The Effect of Minimum Wage Policies on the Wage and Occupational Structure of Establishments

Eliza Forsythe, University of Illinois, Urbana-Champaign*

July 7, 2023

Abstract

Using establishment-level panel data from the Occupational Employment and Wage Statistics program, I estimate the effect of minimum wage increases implemented by 10 states in 2014 and 2015. I show that minimum wage increases lead to wage spillovers within establishments. I find little evidence that minimum wage increases induce establishments to reorganize their occupational mix. Finally, I find that minimum wage increases propagate up the management hierarchy, leading to increased wages for supervisors. Nonetheless, I find overall wage inequality decreases within establishments after minimum wage increases.

*This project was supported by the Russell Sage Foundation. Thanks to the Bureau of Labor Statistics for providing data access via the Visiting Researchers Program. Anahid Bauer provided excellent research assistance. Thanks to audience members at Wage Dynamics in the 21st Century Conference, and to Jeff Clemens for his discussion. Disclaimer: This research was conducted with restricted access to Bureau of Labor Statistics (BLS) data. The views expressed here do not necessarily reflect the views of the BLS.

1 Introduction

A striking regularity in the literature studying the effect of minimum wage laws is that the minimum wage often increases wages above precise statutory minimum. For instance, Cengiz, Dube, Lindner, and Zipperer (2019) find state-level minimum wage increases lead to wage increases up to three dollars above the threshold. However, the mechanism behind these spillovers is not well understood. In this paper, I establish wage spillovers occur within establishments using a nationally representative survey of establishments, and then investigate two potential channels for these spillovers: occupational restructuring and the propagation of wage changes within the establishment.

First, it could be that employers choose to increase wages for other workers in the establishment. Cengiz et al. (2019) use the fact that wage spillovers are driven by incumbent workers to argue that such spillovers are due to employers increasing coworker wages to address equity concerns. Similarly, models of optimal incentives within a hierarchy such as Lazear and Rosen (1981) or MacLeod and Malcomson (1988) can generate similar wage patterns, as employers maintain the spread of wages to preserve incentives.

Alternatively, it could be that establishments respond to minimum wage increases by restructuring production to replace unskilled labor with capital and skilled labor. Consistent with this, two recent papers (Harasztosi and Lindner (2019), Chen (2019)) find establishments increase capital expenditures in response to minimum wage increases, while Aaronson and Phelan (2017) and Lordan and Neumark (2018) also find aggregate evidence that minimum wage increases change the distribution of employment at the expense of employment in more automatable occupations. If these restructurings result in relatively more employment of higher-wage workers, this could result in increased wages within establishments above the minimum wage threshold.

Using establishment-level data from the Occupational Employment and Wage Statistics (OEWS) program, I examine the effect of substantive minimum wage increases in ten states between December 31st, 2013 and January 1st, 2015. These laws increased increased the minimum wage from \$7.67 to \$9.17 for the average worker in the treatment states. The OEWS has a unique data structure, collecting establishment-level employment counts for each of over 800 occupations in 12 different wage bins. By comparing wages and employment in establishments in states that raised the state minimum wage with establishments in 21 states that did not change their minimum wage between 2010 and 2016, I show the minimum wage led establishments to decrease employment in the smallest wage bin (up to \$9.25 an hour) and increase employment in the second wage bin (\$9.25 to \$11.74 an hour). Further, I show that the magnitude of this restructuring of employment is larger the more exposed the establishment is to the minimum wage increase, based on the fraction of low-wage workers before the minimum wage increase or the predicted exposure based on industry. These results confirm that spillovers from the minimum wage occur *within* establishments.

