



The reallocation effects of the UK National Living Wage

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Acknowledgements

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Contents

Acknowledgements	2
Contents.....	2
1 Introduction	4
2 The analysis of the German minimum wage by Dustmann <i>et al</i>	5
2.1 Methodological summary	5
2.2 Theoretical rationale for the results	7
3 Applying the empirical strategy to a UK context.....	10
3.1 The policy context	10
3.2 The data.....	11
3.3 Methodological strategy	12
3.4 Econometric issues	14
Measurement error in hourly wage variable	14
Proportion of workforce covered by National Living Wage.....	15
Consequences for the design of our analysis	15
4 Results: analysis of cross-sectional LFS data.....	17
4.1 Hourly wages.....	17
4.2 Comparison with under-25 age group.....	18
4.2 Weekly earnings	21
4.3 Hours of work.....	22
4.4 Employment	23
4.5 Indicators of labour market composition.....	28
4.6 Summary	29
5 Results: Regional analysis of the impact of the NLW.....	31
5.1 The coverage of the NLW by region.....	31
5.2 The NLW 'gap' measure and its relationship to hourly wages and employment in each region.....	32
5.3 Discussion.....	34

6	Results: Analysis of the 5-quarter longitudinal LFS.....	35
6.1	Introduction	35
6.2	Analysis of change in hourly wages by wage group.....	35
6.3	Transitions from employee status in quarter 1	37
6.4	Transitions to employee status in quarter 5	40
6.5	Detailed breakdown of Wave 5 transitions for low-wage employees in Wave 1 of the LFS panel	43
6.6	Summary	45
7	Conclusion	46
	References.....	47
	Appendix A: Hourly wage regression	49
	Appendix B.....	53

1 Introduction

UNISON has commissioned Landman Economics to carry out an economic analysis of the impact of the National Living Wage – the statutory minimum wage rate for employees aged 25 and over in the UK – on earnings and employment since 2016. The National Living Wage (NLW) was announced by the then Chancellor of the Exchequer George Osborne in his summer 2015 Budget as an above inflation increase in the statutory minimum wage rate for employees aged 25 and over, with the rate initially set at £7.20 per hour from April 2016. In April 2020 the NLW was increased from £8.21 to £8.72 per hour, a rate which is projected to be 60 per cent of median earnings for employees aged 25 and over. Overall, this represents an increase of 30% in the statutory minimum wage for employees aged 25 and over between 2015 and 2020 (around 20% in real terms, allowing for increases in consumer prices over this period).

This report uses data from the UK Labour Force Survey (a large-scale survey of employment and earnings) to look at the impact of the National Living Wage on earnings and employment for the group of affected employees. This is done by measuring changes in earnings, employment and other key economic indicators for low-paid workers compared with workers higher up the hourly earnings distribution.

Many of the techniques used in this paper draw on recent research by Christian Dustmann and colleagues at the Centre for the Research and Analysis of Migration (CReAM) at University College London using data from Germany (Dustmann *et al*, 2020). Chapter 2 of this report explains their approach. Chapter 3 outlines the features of the Labour Force Survey (LFS) used for the analysis in this report and compares the methodological approach used here with that of Dustmann *et al*. Chapter 4 presents results from the overall sample of employees in the Labour Force Survey, comparing labour market outcomes across wages, hours of work and employment for employees on low hourly wages (who are more likely to be affected by the National Living Wage) with those further up the wage distribution. Chapter 5 examines the differential affects of the NLW by workplace region. Chapter 6 uses data from the LFS 5-quarter panel data set to assess whether the introduction of the NLW led to changes in the separation rates from low-paid jobs, or the hiring rates into low paid jobs. The chapter also looks at changes in wages for low-paid employees before and after the introduction of the NLW. Chapter 7 offers conclusions and potential next steps for analysis.

2 The analysis of the German minimum wage by Dustmann *et al*

2.1 Methodological summary

A recent research paper by Christian Dustmann, Attila Lindner, Uta Schönberg, Matthias Umkehrer and Philipp vom Berge for the Centre for the Research and Analysis of Migration (CReAM) at University College London (Dustmann *et al*, 2020) examines the labour market effects of the introduction of a minimum wage in Germany for the first time in the country's history, in January 2015. The German minimum wage (GMW) was initially set at €8.50 per hour and cut deep into the wage distribution, with 15% of workers in Germany earning a wage below €8.50 six months before the minimum wage came into effect. Like the UK National Minimum Wage and National Living Wage, the GMW was set at a uniform national level, and so was much more binding in some regions than others, with more than one in three workers being affected in the most exposed regions.

Dustmann *et al* examine the labour market effects of the initial introduction of the GMW by exploiting variation in the exposure to the minimum wage across workers and regions. The key methodological innovation of the research is to analyse, for the first time in the literature, whether the minimum wage induced low-wage workers to reallocate from small, low-paying firms to larger, higher-paying firms.

The analysis uses high quality administrative data and several complementary methodologies. Initially the research investigates the wage and employment effects of the GMW at the individual level by comparing workers who earned less (treatment group) with workers who earned considerably more (control group) the minimum wage before and after the introduction of the GMW. The rationale for this empirical strategy is that the control group should be unaffected by the introduction of the GMW. This strategy is similar to previous research by Currie and Fallick (1996) and Clemens and Wither (2019) but Dustmann *et al* use better data (administrative rather than survey data) and also deal with potential biases, such as mean reversion, in a convincing and transparent way. The results from this analysis suggest that the GMW significantly increased wages of low-wage workers, relative to wages of high-wage workers located further up the wage distribution. At the same time, there is no indication that the minimum wage had a negative impact on the employment prospects of low-wage workers.

Second, the authors use an analysis that exploits variation in the exposure to the minimum wage across regions (drawing on earlier research by Card, 1992). The results corroborate the findings from the individual-level analysis: the GMW boosted wages but did not reduce employment in regions heavily affected by it. Thus, it helped reduce wage inequality, both across individuals and across regions.

Third, the research addresses the question of how the labour market absorbed wage increases induced by the minimum wage. The hypothesis which Dustmann *et al* test is that the minimum wage improves the quality of firms that operate in the market, by reallocating workers from smaller, lower paying firms to larger, higher paying ones. The results are consistent with reallocation at both the individual and regional level. Most importantly, at the individual level, the analysis shows that low-wage workers, but not high-wage workers, are more likely to upgrade to “better” firms after the introduction of the minimum wage. This “upgrading” takes different forms. First, the minimum wage induces low-wage workers to move to firms that pay a higher daily wage on average. This effect is quantitatively important, and can account for about one quarter of the overall increase in daily wages that low-wage workers experienced following introduction of the GMW. The improvement in average daily wages reflects two types of movements: (a) to firms that offer more full-time jobs and employ a more skilled workforce, and (b) to firms that pay a higher wage premium to the same type of worker. Second, the minimum wage induces low-wage workers to move to larger and more stable firms with lower worker turnover. Low-wage workers also reallocate towards firms that are able to poach a larger share of workers from other firms in response to the minimum wage. Overall, these results suggest that the GMW reallocated low-wage workers to more productive establishments. Given that the policy did not lower employment, these findings suggest that minimum wages increased the production efficiency of labour in Germany from 2015 onwards.

Finally, the paper provides further evidence in support of the worker reallocation hypothesis based on a regional analysis. Specifically, Dustmann *et al* show that in the years following the introduction of the GMW, the number and the share of micro firms with less than three employees declined, whereas firm size and the share of larger firms increased, in regions more exposed to the minimum wage compared to less exposed regions. Moreover, they also find that the minimum wage increased the average firm wage premium, suggesting a compositional shift toward higher paying firms.

The analysis also provides several pieces of evidence that the findings highlighted in the research reflect the causal impact of the GMW, rather than macroeconomic shifts in the economy. First, the effects of the GMW emerged exactly when the policy was introduced. Second, they are concentrated among low-wage workers at the bottom of the wage distribution who are most affected by the minimum wage. Trajectories of high wage workers, in contrast, did not change in response to the minimum wage. Third, the results are robust to controlling for individual and regional characteristics, such as the local unemployment rate, in a flexible manner.

2.2 Theoretical rationale for the results

The predictions from economic theory about the potential employment effect of a wage floor depend on the assumptions made about the way the labour market works. The most simplistic economic model of the labour market assumes ‘perfect competition’, whereby each worker is paid exactly the value of what he or she produces (his or her ‘marginal product’). This model predicts that a minimum wage will either have no effect on the labour market whatsoever (if set at a level below what the lowest-paid worker in the labour market is paid) or will reduce employment (if set above this level). In this view, the higher the minimum wage is, the higher unemployment will be. Any worker for whom the minimum wage is greater than the value of their hourly productivity will lose their job when the minimum wage is introduced.

Alternative models based on ‘imperfect competition’ in the labour market (e.g. Manning 2003a) suggest that due to features of real-world labour markets such as employers’ market power and the costs to employees of moving jobs, it is quite possible that many workers are being paid less than the value of what they produce. In this situation, it is possible for a minimum wage to raise wages without having any adverse effect on employment. In fact, in certain models there may be a positive impact on employment (Card and Krueger, 1995). There is still a certain critical level of minimum wage above which we would expect to encounter adverse employment effects, but it is an empirical question as to where that level is.

Various economic models can account for the reallocation of low wage workers to larger, higher paying firms following the introduction of the minimum wage in Germany. One category of models introduces *search frictions* into the labour market, meaning that looking for, and applying for, jobs is not a costless process (in terms of time spent) for unemployed people looking for work – or for employed people looking to move jobs. This is clearly a more realistic assumption than the simple perfect competition model, which assumes that workers can find jobs and apply for them instantly and at zero cost. Acemoglu (2001) provides an explanation for why in the presence of search frictions, a minimum wage may induce a shift toward more productive, capital-intensive firms. Whereas in a perfectly competitive labour market, wages are equalised across firms with low and high capital intensity, search frictions force firms to agree to a higher wage in jobs with a high capital intensity. As a result of this, firms create too many “bad” jobs (i.e. jobs with a low capital intensity) and too few “good” jobs. A minimum wage induces firms to destroy some jobs with low capital intensity, and set up additional jobs with high capital intensity.

A second category of models involve *monopsonistic or oligopolistic competition* (e.g. Manning 2003b; Bhaskar, Manning and To, 2002; Berger, Herkenhoff and Mongey 2019). The perfectly competitive model assumes an infinite number of firms employing workers in the labour market. By contrast, in these types of models,

monopsony power¹ allows firms to set wages below the marginal product of labour and more productive firms find it optimal to set higher wages and employ more workers. The introduction of a minimum wage drives the smallest and most inefficient firms out of the market. Medium sized and larger firms (partially) absorb the workers previously employed in the smallest firms that shut down. Card, Cardoso, Heinig and Kline (2018) argue that monopsony power of firms naturally emerges when workers have idiosyncratic preferences to work at a particular firm which are “non-pecuniary” (i.e. over and above the wage offered by the firm). Possibly the most important non-pecuniary characteristic of a particular job is the commuting time from home to the workplace: workers are willing to accept lower wages if the workplace is closer to their home. As a result, low paying firms are able to survive in equilibrium, by mostly attracting workers from their close neighbourhood. The introduction of a minimum wage may force these firms to close down, and workers may have to find jobs that are farther from their home.

A third category of models that can explain reallocation of workers towards higher-quality firms involve frictions in the consumer goods market rather than the labour market, as explored in Luca and Luca (2018) and Mayneris, Poncet and Zhang (2018). Consider a model where firms produce differentiated goods, differ in their productivity, and face fixed costs of production, as in (for example) Melitz (2003). In this type of model, a minimum wage, by pushing up labour costs, causes the least productive firms to exit the market. Consumers who had previously purchased goods from these firms will switch to products produced by more efficient firms, which increases the demand for labour in these firms. In this case, we would expect the reallocation to take place predominantly within, rather than between, industries.

Dustmann *et al* find evidence consistent with all three of these categories of model:

- The finding that low-wage workers reallocated towards firms with higher firm fixed-effects for wages and to skill-intensive firms is compatible with the search frictions class of models.
- To test the monopsony models, the results explore the possibility that the reallocation of low-wage workers to higher paying firms comes at the expense of increased commuting distance. The estimates suggest that commuting distance increased by 1.5km (or 8%) for low-wage workers relative to high-wage workers after the introduction of the GMW. These findings are consistent with a model where worker reallocation emerges due to the monopsony power of firms.

¹ ‘monopsony power’ in the labour market describes a situation where firms buying labour (i.e. employers) are less than perfect substitutes for each other, so that employees are not completely indifferent about which firm to work for. This is the counterpart of monopoly power in the product market, where the products offered by firms are not perfect substitutes for one another.

- The results show that around 68% of the overall reallocation of workers to different firms after the introduction of the GMW occurs within industries (defined using a three-digit industrial classification) rather than across industries. This is consistent with models which involve frictions in the consumer goods market. Furthermore, there is evidence that customer switching happens primarily among locally traded goods (that is, in retail and restaurant-related industries), rather than among goods traded in the national or world market where consumers would be more likely to switch to non-German producers.

3 Applying the empirical strategy to a UK context

3.1 The policy context

Whereas a minimum wage was only introduced in Germany in 2015, the UK has had a National Minimum Wage (NMW) since 1999. The UK minimum wage also has differential rates depending on age, whereas the German minimum wage has a single rate for all employees aged 18 or over (under-18s are not covered). Table 3.1 shows the age-related rates for the National Minimum Wage since October 2011. The introduction of the National Living Wage in April 2016 created a new, higher minimum wage rate for employees aged 25 and over.

Table 3.1. National Minimum Wage rates in the UK, 2011-2020

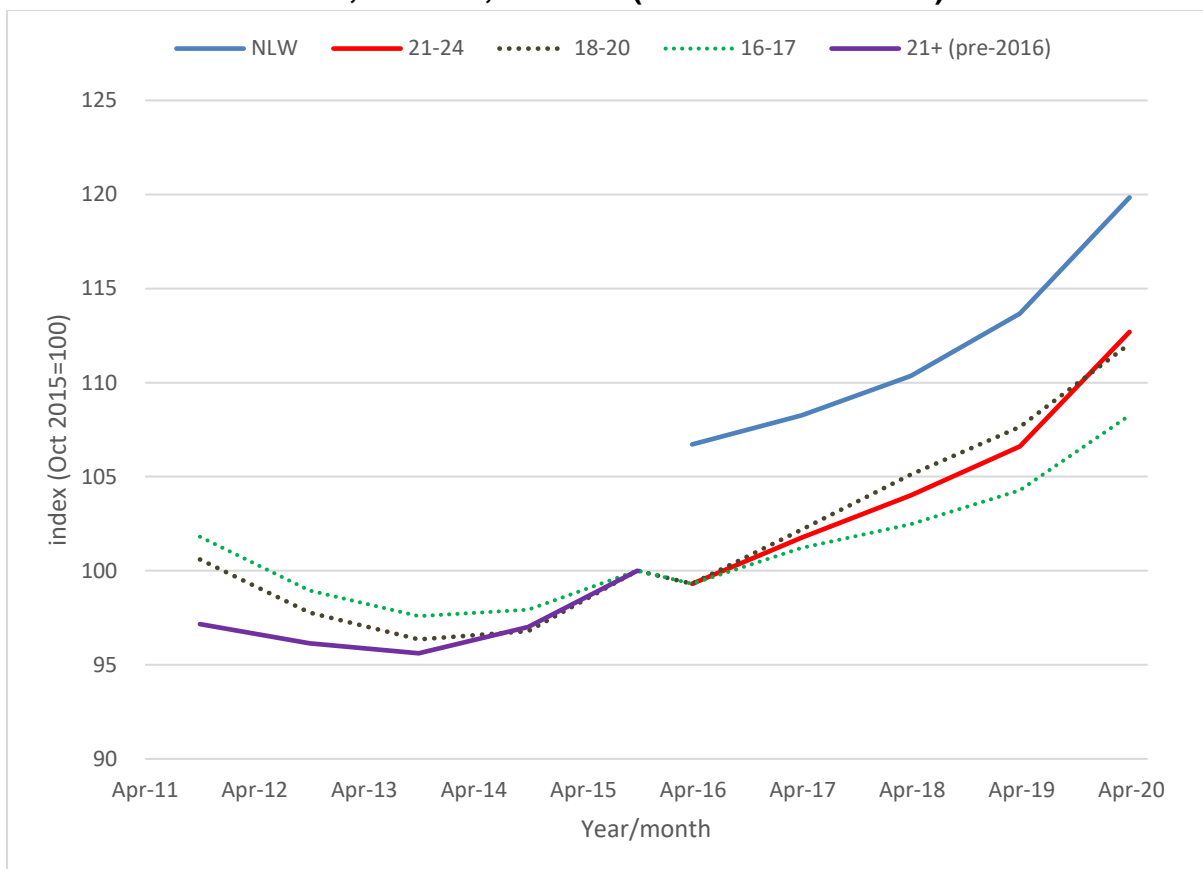
Date	25+ (NLW)	21-24	21+	18-20	16-17
October 2011			£6.08	£4.98	£3.68
October 2012			£6.19	£4.98	£3.68
October 2013			£6.31	£5.03	£3.72
October 2014			£6.50	£5.13	£3.79
October 2015			£6.70	£5.30	£3.87
April 2016	£7.20	£6.70		£5.30	£3.87
April 2017	£7.50	£7.05		£5.60	£4.05
April 2018	£7.83	£7.38		£5.90	£4.20
April 2019	£8.21	£7.70		£6.15	£4.35
April 2020	£8.72	£8.20		£6.45	£4.55

