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Abstract

This paper analyzes employment effects of four minimum wage increases implemented in the Czech Republic during 2012-2017, which cumulatively increased the national minimum wage by 37 percent. We analyze outcomes at the level of firm-occupation-county-specific job cells and apply an intensity-treatment estimator similar to that of Machin et al. (2003). Our preferred specifications suggest that minimum wage increases led to higher wages for low-paid workers and did not have significant impacts on their employment.

JEL Codes: J31, J38, J68.

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Keywords: Minimum wage, intensity treatment, job cells, Czech Republic.

1 Introduction

A large literature studies the ramifications of minimum wages, including its central effect on employment. Most of this work concludes that minimum wage increases have minor to no disemployment effects.[1] A problem with extending this predominantly US-based research to European countries is that the US minimum wage legislation is typically applied at the national level, which limits the use of region-based difference-in-differences identification strategies. Two types of approaches have been devised to allow identification of national minimum wage effects. First, the bunching estimator compares the number of jobs created above the level of an increased minimum wage level with the number of jobs destroyed just below that level (e.g. Meyer and Wise, 1983; Harasztosi and Lindner, 2015; Cengiz et al., 2019), assuming that the wage distribution would remain the same in the absence of a minimum wage increase. Second, the treatment-intensity estimator relies on variations in treatment exposure to national minimum wages typically generated by the pre-existing share of workers whose wages are below the minimum wage level set for the next year. This strategy, applied at the firm and/or establishment level, allows researchers to compare firms that would have to increase their wage bills to varying degrees due to a given minimum wage increase (introduction) in order to keep all of their workers (Machin et al., 2003; Eriksson and Pytlikova, 2004; Harasztosi and Lindner, 2015).

In this paper, we employ both of these strategies and are the first to apply the treatment-intensity approach at the level of job cells, defined as the combination of employee's occupation and employer's location. We study the impacts of four increases in the national minimum wage (NMW) in the Czech Republic implemented during

[1] See Doucouliagos and Stanley (2009) for a meta-analysis of the estimated employment effects.

2012 to 2017. These increases followed a period of 7 years in which the NMW was not increased despite concurrent cumulative 16% growth in mean nominal wages in the economy (The Czech Statistical Office, 2019).[2] Starting at the level of 320 Euro[3] (32% of the average wage) in the beginning of 2013, these changes altogether amount to a 37.5% increase in the national minimum wage, reaching 440 EUR in 2017 (46% of the average wage). The highest annual increase occurred in 2017, when the NMW increased by 11%. We consider these increases both separately and jointly, as one significant NMW increase.

We start our analysis by applying the intensity-treatment estimator at the firm level (as, e.g. Harasztosi and Lindner, 2015, do). That is, we measure the treatment exposure to a NMW increase by the share of employees of a firm who are currently paid a wage that is below the minimum wage level set in next period (we refer to this measure as "the Share") and by the proportion of an employers' total wage bill that corresponds to the sum of wages that would have to be increased so that all current employees are paid at least the minimum wage in next period ("the Gap" measure). A potential weakness of this strategy is, first, that minimum wage increases could be timed to correspond to demand shocks in industries that employ a heavy share of low-wage labor, i.e. that an unobserved demand shock at the firm level could make the minimum wage endogenous. Second, since the share of workers paid below a future NMW in the average firm is around 3%[4] in 2012, such a strategy mixes the effects of NMW on low-wage employment with the evolution of employment high above the NMW level, which is unlikely to be causally affected by the NMW. Indeed, some applications of the

[2]This a similar situation to that of Hungary in 2001, studied in Harasztosi and Lindner (2015).

[3]We apply an approximate conversion rate of 25 CZK per 1 EUR throughout the paper.

[4]For more details and the shares of workers paid below a future NMW in later years see Table 8 in the Appendix.

treatment-intensity approach focus on specific establishments characterized by a high exposure to NMW increases and homogenous labor composition (e.g. Machin et al., 2003 who study care homes), which, however, limits the generalizeability of the results.

In the second step of our analysis, we therefore employ treatment intensity variation at the job-cell level, where job cells are groups of workers in the same firm, in the same location and in the same occupation, and we study only low-wage job cells. This allows us to exploit variation in exposure to NMW increases at the level of homogenous groups of low-wage workers, i.e., we do not mix the NMW effects on employment of low- and high-wage employees. The strategy also allows us to control for firm-level evolution of employment by conditioning on firm FE. We supplement the employment analysis of NMW effects at the job-cell level by asking whether NMW increases affected job-cell worker turnover and employment structure in terms of education, gender, or worker firm-specific tenure.[5]

Third, we apply a bunching estimator. Assuming that real wage distributions would not change in the absence of NMW increases, we compare the number of jobs created above a new NMW level with the number of jobs destroyed below the new NMW level. The real wage distribution from a period preceding a NMW increase is used as a counterfactual. We inspect employment dynamics in a region of +/- 100 EUR (2,500 CZK) around a new NMW level, i.e. approximately 70-130% of the NMW level in 2013.

Our analysis relies on the Czech Structure of Earnings Survey (SES), which offers several advantages for a study of NMW effects.[6] The SES is a large panel of nearly 4 thousand firms which provides detailed information about *all* employees working in the

[5]This is important for understanding the employment effects. If low-educated low-wage workers are replaced by high-wage high-education workers as a result of NMW increases, we would detect no employment effects.

[6]The SES is the linked employer-employee dataset (LEED) designed to collect harmonised data on earnings in EU Member States.

firms surveyed. The SES covers approximately 1.5 million employees each year (out of about 3.5 million salaried employees in the Czech private employment sector). This allows us to observe a large number of homogenous job cells and to exploit significant variations in treatment exposure to NMW increases across these cells. The SES also allows us to study changes in hours worked in addition to employment changes.

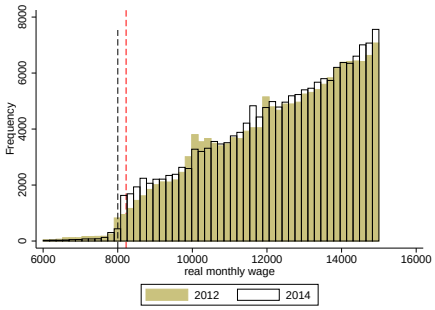
Figure 1 shows that each of the four NMW increases did result in a shift in the wage distribution.[7] Individual graphs show wage distributions for years surrounding each NMW increase; the only exception is graph (a) which shows wage distributions for 2012 and 2014 because the NMW increase was implemented in the middle of 2013. Black horizontal lines denote the initial levels of the NMW and red lines indicate NMW levels after each increase.

Our firm-level analysis produces mixed results. We find a significantly negative employment effect associated with the 2013 NMW increase, but positive employment effects associated with the NMW increases in 2015 and 2016. The employment elasticity with respect to minimum wage associated with the 2013 increase is -0.154[8] (the estimated coefficient is almost 25%). One possible explanation is that employers had already considered possible future NMW increases and adjusted employment accordingly. It could also be that our exposure measures correlate with employment trends of high-wage workers within a firm. It is worth stressing that there is another factor

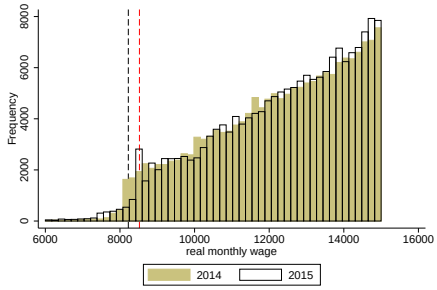
[7]To show changes in wage distributions net of a general price rise in economy, we discount nominal wages by the median wage growth, because inflation rates were very small during the years studied.

[8]It is not obvious how to compare elasticities obtained from difference-in-differences with intensity-treatment estimate types directly. Therefore, different approaches to facilitate the comparison are used in the literature. For example, Harasztosi and Lindner (2015) adjust their estimated elasticity by 25 %, as this is the share of directly affected teenage employees in the US population. We multiply the estimated elasticities by the share of directly affected workers (i.e. workers paid below the NMW level set in the next period) in our data-set.

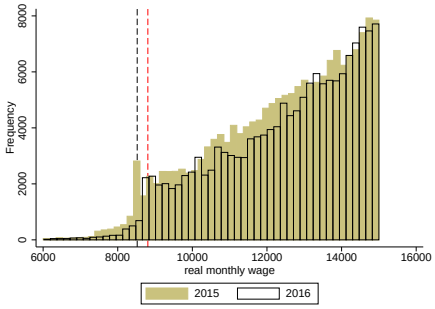
Figure 1: Changes in wage distribution



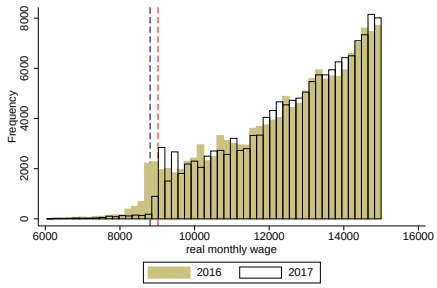
(a) NMW increase in 2013



(b) NMW increase in 2015



(c) NMW increase in 2016



(d) NMW increase in 2017

that may be behind such a large estimate. We analyze the NMW increase in 2013 using data from 2012 and 2014, and it is possible that the estimated coefficient also captures changes in employment that were not caused by the NMW increase. The size of the firm-level based estimate is large compared to previous work. For example, Eriksson and Pytlikova (2004) found in one specification that a NMW increase in 2000 in the Czech Republic caused a 14% decrease in employment. Our estimates show that subsequent NMW increases in 2015 and 2016 had opposite, i.e. positive, effects on employment, which both amounted to approximately 16% (the employment elasticity wrt. NMW are 0.03 and 0.08, respectively). We do not find any statistically significant employment effect associated with the 2017 NMW increase.

Compared to the firm-level results, our job-cell results are more consistent and in line with the existing literature. The estimated coefficients do not switch in signs across years. We find negative employment effects only for the 2013 NMW increase. However, this effect is economically small and below the level of estimates appearing in the recent literature. The NMW increase in 2013 caused a 11% drop in employment for job cells in which all employees were paid less than the NMW (corresponding to an elasticity of -0.066), which is small in comparison to previous research. We also find a small negative and statistically significant effect on employment in 2016 in one specification. Next, we focus on selected job cells. First, we analyze 5 of the most affected occupations separately.[9] We find no negative employment effects using these job cells. Second, we focus on job cells in accommodation and restaurants. Our preferred specification does not show any negative effects on employment. Third, manufacturing does not show negative effects on employment except for the NMW increase in 2013 when analyzed separately.