I then examine how the minimum wage increases spread throughout the establishment. I define four groups of occupations: *low-wage occupations* with a large share of employment under \$9.25 per hour, *spillover occupations* with a large share of employment earning between \$9.25 and \$14.74, *high-wage occupations* with most employment earning over \$14.74, and the balance of occupations with dispersed wages that cannot easily be classified. I find the behavior of the wage distribution differs substantially between occupational groups. Low-wage occupations exhibit a sharp decline in employment in the smallest wage bin and a similar increase in the second wage bin. This is consistent with the direct effect of the minimum wage increase. Spillover occupations instead show a sharp decline in employment in the second wage bin, and a corresponding increase in employment in higher wage bins. As these occupations have little direct exposure to the minimum wage, this strongly suggests establishments are increasing wages to preserve the wage hierarchy between workers affected by the minimum wage and those paid up to \$6 more per hour. Finally, high-wage occupations and unclassified occupations exhibit little change in the occupational wage structure, indicating that these spillovers do not further cascade up the wage hierarchy.

To further understand what types of jobs are affected by these spillovers, I separate the spillover occupations into supervisors and non-supervisors. I find that this spillover wage pattern is only present for supervisors. Further, I show the pattern holds when I examine changes in the wage distribution for all supervisors, not just the ones with a large share of employment in the second and third wage bins. Thus, I conclude that a key channel by which minimum wages spread through an establishment is due to wage spillovers within supervisory relationships. I show that this response is stronger the larger the share of low-wage workers in the establishment, indicating the response is at the establishment level, rather than driven by outside options or other market-wide dynamics.

The fact that the wage spillovers are only present for supervisors and not other occupations with similar or higher wages indicates that this spillover dynamic is driven via reporting relationships, rather than wider concerns about wage compression by the employer. Consistent with this, I find the minimum wage increases result in decreased wage inequality within establishments. While individual firms may pursue different payroll strategies in response to a minimum wage increase, on average establishments do not increase wages symmetrically throughout the establishment.

Next, I turn to the occupational structure of establishments. If establishments substitute minimum wage occupations for capital or higher-skill employment, this will show up as a change in the distribution of occupational employment within the establishment after the minimum wage increase. I find no evidence that establishments change the occupational structure, either across major occupational categories or across narrowly-defined 6-digit occupational codes. I conclude that it does not appear to be the case that firms responded to these minimum wage increases by substantially restructuring production.

The lack of occupational restructuring is consistent with Aaronson, French, Sorkin, and To (2018), who argue that establishments are unable to easily adjust the capital-labor intensity in response to policy changes, and thus aggregate adjustments are driven by establishment entry and exit. However, I also find no clear evidence that establishments were more likely to exit after the minimum wage increase, and I find only weak evidence employment declines, either in aggregate or within establishments.

This paper contributes to the literature in three ways. First, there is a well-established literature that the minimum wage increases wages above the strict minimum wage threshold. Several papers have convincingly documented that minimum wage increases can shift up the wage distribution, beginning with Lee (1999) and including Autor, Manning, and Smith (2016), Fortin, Lemieux, and Lloyd (2021), and Cengiz et al. (2019).[1]

Beginning with at least Grossman (1983), a smaller literature has documented that minimum wages can spillover to other workers.[2] Katz and Krueger (1992) document that restaurants that already paid wages above the minimum wage planned to increase wages in response to a minimum wage increase, and Dube, Giuliano, and Leonard (2019) report in detail the wage policies of a large firm to increase wages for workers earning above the minimum wage in response to a minimum wage increase. In the closest related paper, Gopalan, Hamilton, Kalda, and Sovich (2021) use Equifax data to show spillovers within firms of up to $2.50 above the new minimum wage. My paper contributes to this literature by using nationally representative establishment-level survey data to show these spillovers occur within establishments, and are stronger for establishments with a larger share of near minimum wage employment. In addition, by examining occupational data, I am able to provide the first systematic evidence on how these wage spillovers spread through the organizational and occupational structure.

Second, I contribute to the literature on how the minimum wage affects the production process. Lordan and Neumark (2018) and Aaronson and Phelan (2017) find that increases in the minimum wage change the aggregate occupational structure, with employment shifting away from automatable low-wage occupations. I am able to show there is little evidence of this type of restructuring after these minimum wage increases. Other papers focus on the

[1]Although Autor et al. (2016) argue these spillovers may be due to measurement error, Cengiz et al. (2019) and Clemens and Strain (2022) show asymmetries in the spillovers are inconsistent with measurement error. Further, as I show in this paper, these spillovers are clearly evident in establishment-level payroll data, which has substantially less reporting error.