Figure 3.1 shows the value of the NLW and the other age-related minimum wage rates from 2011 to 2020 (indexed so that the value of each rate in 2015 – the year before the introduction of the NLW – is set to 100). This allows us to see clearly the real terms increase in the value of the NLW – and the other minimum wage rates. In 2015, the minimum wage rate for employees aged 21 and over was slightly higher than it had been in 2011, whereas the minimum wage rates for younger employees were approximately the same as in 2011 (there was a slight real-terms fall between 2012 and 2013 but this was reversed in 2014 and 2015). The introduction of the NLW in 2016 represented an increase of around 7 per cent in the real value of the minimum wage for employees aged 25 and over. These real terms increases continued in subsequent years. By 2020, based on the best current estimates of CPI inflation, the NLW will be 20 per cent higher in real terms than the level of the NMW for employees aged 21 and over before the NLW was introduced. At the same time, minimum wage rates for younger workers have also increased from 2017 onwards. By 2020 it is estimated that the minimum wage for employees aged 21 to 24 and for

employees aged 18 to 20 will be around 12 per cent higher than in 2015, while the minimum wage for 16 and 17 year olds will be about 8 per cent higher than in 2015.

Overall the figure indicates a sustained increase in the real terms value of all minimum wages from 2017 onwards, following a substantial increase (of around 7%) in minimum wage rates for the 25+ age group when the NLW was established in 2016. This represents a clear structural break from the policy in the early 2010s when the minimum wage was allowed to drift slightly downwards in real terms through below-inflation increases.

Figure 3.1 Real terms value of NLW and other age-related minimum wage rates, 2011-20, indexed (October 2015 = 100)



Source: Landman Economics calculations based on ONS Consumer Price Index data

Note: estimated value of CPI for 2020 used to produce index for 2020

3.2 The data

Dustmann *et al* (2020) used data from individual-level German administrative records taken from source data of the Federal Employment Agency's Statistics Department. The equivalent source of data for the UK would be the Annual Survey of Hours and Earnings (ASHE) which is a 1% survey of all employees based on National Insurance Contributions records processed by employers – between

250,000 and 300,000 records per year. Unfortunately, accessing the individual-level ASHE data in the UK is a complex and time-consuming process which would have delayed this research project. Instead, this report uses survey data from the Labour Force Survey (LFS), which is a quarterly survey of around 65,000 adults per quarter (including around 35,000 employees per quarter). The LFS has a five-quarter “rotating panel” structure; individuals in selected household addresses are interviewed five times over a 15-month period. Questions about earnings for employees are asked in the first and fifth wave; the sample size for wage data in each quarter of the LFS is around 10,000². This report combines quarters of the LFS into calendar years to produce a sample size of around 40,000 employees with earnings data per year.

Most of the analysis in this report uses the LFS as a cross-sectional dataset. There is also a version of the dataset which exploits the rotating panel structure of the interviewing to create a five-quarter panel dataset – the “5-quarter longitudinal LFS”. This is useful for looking at labour market transitions (e.g. from working to not working, or vice-versa) or changes in earnings for employees. The analysis in Chapter 6 of this report uses the LFS longitudinal dataset.

The analysis in this report uses the quarterly LFS from 2011q1 to 2019q4 inclusive, arranged into calendar years. Although the NLW was introduced in April 2016 – the start of 2016q2 – there is some evidence that wages began to increase in 2016q1 in anticipation of the NLW being introduced. Hence, using calendar years makes most sense.

3.3 Methodological strategy

The empirical strategy for this research report follows the strategy used by Dustmann *et al* (2020) insofar as it is possible to do so using the Labour Force Survey data. Where it is not possible to do so, an alternative empirical strategy is used if possible (depending on the available data for the UK).

² This is smaller than one would expect by taking two-fifths of 35,000 employee observations in the full LFS sample for each quarter (which would be 14,000). The discrepancy arises because around 4,000 employees in Wave 1 or Wave 5 of each quarterly LFS sample don't answer the earnings question. In some cases this is because people don't respond to the question. In other cases (in Wave 5) it's because the person moved into the sample during the 5-quarter rolling panel and new entrants aren't asked the wage questions.

Table 3.1. Methodological strategy in Dustmann *et al* paper, and equivalent in this report (if any)

Methodological strategy in Dustmann <i>et al</i> paper	Equivalent in this paper (if any)
Comparing workers who earned less than the minimum wage (treated group) with workers who earned considerably more than the minimum wage (control group)	It is possible to do the same with the LFS data. We use two approaches: 1) Aggregate approach by wage band (graphs and tables) 2) 5-quarter longitudinal LFS (graphs)
Additional analysis exploits variation in exposure to the minimum wage across regions.	This paper uses the same strategy with the region variable in the LFS.
Testing the hypothesis that the minimum wage improves the quality of firms that operate in the market, by reallocating workers from smaller, lower paying firms to larger, higher paying ones.	This paper tests the reallocation hypothesis using a mixture of regional analysis and 5-quarter LFS analysis. We also test reallocation to higher-paying industries and occupations.
Comparing the employment share of “micro firms” with less than 3 employees with the employment share of larger firms in regions more exposed to the minimum wage compared to less exposed regions.	Tested using ‘number of workers at workplace’ variable in LFS.
Testing to see whether the minimum wage increased the average firm wage premium, measured as a fixed firm effect in a regression estimated using pre-policy data.	It’s not possible to do this with the LFS because the data doesn’t have firm identifiers or a long enough panel component.
Test for whether minimum wage induces low wage workers to switch to more stable firms with lower churning rates, and to firms with a more skilled workforce that pay a higher wage premium (in line with search and matching models).	Tested using a mixture of regional data and 5-quarter LFS data.
Test for whether commute time increases as a result of reallocation towards higher paying firms.	This cannot be replicated as the travel time variable is not available in LFS End User Licence dataset for the relevant time period.

In summary we are able to replicate some, but not all, of the analysis of Dustmann *et al* using the LFS data for the UK. In addition to this we also expand on the Dustmann *et al* analysis in two ways:

- a) by using the 5-quarter LFS to look at transition rates from employee status to unemployment/inactivity, and also to self-employment, by wage band, before and after the NLW

- b) using the under-25 age group as a comparison group who were not (initially) affected by the increase in the NLW. This is another dimension of the ‘difference-in-differences’ comparison (alongside dividing the wage distribution into hourly earnings bands and looking at the impact of the NLW on low-wage workers compared to high-wage workers). Note however that the minimum wage does increase for the under-25 age groups from 2017 onwards and so they are not a completely ‘clean’ comparison group for later years.

3.4 Econometric issues

This section discusses specific econometric issues which arise due to the Labour Force Survey data and the implementation of the National Living Wage in the UK.

Measurement error in hourly wage variable

The LFS only includes a specific hourly wage variable (HRRATE) for about 30% of the whole sample with earnings information. This is because the HRRATE variable is only collected for employees who are on a specified hourly rate – workers on an annual salary, for example, would not normally be included. The proportion of employees on a specified hourly rate is much higher for low-paid employees than higher-paid employees, as shown in Table 3.2 below. Almost three quarters of employees paid below £9 per hour have a specified hourly rate, compared to only a fifth of employees paid above £15 per hour.

Table 3.2. proportion of workers with valid HRRATE data by band of hourly pay (HOURPAY), LFS sample 2011-2019

Hourly wage band (real terms, 2019 prices)	Proportion of sample with HRRATE data
Less than £9 per hour	73.0%
£9-£11 per hour	58.9%
£11-£13 per hour	43.6%
£13-£15 per hour	33.9%
Above £15 per hour	20.0%

Source: Landman Economics calculations based on LFS data

The measure of hourly pay which is included for all employees with earnings information in the LFS data is HOURPAY which is a variable derived by dividing GRSSWK (gross weekly pay in main job) by usual hours worked excluding overtime (BUSHR), plus usual paid overtime (POTHR) if applicable. Because weekly pay may be based on a number of hours worked that differs from usual hours worked (e.g. for

workers whose pay fluctuates based on specific hours worked in any given week), the derived hourly pay variable HOURPAY may diverge from usual hourly pay for some workers. Our approach is to use the HRRATE variable where available and to use HOURPAY where HRRATE is not available, on the basis that HRRATE is directly reported rather than a derived measure. This reduces (but does not eliminate) measurement error.

Proportion of workforce covered by National Living Wage

Research by the Low Pay Commission suggests that in 2018, the NLW covered 6.5% of employees aged 25 and over (Lord, 2018). This was an increase from the 4.3% of employees aged 25 and over who were covered by the NMW in 2015, the year before the NLW was introduced. Interestingly, coverage of the NLW did not increase significantly between 2016 and 2018 despite further real-terms increases in the NLW. Low Pay Commission analysis suggests that there are significant ‘spillovers’ from the NLW; firms increase pay to keep ahead of the NLW, either to attract workers through a premium over the wage floor, or to maintain differentials within their workforce structure. LPC analysis suggests that in 2018, around 1.6 million employees aged 25 or over are paid at hourly rates between 5 pence and 50 pence above the value of the NLW (Lord, 2018). If these employees are included in the coverage measure, coverage increases to around 14% of the workforce.

At 6.5%, the proportion of the eligible workforce paid at National Living Wage rates in 2018 was significantly below the proportion of the eligible workforce paid at minimum wage rates in 2015, which was 15% according to Dustmann et al (2020). However, the adjusted estimate from the LPC including workers paid up to 50p per hour above the NLW is 14%, which is very similar to the 2015 coverage estimate for Germany.

Consequences for the design of our analysis

Our design of the wage “bins”, or groups, for the analysis of the impact of the NLW on low-paid workers compared to high-paid workers sets the upper bound of the lowest wage group at £9 per hour (in 2019 prices). This helps include employees with hourly wages just above the NLW (between £8.22 and £9 in 2019, for example) in the affected group, and should make it easier to identify statistically significant effects of the NLW on wages and other labour market outcomes.

The selection of wage “bins” for the cross-sectional LFS divides employees in the LFS sample into one of five groups according to their hourly wage (uprated to 2019 price levels):

- i) £9.00 or less;
- ii) £9.01 to £11.00;
- iii) £11.01 to £13.00;
- iv) £13.01 to £15.00;
- v) £15.01 or greater.

This enables us to compare employees in group (i) – who should be directly affected by the introduction of the NLW – with employees in the other groups (who shouldn't be affected).

4 Results: analysis of cross-sectional LFS data

4.1 Hourly wages

Table 4.1 shows average hourly wages (at the 2019 price level) for workers in each wage group for calendar years from 2011 to 2019 inclusive. Panel (a) shows average hourly wages before the introduction of the NLW, while panel (b) shows average wages since the introduction of the NLW.

Table 4.1. Average wages by hourly wage group, employees aged 25 and over, LFS 2011-19

a) Before NLW introduction

Hourly wage group	2011	2012	2013	2014	2015
£9 or less	£7.35	£7.40	£7.36	£7.34	£7.41
£9-£11	£9.96	£9.97	£10.01	£10.00	£10.01
£11-£13	£11.96	£11.93	£11.95	£12.01	£12.01
£13-£15	£13.96	£13.98	£13.92	£13.94	£13.99
More than £15	£24.82	£24.86	£25.05	£24.75	£24.86

b) After NLW introduction

Hourly wage group	2016	2017	2018	2019
£9 or less	£7.63	£7.70	£7.74	£7.81
£9-£11	£9.97	£9.96	£9.91	£9.96
£11-£13	£12.00	£11.99	£11.96	£12.02
£13-£15	£13.98	£13.92	£13.96	£13.98
More than £15	£24.97	£25.08	£24.80	£24.87

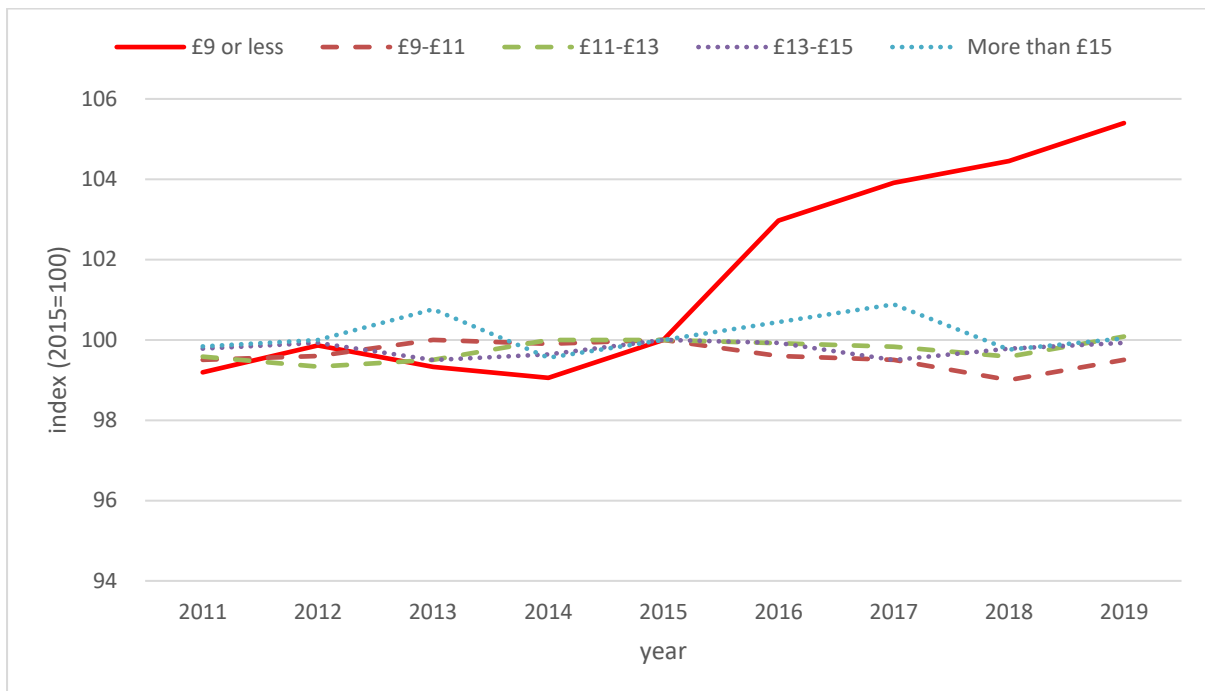
Source: Landman Economics analysis of LFS data

Table 4.1 shows that average hourly earnings in the “£9 or less” hourly wage group were stable at around £7.40 up to 2015, before increasing to £7.63 in 2016, followed by further increases to reach £7.81 by 2019. In total this is an increase of around 5.5 per cent in hourly wages for this group between 2015 and 2019. No comparable increase is evident for the other wage groups.