In line with our treatment-intensity analysis, the bunching-based estimates indicate that employment changes induced by the NMW increases were negligible. Some 4% of jobs around the minimum wage threshold were destroyed in 2017, which was the most extreme case. We find also positive employment effects associated with the 2013 and 2015 increases. However, the bunching estimates are sensitive to the chosen upper and lower bounds, which determine the region of wage distribution where employment changes are measured.

We supplement our job-cell analysis by inspecting additional effects of NMW increases. We find that the NMW increases during 2013-2017 did not affect: i) hours

[9]We include 5 occupations with the highest mean value of the Share variable for each year. These are mostly employees with ISCO codes 5 and 9 (elementary occupations, service and sales workers).

worked, ii) turnover rates, iii) educational and gender composition of job cells. Furthermore, by estimating employment effects on specific parts of the job-cell employment distribution[10], we address a possible correlation between labor demand shocks and the employment evolution of exposed job cells. Our findings suggest that labor demand shocks did not affect our job-cell level results. We also estimate the effects of a hypothetical situation in which a sizable NMW increase is implemented. We combine individual NMW increases during 2012-2017 and treat them as one large hike in the NMW. Our estimates suggest that such a considerable increase would not have a negative effect on employment.

This paper relates to the minimum wage literature in several ways. First, we contribute to the work on the employment effects of minimum wage increases. Similarly to recent EU analyses, we find no or small negative effects of the NMW increases we study on employment. Second, our paper contributes to the part of the literature that applies a treatment-intensity estimator to estimate the employment effects of NMW increases. Often, this approach is the only possible means to identify the causal effects of nation-wide minimum wage increases. This type of research is usually carried out at the firm level (e.g., as in Harasztosi and Lindner 2015, and Eriksson and Pytlikova 2004, who use SES data), or researchers use occupation-specific organizational units (as in Machin et al. 2003, who analyzed employment patterns in the care-homes industry during the introduction of a NMW in the UK). The major advantage of using SES or similar data is that such data-sets contain characteristics of a large number of firms and their employees. However, the firms surveyed are large heterogenous organizational

[10]We consider the job-cell employment distributions without the upper and lower quartiles to exclude positive and negative demand shocks.

units that may employ only a small fraction of workers exposed to a NMW increase.[11] Therefore, measuring the exposure to a NMW increase by the share of affected employees in firms is likely to be imprecise. Moreover, this approach mixes the employment trends of low- and high-paid workers. The other alternative used in the literature is to focus on specific occupational units that group employees with similar wages and characteristics. Therefore, it is possible to precisely zoom in on low-paid employees and study their employment changes. The drawback is that it is difficult to collect such data-sets. Furthermore, the estimated effects of an NMW increase are not generalizable. In this paper, we focus on firm-occupation-county-specific job cells, combining the benefits of both approaches. Using SES data provides a large number of observations, making it possible to focus on specific labor-market segments, i.e. to target subgroups of employees that are likely to be affected by a NMW increase and to compare job cells that are similar. Job cells are small homogenous units and their characteristics derived from information on individuals are more accurate than these of firms. Moreover, when NMW increases are small, the higher variance in exposure at the job-cell level facilitates more precise estimations. We believe that using job cells allows us to compare employees who are in the same part of the wage distribution, and who have similar individual characteristics, but who differ in exposure to NMW increases. Therefore, we estimate the true effects of NMW increases whilst the firm-level analysis also includes the effects on employees who are paid well above the minimum wage. Third, we contribute to the literature on the effects of NMW increases in the Czech Republic. There have been only a few papers studying the effects of minimum wage changes in the Czech Republic (Eriksson and Pytlikova 2004; Fialová and Mysíková 2009; Duspivová et al. 2013).

[11] Approximately only 3% of employees were affected by the 2013 NMW increase in the Czech Republic. For more details see Table 8.

Eriksson and Pytlikova (2004) study relatively large increases - varying from 11.1% to 35.8% - in the minimum wage in the Czech Republic during 1999-2002. Using Czech Structure of Earnings Survey (SES) data, they estimate the effects of NMW increases on wages and employment of low-paid employees at the firm level. They follow the approach used in Card (1992) and construct two variables which measure exposure to NMW increases. Their findings suggest that legislative changes had a positive effect on wages, and there was a small negative effect on employment in some specifications, especially for small firms.

This paper proceeds as follows. Section 2 presents the institutional context. Section 3 describes the data. Section 4 presents our units of interest - job cells. Section 5 shows the methods we apply. Section 6 presents the employment analysis. Section 7 presents wage effects. Section 8 shows the bunching-based estimates. Section 9 concludes.

2 Institutional Context

The existence of a minimum wage is anchored in the Czech Labor Code. The minimum wage has been changed 20 times during the last 25 years (Ministry of Labour and Social Affairs, 2018). The majority of the changes occurred during 1998-2007, when the minimum wage more than tripled to 320 Euro - 8,000 Czech crowns per month. This level remained stable until 2013. Since then, the minimum wage has been adjusted every year except in 2014. The percentage increases with monthly minimum wage levels in brackets are 6.25% (340 EUR - 8,500 CZK); 8.2% (368 EUR - 9,200 CZK); 7.6% (396 EUR - 9,900 CZK); 11.1% (440 EUR -11,000 CZK) in August 2013; January 2015;

January 2016; January 2017 respectively.

Graph 2 shows the evolution of the monthly minimum wage in the Czech Republic together with minimum wage to average wage and median wage ratios. Red bars indicate the timing of minimum wage changes. The minimum wage to average wage ratio varies from approximately 0.3 to 0.42 during the observed period; the rates are similar to those in neighboring countries in the region (OECD, 2018).

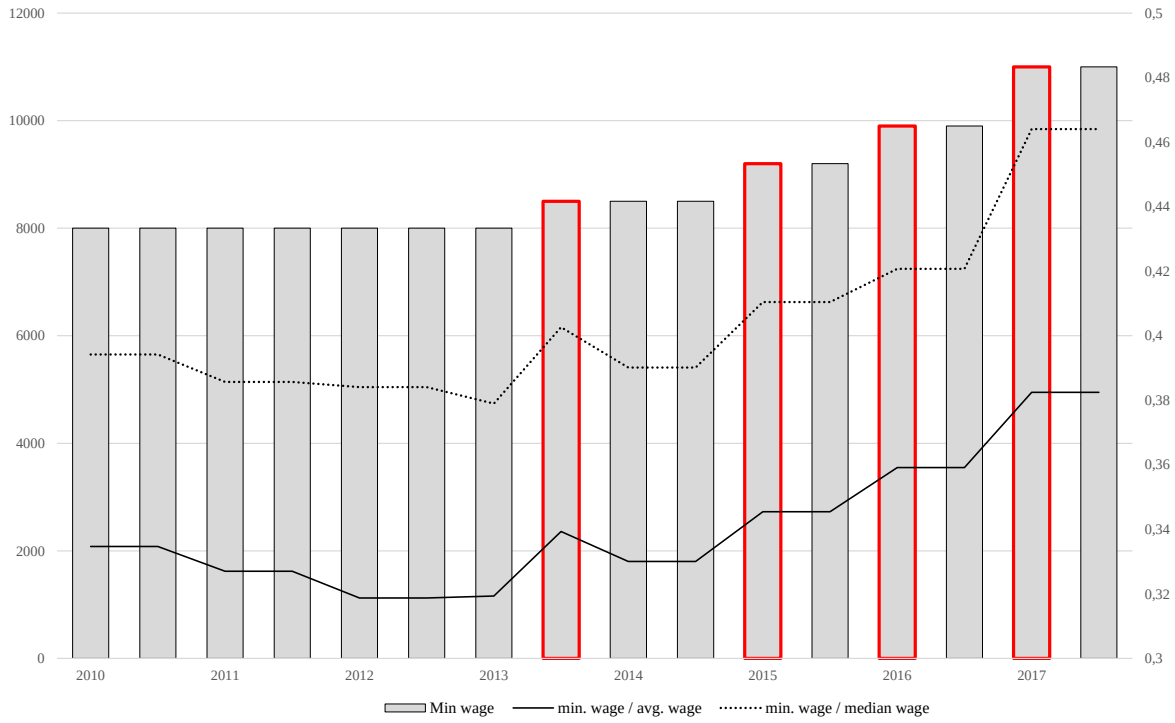


Figure 2: Minimum wage evolution

The Czech Republic is a central European post-communist country with economic activities distributed unequally across regions. The diversity results in the minimum wage setting being most effective in certain industry, occupation, or regional-specific clusters. The simple (unweighted) average wage in NUTS-4 regions in the Czech Republic is 1,150 EUR (28,761 CZK) with a standard deviation of 113.3 (2,833); the average

industry wage (according to 19 CZ-NACE groups) is 1,114 EUR (27,857 CZK) with a standard deviation of 359.8 (8,919); the average wage of CZ-ISCO major groups is 1,041 EUR (26,027 CZK) with a standard deviation of 340 (8,492) (The Czech Statistical Office, 2017). The lowest wages are traditionally in accommodation and food service, and administrative and support service industries. Occupations with the lowest wages in the Czech Republic are mainly elementary occupations, and service and sales workers with an average monthly wage of 619 EUR (15,466 CZK) and 670 EUR (16,755 CZK) respectively in 2016. According to the Ministry of Labor and Social affairs (2018), the average unemployment rate across 77 NUTS4 counties was 3.8% with a standard deviation of 1.45 at the end of 2017.

3 Data

We use information on private-sector employees from the Czech Structure of Earnings Survey for 2012-2017. The data include an unbalanced panel of firms with repeated cross-section observations of all workers employed by each firm. We work with annual data, i.e. we use aggregated data that were reported in each quarter of the year. We use data for 2012 and 2014 to analyze the first increase in NMW, as it happened in the middle of 2013. For the rest of the increases, which occurred in January of each year, we use data on the two years around each NMW increase. Firm-level data provide information about firms´ location (NUTS4 classification), a 4-digit NACE industry code, and the presence of a collective agreement. Data on employees include gender, age, place of work (NUTS4), hours worked, salary, 4-digit ISCO occupation, education, and tenure in the job. The number of observations in the annual surveys vary from 1.23 to 1.31 million per year during the period studied. After dropping observations

with missing values and keeping only full-time workers, we are left with approximately 95% of the original data in each year.