[2]See Brown (1999) for a detailed history.

production process within particular industries. In the manufacturing sector, Chen (2019) finds minimum wages lead to more capital investments, and Baek, Lee, and Park (2021) finds new entrants are more capital intensive. In contrast, Ashenfelter and Jurajda (2022) finds no effect of recent minimum wage increases on the use of customer ordering kiosks at McDonalds restaurants. A key contribution of my approach is to use the occupational structure within establishments, which gives a new way of measuring changes in the production process within establishments across all industries. I have previously used this approach in Forsythe (2019).

Finally, I contribute to a literature on whether minimum wage increases induce establishment exit. Dustmann, Lindner, Schönberg, Umkehrer, and Vom Berge (2022) and Chava, Oettl, and Singh (2023) both find higher minimum wages increase exits by small firms. However, Dustmann et al. (2022) is also able to show that minimum wage increases induce workers to move to higher productivity establishments. Similarly, Luca and Luca (2019) find that minimum wages induce exit by poor performing restaurants (as measured by Yelp reviews). In contrast, Ashenfelter and Jurajda (2022) finds no evidence of entry or exit in response to minimum wage increases. I do not find any systematic evidence that the minimum wage increases I examine induced exit overall or among establishments with a larger share of low-wage employment.

2 Methodology

2.1 State Minimum Wage Policy Changes

I focus on 10 states that increased minimum wages substantively between December 31st 2013 and January 1st 2015, but had not increased their minimum wage since 2010. See Figure 2 for a map of these states and Table 1 for a description of the state policies. I use data compiled by the Department of Labor (`https://www.dol.gov/agencies/whd/state/minimum-wage/history`) and Vaghul and Zipperer (2016) to identify historic minimum wage levels. I focus on these states for three reasons. First, the criterion of no previous minimum wage change since 2010 allows for a reasonable pre-period before the state minimum wage change. In addition, the pre-period is sufficiently after the Great Recession to reduce contamination from recessionary shocks. Second, because many states increased the minimum wage in a one-year period, there is good cross-sectional variation. Third, by focusing on substantive minimum wage increases, defined as more than a 5% increase, I drop indexed increases that are less likely to create a measurable employment change within a the relatively narrow time period of interest.[3]

In Figure 1 I show how the binding minimum wage relates to the cutoff for the smallest wage bin from 2010 through 2020. While all of the treatment states initially have a minimum wage below the $9.25 threshold through 2015, four states (Connecticut, California, Alaska, and Massachusetts) further increased their minimum wage further above $9.25 by the end of 2016. Thus, for a cleaner examination of minimum wage compliance and spillovers across wage bins, I run alternative specifications that restrict the set of treatment states to the 6 remaining states with minimum wages below $9.25 at the end of 2016.

The control group is defined as states that did not increase their minimum wage in the 2010 to 2016 period, all of which were bound by the federal minimum wage during this time period. This results in 21 control states, also marked on Figure 2. In Table 3, I show the average worker in the treatment states went from a binding minimum wage of $7.67 to $9.17 after the minimum wage increase, while the binding minimum wage was $7.25 through the whole period for establishments in the control states.

2.2 OEWS Data

The Occupational Employment and Wage Statistics (OEWS) is a semi-annual survey of establishments conducted by the Bureau of Labor Statistics. Approximately 400,000 establishments are surveyed across two waves each year and establishments are typically

[3] Indexed minimum wage increases are small automatic increases tied to inflation. Although the annual changes are typically small, the cumulative impact can be substantial. See (Brummund & Strain, 2020) and (Clemens & Strain, 2021).

surveyed at most every three years. Aggregated over three years, the unweighted survey includes data on more than half of all employment (*Survey Methods and Reliability Statement for the May 2018 Occupational Employment Statistics Survey*, 2018). The purpose of the survey is to produce high-quality wage estimates for detailed occupations within narrowly-defined geography, industry, and ownership strata.