Figure 4.1 shows these results in the form of a graph by indexing average hourly wages for each wage group at 100 in 2015 and then showing average wages on this index measure for each group. The red solid line shows a clear upward trend for the “£9 or less” hourly wage group, while hourly wages for the other wage groups fluctuate around the 2015 level, showing no clear upward or downward trend. This

figure shows clear evidence that the NLW drove a sustained increase in average hourly wages for workers earning £9 per hour or less (at 2019 prices) while having no measurable effect on earnings for other groups. The fact that real wages were flat after 2015 for the other wage groups also shows that there were no underlying trends that were driving increased wages across the earnings distribution as a whole after 2015. The increase in hourly wages for the low-wage group after 2015 seems to be entirely, and solely, due to the NLW.

Figure 4.1. Average hourly wages (indexed 2015=100) for five hourly wage groups, employees aged 25 and over, LFS 2011-2019



Source: Landman Economics analysis of LFS data

4.2 Comparison with under-25 age group

Table 4.2 shows data in the same format as for Table 4.1, but for employees aged under 25 who were not covered by the National Living Wage. For these employees we use a different set of hourly wage groups to reflect the fact that the minimum wage is set at a lower level for these age groups. Four groups are used:

- 1) £8 or less;
- 2) £8 to £10;
- 3) £10 to £12;
- 4) More than £12.

Table 4.2. Average wages by hourly wage group, employees aged under 25, LFS 2011-19

a) Before NLW introduction

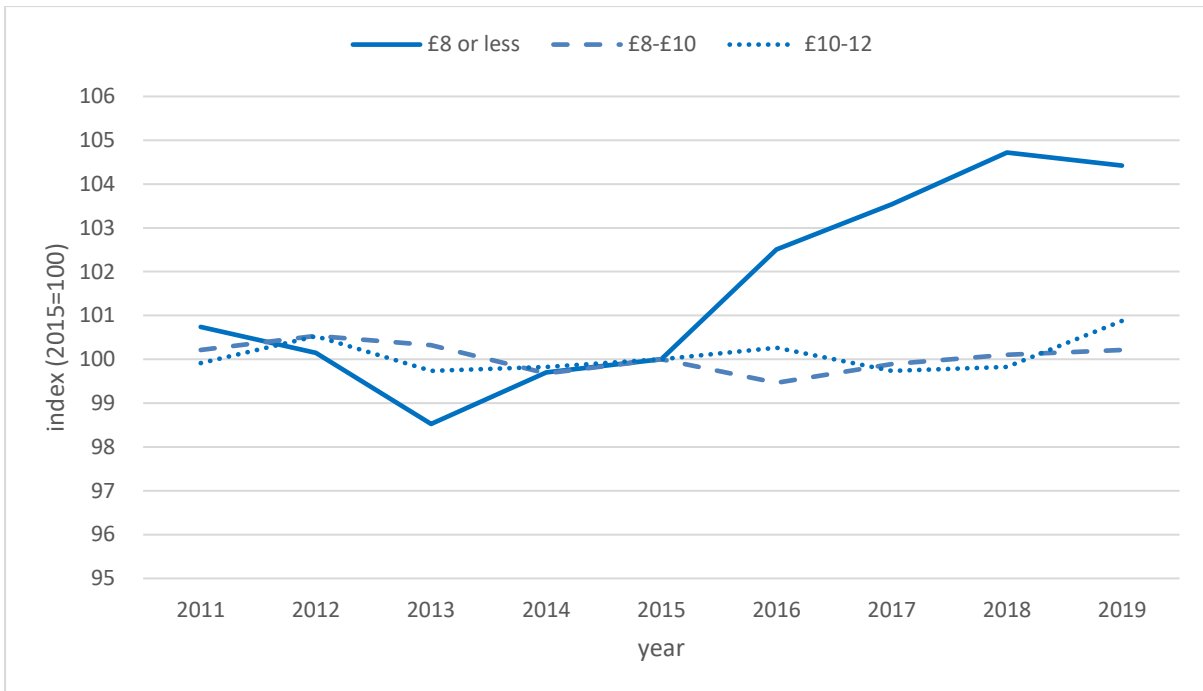
Hourly wage group	2011	2012	2013	2014	2015
£8 or less	£6.83	£6.79	£6.68	£6.76	£6.78
£8-£10	£9.35	£9.38	£9.36	£9.30	£9.33
£10-12	£11.39	£11.46	£11.37	£11.38	£11.40
More than £12	£16.03	£15.78	£15.72	£18.04	£16.26

b) After NLW introduction

Hourly wage group	2016	2017	2018	2019
£8 or less	£6.95	£7.02	£7.10	£7.08
£8-£10	£9.28	£9.32	£9.34	£9.35
£10-12	£11.43	£11.37	£11.38	£11.50
More than £12	£16.07	£15.79	£16.44	£15.91

Table 4.2 shows that with the exception of the “£8 or less” hourly wage group, hourly wages are very stable in real terms for each of the wage groups, although there is more volatility in the “more than £12” wage group (with a particularly high average in 2014), perhaps because this group is relatively small. For the lowest wage group, there is a clear upward trend in hourly wages after 2015. This is confirmed by Figure 4.2 below, which shows trends for the three under-25 hourly wage groups up to £12 per hour, indexed to 2015=100 as with Figure 4.1. (The “more than £12” group is omitted from the graph due to high volatility). The Figure shows a clear upward trend in hourly earnings for employees in the under-25 age group which is of similar magnitude to the trend shown for employees aged 25 and over in Figure 4.1.

Figure 4.2. Average hourly earnings (indexed 2015=100) for three hourly wage groups, employees aged under 25, LFS 2011-2019



Source: Landman Economics analysis of LFS data

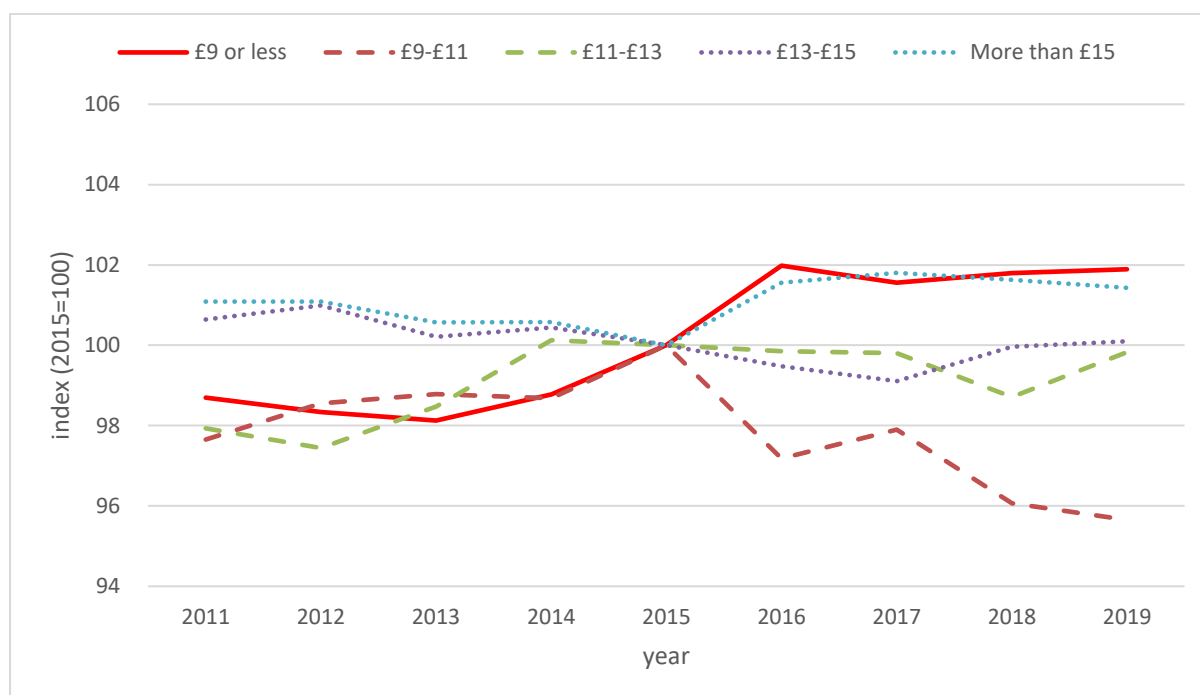
There are two potential explanations for the upward trend in hourly wages for employees aged under 25 in the “£8 or less” wage group. One possibility is that the upward trend reflects real-terms increases in the value of the NMW for under-25s, as shown in Figure 3.1 in the previous chapter (for example, an increase of around 12 per cent in the real-terms value of the NMW for the 21-24 age group). This increase helps explain upward movement in average hourly earnings for low-paid under-25s from 2017 onwards, but it doesn’t explain upward movement for this group in 2016 – when the NMW for under-25 age groups was basically static in real terms, while the NLW increased by 7 per cent).

An alternative explanation is that there have been spillover effects on the under-25 age group arising from the increase in the NLW for employees aged 25 and over. It may be that some firms increased hourly wages for *all* employees – including the under-25s - in the lead-up to the introduction of the NLW in 2016, even though they were only legally obliged to increase wages for employees aged 25 and over. Without data which includes firm identifiers as well as employee information, it is difficult to test which of these theories is a more accurate explanation for the observed trends in the data. Furthermore, both explanations could be partially valid.

4.2 Weekly earnings

Figure 4.3 shows an analysis of average *weekly* earnings by hourly wage group, for employees aged 25 and over, using the same wage groups as in Figure 4.1. This is useful for establishing whether the increase in average hourly wages for the lowest wage group is matched by an increase in average weekly earnings.

Figure 4.3. Average weekly earnings (indexed 2015=100) for five hourly wage groups, employees aged 25 and over, LFS 2011-2019



Source: Landman Economics analysis of LFS data

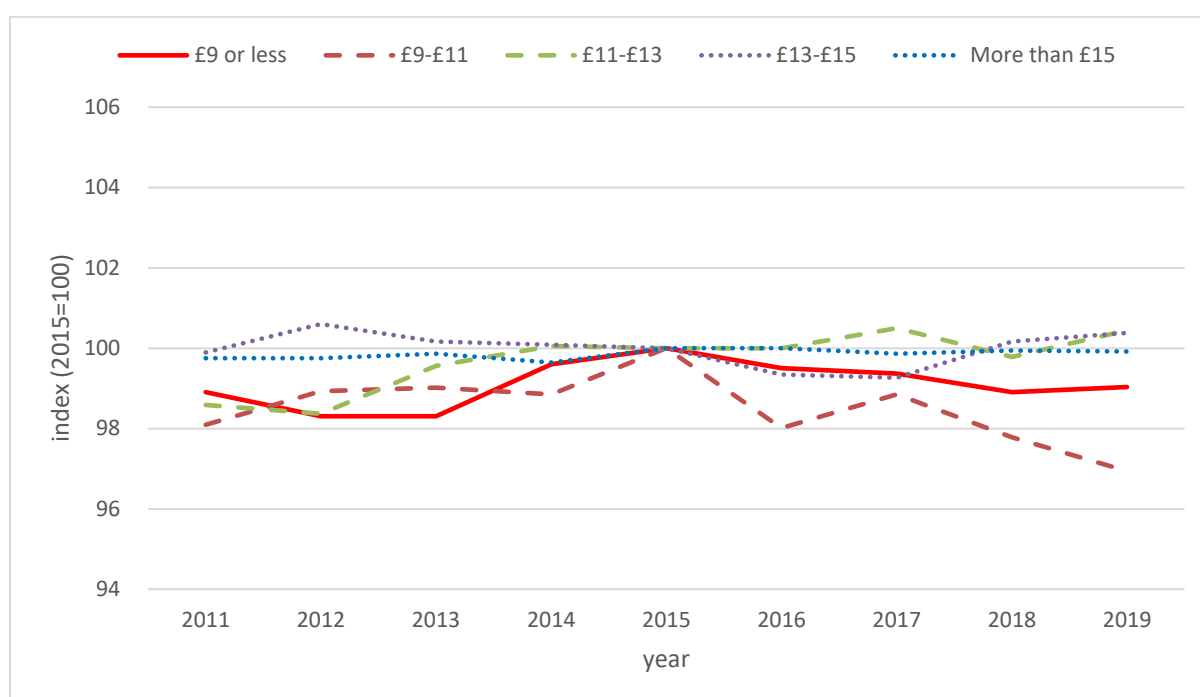
Figure 4.3 shows that the picture for average weekly earnings is more complex and nuanced than for hourly earnings. In the lowest hourly wage group, real weekly earnings had already risen by around 2 per cent between 2013 and 2015. They then rose again by around 2 per cent between 2015 and 2016, staying roughly the same in real terms in 2017 through 2019. By contrast, the group earning between £9 and £11 per hour experienced a *fall* in real weekly earnings of about 4 per cent between 2015 and 2019. Wages for employees earning between £11 and £15 per hour were roughly constant between 2015 and 2019, while for the highest earning group (£15 per hour and above) real weekly earnings initially rose in line with the lowest earning group between 2015 and 2019.

Overall there is some evidence of an increase in weekly earnings for the lowest-paid hourly wage group after the introduction of the NLW, but it is not as clear-cut or as large an effect as for hourly earnings.

4.3 Hours of work

Figure 4.4 shows an analysis of average hours of work for the five hourly wage groups in the LFS sample of employees aged 25 and over. The aim of this analysis is to establish whether the introduction of the NLW coincided with any reduction in average hours worked for the affected wage group.

Figure 4.4. Average hours of work (indexed 2015=100) for five hourly wage groups, employees aged 25 and over, LFS 2011-2019



Source: Landman Economics analysis of LFS data

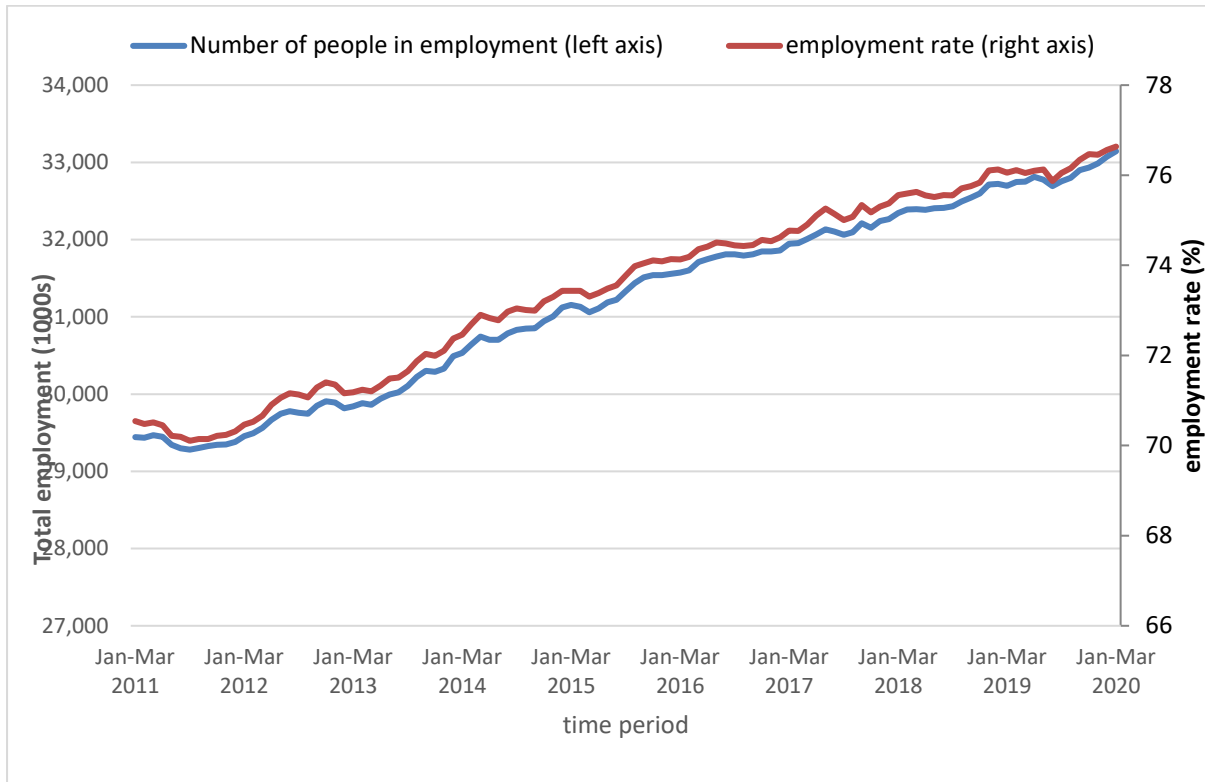
Figure 4.4 shows no strong overall trend in average hours of work for the “£9 or less” wage group between 2011 and 2019. There is a slight uptick in average wages between 2013 and 2015 but only by about 2 per cent. This is partially reversed after 2015. The only group showing a clear and substantial change in average hours worked after 2015 is the “£9 to £11” group (with a reduction of about 3 per cent in average hours by 2019). For other groups, hours change very little over most of the sample period. Overall, there is no evidence that the introduction of the NLW resulted in a fall in average hours worked for the affected wage group – although there is a slight reduction in hours worked for the next lowest wage group, for reasons that are not clear.

