(2.640)
Confidence intervals	[-2.028, 6.444]	[-2.418 - 7.330]	[0.347 - 10.674]	[-8.819 - 1.546]
NMW 2014	0.520	0.141	-1.032	0.107
Standard error	(1.242)	(1.357)	(2.328)	(1.452)
Confidence intervals	[-1.915, 2.954]	[-2.521 - 2.802]	[-5.601 - 3.537]	[-2.742 - 2.957]
NMW 2015	-0.515	-0.976	2.196	-0.130
Standard error	(1.572)	(1.401)	(2.041)	(1.951)
Confidence intervals	[-3.597, 2.567]	[-3.723 - 1.771]	[-1.810 - 6.203]	[-3.960 - 3.700]
NMW 2016	-2.932**	-1.700	-1.756	-3.974**
Standard error	(1.465)	(1.556)	(1.753)	(1.751)
Confidence intervals	[-5.803, -0.060]	[-4.752 - 1.352]	[-5.196 - 1.685]	[-7.410 - -0.537]
NMW 2017	-0.556	-0.252	-0.529	1.560
Standard error	(0.960)	(1.139)	(1.434)	(1.551)
Confidence intervals	[-2.438, 1.325]	[-2.485 - 1.981]	[-3.344 - 2.286]	[-1.485 - 4.605]
NMW 2018	-0.741	-1.106	-0.309	0.267
Standard error	(0.993)	(1.054)	(1.429)	(1.361)
Confidence intervals	[-2.688, 1.206]	[-3.174 - 0.962]	[-3.114 - 2.497]	[-2.405 - 2.939]
Controls	No	No	No	No
R-squared	0.008	0.021	0.026	0.016
Observations	7,524	3,516	1,722	1,558

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

Table 8.26 Treatment effects of yearly upratings on weekly working hours, alternative comparison group

	All	Women working part-time	Women working full-time	Men working full-time
NMW 2011	2.184*	0.599	2.982*	-0.100*
Standard error	(1.204)	(0.998)	(1.807)	(0.060)
Confidence intervals	[-0.176, 4.545]	[-1.359 - 2.556]	[-0.565 - 6.529]	[-0.218 - 0.018]
NMW 2012	2.010	0.712	-4.112***	-0.059
Standard error	(1.259)	(1.116)	(1.520)	(0.054)
Confidence intervals	[-0.458, 4.478]	[-1.477 - 2.900]	[-7.095 - -1.129]	[-0.164 - 0.047]
NMW 2013	-0.556	-0.093	3.910**	0.046
Standard error	(1.483)	(1.730)	(1.628)	(0.045)
Confidence intervals	[-3.465, 2.352]	[-3.487 - 3.300]	[0.713 - 7.106]	[-0.043 - 0.135]
NMW 2014	-1.496	-0.828	-1.952	0.011
Standard error	(1.083)	(1.266)	(1.605)	(0.032)
Confidence intervals	[-3.620, 0.628]	[-3.310 - 1.655]	[-5.103 - 1.199]	[-0.051 - 0.073]
NMW 2015	-1.850	1.489	-1.622	-0.120
Standard error	(1.589)	(1.525)	(1.748)	(0.073)
Confidence intervals	[-4.966, 1.266]	[-1.503 - 4.480]	[-5.054 - 1.810]	[-0.264 - 0.023]
NMW 2016	-0.378	-0.441	-2.071	-0.033
Standard error	(1.101)	(1.298)	(1.523)	(0.056)
Confidence intervals	[-2.536, 1.781]	[-2.986 - 2.105]	[-5.061 - 0.919]	[-0.143 - 0.077]
NMW 2017	-0.364	1.864	-1.344	-0.014
Standard error	(1.004)	(1.249)	(1.209)	(0.038)
Confidence intervals	[-2.332, 1.605]	[-0.587 - 4.315]	[-3.717 - 1.029]	[-0.090 - 0.061]
NMW 2018	-1.286	-2.231	-1.191	-0.039
Standard error	(1.169)	(1.492)	(1.389)	(0.041)
Confidence intervals	[-3.579, 1.007]	[-5.157 - 0.695]	[-3.916 - 1.535]	[-0.120 - 0.042]
Controls	No	No	No	No
R-squared	0.034	0.031	0.028	0.048
Observations	6,638	2,826	1,576	1,710

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

LFS weekly working hours, basic controls

Table 8.27 Treatment effects of yearly upratings on weekly working hours, main specification