4 Job Cells

Our main units of interest are firm-occupation-county-specific job cells. Job cells are groups of employees with similar skills and wages, and we argue that they are more homogenous than firms in terms of employment dynamics. There are 3,655 firms and 51,977 job cells in our data in 2012. The higher number of job-cell observations allows us to zoom in on the bottom segment of the job-cell wage distribution, where low-paid workers are sorted. Assuming that employment changes of high-paid and low-paid employees differ, focusing only on low-paid job cells brings us closer to satisfying the identifying assumption of the same employment evolution in organizational units which are and are not affected by the NMW increase.

We generate job-cell characteristics from individual characteristics of employees who belong to the same job cell. Most importantly, we create log(cell wage) as the mean of individual log(monthly wages) and log cell employment for each year. Similarly, we generate shares of females, Czech nationals, average age, tenure in the job, and their squared counterparts.

5 Methods

Unlike in US-based research, we cannot apply region-based difference-in-differences identification strategies. Therefore, we use the treatment-intensity estimator applied in, e.g., Machin et al. (2003). This approach compares organizational units with different

treatment exposures to a NMW increase, to estimate the causal effects of NMW increases on changes in employment and wages. The underlying identification assumption is that affected and non-affected firms / job cells would follow the same employment evolution in the absence of NMW increases.[12] The treatment exposure is typically measured by the share of employees who are paid below the NMW level set for the next year. Below, we define two measures representing the exposure to NMW changes, which we subsequently use in regressions in which changes in wages and employment are on the LHS and the exposure measures are on the RHS of our regression equations. This approach allows us to identify what parts of changes in employment and wages are induced by increases in the NMW.

We define an indicator for a worker i who is paid in period t below a new NMW level set in period *t+1*:

$$affected_{i,t} = \begin{cases} 1 & \text{if NMW}_{t+1} > \text{monthly wage}_{i,t} \\ 0 & \text{otherwise} \end{cases}$$

We follow by considering a simple share of workers paid below a new NMW level (extensive margin) and call it the *Share*,

$$Share_{j,c,o,t} = \frac{\sum_i affected_{i,j,c,o,t}}{N_{j,c,o,t}} \tag{1}$$

where a subscript j states for firms, c county, o occupation and N is the total number of workers within a specific firm / job cell. The share measure equals the share

[12]It is not possible to test this assumption directly. However, we test for different employment evolution for firms / job cells which were / were not affected by the NMW increase in 2013 during 2011-2012, and find that employment trends were the same for firms with different exposure to the 2013 NMW increase. Results are available upon request.

of workers below the new NMW and captures the extent to which a firm / job cell is exposed to an upcoming change in the NMW. However, the Share measure does not inform us how intense the effects would be. Therefore, we construct another variable called *Gap* which measures the size of this exposure (intensive margin) on the firm / job-cell level. [13] This measure also reflects the size of job cells, being larger for job cells with more workers provided that the values of the Share variable are similar.

$$Gap_{j,c,o,t} = \frac{\sum_i max(w_{t+1}^{min} - w_{ij}, 0)}{\sum_i w_{ij}} \tag{2}$$

Where the w_{t+1}^{min} variable is a NMW level expressed in terms of monthly wage and the w_{ij} variable is average monthly wage computed as the total money paid to a worker during the period observed, divided by the number of months an employee worked. See the Appendix for more details about the construction of the monthly wage. The Gap variable measures the proportion of employers' wage bills that must be increased so that all workers are paid at least a NMW level set in next period.

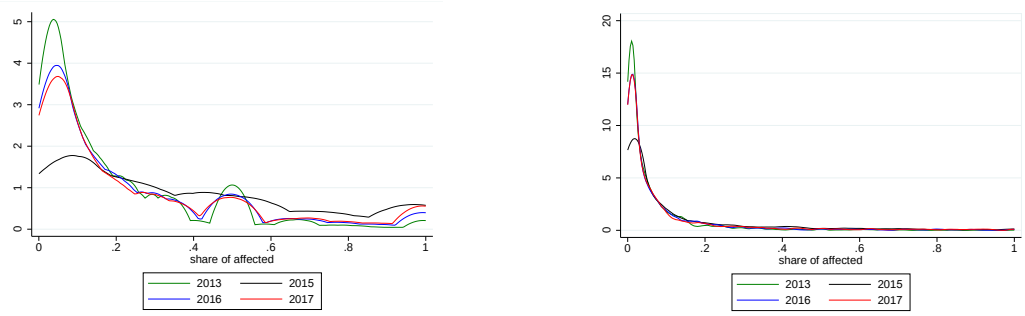
More than 21,000 employees are directly affected by the 2013 NMW increase in our dataset in 2012, corresponding to less than 2% of employees (unweighted). These workers must either be paid an increased wage or be laid off. The share of employees affected by the subsequent increase was 0.85%. The share was growing since then, accounting for 2.09% in 2015, and 2.37% in 2016. Mean distances between the monthly wages of affected workers and the new NMW level in the next period vary around 23-36 EUR (580-890 CZK) across the NMW increases. Detailed summary statistics at the individual level can be found in the Appendix, Table 3.

[13] There are several options to measure the intensity, however, we stick to this widely used measure from the literature, e.g. in Machin et al. (2003).

Our data show that affected employees are concentrated in specific occupations and industries. Table 5 in the Appendix summarizes shares of employees who were affected by NMW increases for each specific ISCO group and year. The groups that experienced the highest shares are *Elementary Occupations* and *Service and Sales Workers*. Focusing on specific industries, the highest shares of affected employees are in the *Hotel and Food Services* and *Real Estate* industries. Detailed statistics can be found in Table 6 in the Appendix.

We also compare characteristics of the job cells that were / were not affected. We call a job cell (firm) "affected" if at least one employee is paid below the NMW level effective in the next period. Affected jobs cells are larger: the average size of the affected job cells is 66 employees vs. only 18 employees for unaffected job cells in 2012. The affected job cells include significantly higher shares of females, slightly older employees in some of the years studied, a lower share of Czech nationals, and less time in the job. The affected job cells have a significantly lower number of hours worked compared to those which were not affected. Not surprisingly, the affected job cells contain more people with primary and vocational education. Overall summary statistics at the job-cell level are presented in the Appendix, Table 7. Firm level characteristics show similar patterns to the job-cell level; detailed summary statistics can be found in the Appendix, Table 8.

Figures 3a and 3b show distributions of the Share variable for all affected job cells and firms. Each color represents the distribution for a particular NMW increase. The Share measure has a higher variation in the case of job cells; the standard deviations across studied years vary in the range of 0.21-0.32 and 0.11-0.19 in the case of job cells and firms, respectively). The Gap variable is distributed similarly to the Share measure.



(a) Job-cell level (low-wage job cells)

(b) Firm level (all firms)

Figure 3: Kernel density of the Share measure: Firm vs. Job-cell levels

6 Employment Effects

To estimate the effects of the NMW increases on employment, we estimate Equation 3

$$\Delta log(employment)_{j,c,o,t} = \alpha_1 + \beta_1 * Share_{j,c,o,t-1} + \beta_2 * Gap_{j,c,o,t-1} + \delta_1 * X_{j,c,o,t-1} + \psi_{j,c,o,t} \quad (3)$$

where the dependent variable is the change in log(firm / job-cell employment). Our coefficients of interest are β_1, β_2 (estimated separately), X are control variables and ψ are firm an county two-way cluster-robust errors. We use the Share and Gap variables to measure the NMW exposure. We also weight Eq. 3 by the number of employees in firms / job cells. The Share coefficient (β_1) states the average (dis)employment effect for a firm / job cell, where all employees are affected (i.e. paid below the NMW level effective in the next period); the comparison groups are firms / job cells where no employee is affected.[14] Similarly, the Gap coefficient (β_2) states what would be the average (dis)employment effect if employers would have to double their wage bills as a

[14]There is no firm and only a small number job-cells that contain exclusively employees who are affected by a NMW increase. For example, among the affected units in 2012, the average share of affected employees was 19% for job cells and 6% for firms (see Tables 7 and 8 in Appendix). However, we stick to this interpretation to make our results comparable with previous research.

consequence of a NMW increase.

We use only firms and job cells that exist in both periods for the most part of our analysis, i.e. we do not include any newly created and destroyed units.[15] We analyze job cells from the first quartile of the job-cell wage distribution as these units are most likely to be affected by a NMW increase, and they are in terms of their characteristics / covariates. Table 1 summarizes the estimated employment effects. Rows represent different econometric specifications. Columns show estimates for three different exposure measures associated with each of the four studied NMW increases. We focus on the estimated Share coefficients in our interpretation below. In cases where the Gap and the weighted Share estimates are statistically different from zero, the estimated effects have the same signs as the Share estimates. The size of the estimates is similar to our Share estimates in our job-cells specifications.

We first carry out analysis on the firm level as this is usually the level used in the literature. Our results are presented on the first line of Table 1. The firm-level results suggest that there is a negative effect on employment associated with the NMW increase in 2013 and there are small positive effects on employment in 2015 and 2016. The estimated negative coefficient amounts to almost 25% (employment elasticity[16] with respect to minimum wage is -0.154).[17] One explanation for such a large effect can be that employers expected future increases in minimum wage levels and, thus, adjusted their decisions about employment accordingly. Another possible explanation is that the

[15]We perform a robustness check by putting 0 for destroyed and created job cells to account for possible employment effects, which are not captured in our estimates.

[16]We compute employment elasticity with respect to minimum wage as: (%Δ employment due to the NMW increase (i.e., β_1 from Eq. 3) / % increase in the NMW (computed as the increase in the NMW relative to median wage in the economy))*(share of directly affected employees in our data).

[17]Importantly, this effect is driven by small firms, for detailed results see Table 9.

Czech Republic was still experiencing the end of the Great Recession in 2013 and this was a different economic situation compared to subsequent years when the NMW was increased during the economic boom (The World Bank Group, 2019). To address a possible effect of the economic cycle, we test whether firm-level employment and wages are more procyclical in firms with a higher share of low-paid employees.[18] We do not find that firms with a higher share of low-paid workers have different employment patterns during economic booms and busts.[19] The full set of results can be found in Tables 18 and 17 in the Appendix. It is also possible that more exposed firms were affected more severely by a 2013-specific negative labor demand shock.[20] Finally, it is possible that the firm-level estimates capture also the employment trends of high-wage employees. To address this concern, we estimate the firm-level equation using only employees who belong to the first quartile of job-cell wage distribution, i.e. the low-wage employees. The results are presented in Table 15. We do not find that the NMW increases caused decreases in employment in this specification. Our findings indicate that studies estimating the employment effects of NMW increases on the level of firms should consider to zoom in on employment trends of low-wage employees. Results based on our preferred units of interest - job cells - present a different picture. Our estimates suggest that there were no or only small negative employment effects. Although we are not able to test the identifying assumption of equal employment trends in the absence of NMW

[18]We use the Czech SES semiannual data during 2007-2012, i.e. for these years when the NMW was not raised. We construct a panel of firms and we estimate regression equations where the dependent variables are firm-level percentage changes in wages and employment. Our independent variables are shares of low-paid workers - measured as a share of workers whose wages belong to the 1st decile, 1st quartile, or bottom half of the wage distribution. We approximate the economic performance by the industry-specific growth rate in production that is based on OECD (2019) STAN data. We use standard controls and include firm fixed-effects.