4.4 Employment

As an opening to the discussion of the potential employment effects of the National Living Wage in this section, it is instructive to show evidence from the Office for National Statistics on overall employment (both in numbers of adults and as a percentage of the working age population) since 2011. Figure 4.5 shows the overall number of people in employment in the UK between 2011 and 2020 and the employment rate in the UK using the official UK government definition (number of adults aged between 16 and 64 inclusive in employment as a percentage of all adults aged between 16 and 64).

When analysing Figure 4.5 it is important to note that the overall number of adults in employment includes employees *and* self-employed people, and includes workers under 25 as well as over-25s, and so is not the same sample criteria as the headline measure for LFS employees aged 25 and over which we focus on in this report. However, the aggregate ONS statistics do not include a breakdown for employees aged 25 and over only, so the aggregate numbers are presented for comparison purposes.

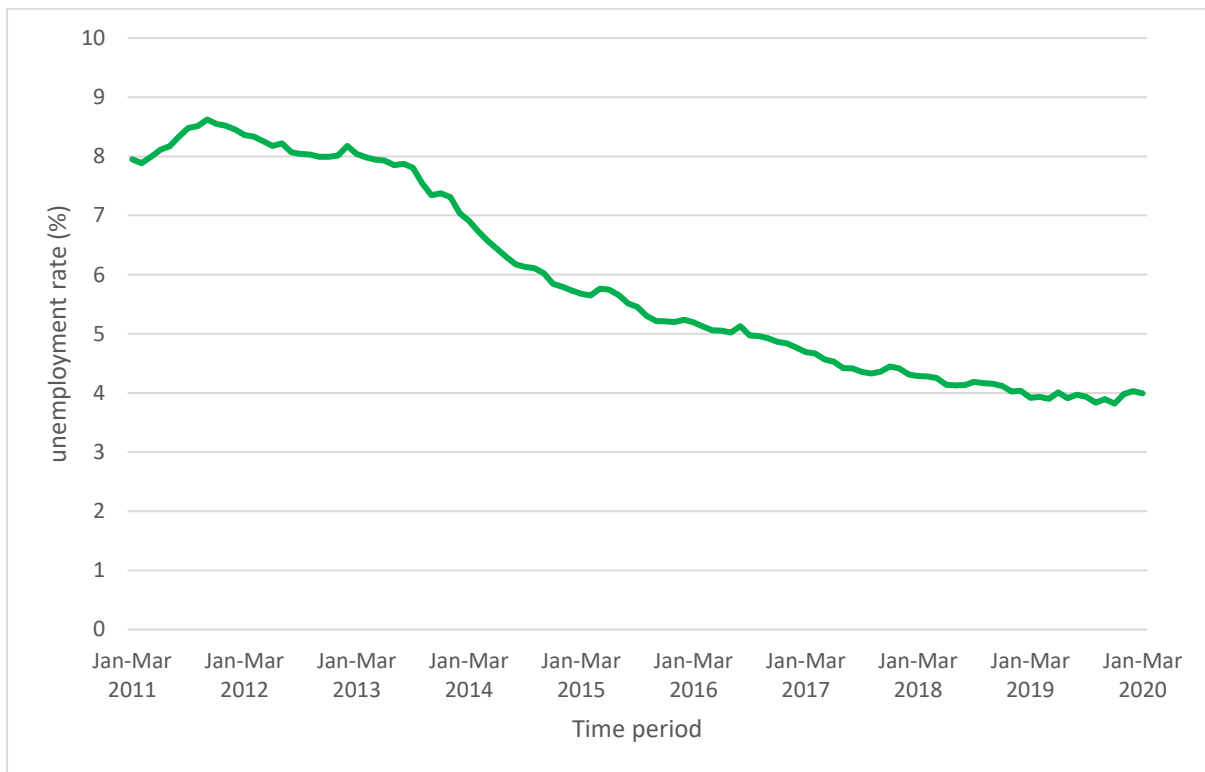
Figure 4.5. Number of people in employment and employment rate for 16-64 year olds, United Kingdom, 2011-2020



Source: Office for National Statistics (2020)

Overall, Figure 4.5 shows no reduction in employment after the NLW was implemented in April 2016. From early 2012 onwards there was a strong increase in the total number of employed adults and the employment rate, as the UK recovered from the severe recession of 2008-09. The rate of increase in employment slowed slightly after 2015, but this would have been expected anyway – regardless of changes to minimum wage legislation – as the UK returned to something closer to ‘full employment’ after recovering from the recession. Figure 4.6 below shows the unemployment rate for the 16-64 age group, which was trending downwards from late 2013 onwards, with the downward curve flattening out by 2019 as the unemployment rate reached 4 per cent.

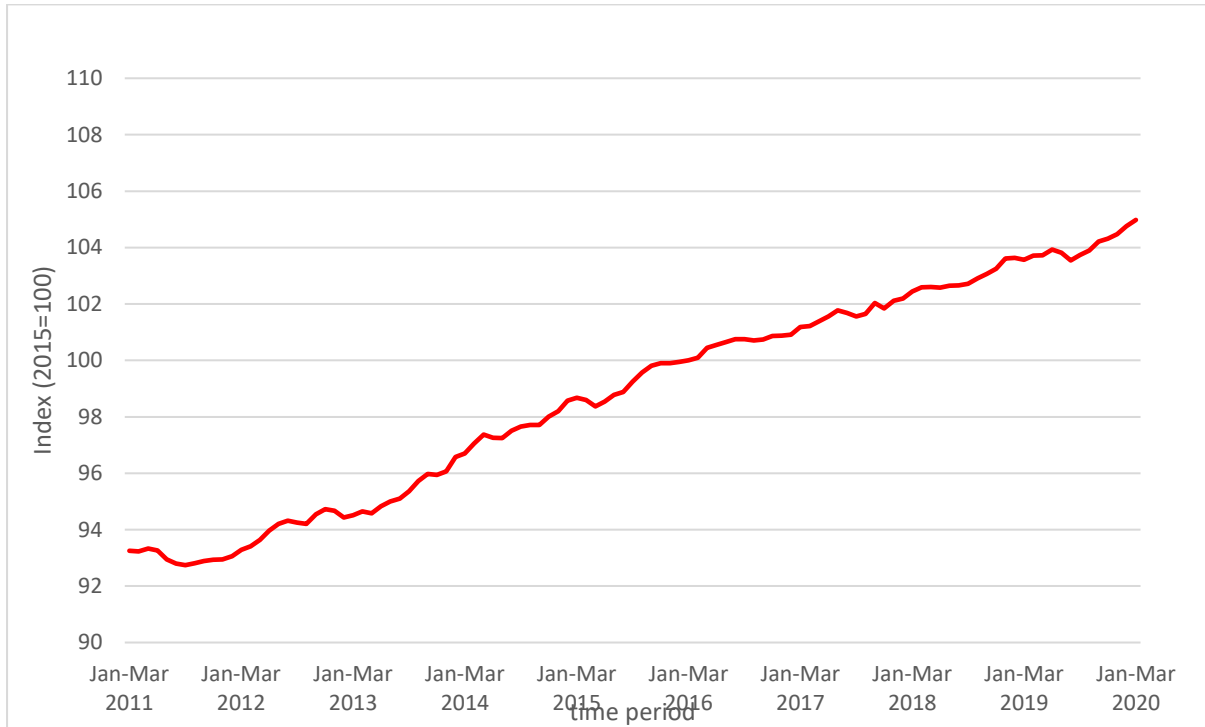
Figure 4.6. Unemployment rate, 16-64 year olds, United Kingdom 2011-2020



Source: Office for National Statistics (2020)

Figure 4.7 shows the index for the number of people in employment (using 2015=100). After increasing by 7% between early 2012 and late 2015, employment increased by a further 5% between early 2016 and early 2020.

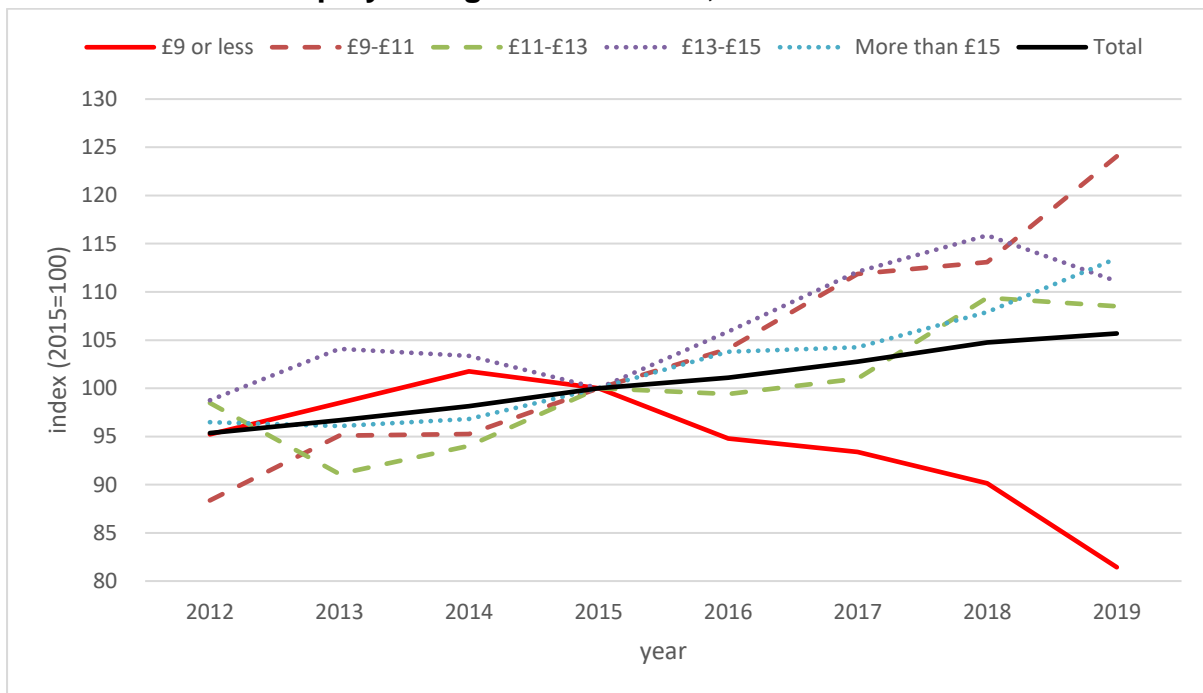
Figure 4.6. Number of people in employment (indexed Oct-Dec 2015=100)



Source: Landman Economics calculations based on Office for National Statistics (2020)

Figure 4.8 uses the LFS data from our analysis of employees aged 25 and over to show trends in employment rates for different wage groups between 2011 and 2019. Note that the vertical axis of the diagram has a larger scale than for the other graphs in this chapter because there were bigger changes in employment by wage group than for wages or hours.

Figure 4.8 Total employment (indexed 2015=100) for five hourly wage groups, employees aged 25 and over, LFS 2011-2019



Source: Landman Economics analysis of LFS data

Figure 4.8 shows that since 2015 there has been a substantial fall in employment (a reduction of about 20%) for employees on wages of £9 or less. However, there has been an increase in employment of around 25% for employees on hourly wages between £9 and £11, while employment has increased by around 10% for each of the higher wage groups. Overall, this means that the total number of employees (shown by the black solid line) has continued to increase after 2015 at approximately the same rate as before 2015.

Figure 4.8 appears to show some evidence of substitution by employers from low-paid jobs into medium-paid and high-paid jobs after the NLW was introduced. However, this does not necessarily mean that the NLW has resulted in higher unemployment for workers who were in low-paid work before 2016, as they may have been able to secure higher-paid jobs after 2016 instead, in line with the various reallocation theories outlined in Chapter 2 of this report. Chapter 6 considers this question in more detail by using the 5-quarter LFS panel dataset to establish the transition rates to higher paid work, self-employment unemployment and inactivity for for workers who were in the low-paid wage group prior to 2016.

It is also worth noting that there is a longer term trend of increased employment for workers in the “£9 to £11” wage group which pre-dates the introduction of the National Living Wage, whereas there is more evidence of a structural break in employment trends for the “up to £9” wage group. Employment for the lowest-paid employees was increasing up to 2014, but then began falling from 2015 onwards.

4.5 Indicators of labour market composition

Figure 4.9 shows trends in the composition of the UK labour market using indicators that are associated with high pay and low pay (based on a regression of LFS hourly wages against various worker and job characteristics; the full regression results are shown in Appendix A to this report). The graph includes three job characteristics associated with high pay (shaded in green):

- i) 500 or more employees in the workplace.
- ii) High-paying industries (mining and quarrying; electricity, gas and water; information and communication; financial and insurance; professional, scientific and technical activities).
- iii) High-paying occupations (managers, directors and senior officials; professional occupations; associate professional and technical occupations).

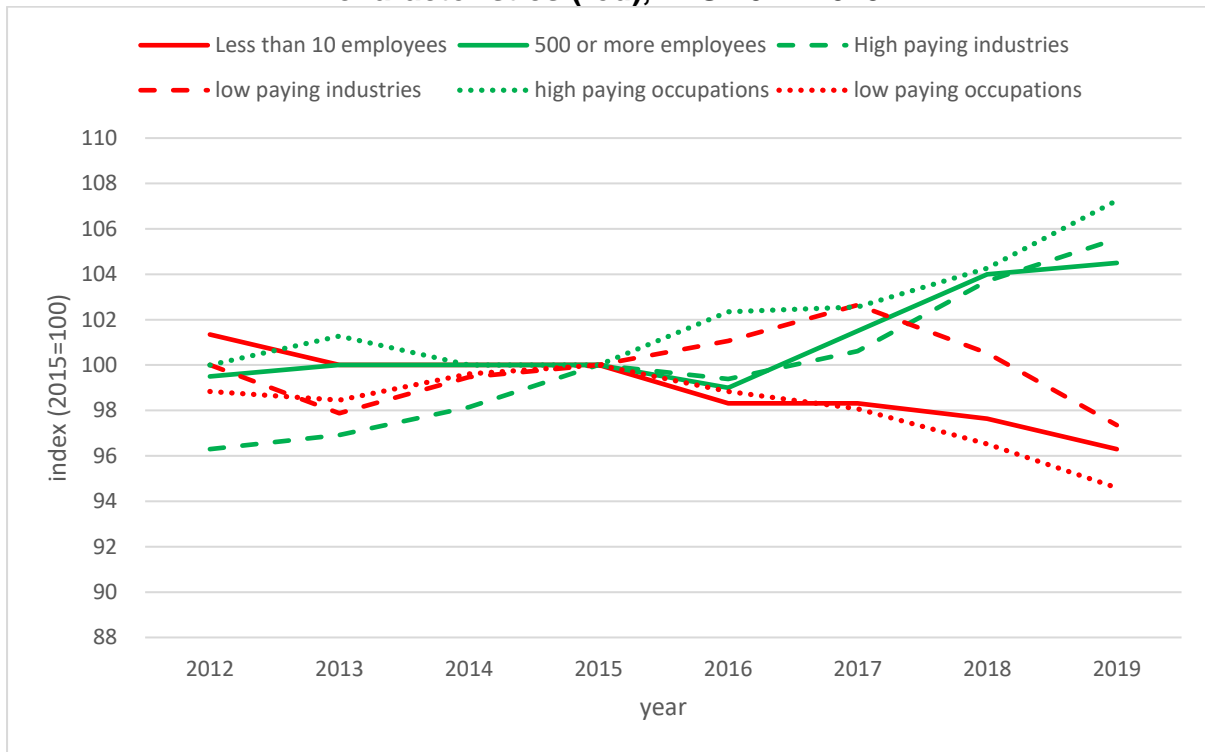
The graph also includes three job characteristics associated with low pay (shaded in red):

- i) Less than 10 employees in the workplace;
- ii) Low-paying industries (agriculture, forestry and fishing; wholesale and retail trade; accommodation and food services; arts, entertainment and recreation);
- iii) Low-paying occupations (caring, leisure and other services; process, plant and machine operatives; elementary occupations).