	All	Women	Women	Men working

		working part-time	working full-time	full-time
NMW 2011	0.615	0.065	3.370**	1.045
Standard error	(1.103)	(1.015)	(1.620)	(1.375)
Confidence intervals	[-1.547, 2.776]	[-1.926, 2.056]	[0.191, 6.549]	[-1.654, 3.743]
NMW 2012	0.568	1.238	-1.739	0.600
Standard error	(1.049)	(0.967)	(1.565)	(1.660)
Confidence intervals	[-1.489, 2.625]	[-0.660, 3.135]	[-4.811, 1.332]	[-2.659, 3.858]
NMW 2013	0.714	0.966	4.380**	-4.831*
Standard error	(1.478)	(1.442)	(1.783)	(2.719)
Confidence intervals	[-2.183, 3.612]	[-1.862, 3.793]	[0.881, 7.879]	[-10.168, 0.506]
NMW 2014	0.456	0.026	-1.483	0.646
Standard error	(1.013)	(1.210)	(2.033)	(1.373)
Confidence intervals	[-1.530, 2.441]	[-2.347, 2.400]	[-5.472, 2.507]	[-2.050, 3.341]
NMW 2015	-1.266	-0.362	1.896	-0.388
Standard error	(1.319)	(1.439)	(1.940)	(1.803)
Confidence intervals	[-3.853, 1.321]	[-3.184, 2.461]	[-1.913, 5.704]	[-3.928, 3.152]
NMW 2016	-1.313	-0.927	-2.220*	-2.842**
Standard error	(1.005)	(1.314)	(1.271)	(1.225)
Confidence intervals	[-3.285, 0.658]	[-3.504, 1.650]	[-4.715, 0.276]	[-5.248, -0.437]
NMW 2017	-0.026	0.186	-0.332	1.605
Standard error	(0.883)	(1.045)	(1.304)	(1.422)
Confidence intervals	[-1.757, 1.706]	[-1.863, 2.234]	[-2.892, 2.227]	[-1.187, 4.397]
NMW 2018	-0.525	-1.498	-0.095	0.883
Standard error	(0.899)	(0.993)	(1.422)	(1.368)
Confidence intervals	[-2.287, 1.238]	[-3.444, 0.449]	[-2.886, 2.696]	[-1.802, 3.569]
Controls	Basic	Basic	Basic	Basic
R-squared	0.153	0.032	0.042	0.026
Observations	7,524	3,516	1,722	1,558

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

Table 8.28 Treatment effects of yearly upratings on weekly working hours, weighted wage gap

	All	Women working part-time	Women working full-time	Men working full-time
NMW 2011	0.786	0.569	3.951**	1.176
Standard error	(1.315)	(1.156)	(1.828)	(1.622)
Confidence intervals	[-1.793, 3.365]	[-1.698 - 2.836]	[0.363 - 7.539]	[-2.008 - 4.359]

NMW 2012	0.760	1.115	-1.253	-0.534
Standard error	(1.120)	(1.022)	(1.789)	(1.775)
Confidence intervals	[-1.436, 2.956]	[-0.891 - 3.120]	[-4.764 - 2.257]	[-4.019 - 2.950]
NMW 2013	2.801	2.421	5.506**	-3.400
Standard error	(2.139)	(2.423)	(2.671)	(2.778)
Confidence intervals	[-1.392, 6.994]	[-2.331 - 7.173]	[0.263 - 10.748]	[-8.853 - 2.052]
NMW 2014	0.639	0.277	-0.969	0.171
Standard error	(1.105)	(1.331)	(2.305)	(1.472)
Confidence intervals	[-1.528, 2.806]	[-2.333 - 2.887]	[-5.494 - 3.555]	[-2.718 - 3.060]
NMW 2015	-1.019	-0.804	1.943	-0.049
Standard error	(1.424)	(1.395)	(2.060)	(1.950)
Confidence intervals	[-3.811, 1.773]	[-3.539 - 1.932]	[-2.100 - 5.986]	[-3.876 - 3.778]
NMW 2016	-2.285*	-1.573	-1.811	-3.932**
Standard error	(1.325)	(1.554)	(1.726)	(1.731)
Confidence intervals	[-4.883, 0.314]	[-4.621 - 1.475]	[-5.198 - 1.577]	[-7.329 - -0.534]
NMW 2017	-0.223	-0.031	-0.636	1.384
Standard error	(0.944)	(1.123)	(1.434)	(1.521)
Confidence intervals	[-2.075, 1.628]	[-2.233 - 2.171]	[-3.450 - 2.179]	[-1.602 - 4.370]
NMW 2018	-0.331	-0.734	0.111	0.358
Standard error	(0.947)	(1.052)	(1.386)	(1.365)
Confidence intervals	[-2.189, 1.526]	[-2.796 - 1.329]	[-2.609 - 2.831]	[-2.321 - 3.037]
Controls	Basic	Basic	Basic	Basic
R-squared	0.155	0.031	0.039	0.022
Observations	7,524	3,516	1,722	1,558