[19]We have also found that firm-level wages are procyclical, the percentage growth is faster in firms with higher share of low-paid employees the interaction of a share of low-paid and the economic growth is associated with negative effects on wage growth.

[20]To account for this issue, we run regression equations with firm fixed-effects on the job-cell level.

increases directly, we aim to get as close as possible to satisfying this assumption by considering only job cells from from the 1st quartile of the job-cell wage distribution. Table 1 shows that there were negative effects on employment only in 2013 and these were almost negligible. The employment effects in 2013 are comparable for various specifications, they amount to -10.6% in our baseline specification and -13.1% in the specification with firm fixed-effects; the associated employment elasticities with respect to the minimum wage are -0.066 and -0.081, respectively. These effects are small and comparable to previous findings (e.g., Harasztosi and Lindner, 2015, found employment elasticities around -0.035). We did not find consistent statistically significant employment effects in other years than in 2013. Connecting job cells across all years, we are able to estimate the employment effects of the NMW increases controlling for job-cell fixed-effects. Table 12 present these estimates. We find a small negative effect on employment which amounts to -5.72% with this specification.

Figure 4 presents the Share estimates for different specifications (first three rows in Table 1) together with 95% confidence intervals. The horizontal axis indicates the year of a NMW increase and the vertical axis shows the size of our coefficient estimates. As recent research argues (Brewer et al., 2019), relevant public policy recommendations should consider not only a failure to reject the null hypothesis but also the range of the estimated effects on employment. Figure 4 shows that the firm-level estimates are less precise compared to the job-cell level counterparts. The point estimates in absolute value are usually higher in the case of firms, however, they are not statistically different from the job-cell level estimates. Our job-cell level estimates are consistent and economically small.

The employment effects of minimum wage increases are probably the most often

Figure 4: Estimates comparison - the Share measure

studied ones, however, there are other effects of interest closely related to minimum wage increases.

Specific occupations - Some low-skilled occupations are more likely to be affected by minimum wage increases. Instead of focusing on one specific occupation, we select five occupations with the highest mean values of the Share exposure measure in each year.[21] The most affected occupations belong mainly to groups 5 and 9 (*Elementary Occupations*, *Service and Sales Workers*). Our results do not show any negative employment effects during the studied years (Table 1, line "5 most affected occupations").

Specific industries - We focus on job cells in specific industries, which are likely to be affected by the NMW increases. We are interested in the response of hotel and food serving industry to the rise of the NMW.[22] Surprisingly, we find no statistically significant decrease in employment associated with any of the studied years. The estimates can be found in Table 1, line "Accommodation and food services". We also estimate the employment effects using job cells from the manufacturing industry sep-

[21] We use two digit ISCO classification in this case. Table 5 presents shares of affected employees on one digit ISCO level.

[22] There is anecdotal evidence that some employees are officially paid exactly the minimum wage level and they get the rest of their pay off the books.

arately. This is the largest industry accounting for almost 40% of salaried employees in the Czech Republic. The results presented in Table 1, line "Manufacturing" do not show any disemployment effects except for the 2013 increase. Our estimate, in terms of size, is similar to the firm-level estimate in the same year -27% (employment elasticity with respect to minimum wage is -0.106). Similarly to the employment effects associated with the NMW increase in 2013 on the firm level, these results are driven by small units (see Table 10).

Destroyed / created job cells[23] - Considering only job cells that are observable in both periods surrounding the NMW increases in our analysis may neglect systematic closure and / or creation of job cells. Therefore, we carry out a robustness exercise, where we put 0 for employment when a job cell is missing in our data. The results can be found on the line "0 if missing" in Table 1. The results indicate that there are negative employment effects mainly associated with the NMW increases in 2013, 2015, and 2016.[24] Nevertheless, similarly to our baseline specification, these estimates are rather small.

110 pcnt. of NMW levels - To account for possible spillovers, we arbitrarily set the NMW levels to 110 percent of their original levels and estimate the employment regressions. We do not find evidence that the NMW increases affected employment of workers paid above the new NMW levels.

Hours worked - One may be worried that the employers do not lay off their employees but instead, they reduce their working hours. To address this issue, we estimate equations with changes in log hours worked as the dependent variable. The

[23]By construction, we are not able to determine the exposure to a NMW increase for job cells missing in the period before a NMW increase as we do not observe wages of employees working in these job cells.

[24]The size of the negative effect associated with the 2013 increase is comparable to our firm-level estimate in the same year.

estimates in a row "LHS: Hours worked" in Table 1 show that we do not see such behavior in our data.

Turnover - It is possible that employers replace employees paid below new NMW levels by new workers who are paid higher wages. In this case, the employment level could remain the same and the job cell would show a growth in the average cell wage. To explore this issue, we run regressions with turnover as the dependent variable. The results are presented in the Table 1. We do not find any systematic evidence that employers substitute workers more in job cells where they are paid below the NMW levels.

Skill substitution -It can also happen that employers forced to increase wages, do a substitution in skills to mitigate their costs, i.e. a situation when they replace low-skilled employees by employees with better skills. To inspect this scenario, we run a set of regressions with average education as the dependent variable (the education category variable varies from 1 to 6 according to the highest education attained). We do not have any indication that this is the case.

Gender composition - We ask whether employers change a gender composition of job cells as a result of the NMW increases. We run regressions with a percentage change in the share of females in job cells as the dependent variable. We do not find that females are systematically replaced by male workers or *vice versa*. The only significant results associated with the NMW increases in 2015 and 2016 are economically small.

Job-cell fixed-effects - To inspect job-cell-specific effects, we create a panel of job cells during 2012-2017 and estimate a regression equation with job-cell fixed-effects. Results can be found in Table 12. We see a small negative employment effect which amounts to 5.7%. The size of the estimate is in line with our job-cells results. We also observe a positive effect on wage growth which amounts to 10.5%.

Unemployment - To address the concern that employment effects in regions with high unemployment rates can be different to those in regions with low unemployment, we control for county-specific unemployment rates and we interact our exposure measures with unemployment rates. We only find evidence that the levels of unemployment are important controls in 2015. Specifically, counties with higher unemployment rates exhibited a higher increase in job-cell employment compared to counties with low unemployment rates. This might suggest that supply of workers in regions with low unemployment was already depleted due to the economic boom and firms had the only opportunity to hire people in counties with high unemployment. Detailed results can be found in Table 11 in the Appendix.

One big increase in the NMW - The studied NMW increases in the CR are rather small. To simulate a hypothetical situation when a minimum wage level is increased significantly, we combine job-cell data from 2012 and 2017[25], recode our exposure measures, and evaluate one big increases in NMW. We do not find that this artificial increase in NMW had any effects on employment of low-paid employees (see Table 13 for detailed results).

Finally, we would like to stress that we are aware of some aspects that we are not able to control. One of these is a wage-benefits substitution. It can happen, that some employers reduce employees' benefits so they can afford to increase their wages. Another potential issue can be that employers change contracts for their employees and hire them as self-employed contractors. This would show as a disemployment effect in our data, although these workers may not loose most of their income.

[25]We use only data on job cells which we observe in both periods, i.e. only job cells that survived all the studied increases are included.

Table 1: Employment effects

	Δ log Employment 2012-14			Δ log Employment 2014-15			Δ log Employment 2015-16			Δ log Employment 2016-17		
	Share	Gap	Share (wght)	Share	Gap	Share (wght)	Share	Gap	Share (wght)	Share	Gap	Share (wght)
Firm level	-0.248**	0.0436	-0.232*	0.157**	2.330*	0.114	0.155**	2.817**	-0.0282	-0.0173	0.578	0.112
R2 adj. (n.obs.: 2206; 2182; 2218; 2218)	0.082	0.074	0.188	0.031	0.031	0.204	0.024	0.022	0.274	0.05	0.05	0.191
Job-cell level	-0.106*	-0.229	0.0332	0.029	0.651	0.0494	-0.00498	-0.0288	-0.0999*	-0.0379	-0.375	-0.116
R2 adj. (n.obs.: 6961; 6879; 6902; 7350)	0.034	0.034	0.292	0.021	0.023	0.224	0.012	0.012	0.148	0.03	0.03	0.149
Job-cell level (Firm FE)	-0.131*	-0.481*	-0.0507	-0.0512	0.269	0.0379	-0.0209	-0.0719	0.0112	-0.0397	-0.397	-0.1
R2 adj. (n.obs.: 6961; 6879; 6902; 7350)	0.238	0.237	0.799	0.17	0.17	0.698	0.075	0.075	0.298	0.145	0.146	0.581
5 most affected occupations	-0.044	0.151	0.073	0.0408	2.366***	0.0241	0.0023	0.136	-0.0946	-0.0403	-1.33	-0.0551
R2 adj. (n.obs.: 1940; 1921; 1925; 1950)	0.029	0.029	0.468	0.035	0.055	0.232	0.009	0.009	0.15	0.011	0.019	0.174
Accommodation and food service	-0.534	-9.255	-3.294*	0.0966	1.226	0.498*	-0.0494	-2.613	-0.045	-0.0807	-2.292*	0.0195
R2 adj. (n.obs.: 311; 311; 311; 311)	0.115	0.107	0.824	0.071	0.069	0.242	-0.076	-0.074	0.008	0.211	0.217	0.4
Manufacturing	-0.269***	-1.252***	-0.112	0.355	2.028***	0.604**	0.0256	0.223	0.12	-0.00521	-0.198	0.0444
R2 adj. (n.obs.: 10819; 10819; 10819; 10819)	0.039	0.038	0.212	0.032	0.034	0.186	0.029	0.029	0.115	0.027	0.027	0.083
0 if missing	-0.288***	-0.379*	-0.109	-0.0813*	-0.121	0.00931	-0.176***	0.141	-0.572**	-0.0126	-0.0916	-0.0797
R2 adj. (n.obs.: 14041; 14598; 14747; 12986)	0.069	0.068	0.144	0.035	0.035	0.112	0.085	0.084	0.184	0.016	0.016	0.119
110 pct of MW	-0.0363	0.023	-0.0178	0.0002	0.363	0.0301	-0.015	-0.0323	-0.0976**	-0.0357*	-0.232	-0.0577
R2 adj. (n.obs.: 6961; 6879; 6902; 7350)	0.034	0.034	0.292	0.021	0.022	0.224	0.012	0.012	0.149	0.03	0.03	0.147
LHS: Hours worked	-0.0288	-0.0131	0.106	0.0421	0.925*	0.0407	0.0118	-0.175	-0.0631	-0.0153	-0.223	-0.138
R2 adj. (n.obs.: 6961; 6879; 6902; 7350)	0.045	0.045	0.266	0.025	0.028	0.213	0.019	0.019	0.144	0.024	0.025	0.122
LHS: Turnover	0.141	-0.1	-0.0405	-0.146	-1.697	-0.0947	-0.15	-0.394	0.0499	0.0431	0.0614	0.0772
R2 adj. (n.obs.: 6961; 6879; 6902; 7350)	0	0	0.055	-0.005	-0.005	-0.005	0.002	0.001	0.047	0.05	0.05	0.136
LHS: Δ Education	0.0162	0.229	-0.0222	-0.0166	-0.0352	-0.0321**	0.00629	-0.0292	-0.0134	-0.0265*	-0.358*	-0.0133
R2 adj. (n.obs.: 6862; 6775; 6806; 7282)	0.121	0.121	0.166	0.065	0.065	0.093	0.073	0.073	0.073	0.055	0.055	0.052
LHS: Δ Gender composition	0.002	0.118	0.0162	-0.016	0.0125	-0.0155*	0.0131*	0.0345	-0.0002	0.002	0.126	0.0284
R2 adj. (n.obs.: 6961; 6879; 6902; 7350)	0.007	0.007	0.162	0.01	0.01	0.087	-0.002	-0.002	0.034	0.002	0.003	0.059