Figure 4.9 shows how the relative incidence of these job characteristics changed among employees in the UK between 2011 and 2019 using LFS data (once again setting the index to 100 in 2015). The results show that the “high-pay” characteristics – in terms of workplace size, industry and occupations – all increased as a share of employee jobs after 2015. For industry, this continued a trend that was visible before 2015, whereas for workplace size and occupation, no clear trend was apparent before 2015. For “low-pay” characteristics the opposite is the case – there are clear downward trends in the incidence of low-paying occupations and workplaces with less than ten employees after 2015, and these trends were not evident before 2015 to any great extent. The incidence of jobs in low-paying industries initially increases between 2015 and 2017 but then falls back sharply in 2018 and 2019.

Overall, Figure 4.9 shows clear evidence of compositional shifts in the UK labour market towards “high-pay” jobs and away from “low-pay” jobs after the introduction of the NLW. This is evidence in support of the “reallocation hypothesis” as posited by the theoretical literature on the impact of minimum wages under imperfect competition in the labour and/or product markets as outlined in the discussion of Dustmann *et al* earlier.

Figure 4.9. Trends in “high-pay” job characteristics (green) and “low-pay” job characteristics (red), LFS 2011-2019



Source: Landman Economics analysis of LFS data

4.6 Summary

- There is evidence of a clear upward trend in average hourly wages for employees aged 25 and over earning £9 per hour or less: between 2015 and 2019, average hourly wages for this group increased by just under 6 per cent. In contrast, there was no evidence of increased hourly pay for higher-paid employees over this period.
- There is also some evidence of increased hourly wages for employees aged under 25 earning £8 per hour or less. This could be due to real terms increases in the NMW for under-25 age groups, or spillover effects from the NLW increases, or a combination of the two.
- There is some evidence of an increase in weekly earnings for the lowest-paid hourly wage group, but not as clear cut or large an effect as for hourly earnings.
- There is no evidence that the introduction of the NLW resulted in a reduction in average hours worked for the affected wage group.
- The LFS data indicate a substantial fall in employment for employees on wages of £9 or less from 2016 onwards, but this seems to be balanced out by increase in the higher-waged groups (particularly the group earning between £9 and £11 per hour). Overall, the number of employees continues to increase after 2015 at approximately the same rate as before 2015.

- There is clear evidence of compositional shifts in the UK labour market towards job characteristics associated with higher pay, and away from and away from job characteristics associated with lower pay, after the introduction of the NLW. This is evidence in favour of a reallocation of employees from lower-paid employment to higher-paid employment, consistent with the theoretical frameworks outlined in Chapter 2 of this report.

5 Results: Regional analysis of the impact of the NLW

5.1 The coverage of the NLW by region

So far in this report, the analysis has been carried out by wage group at the aggregate (whole-UK) level. In this section we analyse the impact of the NLW at regional level using the 21 codes for “region of workplace” in the LFS (the REGWKR variable). The coverage of the NLW varies significantly across regions. Figure 5.1 shows estimates from the LFS for 2016 (the year the NLW was introduced) showing the proportion of employees aged 25 and over paid at or below³ the NLW. On average, 11.6% of workers were paid at or below the NLW across the UK in 2016, but the percentage paid at this level varied significantly across regions. The regions with the lowest proportion of workers paid at or below the NLW were Central London, Inner London, Outer London and Rest of Scotland (outside Strathclyde). The regions with the highest proportion of workers at or below the NLW were Wales, East Midlands, Greater Manchester, Rest of North West and Northern Ireland. In Wales, the proportion of workers paid at or below the NLW, at 15.6%, was over three times higher than in Central London (4.9%).

³ Note that in cases where an employee appears to be paid below the NMW it could be due to measurement error in the HOURPAY variable (as discussed in Section 3.3) or it could be due to non-enforcement of the NLW – it is impossible to tell which of these explanations is correct based on the LFS data.

Figure 5.1. Percentage of employees aged 25 or over paid at or below the NLW by region



Source: Landman Economics analysis of LFS data

5.2 The NLW ‘gap’ measure and its relationship to hourly wages and employment in each region

This section follows Section 4 of Dustmann *et al* (2020) by exploiting variation in the proportion of workers paid at NLW across regions. The statistic of interest that we compute for each of the 21 work regions **before** the NLW was introduced in 2016 is a continuous measure for the region’s exposure to the NLW that has often been used in the minimum wage literature (e.g. Card and Krueger, 1994 and Draca, Machin and Van Reenen 2011):

$$GAP_{rt} = \frac{\sum_{i \in r} h_{it} \min\{0, NLW - w_{it}\}}{\sum_{i \in r} h_{it} w_{it}}$$

where h_{it} denotes the weekly hours worked of worker i (employed in region r), NLW is the minimum wage and w_{it} refers to the worker’s hourly wage. All wages are measured in real terms at 2016 prices. This measure depends on the share of individuals in the region who earn less than the NLW, but also on how much each

worker's wage is below the minimum wage. The measure (if multiplied by 100) reflects the percentage wage increase necessary to bring all workers in the region up to the minimum wage.

We average the gap measure over the five years before the NLW was introduced (2011 to 2015) to obtain a time-constant gap measure for each region:

$$\overline{GAP}_r = \sum_{t=2011}^{2015} GAP_{rt}$$

This gap measure varies substantially across regions, being highest in Rest of Yorkshire and Humberside (0.0078) and Northern Ireland (0.0077) and lowest in Central London (0.0011) and Inner London (0.00024). The correlation between the gap measure and the proportion of employees paid at or below the NLW level is strong (around 0.9).

In the remainder of this chapter we examine the relationship between the NLW gap measure and outcomes in the region, such as average wage and average employment. Specifically, we estimate event-study regressions of the following specification:

Sample: regions from 2011-19 inclusive

Dependent variable: Economic outcome (e.g. average log hourly wage, log employment)

Regressors:

- NLW gap measure (for 2016 and subsequent years, computed on 2011-15 data) interacted with a dummy set to 1 for 2016 and subsequent years, and 0 for years before 2016. (Note that the gap measure is multiplied by 100 so that a unit change is an increase of 1% in the gap).
- Year dummies
- Region of work dummies
- (in specification 2 only) region of work dummies interacted with time trends

Specification 1 includes a basic set of controls only (year dummies and regional dummies), while specification 2 includes additional controls (regional dummies interacted with linear time trends) which control for pre-existing trends in wages and employment.

Table 5.1 shows the regression results. In specification 1 of the log hourly wage regression (on the first row), the coefficient on the wage gap for 2016 and subsequent years is positive and statistically significant at the 5% level ($t = 2.67$). The coefficient is 0.04, suggesting that average wages would be 4% higher after the NLW was introduced for every 1% increase in the NLW gap. In specification 2,

where region-specific time trends are included, the coefficient is much smaller (0.008) and is no longer statistically significant. In the employment specifications on the next row, the coefficient on the wage gap measure is not statistically significant in either specification (1) or specification (2). There seems to be no identifiable relationship between the size of the wage gap and the employment effect (if any) of the NLW, controlling for region fixed effects and time effects.

Table 5.1. Headline results from LFS workplace region regressions

Dependent variable	Coefficient on wage gap for 2016 and subsequent years (standard error)	
	Specification (1)	Specification (2)
Log hourly wage	0.040 (0.015)	0.008 (0.024)
Log employment	-0.047 (0.095)	0.023 (0.071)

5.3 Discussion

Overall, the regional analysis identifies only a weak relationship between the size of the NLW ‘gap’ for each region and hourly wages in that region, and no relationship between the size of the gap and employment in each region, controlling for other factors. This may be because the LFS data only provides 21 separate regions for Analysis compared with over 300 regions in the German data used by Dustmann *et al.* The ‘regions’ used in the Dustmann *et al.* analysis are more comparable to the UK’s Local Authority Districts than NUTS1 or NUTS2 geographical areas. With only 21 regions to work with, the potential for finding a statistically significant relationship between the regional wage gap and labour market outcome variables is much more unlikely in this UK analysis than it was in the German analysis by Dustmann *et al.*

6 Results: Analysis of the 5-quarter longitudinal LFS

6.1 Introduction

The Labour Force Survey 5-quarter longitudinal dataset uses the same data from individual and household interviews as the cross-sectional LFS analysed in Chapters 4 and 5 of this report, but the data are structured in a panel format – with up to five consecutive quarterly interviews for each adult in the survey. The sample sizes and response weights in the 5-quarter version of the LFS data are adjusted accordingly. The 5-quarter longitudinal LFS allows researchers to analyse labour market transitions over a period of 12 months between the initial quarterly interview and the final quarterly interview for each sample member.

This chapter uses the 5-quarter longitudinal LFS dataset to dig deeper into some of the findings from the cross-sectional LFS, analysed by wage band (in Chapter 4) and by workplace region (in Chapter 5). It is necessary to examine trends in wages and labour market status for specific individuals to answer particular questions raised by the analyses in Chapter 4 in particular. For example:

- Are employees in low-wage jobs (i.e. in the “up to £9 per hour” group) more likely to make transitions into higher paid jobs after the introduction of the NLW?
- Is there a higher rate of separation from low paid jobs into inactivity or unemployment after the NLW is introduced?
- Is there a decline in the hiring rate into low paid jobs after the NLW is introduced?
- Is there increased movement into self-employment after the NLW is introduced?

This chapter addresses all of these questions

6.2 Analysis of change in hourly wages by wage group

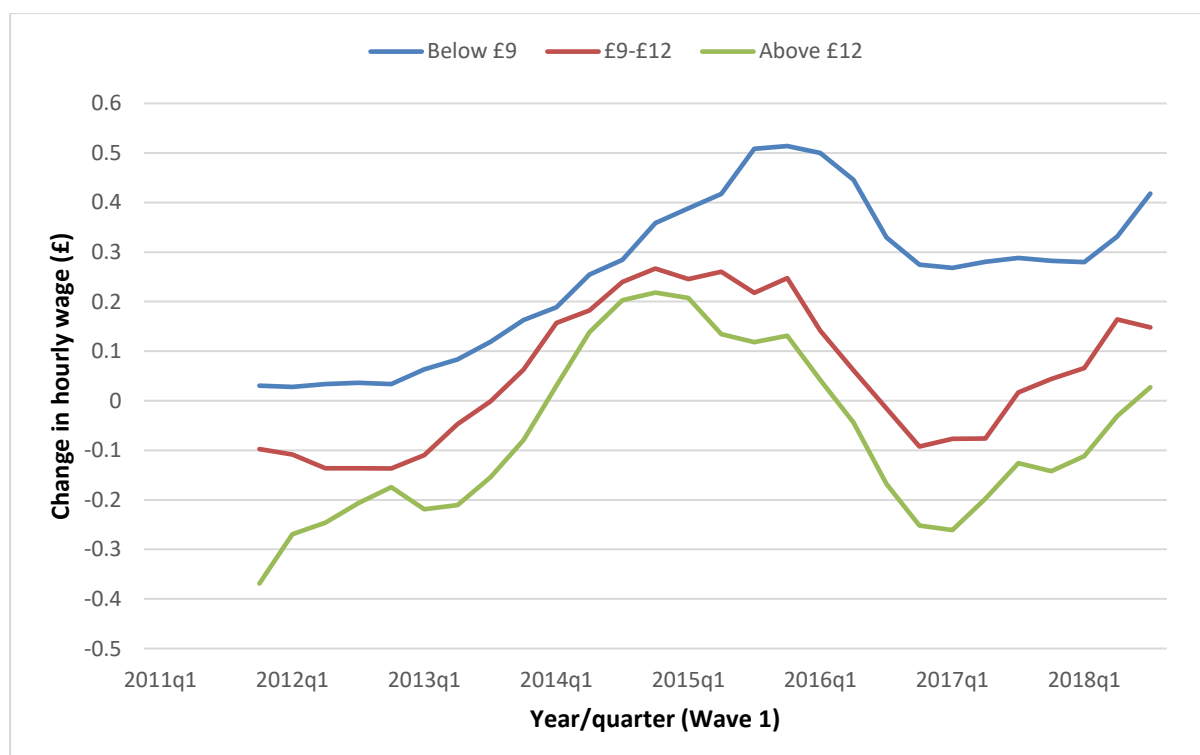
This chapter uses a simplified set of hourly wage groups compared to Chapter 4, with only three categories:

1. Below £9 per hour;
2. £9-£12 per hour;
3. Above £12 per hour.

Note that because the 5-quarter LFS has *two* hourly wage variables for individuals who were employees in Wave 1 and Wave 5 of the survey⁴, it is necessary to specify which wage variable is being used to create the categories. In this section hourly wage data from Wave 1 are used.

Figure 6.1 shows the median change in hourly wages between Wave 1 and Wave, broken down according to the level of hourly wages in Wave 1 for employees aged 25 and over (in Wave 1) in the LFS. The data are presented as a moving average of the last four quarters so that the trends in the Figure are smoother and easier to analyse. Figure 6.1 shows that the median change in hourly wages increased significantly for the “below £9 per hour” wage group relative to the higher-paid wage groups. Between 2016q1 and 2017q3, median wage growth for the lowest paid group was about 30 pence per hour higher than for the “£9 to £12” wage group. The difference between the two groups reduced slightly after 2017, but was still higher than it had been before 2015. The trend in the gap between the “below £9” and “above £12” categories after 2015 is similar to the gap between the “below £9” and “£9-£12” groups, but the contrast is even more pronounced.

Figure 6.1. Median change in hourly wages between Wave 1 and Wave 5 of LFS by wage group, employees aged 25 and over, by hourly wage in Wave 1



Source: Landman Economics analysis of LFS 5-quarter longitudinal data

Note: smoothed (4-quarter moving average)

⁴ Provided that wage data at Wave 1 or Wave 5 are not missing – this is discussed in more detail in Section 6.5 below.