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

Table 8.29 Treatment effects of yearly upratings on weekly working hours, alternative comparison group

	All	Women working part-time	Women working full-time	Men working full-time
NMW 2011	1.448	0.689	3.016*	-0.104*
Standard error	(1.110)	(0.990)	(1.651)	(0.059)
Confidence intervals	[-0.728, 3.625]	[-1.252 - 2.630]	[-0.225 - 6.258]	[-0.221 - 0.012]
NMW 2012	2.031*	0.954	-4.085***	-0.056
Standard error	(1.122)	(1.109)	(1.493)	(0.052)
Confidence intervals	[-0.169, 4.231]	[-1.222 - 3.130]	[-7.015 - -1.154]	[-0.158 - 0.046]
NMW 2013	-0.316	-0.074	3.861**	0.038
Standard error	(1.435)	(1.714)	(1.637)	(0.043)
Confidence intervals	[-3.130, 2.497]	[-3.436 - 3.288]	[0.647 - 7.075]	[-0.047 - 0.122]
NMW 2014	-0.472	-0.576	-2.035	0.009
Standard error	(0.934)	(1.214)	(1.567)	(0.029)
Confidence intervals	[-2.303, 1.360]	[-2.957 - 1.805]	[-5.111 - 1.041]	[-0.048 - 0.067]
NMW 2015	-1.728	1.636	-1.750	-0.118
Standard error	(1.383)	(1.527)	(1.707)	(0.072)
Confidence intervals	[-4.439, 0.983]	[-1.360 - 4.632]	[-5.100 - 1.600]	[-0.259 - 0.023]
NMW 2016	-0.001	-0.356	-2.062	-0.037
Standard error	(0.999)	(1.316)	(1.538)	(0.056)
Confidence intervals	[-1.958, 1.957]	[-2.938 - 2.227]	[-5.082 - 0.958]	[-0.146 - 0.072]
NMW 2017	0.283	2.159*	-1.447	-0.015
Standard error	(0.944)	(1.236)	(1.202)	(0.039)
Confidence intervals	[-1.569, 2.135]	[-0.265 - 4.582]	[-3.807 - 0.912]	[-0.091 - 0.061]
NMW 2018	-0.928	-1.832	-1.191	-0.033
Standard error	(1.042)	(1.488)	(1.387)	(0.039)
Confidence intervals	[-2.971, 1.115]	[-4.751 - 1.088]	[-3.915 - 1.532]	[-0.110 - 0.044]
Controls	Basic	Basic	Basic	Basic
R-squared	0.192	0.042	0.038	0.056
Observations	6,638	2,826	1,576	1,710

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level. The regressions are weighted using the LFS longitudinal weights. Standard errors clustered at the individual level in parentheses. 95% Confidence intervals in brackets.

Appendix D – Detailed subgroup analysis for very small and very large firms

ASHE employment retention with controls, 2016

Table 8.30 Employment retention following introduction of NLW in 2016, for very small firms

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Larger (10 or more employees)					
Impact	-0.025***	-0.039***	0.027	-0.044*	-0.011
Standard error	0.009	0.012	0.024	0.023	0.020
Counterfactual	0.688	0.714	0.654	0.670	0.658
Micro (1-9)					
Impact	-0.032	-0.032	0.031	-0.021	-0.037
Standard error	0.028	0.038	0.103	0.065	0.064
Counterfactual	0.578	0.582	0.598	0.531	0.623
Difference	-0.008	0.007	0.004	0.023	-0.026
Standard error	0.027	0.036	0.100	0.061	0.061
Base	62,289	31,682	7,080	11,210	12,317

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 8.31 Employment retention following introduction of NLW in 2016, for very large firms