Note: The table reports the employment effects of NMW increases for 2013-2017. Columns state the estimated β coefficients from Eq. 3 related to each NMW increase i.e., the estimated coefficients associated with the Share and Gap measures, and the Share measure where linear regressions are weighted by the number of employees within cells or firms. Rows represent different specifications. Controls included: age, length of employment, gender, share of Czech employees, educ. cat, firm size cat., county, industry, occupation (industry substituted by firm in Firm FE regressions). Observations - Job cell level: 1st quartile (except "5 most affected occupations", "Manufacturing", "Accommodation and food service" reg. where are all JCs are used) ; Firm level: all firms.
Share (wght) - Coefficient from a regression weighted by the number of employees within units.
P-values ***0.01, **0.05, *0.1.

7 Wage Effects

The next step of our analysis is to inspect how the 2013-2017 NMW increases affected wages of low-paid workers. Figures 1a, 1b, 1c, 1d show visible bunching around new NMW levels, indicating that the NMW increases were binding and, thus, they should have a positive effect on wages of low-paid employees. Similarly to the employment effects, we estimate the wage effects of the NMW increases by Equation 4

$$\Delta log(cellwage)_{j,c,o,t} = \alpha_2 + \beta_3 * Share_{j,c,o,t-1} + \beta_4 * Gap_{j,c,o,t-1} + \delta_2 * X_{j,c,o,t-1} + \epsilon_{j,c,o,t} \quad (4)$$

where the dependent variable is a percentage growth in wages, our coefficients of interest are β and the regression equations include controls for age, tenure in the job, gender, share of Czech employees, educ. cat, firm size category, county, industry, occupation. Table 2 summarizes the results. Columns represent different exposure measures (the Share, the Gap, and the Share weighted by the number of workers employed within units) for each of the studied NMW increases. Rows represent various levels of our analysis and econometric specifications. The exposure measures capture wage growth better on the job-cell level, being comparable for all presented specifications. Our baseline results suggest that NMW increases caused a raise in wages of directly affected employees by 8%, 9.4%, 2.8%, and 5.5% in 2013, 2015, 2016, and 2017 respectively. Similarly to the interpretation of the employment effects, these are the effects for job cells where all employees are affected and their wages are increased, i.e. none of them is laid off. The growth in wages caused by the NMW increase is slightly smaller when firm fixed effects are included. The highest estimated coefficients across all specifications are associated with the NMW increase in 2015. Table 16 in Appendix shows the job-cell level β_3 estimates for different parts of the wage distribution in each year. A comparison

between years shows that the estimates are the highest in 2014 and the lowest in 2015.

Furthermore, we estimate the wage effects on a subsample of 5 most affected occupations. The estimates have a comparable size to our baseline specification based on all job cells from the 1st quartile of the job-cell wage distribution.

We also present estimates for *Accomodation and food services* and *Manufacturing* industries. There is anecdotal evidence that employees in restaurants are paid only the minimum wage and the rest of their salary is paid off the books. Accepting the rumor to be true, we would observe a significant increase in wages and no negative effects on employment. However, we do not find this pattern in our data. This may be because the Czech SES contains mostly firms with a higher number of employees where this kind of behavior is not practiced.

Table 2: Wage effects

	Δ log Wage 2012-14			Δ log Wage 2014-15			Δ log Wage 2015-16			Δ log Wage 2016-17		
	Share	Gap	Share (wght)	Share	Gap	Share (wght)	Share	Gap	Share (wght)	Share	Gap	Share (wght)
Firm level	0.0299	-0.206***	0.000721	0.0375	0.634	0.0465**	0.0199	0.654***	0.0101	0.0496**	0.736**	0.0398
R2 adj. (n.obs.: 2206; 2182; 2218; 2218)	0.128	0.131	0.236	0.019	0.02	0.204	0.078	0.079	0.251	0.107	0.107	0.207
Job-cell level	0.0804***	0.306**	0.0583	0.0937***	0.516	0.0457**	0.0275***	0.13	0.00506	0.0545***	0.467**	0.0870***
R2 adj. (n.obs.: 6961; 6879; 6902; 7350)	0.087	0.082	0.305	0.099	0.102	0.143	0.092	0.091	0.209	0.12	0.119	0.174
Job-cell level (Firm FE)	0.0603**	0.228*	0.062	0.0753***	0.347	0.0684	0.0403***	0.0986	0.0330***	0.0510***	0.399*	0.0906***
R2 adj. (n.obs.: 6961; 6879; 6902; 7350)	0.318	0.316	0.759	0.393	0.393	0.572	0.334	0.331	0.598	0.374	0.375	0.584
5 most affected occupations	0.0447*	0.621***	0.0812*	0.0779***	1.160***	0.0319***	0.0431***	0.473**	0.0195**	0.0458***	0.812***	0.0737***
R2 adj. (n.obs.: 1940; 1921; 1925; 1950)	0.076	0.08	0.569	0.088	0.13	0.253	0.124	0.123	0.239	0.133	0.155	0.242
Accommodation and food service	0.116	-1.388	0.691*	0.103*	2.154	0.190**	-0.0249	-0.0617	-0.0236	0.00417	0.896	0.0144
R2 adj. (n.obs.: 311; 311; 311; 311)	-0.043	-0.049	0.804	-0.012	-0.024	0.132	0.013	0.012	0.031	0.187	0.196	0.234

Note: The table reports the wage effects of NMW increases for 2013-2017. Columns state the estimated β coefficients from Eq. 3 related to each NMW increase i.e., the estimated coefficients associated with the Share and Gap measures, and the Share measure where linear regressions are weighted by the number of employees within cells or firms. Rows represent different specifications. Controls included: age, length of job, gender, share of Czech employees, educ. cat, firm size cat., county, industry, occupation (industry substituted by firm in Firm FE regressions). Observations - Job cell level: 1st quartile (except "5 most affected occupations", "Manufacturing", "Accommodation and food service" reg. where are all JCs are used) ; Firm level: all firms.
Share (wght) - Coefficient from a regression weighted by the number of employees within units.
P-values ***0.01, **0.05, *0.1.

8 Bunching

The third step our analysis is to apply the bunching estimator, which represents a common tool applied in the economic literature estimating the effects of minimum wage changes (e.g. Meyer and Wise, 1983, Harasztosi and Lindner, 2015, or Cengiz et al., 2019).[26] This approach aims to shed light on employment changes of workers who are paid around a minimum wage threshold. The bunching estimator allows researchers to clarify how the number of "missing" jobs (compared to a counterfactual wage distribution) below a minimum wage threshold relates to the excess of jobs in a new wage distribution above the threshold. The identifying assumption behind the bunching estimator is that the wage distributions would be the same in absence of NMW increases. Usually, counterfactual wage distributions are based on wage distributions in periods prior to NMW changes or they are artificially created as, for example, in Friedman et al. (2011), who applied a polynomial fit to a current period distributions. Upper and lower bounds defining the region of interest are set arbitrarily.

Figures 1a, 1b, 1c, 1d show that the minimum wage changes in the Czech Republic were small and the bunching around the new NMW levels is moderate. We use a real wage distribution, where wages are discounted by the median growth in wages (with a base in 2013), as the rates of inflation were very low during 2012-2017 (varying in the range 0.3-3.3) and average wages grew much faster than inflation. We set the upper and lower bounds as + /- 100 EUR (2,500 CZK) around a new NMW level, i.e. we capture employment of everyone whose monthly wage is in a range of approximately 70 - 130 % of the NMW level in 2013. We use the same approach to choose bounds for the subsequent increases. This is in line with Harasztosi and Lindner (2015) who use

[26]For a review of the bunching literature see Kleven (2016).

20%, 35%, and 50% ranges of the new minimum wage.[27]

Analyzing the increase in 2013, we see that there is approximately 1,300 excess of jobs, which means that for every 100 jobs in our range there were 3 new jobs created. The size and direction of the effect related to the NMW increase in 2015 is almost identical. We observe an increase which amounts to approximately 1,300 jobs (for each 100 jobs there were 3 new created). In 2016 and 2017 there were very small decreases in employment, 1,260 and 1,440 jobs respectively, which means that for every 100 jobs there were destroyed 3 jobs associated with the increase in 2016 and 4 jobs associated with the increase in 2017. Our results are similar in magnitude to previous research. For example, Harasztosi and Lindner (2015) found that the NMW increase in Hungary in 2001 caused that 3 out of 100 workers lost their job.