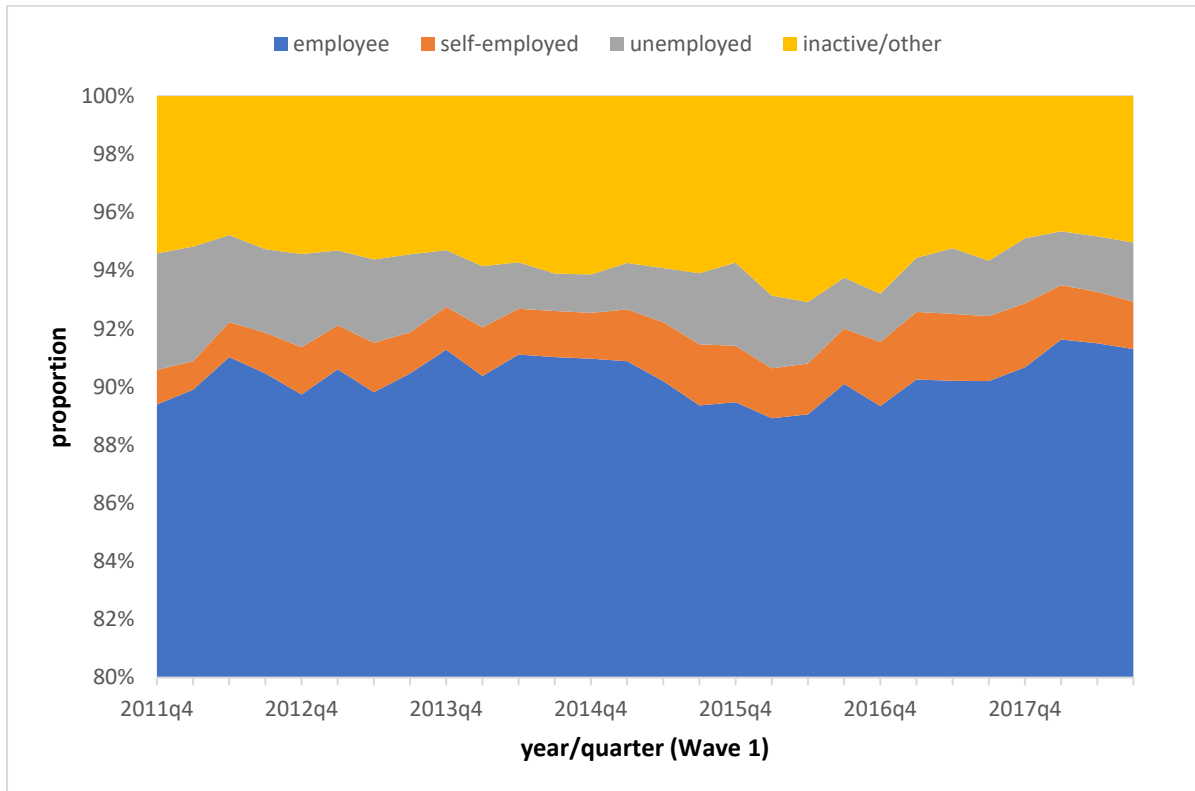
6.3 Transitions from employee status in quarter 1

This section looks at what happens to adults in the 5-quarter longitudinal LFS who are employees in Wave 1 of the survey, by Wave 5 of the survey (one year later). What proportion of the Wave 1 employees are still employees by Wave 5, and how many have changed labour market status? The analysis uses four different labour market categories:

1. Employee
2. Self-employed
3. Unemployed
4. Inactive (incl not seeking work, student, retired).

Figure 6.2 shows labour market status at Wave 5 for LFS employees aged 25 and over who were employees in the “below £9 per hour” group in Wave 1. Over the whole sample period, the *employee retention rate* (the proportion of Wave 1 employees who were still employees by Wave 5) increased from around 89% to 91%. There was a slight fall in the retention rate between 2015 and 2016 (around the time the NLW was introduced), but the retention rate then increased again after early 2017. The transition rate to self-employment also increased slightly over the whole sample period (from around 1.2% in 2012 to 2.2% in 2017), but this is a gradual increase rather than an abrupt increase at the time of the NLW’s introduction. The transition rate to unemployment falls overall, from 4% at the start of the sample period to around 2% by the end of the sample period. There is evidence of a slight increase in the rate of transition to unemployment at the time the NLW was introduced (an increase from about 1.5% to 2.5%), but this happens only in the first year, after which the transition rate to unemployment falls again. The transition rate to inactivity is reasonably flat at between 5 and 6% between 2011 and 2015. Transition to inactivity rises slightly in 2016 (to around 7%) but then falls to below 5% by 2018. Overall, there is some evidence of increased transition to unemployment and inactivity in the short run when the NLW is introduced in 2016, but there is no evidence that these trends persisted in 2017 and subsequent years. On the contrary, the employee retention rate *increased* from 2017 onwards, and the rate of transition to inactivity fell from 2017 onwards. Furthermore, there is no evidence of increased unemployment in the aggregate labour market statistics (as shown by Figure 4.6 in Chapter 4).

Figure 6.2. Labour market status in LFS Wave 5 for employees aged 25 and over who were earning below £9 per hour in Wave 1, 2011-2019

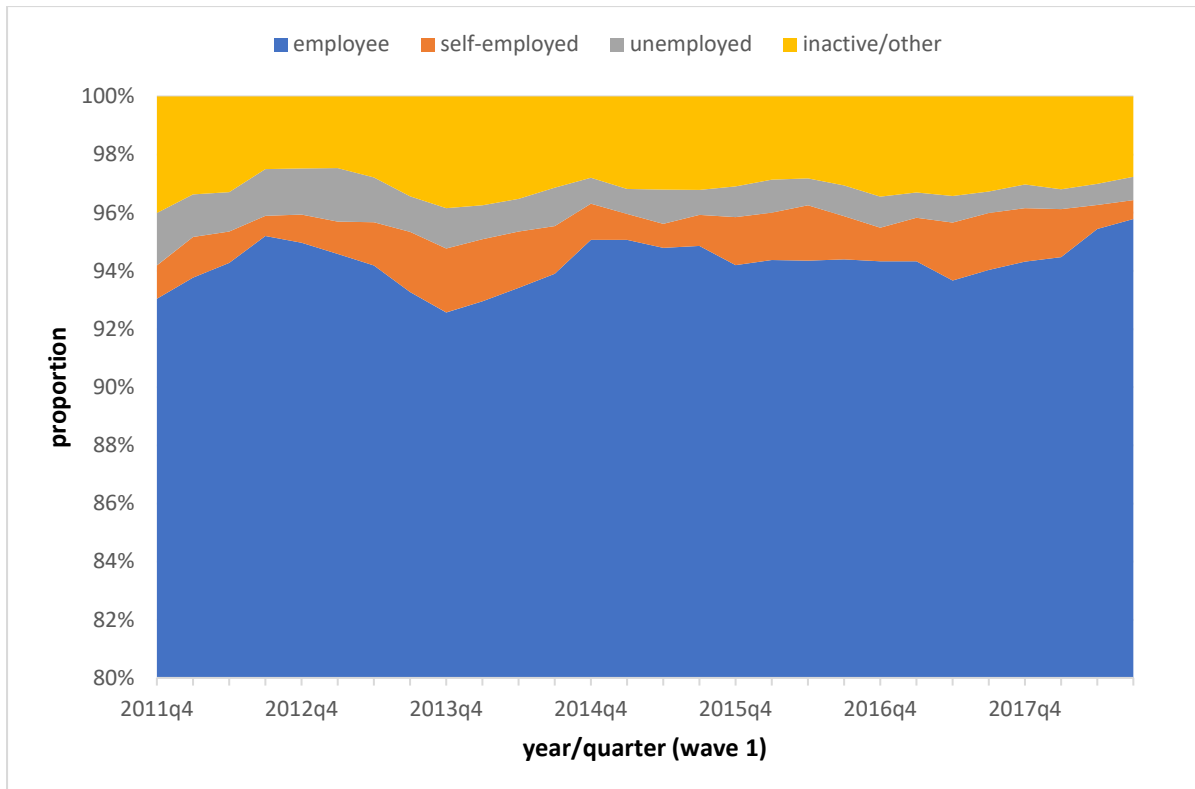


Source: Landman Economics analysis of LFS 5-quarter longitudinal data

Note: smoothed (4-quarter moving average)

Figure 6.2 shows labour market status at Wave 5 for LFS employees aged 25 and over who were employees in the “£9 to £12 per hour” group in Wave 1. Retention rates for employees in this wage group are much higher than for the “below £9 per hour” group, at around Retention rates much better for employees in the higher wage group, at between 93 and 95% over most of the sample period. This is true both before and after the introduction of the NLW. both before and after introduction of NLW. While the retention rate and the transition rates to self-employment, unemployment and inactivity fluctuate over the period 2011 to 2019, there does not seem to be an obvious pattern with respect to the post-2016 (NLW) period compared to 2011-15 (before the NLW was introduced). As with Figure 6.2 above, there is a decline over the whole period in the transition rate to unemployment, which is consistent with a strengthening labour market in the recovery from the 2008-9 recession.

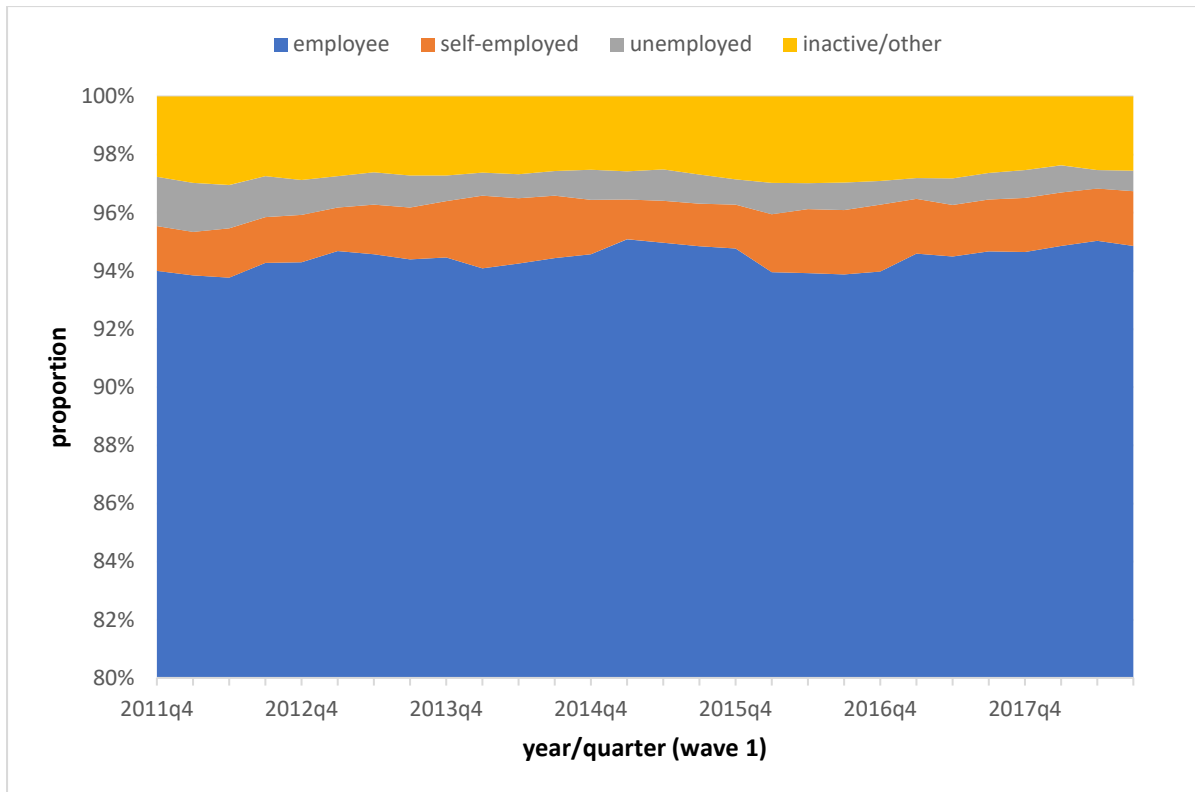
Figure 6.3. Labour market status in LFS Wave 5 for employees aged 25 and over who were earning between £9 and £12 per hour in Wave 1, 2011-2019



Source: Landman Economics analysis of LFS 5-quarter longitudinal data
 Note: smoothed (4-quarter moving average)

Figure 6.4 shows labour market status at Wave 5 for LFS employees aged 25 and over who were employees in the “over £12 per hour” group in Wave 1. The patterns look similar to those observed in Figure 6.3, but with a slightly higher retention rate, and less volatility. Once again there is no evidence of the transition rates being affected by the introduction of the NLW.

Figure 6.4. Labour market status in LFS Wave 5 for employees aged 25 and over who were earning over £12 per hour in Wave 1, 2011-2019



Source: Landman Economics analysis of LFS 5-quarter longitudinal data
 Note: smoothed (4-quarter moving average)

6.4 Transitions to employee status in quarter 5

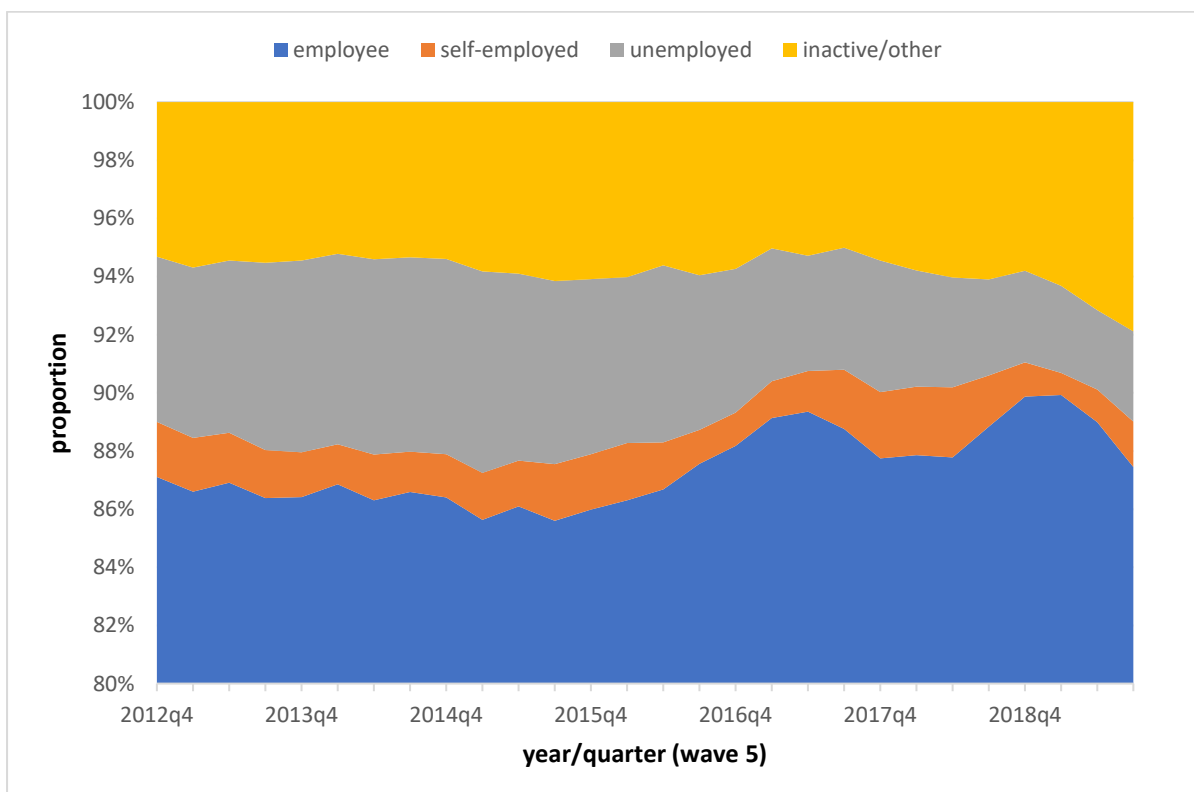
The analysis in this section is in a similar format to Section 6.3, but rather than analysing labour market transitions by Wave 5 for adults aged 25 and over who were employees in LFS Wave 1, this section looks at transitions from Wave 1 for adults aged 25 and over who were employees in LFS Wave 5. The aim in this section is to assess hiring patterns for Wave 5 employees, and in particular to examine whether there is a drop-off in the proportion of low-paid Wave 5 employees moving out of unemployment or inactivity after the introduction of the NLW.

Figure 6.5 shows labour market status at Wave 1 for LFS employees aged 25 and over who were employees in the “under £9 per hour” group in Wave 5. Over the sample period, there is a lower proportion of people in employment at Wave 5 who were unemployed in Wave 1 (the proportion falls from around 7% at the start of 2015 to 4% by 2017q2 and then further to 3% by 2019q1). However, as shown in Chapter 4, there is a substantial fall in unemployment in the UK over this time period (the unemployment rate for 16-64 year olds fell from 8.6% in late 2011 to 5.2% by

early 2016 and then further to 3.8% by late 2019) so we would expect a reduction in the number of people moving from unemployment into work anyway, due to the smaller pool of unemployed. The proportion of entrants into low-paid jobs from inactive labour market status also increases slightly at the end of the time period (from 5% in late 2017 to around 7.5% by late 2019), while the proportion of entrants into low-paid jobs from self-employment fluctuates over the period, falling in 2016 but then increasing again in 2017-18 before falling in 2019. Neither the trend in transitions from inactive status nor the trend in transitions from self-employed status appear to have any obvious relationship with the introduction of the NLW.