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Smaller (under 1,000)					
Impact	-0.032***	-0.033**	0.001	-0.056*	-0.032
Standard error	0.011	0.016	0.031	0.029	0.023
Counterfactual	0.639	0.651	0.639	0.616	0.643
Very large (1,000 or more)					
Impact	-0.020	-0.045	0.067	-0.028	0.018
Standard error	0.020	0.028	0.057	0.051	0.045
Counterfactual	0.714	0.745	0.663	0.689	0.664
Difference	0.012	-0.012	0.066	0.027	0.050
Standard error	0.016	0.022	0.048	0.042	0.039
Base	62,289	31,682	7,080	11,210	12,317

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

ASHE employment retention with controls, 2017

Table 8.32 Employment retention following uprating of NLW in 2017, for very small firms

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Larger (10 or more employees)					
Impact	0.010	0.002	0.026	-0.011	0.033
Standard error	0.011	0.014	0.029	0.028	0.024
Counterfactual	0.690	0.703	0.687	0.680	0.660
Micro (1-9)					
Impact	-0.016	0.031	-0.116	-0.058	-0.048
Standard error	0.034	0.046	0.135	0.075	0.077
Counterfactual	0.558	0.569	0.656	0.512	0.561
Difference	-0.026	0.029	-0.142	-0.046	-0.081
Standard error	0.032	0.044	0.132	0.070	0.073
Base	56,458	28,493	6,640	9,771	11,554

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 8.33 Employment retention following uprating of NLW in 2017, for very large firms

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Smaller (under 1,000)					
Impact	0.013	0.034*	0.010	-0.008	-0.029
Standard error	0.014	0.020	0.039	0.035	0.029
Counterfactual	0.621	0.625	0.655	0.592	0.620
Very large (1,000 or more)					
Impact	-0.004	-0.020	0.022	-0.044	0.089
Standard error	0.024	0.034	0.069	0.062	0.055
Counterfactual	0.731	0.746	0.717	0.725	0.685
Difference	-0.017	-0.054	0.013	-0.036	0.119**
Standard error	0.020	0.027	0.057	0.051	0.046
Base	56,458	28,493	6,640	9,771	11,554

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

ASHE employment retention with controls, 2018

Table 8.34 Employment retention following uprating of NLW in 2018, for very small firms

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Larger (10 or more employees)					
Impact	0.025***	0.024*	0.013	0.049**	0.014
Standard error	0.009	0.012	0.025	0.022	0.020
Counterfactual	0.652	0.662	0.640	0.622	0.648
Micro (1-9)					
Impact	-0.017	-0.006	-0.104	-0.041	0.033
Standard error	0.027	0.037	0.101	0.061	0.066
Counterfactual	0.626	0.633	0.655	0.605	0.646
Difference	-0.042	-0.030	-0.117	-0.090	0.019
Standard error	0.026	0.035	0.097	0.056	0.063
Base	62,555	31,561	7,240	11,289	12,465

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 8.35 Employment retention following uprating of NLW in 2018, for very large firms

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Smaller (under 1,000)					
Impact	-0.001	-0.002	-0.044	0.003	0.004
Standard error	0.011	0.016	0.032	0.027	0.024
Counterfactual	0.656	0.663	0.654	0.634	0.672
Very large (1,000 or more)					
Impact	0.041**	0.038	0.071	0.050	0.031
Standard error	0.020	0.028	0.059	0.049	0.046
Counterfactual	0.638	0.659	0.618	0.606	0.611
Difference	0.042**	0.040*	0.115**	0.047	0.027
Standard error	0.016	0.023	0.049	0.041	0.039
Base	62,555	31,561	7,240	11,289	12,465

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

ASHE weekly working hours with controls, 2016

Table 8.36 Weekly working hours following introduction of NLW in 2016, for very small firms

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Larger (10 or more employees)					
Impact	-0.102	-0.292	-0.019	0.447	0.048
Standard error	0.176	0.248	0.288	0.652	0.253
Counterfactual	0.418	0.581	-0.027	0.317	-0.293
Micro (1-9)					
Impact	0.261	0.007	-0.439	1.603	0.118
Standard error	0.585	0.821	1.216	1.973	0.838
Counterfactual	-0.097	0.101	-0.020	-1.247	-0.103
Difference	0.363	0.299	-0.420	1.156	0.070
Standard error	0.558	0.783	1.181	1.862	0.799
Base	43,010	22,733	5,001	6,934	8,342