Our bunching estimates are small (the highest unemployment estimate based on the bunching estimator is approximately three times smaller than the treatment-intensity estimate on the job-cell level in 2013) and they do not suggest that the studied NMW increases caused consistent disemployment effects.

9 Conclusion

This paper studies four recent increases in the NMW in the Czech Republic during 2013-2017. Constructing exposure measures similar to Machin et al. (2003), we inspect the effects of the NMW increases on employment and wages on the job-cell level. Compared to previous studies, which work with firm-level observations, we are able to study

[27]Harasztosi and Lindner (2015) do not use a lower bound because the NMW increase in Hungary amounts to approximately 60%, i.e. setting the lower bound symmetrically around the new NMW level would lead to leaving out some workers. However, the NMW increases in the Czech Republic are much smaller (they altogether amount to approximately 37%) and we set the lower bound to exclude potential outliers on the very bottom part of the wage distribution.

exposure more precisely for homogenous groups of workers.

Our findings suggest that the inspected NMW increases had positive effects on wage growth of low-paid workers; however, they have no or small negative effects on employment. In our preferred specification, the employment elasticities with respect to the minimum wage are varying between -0.0093 and 0.0017 which are rather small estimates compared to the existing literature. Our results are confirmed by several robustness tests.

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10 Appendix

Wage measure

Wage measures available in our dataset are based on the total money paid out to employees. However, for the purpose of minimum wage analysis, it is necessary to clean these wage measures and work with just the parts of wage that belong to the wage according to the minimum wage law[28]. The monthly wage available in the dataset is defined as

$$\text{monthly wage} = \frac{\text{money paid out since January } 1^{\text{st}}}{\text{number of months worked since January } 1^{\text{st}}} \tag{5}$$

We strictly follow the minimum wage legislation and we adjust the nominator according to the definition of wage in Government decree no. 89/2012 Sb. We also adjust number of months worked since January 1st so it does not include overtime hours. This definition is as close as possible to the definition in legislation.

[28]This wage measure does not include overtime pay, extra pay for hard work, etc. For more information please see Government decree no. 89/2012 Sb.

Tables

Table 3: Employees affected by NMW increases

year	Number of affected by MW in sample	Percent in sample	Fraction in firms with < 100 employees	Mean distance to the new MW level (in CZK)	Median distance to the new MW level (in CZK)
2012	21,659	1.77 %	0.52	890.5	420.9
				(1331.8)	
2014	10,560	0.85 %	0.54	583.2	427.6
				(649.2)	
2015	26,548	2.09 %	0.51	738.3	613.7
				(700.2)	
2016	30,507	2.37 %	0.56	890.1	785.0
				(744.7)	

* Standard deviations in parenthesis.

Note: The table reports descriptive statistics on employees who were / were not exposed to NMW increases in each year. The last two columns report the distances (among employees affected by the NMW increases) to the NMW level in the next period.

Table 4: Individual level characteristics - percentages of employees affected by NMW

	Category	2012	2014	2015	2016
Gender					
	Male	1.45	0.69	1.69	1.90
	Female	2.22	1.09	2.64	3.00
Age Group					
	<20	4.01	1.36	4.19	3.46
	21-30	1.91	0.61	1.97	2.22
	31-40	1.73	0.56	1.77	2.00
	41-50	1.56	0.87	1.89	2.17
	51-60	1.67	1.35	2.57	2.96
	>61	3.34	1.63	3.72	3.93
Education					
	Primary	2.84	2.98	4.77	5.42
	Apprenticeship	1.81	1.19	2.38	2.85
	Secondary	1.46	0.39	1.44	1.66
	College	1.52	0.12	1.24	1.41
	Post-graduate	1.69	0.06	1.25	1.14
Tenure in the job					
	<1 year	3.57	2.27	4.08	4.17
	1-5 years	2.25	1.26	2.95	3.32
	>5 years	1.16	0.36	1.18	1.40

Note: The table reports percentages of employees who were exposed to NMW increases in each year (by various characteristics).

Table 5: Occupations: percentages of affected employees in each occupational group and year

ISCO group	2012	2014	2015	2016
Managers	0.87	0.11	0.80	0.97
Professionals	1.35	0.02	1.11	1.34
Technicians and Associate Professionals	1.16	0.06	0.86	1.01
Clerical Support Workers	1.05	0.20	1.03	1.39
Services and Sales Workers	4.63	3.52	6.98	6.27
Skilled Agricultural, Forestry and Fishery Workers	3.01	0.48	2.12	2.38
Craft and Related Trades Workers	1.24	0.19	1.02	1.33
Plant and Machine Operators and Assemblers	1.40	0.43	1.28	1.66
Elementary Occupations	4.92	6.47	9.10	11.35

Note: The table reports percentages of workers affected by NMW increases in each year and occupational group (2 digit ISCO classification).

Table 6: Industry: percentages of affected employees in each industry group and year

NACE group	2012	2014	2015	2016
Aggr., Forest., Fish.	2.15	0.60	1.78	2.16
Mining and Metalurgy	1.13	0.16	0.50	0.80
Manufacturing	1.13	0.33	1.04	1.27
Utilities	0.45	0.40	0.71	0.84
Construction	1.18	0.24	1.70	1.57
Retail	2.10	0.51	2.90	2.30
Hotels, food serving	7.70	4.05	5.37	6.72
Transport	1.49	0.08	0.92	1.22
Banks, insurance	1.14	0.02	0.74	1.03
Real Estate, R&D	6.06	6.41	9.35	10.81
Public Admin, defense	0.39	0.00	1.22	0.64
Education	0.86	0.38	1.49	1.43
Health	1.72	1.94	3.36	5.15
Other Services	3.32	1.43	3.13	4.24
Communications	1.30	0.01	1.22	1.28

Note: The table reports percentages of employees affected by NMW increases in each year and industry (2 digit NACE classification).

Table 7: Job-cell characteristics

	2012		2014		2015		2016	
	Not affected	Affected	Not affected	Affected	Not affected	Affected	Not affected	Affected
Share	-	0.1870	-	0.3679	-	0.2302	-	0.2532
		(0.214)		(0.319)		(0.261)		(0.287)
Intensity measure	-	0.0078	-	0.0263	-	0.008	-	0.0126
		(0.103)		(0.129)		(0.035)		(0.041)
JC employement	18.3	66.4	22.08	45.2	18.6	64.4	18.5	64.6
	(59.7)	(174.7)	(76.7)	(125.3)	(62.7)	(166.6)	(57.2)	(183.5)
Net hrs worked	1655	1549	1642	1503	1619	1517	1619	1508
	(314)	(404)	(325)	(444)	(342)	(419)	(348)	(431)
Female	0.419	0.521	0.431	0.594	0.425	0.543	0.426	0.532
	(0.39)	(0.36)	(0.39)	(0.36)	(0.39)	(0.36)	(0.39)	(0.36)
Age	41.9	41.3	42	44.3	42.3	41.7	42.3	42.2
	(7.0)	(6.5)	(7.0)	(6.6)	(7.0)	(6.7)	(6.9)	(6.8)
Tenure in the job	9.3	7.4	9.5	5.7	9.7	7.0	9.5	7.1
	(6.8)	(5.5)	(6.7)	(5.9)	(6.8)	(5.1)	(6.7)	(5.71)
Primary educ.	0.043	0.082	0.041	0.180	0.040	0.095	0.040	0.098
	(0.12)	(0.15)	(0.11)	(0.23)	(0.11)	(0.17)	(0.11)	(0.17)
Apprenticeship educ.	0.311	0.360	0.301	0.513	0.295	0.376	0.287	0.369
	(0.34)	(0.32)	(0.33)	(0.30)	(0.33)	(0.32)	(0.33)	(0.32)
Secondary educ.	0.406	0.341	0.406	0.200	0.411	0.319	0.408	0.320
	(0.32)	(0.28)	(0.31)	(0.23)	(0.31)	(0.27)	(0.31)	(0.27)
Tertiary educ.	0.203	0.159	0.215	0.041	0.220	0.153	0.228	0.160
	(0.29)	(0.25)	(0.30)	(0.13)	(0.30)	(0.25)	(0.30)	(0.25)
Czech nationality	0.975	0.957	0.973	0.945	0.973	0.948	0.970	0.943
	(0.09)	(0.11)	(0.09)	(0.16)	(0.09)	(0.13)	(0.09)	(0.14)
N	46,867	5,110	51,491	1,559	47,715	5,507	47,391	6,011

* Standard deviations in parenthesis.

Note: The table reports characteristics of job cells that were / were not exposed to the NMW increases in each year. "Not affected" are the job cells in which all employees were paid above the NMW level effective in the next period. Similarly, "Affected" job cells contain at least one employee paid below the NMW level in the next period.

Table 8: Firm characteristics

	2012		2014		2015		2016	
	Not affected	Affected	Not affected	Affected	Not affected	Affected	Not affected	Affected
Share	-	0.0624	-	0.1154	-	0.0827	-	0.0920
		(0.112)		(0.189)		(0.152)		(0.170)
Intensity measure	-	0.0016	-	0.0059	-	0.0027	-	0.0039
		(0.034)		(0.015)		(0.011)		(0.015)
Firm employment	200.9	459.2	297.4	396.2	208.6	441.4	211.1	440.3
	(328.6)	(1335.2)	(840.9)	(1288.3)	(394.6)	(1262.4)	(358.5)	(1250)
Net hrs worked	1659	1605	1634	1582	1624	1575	1622	1586
	(332)	(367)	(344)	(410)	(358)	(394)	(355)	(392)
Female	0.374	0.444	0.401	0.506	0.386	0.456	0.391	0.455
	(0.25)	(0.26)	(0.25)	(0.27)	(0.26)	(0.25)	(0.25)	(0.26)
Age	41.2	41.2	41.2	42.6	41.7	41.5	41.9	41.5
	(4.6)	(4.7)	(4.8)	(4.7)	(4.7)	(4.7)	(4.8)	(4.6)
Tenure in the job	8.1	7.8	8.2	7.5	8.3	7.6	8.3	7.7
	(5.7)	(5.2)	(5.1)	(6.5)	(4.7)	(4.7)	(4.9)	(5.4)
Primary educ.	0.053	0.071	0.048	0.103	0.048	0.070	0.045	0.070
	(0.097)	(0.105)	(0.079)	(0.154)	(0.086)	(0.113)	(0.081)	(0.112)
Apprenticeship educ.	0.403	0.393	0.363	0.435	0.372	0.378	0.354	0.363
	(0.254)	(0.239)	(0.251)	(0.240)	(0.260)	(0.242)	(0.258)	(0.239)
Secondary educ.	0.340	0.328	0.353	0.303	0.349	0.333	0.351	0.334
	(0.179)	(0.166)	(0.178)	(0.179)	(0.184)	(0.172)	(0.182)	(0.175)
Tertiary educ.	0.162	0.156	0.193	0.108	0.194	0.167	0.202	0.180
	(0.191)	(0.182)	(0.209)	(0.134)	(0.213)	(0.189)	(0.219)	(0.201)
Czech nationality	0.967	0.956	0.958	0.945	0.963	0.945	0.957	0.940
	(0.075)	(0.094)	(0.088)	(0.148)	(0.083)	(0.118)	(0.092)	(0.121)
N	1,775	1,880	3,253	662	1,903	1,968	1,717	2,100

Standard deviations in parentheses.