Overall there appears to be a reduction in the proportion of low-wage employees at wave 5 who were not employees at Wave 1 (i.e. a reduction in hiring rates) but this is entirely due to reductions in the number of people transitioning from unemployment, which we would expect in a period of falling unemployment regardless of the level at which the minimum wage is set – because as the unemployment rate decreases, there are fewer unemployed people in the labour market available to hire into jobs.

Figure 6.5. Labour market status in LFS Wave 1 for employees aged 25 and over who were earning below £9 per hour in Wave 5, 2012-2019

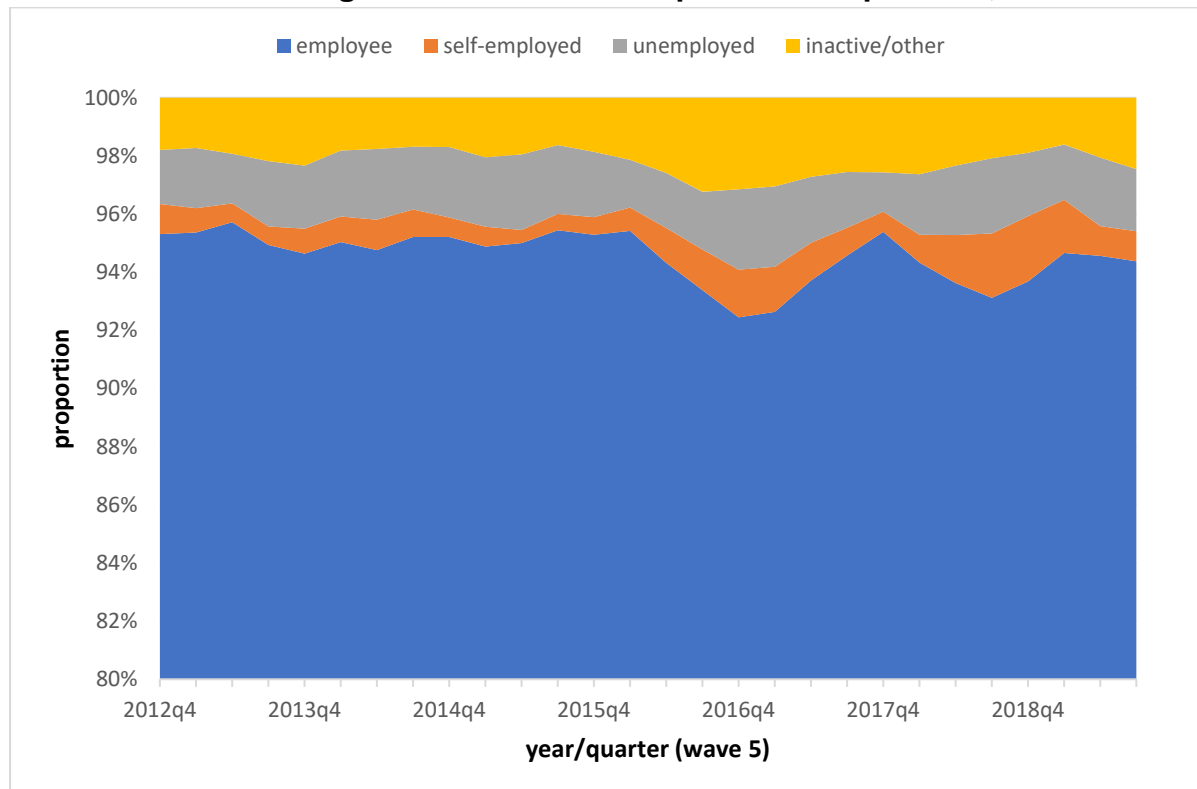


Source: Landman Economics analysis of LFS 5-quarter longitudinal data

Note: smoothed (4-quarter moving average)

Figure 6.6 shows labour market status at Wave 1 for LFS employees aged 25 and over who were employees in the “£9 to £12 per hour” group in Wave 5. In contrast to the lowest-paid hourly wage group, there appears to be an increase in hiring rates after the introduction of the NLW – from about 5% in mid-2015 to 7.5% by the end of 2016. However, the hiring rate later reduces to not far above where it was before the NLW was introduced. The main trends are an increased movement from self-employment into waged work at this level and a slight reduction in movements from inactivity into work after 2016. The fact that hiring rates for employees in this wage bracket increased after the NLW was introduced, whereas hiring rates fell for employees in the lowest wage group, may indicate a shift in hiring patterns in favour of the £9-12 wage group after 2016. We examine this possibility in more detail in Section 6.5, which looks at transitions *between different employee wage bands*.

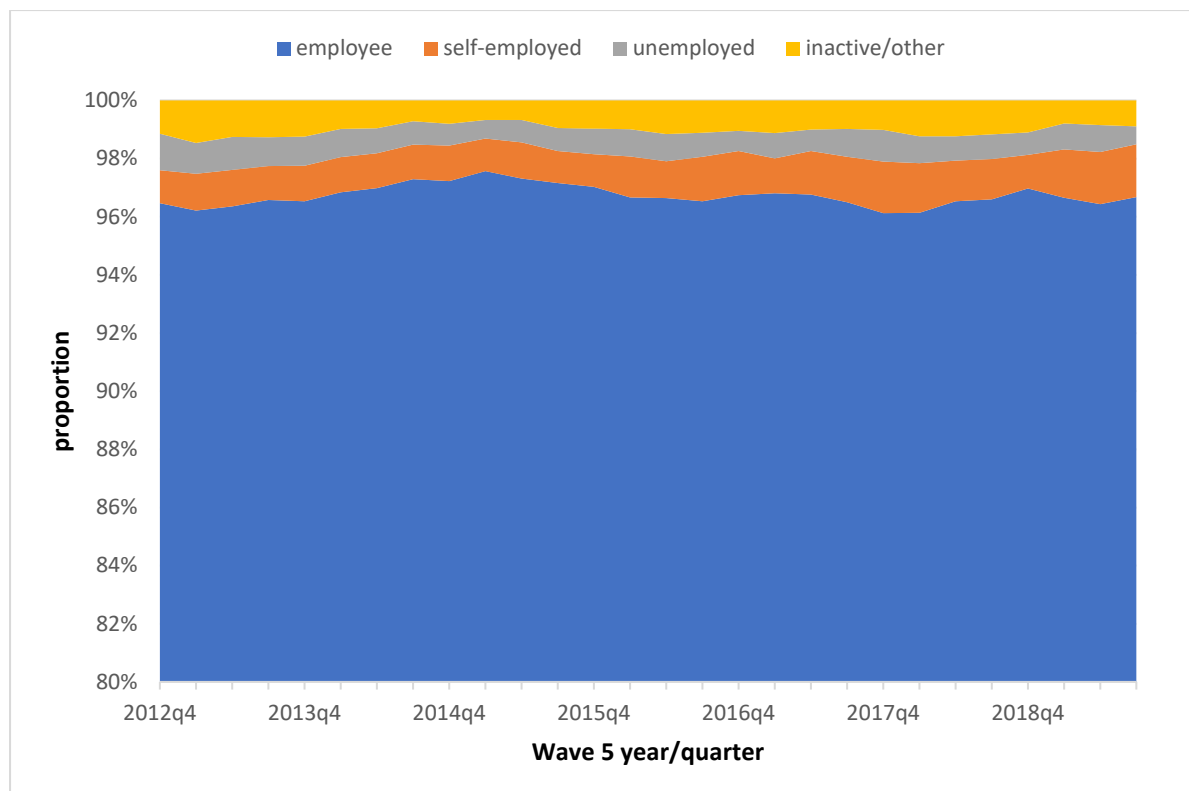
Figure 6.6. Labour market status in LFS quarter 1 for employees aged 25 and over who were earning between £9 and £12 per hour in quarter 5, 2012-2019



Source: Landman Economics analysis of LFS 5-quarter longitudinal data
 Note: smoothed (4-quarter moving average)

Figure 6.7 shows labour market status at Wave 1 for LFS employees aged 25 and over who were employees in the “more than £12 per hour” group in Wave 5. This graph shows less movement than for the other two wage brackets. If anything there is a slight increase in the hiring rate from 2014 onwards, but the differences from year to year are extremely small.

Figure 6.7. Labour market status in LFS quarter 1 for employees aged 25 and over who were earning over £12 per hour in quarter 5, 2012-2019



Source: Landman Economics analysis of LFS 5-quarter longitudinal data
 Note: smoothed (4-quarter moving average)

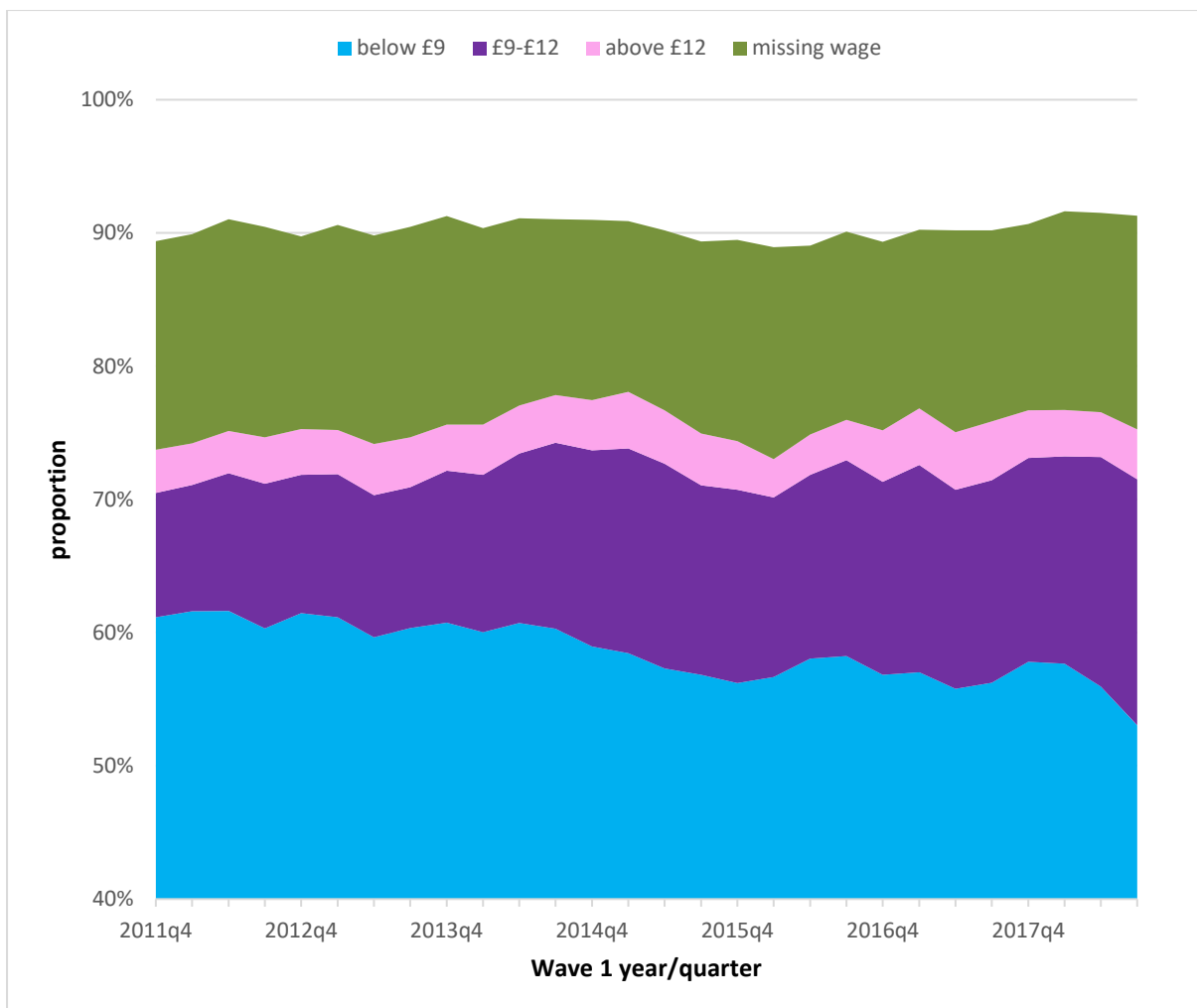
6.5 Detailed breakdown of Wave 5 transitions for low-wage employees in Wave 1 of the LFS panel

The analysis in this section breaks down the blue area of Figure 6.2 above (the subsample of LFS interviewees who were employees paid up to £9 per hour in Wave 1, and still employees at Wave 5) and looks at whereabouts in the hourly wage distribution those employees were at by Wave 5. The hourly wage distribution is shown in Figure 6.8 below. Note that the vertical scale of the graph is wider here than in Figure 6.2 so the overall shape of the graph looks flatter than the blue section in that Figure. Also, there are a large number of missing values for hourly earnings in Wave 5 (the green block in the diagram) – this is an unfortunate feature of the LFS dataset; around 15% of employee interviewees at Wave 5 do not provide earnings data.

Overall, Figure 6.8 shows that there is a reduction in the proportion of low waged employees at Wave 1 who are still in the low-wage group in Wave 5 after 2014. The proportion falls from around 60% in 2014 to 56% by mid-2017. However, this fall is

balanced out by an increase in the proportion of employees moving up to the £9-£12 hourly wage group, meaning that the overall proportion of workers in these groups is little changed at around 70% for the whole period. There is some evidence of a slight increase in the combined proportion of employees at wages below £12 at the end of 2014 – before the NLW was announced or implemented – but this then comes back down again to the longer-term average of around 70 per cent. The proportion of employees moving up to hourly wages above £12 is relatively stable, as is the proportion of employees with missing wage data.

Figure 6.8. Breakdown of hourly wage distribution at LFS Wave 5 for employees aged 25 and over who were paid at below £9 per hour in Wave 1



Source: Landman Economics analysis of LFS 5-quarter longitudinal data

Note: smoothed (4-quarter moving average)

Appendix B of this report shows equivalent graphs for the analysis of movements between wage groups by Wave 5 for employees who were in the two higher-paid wage groups in Wave 1 (£9-£12 and more than £12 per hour). These show very stable transition patterns from year to year, with no obvious changes as a result of the NLW.

6.6 Summary

- The median change in wages between Wave 1 and Wave 5 for employees in the “below £9 per hour” wage group at Wave 1 increased from 30p per hour to around 50p per hour between mid-2014 and mid-2016. By contrast, median changes in wages for employees in the “£9-£12 per hour” and “above £12 per hour” groups were approximately unchanged over the same period.
- After 2016, the median change in wages for employees in the lowest wage group was significantly higher than for employees in the other two wage groups. The lowest paid wage group performed significantly better in terms of wage increases relative to the other two wage groups after 2016 than was the case prior to 2014.
- There is some evidence of increased transition to unemployment and inactivity between Wave 1 and Wave 5 of the LFS for the lowest paid hourly wage group just after the NLW was introduced in 2016, but there is no evidence that these trends persisted in 2017 and subsequent years. On the contrary, the employee retention rate increased from 2017 onwards and the rate of transition to inactivity fell from 2017 onwards.
- Overall, there appears to be a reduction in the proportion of employees in the lowest paid hourly wage group at Wave 5 who were not employees at Wave 1 (i.e. a reduction in hiring rates) but this is due to reductions in the number of people transitioning from unemployment, which we would expect in a period of falling unemployment regardless of the level at which the minimum wage is set – because as the unemployment rate decreases, there are fewer unemployed people in the labour market available to hire into jobs.
- There is a reduction in the proportion of employees paid less than £9 per hour aged 25 and over at Wave 1 who were still in this low-wage group in Wave 5 after 2014. However, this fall is balanced out by an *increase* in the proportion of employees moving up to the £9-£12 hourly wage group, meaning that the overall proportion of workers in these groups is little changed at around 70% for the whole period. This suggests that overall, increasing numbers of employees are making a transition from the lowest-paid wage category to the higher wage category.

7 Conclusion

The analysis of data from the Labour Force Survey in this report shows, first and foremost, that between 2011 and 2019, overall employment for workers on low-to-medium hourly earnings (below £11 or £12 per hour) in the UK increased substantially. This was true both before and after the introduction of the NLW in 2016. However, within this group there was a shift away from the lowest-paid employment category (less than £9 per hour) and towards “medium-paid” employment (between £9 and £11 or £12 per hour, depending on the precise classification used in each chapter of the report). There is no evidence that the introduction of the NLW increased aggregate unemployment or reduced aggregate employment in the UK.