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 8.37 Weekly working hours following introduction of NLW in 2016, for very large firms

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Smaller (under 1,000)					
Impact	-0.183	-0.514	0.070	0.694	-0.022
Standard error	0.235	0.353	0.371	0.860	0.306
Counterfactual	0.181	0.470	-0.120	-0.633	-0.249
Very large (1,000 or more)					
Impact	0.085	-0.035	-0.232	0.660	0.177
Standard error	0.407	0.589	0.674	1.488	0.582
Counterfactual	0.557	0.634	0.094	0.863	-0.308
Difference	0.268	0.480	-0.302	-0.033	0.199
Standard error	0.333	0.472	0.563	1.215	0.495
Base	43,010	22,733	5,001	6,934	8,342

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

ASHE weekly working hours with controls, 2017

Table 8.38 Weekly working hours following uprating of NLW in 2017, for very small firms

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Larger (10 or more employees)					
Impact	-0.370*	-0.335	-0.225	-0.650	0.075
Standard error	0.211	0.298	0.327	0.800	0.306
Counterfactual	0.157	0.049	-0.241	0.481	-0.273
Micro (1-9)					
Impact	-0.407	-0.492	-2.414	-0.528	0.876
Standard error	0.717	0.990	1.592	2.412	1.059
Counterfactual	0.116	0.009	1.943	0.790	-1.214
Difference	-0.037	-0.157	-2.189	0.121	0.802
Standard error	0.686	0.944	1.558	2.275	1.014
Base	39,383	20,609	4,734	6,155	7,885

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 8.39 Weekly working hours following uprating of NLW in 2017, for very large firms

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Smaller (under 1,000)					
Impact	-0.430	-0.430	-0.430	-0.620	0.021
Standard error	0.290	0.427	0.450	1.079	0.391
Counterfactual	-0.168	-0.331	0.051	-0.180	-0.562
Very large (1,000 or more)					
Impact	-0.355	-0.296	-0.210	-0.656	0.203
Standard error	0.494	0.709	0.784	1.842	0.708
Counterfactual	0.463	0.376	-0.360	1.155	-0.060
Difference	0.075	0.133	0.220	-0.036	0.182
Standard error	0.400	0.567	0.643	1.493	0.590
Base	39,383	20,609	4,734	6,155	7,885

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

ASHE weekly working hours with controls, 2018

Table 8.40 Weekly working hours following uprating of NLW in 2018, for very small firms

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Larger (10 or more employees)					
Impact	-0.153	-0.357	-0.179	0.573	-0.010
Standard error	0.177	0.251	0.289	0.626	0.252
Counterfactual	0.360	0.533	0.055	0.001	-0.182
Micro (1-9)					
Impact	-0.020	-0.246	-0.224	0.944	-0.102
Standard error	0.555	0.776	1.184	1.763	0.841
Counterfactual	0.296	0.786	0.232	-0.872	-0.314
Difference	0.133	0.111	-0.045	0.371	-0.092
Standard error	0.526	0.735	1.149	1.648	0.802
Base	43,312	22,648	5,065	7,088	8,511

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Table 8.41 Weekly working hours following uprating of NLW in 2018, for very large firms

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Smaller (under 1,000)					
Impact	-0.041	-0.238	-0.209	0.449	0.197
Standard error	0.226	0.338	0.373	0.785	0.302
Counterfactual	0.263	0.476	0.125	-0.068	-0.277
Very large (1,000 or more)					
Impact	-0.242	-0.419	-0.158	0.723	-0.398
Standard error	0.401	0.578	0.675	1.395	0.580
Counterfactual	0.455	0.678	-0.032	-0.111	-0.042
Difference	-0.201	-0.181	0.052	0.275	-0.595
Standard error	0.331	0.469	0.562	1.152	0.495
Base	43,312	22,648	5,065	7,088	8,511

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Appendix E – Results of pooled analysis using ASHE

This appendix reports estimates of the impact of the introduction and uprating of the NLW on real wages, employment retention and working hours averaged over the years from 2016 to 2018. The years from 2012 to 2014 are used as the pre-intervention period, as with the earlier analyses. All tables report findings from the analysis of ASHE with the full set of control variables.

Real wages 2016-2018

Table 8.42 shows how the introduction and uprating of the NLW between 2016 and 2018 affected real wages for low-paid employees. Across all three specifications, the NLW increased real wages for female employees, irrespective of whether they worked part-time or full-time. There are also signs that it resulted in higher wages for men who worked full-time in two of the three specifications, but it had little impact on wages for low-paid men who worked part-time.