Note: The table reports characteristics of firms that were / were not exposed to the NMW increases in each year. "Not affected" are firms in which all employees were paid above the NMW level effective in the next period. Similarly, "Affected" firms contain at least one employee paid below the NMW level in the next period.

Table 9: Employment effects of NMW increase: 2012-2014 data, firm level

	All firms			Firms with > 100 employees		
	Share	Gap	Weighted	Share	Gap	Weighted
Share	-0.248**		-0.241*	-0.189		-0.240*
	(0.113)		(0.126)	(0.136)		(0.134)
Gap		0.0427			0.0506	
		(0.107)			(0.103)	
Age	0.0191	0.0194	0.0653***	0.0567*	0.0570*	0.0742***
	(0.0283)	(0.0284)	(0.0250)	(0.0302)	(0.0303)	(0.0278)
Age sq.	-0.0287	-0.0298	-0.0855***	-0.0718**	-0.0731**	-0.0951***
	(0.0349)	(0.0350)	(0.0296)	(0.0354)	(0.0357)	(0.0330)
Tenure in the job	-0.00422	-0.00388	-0.0120**	-0.0180**	-0.0171**	-0.0205***
	(0.00257)	(0.00257)	(0.00576)	(0.00735)	(0.00732)	(0.00637)
Tenure sq.	0.000138***	0.000140***	0.000508**	0.000761**	0.000743**	0.000866***
	(0.0000308)	(0.0000305)	(0.000220)	(0.000316)	(0.000316)	(0.000242)
Female	0.00733	0.000303	0.0502	0.0397	0.0361	0.0494
	(0.0464)	(0.0454)	(0.0436)	(0.0589)	(0.0583)	(0.0470)
Czech	0.0304	0.0640	0.117	0.0961	0.126	0.129
	(0.129)	(0.131)	(0.108)	(0.116)	(0.121)	(0.113)
Constant	-0.193	-0.237	-1.153**	-1.170*	-1.195*	-1.391**
	(0.629)	(0.628)	(0.507)	(0.612)	(0.617)	(0.550)
Educ cat	Yes	Yes	Yes	Yes	Yes	Yes
Firm size	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
County	Yes	Yes	Yes	Yes	Yes	Yes
Occupation	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,206	2,206	2,206	1,605	1,605	1,605
Adjusted R^2	0.082	0.077	0.198	0.079	0.076	0.187

Standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.010

Note: The table reports the employment effects (Dep. var: Δ logEmpl) of the NMW increase in 2013 using firm-level data from 2012 and 2014. Columns represent different exposure measures. Columns (1)-(3) consider all firms, columns (4)-(6) consider only firms that include more than 100 employees.

Table 10: Employment effects of NMW increases: 2012-2014 data, all job cells from the Manufacturing industry

	All cells			Cells > 10		
	Share	Gap	Weighted	Share	Gap	Weighted
Share	-0.269***		-0.112	-0.212		-0.0631
	(0.103)		(0.163)	(0.179)		(0.180)
Gap		-1.252***			-0.942***	
		(0.128)			(0.166)	
Age	0.0269***	0.0270***	0.0749***	0.0573***	0.0578***	0.0976***
	(0.00757)	(0.00755)	(0.0213)	(0.0170)	(0.0169)	(0.0288)
Age sq.	-0.0326***	-0.0327***	-0.0977***	-0.0765***	-0.0771***	-0.129***
	(0.00875)	(0.00873)	(0.0259)	(0.0204)	(0.0203)	(0.0355)
Tenure in the job	-0.0144***	-0.0142***	-0.0140**	-0.0144***	-0.0141***	-0.0155**
	(0.00266)	(0.00266)	(0.00582)	(0.00523)	(0.00525)	(0.00749)
Tenure sq.	0.000446***	0.000443***	0.000704***	0.000611***	0.000603***	0.000848***
	(0.0000757)	(0.0000756)	(0.000194)	(0.000175)	(0.000175)	(0.000266)
Female	-0.0252	-0.0253	-0.138**	-0.0216	-0.0218	-0.137**
	(0.0184)	(0.0185)	(0.0574)	(0.0327)	(0.0326)	(0.0623)
Czech	-0.0340	-0.0312	-0.0521	0.161*	0.164*	-0.0343
	(0.0666)	(0.0668)	(0.143)	(0.0948)	(0.0946)	(0.161)
Constant	-0.543***	-0.550***	-2.180***	-1.815***	-1.826***	-3.213***
	(0.173)	(0.173)	(0.649)	(0.364)	(0.364)	(0.820)
Educ cat	Yes	Yes	Yes	Yes	Yes	Yes
Firm size	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
County	Yes	Yes	Yes	Yes	Yes	Yes
Occupation	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,819	10,819	10,819	5,438	5,438	5,438
Adjusted R^2	0.039	0.038	0.212	0.061	0.061	0.224

Standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.010.

Note: The table reports employment effects (Dep. var: Δ logEmpl) of the 2013 NMW increase estimated on the job cells that belong to the Manufacturing industry. We use data from 2012 and 2014. Columns represent different exposure measures. Columns (1)-(3) consider all job cells, columns (4)-(6) consider only job cells that include more than 10 employees.

Table 11: Employment effects - interactions with local unemployment rates

	All cells		Cells > 10	
	Share	Gap	Share	Gap
2012				
Share	-0.181		-0.558	
	(0.225)		(0.373)	
Shr*Unempl	0.00803		0.0456	
	(0.0218)		(0.0385)	
Gap		0.127		-1.846
		(1.691)		(2.694)
Gap * Unempl		-0.0391		0.217
		(0.180)		(0.287)
Unemployment	0.00311	0.00377	0.00580	0.00778
	(0.00898)	(0.00909)	(0.0128)	(0.0130)
2014				
Share	-0.0798		0.00313	
	(0.152)		(0.224)	
Shr*Unempl	0.0121		0.00743	
	(0.0143)		(0.0261)	
Gap		-0.505		5.281**
		(1.170)		(2.157)
Gap * Unempl		0.165		-0.479*
		(0.171)		(0.278)
Unemployment	-0.0000338	-0.0000157	-0.0103	-0.00668
	(0.00610)	(0.00590)	(0.0136)	(0.00744)
2015				
Share	-0.0519		-0.0490	
	(0.0876)		(0.122)	
Shr*Unempl	0.00620		0.00211	
	(0.0107)		(0.0151)	
Gap		-0.402		1.107
		(0.344)		(2.120)
Gap * Unempl		0.0642		-0.0491
		(0.0598)		(0.265)
Unemployment	0.0128***	0.0130***	0.0200***	0.0203***
	(0.00423)	(0.00419)	(0.00692)	(0.00683)
2016				
Share	-0.0290		-0.276**	
	(0.0644)		(0.122)	
Shr*Unempl	-0.00136		0.0212	
	(0.00881)		(0.0137)	
Gap		0.901		-5.264**
		(0.585)		(2.509)
Gap * Unempl		-0.253*		0.407*
		(0.154)		(0.233)
Unemployment	-0.000322	0.000557	-0.00168	-0.00157
	(0.00440)	(0.00430)	(0.00723)	(0.00717)
Controls	Yes	Yes	Yes	Yes

Standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.010.

Note: The table reports employment effects (Dep. var: Δ logEmpl) using the interactions of exposure measures and county-specific unemployment rates in each year, i.e., we ask whether the employment effect is stronger in counties experiencing high unemployment rates. Columns represent different exposure measures. Columns (1)-(2) consider all job cells from the 1st quartile of job-cell wage distribution, columns (3)-(4) consider only job cells from the 1st quartile that consist of more than 10 employees. Controls include age, age sq., tenure in the job, tenure sq., county, firm size, and shares of females, Czechs, workers with the highest education attained.

Table 12: Employment effects with job-cell fixed effects

	Δ logEmpl		Δ logWage	
	(1)	(2)	(1)	(2)
Share	-0.0572***		0.105***	
	(0.0194)		(0.00825)	
Gap		-0.471**		0.584***
		(0.228)		(0.0969)
Age	-0.0277***	-0.0276***	0.00000390	-0.000328
	(0.00487)	(0.00487)	(0.00167)	(0.00167)
Age sq.	0.0285***	0.0282***	0.00575***	0.00626***
	(0.00589)	(0.00589)	(0.00200)	(0.00201)
Tenure in the job	-0.0307***	-0.0307***	0.00627***	0.00635***
	(0.00206)	(0.00206)	(0.000747)	(0.000750)
Tenure sq.	0.000297***	0.000297***	-0.0000689***	-0.0000688***
	(0.0000237)	(0.0000237)	(0.0000144)	(0.0000142)
Female	0.0635*	0.0640*	-0.0738***	-0.0743***
	(0.0375)	(0.0375)	(0.0106)	(0.0106)
Czech nat.	-0.0984	-0.0976	-0.146***	-0.146***
	(0.0607)	(0.0608)	(0.0198)	(0.0199)
Constant	2.542***	2.530***	9.527***	9.647***
	(0.153)	(0.154)	(0.0445)	(0.0785)
Educ cat	Yes	Yes	Yes	Yes
Firm size	Yes	Yes	Yes	Yes
Industry	Yes	Yes	No	Yes
Observations	60,441	60,441	60,441	60,441
Adjusted R^2	0.053	0.053	0.067	0.062

Standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.010.

Note: The table reports the employment and wage effects (Dep. var: Δ logEmpl, Δ logWage) of the NMW increases. We estimate linear regressions on job-cell panel data for 2012-2017. The job-cell fixed effects are included. The first two rows are our coefficients of interest. We use all job cells.