The observed pattern of changes in wages after the introduction of – and subsequent real-terms increases in – the National Living Wage is consistent with the theories of the labour market outlined in the analysis of the German minimum wage by Dustmann *et al* (2020) and discussed in Section 2.2 of this report. Specifically, the evidence suggests that the NLW has improved the quality of jobs for low-to-medium paid employees in the UK labour market – by reallocating workers from jobs with characteristics associated with “low pay” (conditional on worker attributes such as age and educational attainment) to jobs with characteristics associated with “high pay”. This is consistent with Figure 4.9 which shows increases in the proportion of jobs in workplaces with more than 500 employees, in high-paying industries and in high-paying occupations – and reductions in the proportion of jobs in workplaces with fewer than 10 employees, low-paying industries and low-paying occupations – after 2016. The implication is that the NLW has reduced employment for employers offering lower wages (conditional on worker characteristics) by squeezing the margins for those employers, but that at the same time employment for employers offering higher wages has increased.

As explained in Section 2.2 of this report, these empirical findings are consistent with three different kinds of economic model: (a) models incorporating search frictions in the labour market, (b) models involving monopsony power of firms hiring workers, and (c) models with frictions in the consumer goods market. By itself, the data from the Labour Force Survey is of limited use for identifying which of these theories is most empirically relevant in explaining the observed results for the UK. This is because the LFS does not have enough information on firm characteristics to distinguish between the three theories. One potential avenue for future research on the impact of the NLW is to use linked employer-employee datasets with more information on firm characteristics. It would also be useful to use microdata from the Annual Survey on Hours and Earnings to analyse the introduction of the NLW, as this would provide a larger sample size than the LFS, and also potentially a longer panel element.

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Appendix A: Hourly wage regression

An hourly wage regression on the 2019 LFS data was used to identify high and low-paying industries and occupations, and also to show that working in a workplace with 500 or more total employees was associated with higher wages (conditional on other factors), while working in a workplace with fewer than 10 employees was associated with lower wages.

The regression is Ordinary Least Squares with the log of the hourly wage as the dependent variable, and the regressors are as shown in Table A.1 below.

Table A.1. Variable names in wage regression

Variable name	Regressor
Gender/family type:	[base category: single man, no children]
sexcou_d2	Single woman, no children
sexcou_d3	Man in couple, no children
sexcou_d4	Woman in couple, no children
sexcou_d5	Male lone parent
sexcou_d6	Female lone parent
sexcou_d7	Man in couple with children
sexcou_d8	Woman in couple with children
parttime	Part-time employee
Industry (1-digit SIC07):	[base category: A (agriculture)]
ind_b	B: Mining and quarrying
ind_c	C: Manufacturing
ind_d	D: Electricity, gas
ind_e	E: Water supply, sewerage, waste
ind_f	F: Construction
ind_g	G: Wholesale & retail trade, repair of vehicles
ind_h	H: Transport & storage
ind_i	I: Accommodation & food services
ind_j	J: Information & communication
ind_k	K: Financial & insurance activities
ind_l	L: Real estate activities
ind_m	M: Professional, scientific & technical activities
ind_n	N: Admin & support services
ind_o	O: Public admin & defence
ind_p	P: Education
ind_q	Q: Health & social work
ind_r	R: Arts, entertainment & recreation
ind_s	S: Other service activities
ind_t	T: Households as employers
ind_u	U: Extraterritorial organisations
pubsect	Public sector employee
volsect	Voluntary sector employee
firm_10	Fewer than 10 employees in workplace
firm_500	More than 500 employees in workplace
Occupation (1-digit SOC2010):	[base category: 9 (elementary occupations)]

sc_2	1: Managers, directors & senior officials
sc_3	2: Professional occupations
sc_4	3: Associate professional & technical occupations
sc_5	4: Administrative & secretarial occupations
sc_6	5: Skilled trades occupations
sc_7	6: Caring, leisure & other service occupations
sc_8	7: Sales & customer service occupations
sc_9	8: Process, plant & machine operatives
Age:	[base category: 18-20]
age2229	22-29
age3039	30-39
age4049	40-49
age5059	50-59
age6069	60-69
age70	70+
Ethnicity:	[base category: white]
eth_mx	Mixed
eth_in	Indian
eth_pk	Pakistani
eth_ba	Bangladeshi
eth_ch	Chinese
eth_oa	Other Asian
eth_bl	Black
eth_ot	Other Ethnic Group
Region of workplace:	[base category: Northern Ireland]
regw_d1	Tyne & Wear
regw_d2	Rest of Northern Region
regw_d3	South Yorkshire
regw_d4	West Yorkshire
regw_d5	Rest of Yorkshire & Humberside
regw_d6	East Midlands
regw_d7	East Anglia
regw_d8	Central London
regw_d9	Inner London (not Central)
regw_d10	Outer London
regw_d11	Rest of South East
regw_d12	South West
regw_d13	West Midlands Metropolitan
regw_d14	Rest of West Midlands
regw_d15	Greater Manchester
regw_d16	Merseyside
regw_d17	Rest of North West
regw_d18	Wales
regw_d19	Strathclyde
regw_d20	Rest of Scotland
disab	Disabled (Equality Act 2010 definition)

Table A.2 shows the results from the wage regression.

Table A.2. Results from wage regression

Source	SS	df	MS	Number of obs	=	39,218
Model	5121.25431	75	68.2833908	F(75, 39142)	=	400.03
Residual	6681.38165	39,142	.17069597	Prob > F	=	0.0000
				R-squared	=	0.4339
				Adj R-squared	=	0.4328
Total	11802.636	39,217	.300957135	Root MSE	=	.41315

logwage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
sexcou_d2	-.072401	.0100567	-7.20	0.000	-.0921123 -.0526897
sexcou_d3	.0336673	.0086925	3.87	0.000	.0166298 .0507048
sexcou_d4	-.0542086	.008917	-6.08	0.000	-.0716862 -.036731
sexcou_d5	.0039828	.0255414	0.16	0.876	-.0460791 .0540446
sexcou_d6	-.0808516	.0124377	-6.50	0.000	-.1052297 -.0564734
sexcou_d7	.0814324	.0088139	9.24	0.000	.064157 .0987078
sexcou_d8	-.0260146	.0093782	-2.77	0.006	-.0443961 -.0076331
parttime	-.0206901	.0056453	-3.66	0.000	-.0317551 -.009625
ind_b	.313695	.0398348	7.87	0.000	.2356178 .3917721
ind_c	.1535456	.023109	6.64	0.000	.1082515 .1988398
ind_d	.297196	.033285	8.93	0.000	.2319567 .3624353
ind_e	.1352209	.0320266	4.22	0.000	.0724479 .1979938
ind_f	.1830255	.0240998	7.59	0.000	.1357893 .2302617
ind_g	.0155663	.0230273	0.68	0.499	-.0295677 .0607003
ind_h	.1457356	.0243356	5.99	0.000	.0980372 .193434
ind_i	-.0116242	.0241836	-0.48	0.631	-.0590246 .0357763
ind_j	.2445261	.0246392	9.92	0.000	.1962327 .2928195
ind_k	.3188763	.024683	12.92	0.000	.2704969 .3672557
ind_l	.1192948	.0299946	3.98	0.000	.0605048 .1780849
ind_m	.2185278	.0236812	9.23	0.000	.172112 .2649435
ind_n	.0888653	.0244749	3.63	0.000	.0408939 .1368368
ind_o	.0991509	.023757	4.17	0.000	.0525867 .1457151
ind_p	.0438219	.0234982	1.86	0.062	-.0022351 .0898789
ind_q	.0429149	.0232393	1.85	0.065	-.0026347 .0884645
ind_r	-.0025417	.0266032	-0.10	0.924	-.0546847 .0496013
ind_s	.080994	.0265844	3.05	0.002	.0288878 .1331001
ind_t	.1114874	.0813329	1.37	0.170	-.047927 .2709018
ind_u	.2340068	.0559961	4.18	0.000	.124253 .3437606
pubsect	.0131291	.0067647	1.94	0.052	-.0001298 .0263881
volsect	-.0081562	.012374	-0.66	0.510	-.0324096 .0160972
firm_10	-.1020258	.0050452	-20.22	0.000	-.1119145 -.092137
firm500	.0961544	.0058289	16.50	0.000	.0847295 .1075793
sc_1	.5656353	.0099603	56.79	0.000	.5461128 .5851578
sc_2	.5941853	.0090801	65.44	0.000	.5763882 .6119824
sc_3	.3879921	.0094842	40.91	0.000	.3694028 .4065815
sc_4	.1727228	.009757	17.70	0.000	.153599 .1918467
sc_5	.1591282	.0108602	14.65	0.000	.1378419 .1804145
sc_6	.0510175	.0105437	4.84	0.000	.0303516 .0716834
sc_7	.1033585	.0108446	9.53	0.000	.0821028 .1246142
sc_8	.0344927	.011622	2.97	0.003	.0117134 .057272
age2229	.192176	.0115756	16.60	0.000	.1694875 .2148646
age3039	.3337955	.0110453	30.22	0.000	.3121464 .3554446
age4049	.4040062	.0111314	36.29	0.000	.3821884 .4258239
age5059	.4173975	.0111295	37.50	0.000	.3955834 .4392115
age6069	.3761729	.0124371	30.25	0.000	.3517958 .40055
age70	.3269558	.0228693	14.30	0.000	.2821315 .3717801
eth_mx	-.0358108	.022116	-1.62	0.105	-.0791587 .0075372
eth_in	-.0326683	.0147327	-2.22	0.027	-.0615447 -.0037919
eth_pk	-.0816058	.0221894	-3.68	0.000	-.1250975 -.0381141
eth_ba	-.1797515	.0344401	-5.22	0.000	-.2472551 -.112248
eth_ch	.0156694	.0326382	0.48	0.631	-.0483022 .079641
eth_oa	-.1086192	.0210451	-5.16	0.000	-.1498681 -.0673702
eth_b1	-.0991143	.0143437	-6.91	0.000	-.1272284 -.0710002
eth_ot	-.0614628	.020565	-2.99	0.003	-.1017706 -.021155
regw_d1	-.0031869	.0168151	-0.19	0.850	-.0361449 .029771

regw_d2		.0170855	.0141597	1.21	0.228	-.0106679	.0448388
regw_d3		.0251542	.0168289	1.49	0.135	-.0078309	.0581393
regw_d4		.0243346	.0135028	1.80	0.072	-.0021312	.0508005
regw_d5		.0066118	.0144712	0.46	0.648	-.021752	.0349756
regw_d6		.0235518	.0109411	2.15	0.031	.0021069	.0449966
regw_d7		.033854	.0129125	2.62	0.009	.0085452	.0591628
regw_d8		.3847869	.0130281	29.54	0.000	.3592515	.4103223
regw_d9		.2546214	.0154665	16.46	0.000	.2243066	.2849362
regw_d10		.1604131	.0135892	11.80	0.000	.1337779	.1870482
regw_d11		.0900053	.0094062	9.57	0.000	.0715688	.1084417
regw_d12		.025617	.0104582	2.45	0.014	.0051187	.0461153
regw_d13		.0470177	.0136274	3.45	0.001	.0203077	.0737277
regw_d14		.039464	.0128311	3.08	0.002	.0143147	.0646133
regw_d15		.0605808	.0129335	4.68	0.000	.0352308	.0859307
regw_d16		.0231464	.0172071	1.35	0.179	-.0105798	.0568727
regw_d17		.0083336	.0131485	0.63	0.526	-.0174378	.034105
regw_d18		-.0077239	.0129462	-0.60	0.551	-.0330988	.0176511
regw_d19		.0695546	.0144077	4.83	0.000	.0413151	.0977941
regw_d20		.0844146	.0122453	6.89	0.000	.0604136	.1084156
disab		-.0586854	.0059541	-9.86	0.000	-.0703555	-.0470153
_cons		1.823667	.0260111	70.11	0.000	1.772685	1.87465

Appendix B

Figure B.1. Breakdown of hourly wage distribution at LFS Wave 5 for employees aged 25 and over who were paid at £9-£12 per hour in Wave 1

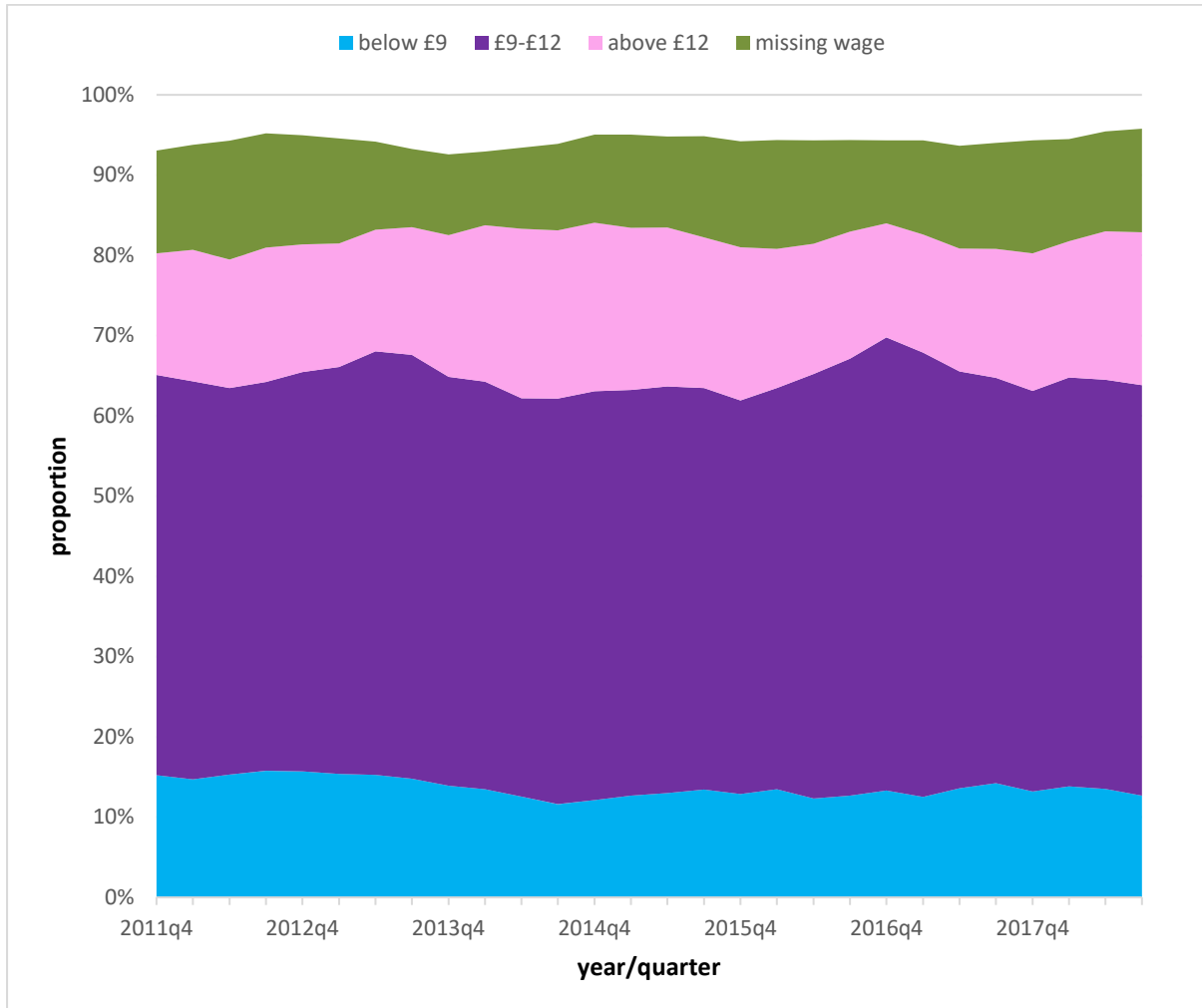


Figure B.2. Breakdown of hourly wage distribution at LFS Wave 5 for employees aged 25 and over who were paid at over £12 per hour in Wave 1