Table 8.42 Impact of the NLW on real wages, 2016-2018

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Main comparison group					
Impact	0.014***	0.015***	0.027***	-0.001	0.011**
Standard error	0.003	0.004	0.006	0.009	0.005
Lower CI	0.008	0.007	0.015	-0.018	0.001
Upper CI	0.020	0.023	0.039	0.017	0.022
Alternative comparison group					
Impact	0.015***	0.012***	0.033***	0.003	0.012**
Standard error	0.003	0.004	0.006	0.009	0.006
Lower CI	0.010	0.004	0.021	-0.015	0.001
Upper CI	0.021	0.020	0.045	0.021	0.023
Wage gap definition					
Impact	0.013***	0.016***	0.021**	-0.006	0.013
Standard error	0.004	0.006	0.009	0.011	0.008
Lower CI	0.005	0.005	0.004	-0.028	-0.003
Upper CI	0.021	0.027	0.039	0.016	0.029
Base (i) and (iii)	64,347	33,580	7,591	10,563	12,613
Base (ii)	63,254	30,962	8,306	9,728	14,258

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Employment retention 2016-2018

Despite the evidence that the introduction and uprating of the NLW increased real wages for women in particular, there was little evidence that this resulted in lower rates of employment retention for those directly affected by the NLW (

Table 8.43). Only male full-time employees experienced an increase in employment retention following the introduction and uprating of the NLW and this was only apparent in the weighted wage gap version of the analysis. The fact that this was not evident in the other two specifications suggests that it was sensitive to the way in which the treatment and comparison groups were defined.

Table 8.43 Impact of the NLW on employment retention, 2016-2018

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Main comparison group					
Impact	-0.001	-0.006	0.018	-0.009	0.007
Standard error	0.006	0.009	0.018	0.016	0.014
Lower CI	-0.013	-0.023	-0.018	-0.039	-0.021
Upper CI	0.011	0.010	0.054	0.022	0.034
Alternative comparison group					
Impact	0.003	-0.005	0.023	-0.018	0.013
Standard error	0.006	0.009	0.018	0.017	0.014
Lower CI	-0.009	-0.023	-0.012	-0.051	-0.015
Upper CI	0.016	0.013	0.058	0.015	0.040
Wage gap definition					
Impact	0.010	0.003	-0.012	0.001	0.052**
Standard error	0.008	0.011	0.026	0.019	0.020
Lower CI	-0.006	-0.019	-0.063	-0.036	0.012
Upper CI	0.026	0.026	0.038	0.039	0.091
Base (i) and (iii)	93,275	46,865	10,828	16,921	18,661
Base (ii)	90,476	42,785	11,562	15,505	20,624

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.

Weekly working hours 2016-2018

The introduction and uprating of the NLW did not have a statistically significant impact on working hours for low paid employees who were in employment before and after each uprating over the period from 2016 to 2018. This was apparent across all of the three specifications for each of the different subgroups considered (

Table 8.44).

Table 8.44 Impact of the NLW on working hours, 2016-2018

	All	Women working part-time	Women working full-time	Men working part-time	Men working full-time
Main comparison group					
Impact	-0.154	-0.292*	-0.163	0.305	0.055
Standard error	0.124	0.176	0.206	0.442	0.178
Lower CI	-0.398	-0.638	-0.566	-0.563	-0.294
Upper CI	0.089	0.054	0.241	1.172	0.404
Alternative comparison group					
Impact	-0.033	0.075	0.050	-0.507	0.191
Standard error	0.120	0.183	0.175	0.463	0.155
Lower CI	-0.269	-0.284	-0.293	-1.415	-0.114
Upper CI	0.203	0.434	0.392	0.401	0.496
Wage gap definition					
Impact	-0.013	-0.106	0.070	0.547	0.169
Standard error	0.167	0.235	0.290	0.548	0.257
Lower CI	-0.340	-0.567	-0.498	-0.528	-0.336
Upper CI	0.315	0.355	0.638	1.622	0.673
Base (i) and (iii)	64,347	33,580	7,591	10,563	12,613
Base (ii)	63,254	30,962	8,306	9,728	14,258

Notes: ***=statistically significant at the 1 per cent level; **=statistically significant at the 5 per cent level; *=statistically significant at the 10 per cent level.