Table 13: Employment effects: one large artificial NMW increase between 2012-2017

	All cells			Cells > 10		
	Share	Gap	Weighted	Share	Gap	Weighted
Share	-0.0414		-0.0740	-0.0529		-0.0480
	(0.0300)		(0.0869)	(0.0602)		(0.103)
Gap		0.116			0.121	
		(0.132)			(0.165)	
Age	0.0185***	0.0185***	0.0668***	0.0346***	0.0346***	0.0881***
	(0.00466)	(0.00465)	(0.0210)	(0.0125)	(0.0125)	(0.0292)
Age sq.	-0.0238***	-0.0239***	-0.0875***	-0.0526***	-0.0528***	-0.119***
	(0.00538)	(0.00538)	(0.0244)	(0.0147)	(0.0147)	(0.0346)
Tenure in the job	-0.0114***	-0.0113***	0.00249	0.00200	0.00228	0.0105
	(0.00280)	(0.00278)	(0.00509)	(0.00401)	(0.00401)	(0.00695)
Tenure sq.	0.000341***	0.000340***	0.000104	0.0000567	0.0000507	-0.000101
	(0.0000993)	(0.0000985)	(0.000160)	(0.000131)	(0.000131)	(0.000232)
Female	-0.0562***	-0.0569***	-0.226***	-0.0693***	-0.0708***	-0.235***
	(0.0121)	(0.0121)	(0.0573)	(0.0263)	(0.0263)	(0.0661)
Czech	0.0345	0.0368	-0.0335	0.0181	0.0247	-0.0523
	(0.0466)	(0.0466)	(0.132)	(0.0930)	(0.0934)	(0.153)
Constant	-0.383***	-0.390***	-1.347***	-0.884***	-0.892***	-1.759***
	(0.112)	(0.112)	(0.479)	(0.330)	(0.330)	(0.665)
Educ cat	Yes	Yes	Yes	Yes	Yes	Yes
Firm size	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
County	Yes	Yes	Yes	Yes	Yes	Yes
Occupation	Yes	Yes	Yes	Yes	Yes	Yes
Observations	34,002	34,002	34,002	14,401	14,401	14,401
Adjusted R^2	0.030	0.030	0.147	0.056	0.055	0.166

Standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.010.

Note: The table reports the employment effects (Dep. var: Δ logEmpl) of an artificial increase in the NMW between 2012 and 2017. We use all job cells that survived from 2012 to 2017. Columns represent different exposure measures. Columns (1)-(3) consider all job cells, columns (4)-(6) consider only job cells that consist more than 10 employees.

Table 14: Wage effects: one large artificial NMW increase between 2012-2017

	All cells			Cells > 10		
	Share	Gap	Weighted	Share	Gap	Weighted
Share	0.0893***		0.0644***	0.0744***		0.0566**
	(0.0108)		(0.0239)	(0.0183)		(0.0274)
Gap		0.286			0.111	
		(0.179)			(0.165)	
Age	-0.0140***	-0.0142***	-0.0301***	-0.0197***	-0.0200***	-0.0385***
	(0.00166)	(0.00166)	(0.00685)	(0.00322)	(0.00322)	(0.00931)
Age sq.	0.0142***	0.0143***	0.0332***	0.0215***	0.0219***	0.0435***
	(0.00197)	(0.00197)	(0.00760)	(0.00382)	(0.00382)	(0.0105)
Tenure in the job	-0.00247***	-0.00252***	-0.00315***	-0.00237**	-0.00259***	-0.00369**
	(0.000487)	(0.000491)	(0.00112)	(0.000983)	(0.000985)	(0.00147)
Tenure sq.	0.0000323**	0.0000323**	0.0000786**	0.0000499	0.0000538*	0.000110**
	(0.0000133)	(0.0000135)	(0.0000327)	(0.0000309)	(0.0000310)	(0.0000453)
Female	0.0464***	0.0473***	0.0622***	0.0524***	0.0540***	0.0661***
	(0.00427)	(0.00427)	(0.00800)	(0.00619)	(0.00617)	(0.00946)
Czech	0.0348*	0.0362**	-0.0146	-0.0128	-0.0134	-0.0175
	(0.0181)	(0.0182)	(0.0259)	(0.0246)	(0.0248)	(0.0294)
Constant	0.495***	0.498***	0.878***	0.543***	0.548***	0.985***
	(0.0489)	(0.0489)	(0.150)	(0.152)	(0.152)	(0.229)
Educ cat	Yes	Yes	Yes	Yes	Yes	Yes
Firm size	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
County	Yes	Yes	Yes	Yes	Yes	Yes
Occupation	Yes	Yes	Yes	Yes	Yes	Yes
Observations	34,002	34,002	34,002	14,401	14,401	14,401
Adjusted R^2	0.085	0.084	0.186	0.124	0.122	0.215

Standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.010.

Note: The table reports the wage effects (Dep. var: Δ logCellWage) of an artificial increase in the NMW between 2012 and 2017. We use only job cells that survived from 2012 to 2017. Columns represent different exposure measures. Columns (1)-(3) consider all job cells, columns (4)-(6) consider only job cells that consist of more than 10 employees.

Table 15: Employment effects for low-wage employees: firm-level exposure

	Δ log Employment		
	Share	Gap	Share (wght)
2013 NMW increase	0.007	-0.192	-0.0476
R2 adj. (n. obs.:1357)	0.07	0.07	0.29
2015 NMW increase	0.007	10.75***	0.007
R2 adj. (n. obs.:1357)	0.02	0.02	0.22
2016 NMW increase 2016	-0.002	3.000	0.0
R2 adj. (n. obs.:1357)	0.03	0.03	0.24
2017 NMW increase	0.011	0.734	0.008
R2 adj. (n. obs.:1357)	0.06	0.06	0.33

Note: The table reports results on employment effects of the NMW increases for 2013-2017. The dependent variables is $\Delta logEmpl$ (firm level), independent variables are exposure measures at the level of firms. Only employees who belong to the first quartile of the job-cell wage distribution are used. Columns represent different exposure measures. Rows show estimated effects for different NMW increases. Controls include age, age sq., tenure in the job, tenure sq., county, firm size, industry, and shares of females, Czechs, and the highest education attained.

Table 16: Wage effects for different subsamples of job cells

	All observations	Below median	1st quartile	10 most affected occ
2012				
Share	0.0359**	0.0646***	0.0733***	0.0496**
	(0.0174)	(0.0190)	(0.0218)	(0.0204)
2014				
Share	0.0906***	0.0916***	0.0874***	0.0714***
	(0.0284)	(0.0286)	(0.0293)	(0.0205)
2015				
Share	0.0215**	0.0245***	0.0280***	0.0464***
	(0.00935)	(0.00859)	(0.00792)	(0.0108)
2016				
Share	0.0481***	0.0577***	0.0491***	0.0443***
	(0.00874)	(0.00852)	(0.00748)	(0.00895)
Controls	Yes	Yes	Yes	Yes

Standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.010.

Note: The table reports β_3 coefficients from Eq. 4 for various subsamples of job cells based on the job-cell wage distribution in each year. Controls include age, age sq., tenure in the job, tenure sq., county, firm size, and shares of females, Czechs, and highest education attained.

Table 17: Wage cyclicality in firms with low-paid employees

	Low-paid: 1st decile	Low-paid: 1st quartile	Low-paid: below median
Pcnt. change in ind. prod.	0.000798***	0.000501**	-0.000386
	(0.000177)	(0.000234)	(0.000386)
Share of low-paid	0.602***	0.579***	0.632***
	(0.0298)	(0.0204)	(0.0204)
Ind. growth*shr of low-paid	-0.00215***	-0.000625	0.000829
	(0.000757)	(0.000503)	(0.000539)
Constant	-0.243	-0.336	-0.641***
	(0.228)	(0.226)	(0.246)
Observations	11,130	11,130	11,130
Adjusted R^2	0.170	0.238	0.278

Standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.010.

Note: The table reports results on wage cyclicality of firms with varying proportions of low-paid employees across the economic cycle. The dependent variable is $\Delta logWage$. The percentage change in industrial production approximates the phase of the economic cycle. We are primarily interested in the estimated coefficients *"Ind. growth*shr of low-paid"*. Columns represent different measures of low-paid employees. Controls include age, age sq., tenure in the job, tenure sq., county, firm size, and shares of females, Czechs, and highest education attained. We use semiannual data from SES 2007-2012, all firms. The regressions contains firm fixed effects.

Table 18: Employment cyclicality in firms with low-paid employees

	Low-paid: 1st decile	Low-paid: 1st quartile	Low-paid: below median
Pcnt. change in ind. prod.	0.00117***	0.00113**	0.00182**
	(0.000403)	(0.000489)	(0.000711)
Share of low-paid	0.0662	-0.0896	-0.129***
	(0.0801)	(0.0602)	(0.0492)
Ind. growth*shr of low-paid	0.00113	0.000967	-0.000499
	(0.00273)	(0.00142)	(0.00114)
Constant	-1.349**	-1.392**	-1.327*
	(0.683)	(0.677)	(0.687)
Controls	Yes	Yes	Yes
Observations	11,130	11,130	11,130
Adjusted R^2	0.101	0.101	0.102

Standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.010.

Note: The table reports results on employment cyclicality of firms with varying proportions of low-paid employees across the economic cycle. The dependent variable is $\Delta logEmpl$. The percentage change in industrial production approximates the phase of the economic cycle. We are primarily interested in the estimated coefficients *"Ind. growth*shr of low-paid"*. Columns represent different measures of low-paid employees. Controls include age, age sq., tenure in the job, tenure sq., county, firm size, and shares of females, Czechs, and highest education attained. We use semiannual data from SES 2007-2012. The regressions contains firm fixed effects.

Abstrakt

Tento článek měří dopady nárůstů minimální mzdy na zaměstnanost nízkovýdělkových zaměstnanců v České republice v letech 2013-2017, kdy kumulativní nárůst minimální mzdy činil 37 procent. Pro určení kauzálního vztahu využíváme identifikační strategii podobnou té, jež byla použita například v Machin, Manning a Rahman (2003). Výsledky jsou měřeny na úrovni pracovních buněk, které jsou tvořeny kombinací firmy, povolání a regionu, ve kterých zaměstnanci pracují. Naše výsledky naznačují, že zkoumané nárůsty minimální mzdy mírně navýšily mzdy nízkovýdělkových pracovníků a zároveň neměly výraznější dopad na změnu zaměstnanosti.

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