In particular, the OEWS is a stratified random sample of the population of establishments included in the Quarterly Census of Employment and Wages (QCEW). The OEWS stratifies establishments based on geography (Metropolitan Statistical Areas and rural Balance of State Areas), industry codes (NAICS), and ownership. Although not formally designed as a panel, the sampling procedures result in a random subset of establishments surveyed more than once. I describe this in more detail in the Data Appendix, see also Dey and Handwerker (2016) for more information on the longitudinal features of the OEWS survey. I construct a cross-sectional sample which includes all establishments and a panel sample comprised of establishments that can be matched across time. Both samples are restricted to private sector employment.

Since the sample is stratified, estimates in this paper use weights to be representative of the underlying employment distribution. Briefly, the OEWS sampling weights reflect the probability that an establishment is sampled within its strata. The OEWS then reweights using QCEW data, in order to be representative of employment at different levels of aggregation. In this paper, I use OEWS sampling weights and QCEW reweights for the cross-sectional data. In addition, I reweight the panel data to match the weighted cross-sectional industry and establishment size distribution within the state by half-year. See the Data Appendix for more details on the OEWS survey and the weighting procedures.

To analyze the effect of the minimum wage increases within establishments, I construct a sample of establishments that were surveyed before and after the minimum wage increases. Due to the OEWS sampling structure, I limit the matched panel sample to the four years surrounding the minimum wage increase. In particular, I focus on establishments that were surveyed once in the fourth quarter of 2012 through the fourth quarter of 2013, and again in the fourth quarter of 2015 through the fourth quarter of 2016. This results in 48,689 establishments in the treatment states and 90,871 in the control states, with each establishment sampled twice. In addition, I analyze the effect of the minimum wage increases on the cross-section of establishments. Although the cross-sectional data extends through 2018, for my primary sample I focus on the 2012 through 2016 period to be consistent with the panel. This results in 331,086 establishment-year observations in the treatment group and 650,944 in the control group. In Table 3, I show means and standard errors for key variables.

When surveyed, the establishment reports a grid of the employment counts for each six-digit SOC occupation in each of twelve wage bins. The wage bins change periodically, however from 2009 through 2018 the lowest bin does not change (up to $9.25). In 2014 the higher wage bins increased, but this was implemented nationwide. Table 2 shows the exact dollar cutoffs by year. Reported wages include tips and bonuses, but exclude overtime and other extra pay.

Although the data is very rich, there are several limitations. First, there is no information about the workers beyond the occupation and wage bin. Thus, it is not possible to measure changes in worker characteristics. In particular, since I cannot observe education, I am unable to capture changes in skill demand within occupations, as in Clemens, Kahn, and Meer (2021). Second, the survey does not collect information on hours worked, thus the number of workers in each cell may include a mix of full-time and part-time workers.[4] This means that I am unable to observe whether employers change the number of hours in response to minimum wage changes. In the Appendix I provide complementary individual-level analysis using the Current Population Survey (CPS), finding consistent results using hours-adjusted employment.

Occupations are classified using the 2010 Standard Occupational Classification (SOC) codes. This consists of 840 detailed occupations. To evaluate whether there are major

[4]Wages are reported at the hourly level for part time employees and either hourly or annual for full time employees. OEWS translates annual salaries into hourly wages.

changes in the occupational structure of establishments, I combine occupations into five mutually exclusive occupational categories: management (SOC codes 11, plus supervisors from each other category), professional (SOC codes 13-29), clerical and sales (SOC codes 41-43), production (SOC codes 45-53), and service (SOC codes 31-39). For some specifications, I distinguish between supervisors and management occupations. In addition, in the Appendix I examine a variety of measures occupational susceptibility to offshoring or automation.

To evaluate whether minimum wage increases induce more subtle changes in occupational structure, I also construct a dissimilarity index:

$$Index_{ijt} = \frac{1}{2}\sum_{i=1}^{N}|\frac{emp_{ijt}}{emp_{jt}} - \frac{emp_{ijt-1}}{emp_{jt-1}}| \tag{1}$$

where emp_{ijt} is the employment in 6-digit occupation i in establishment j in period t, and emp_{jt} is the total employment in establishment j in period t. This provides a measure of what percent of employment is reallocated across 6-digit occupational categories between two points in time.

To examine spillovers across occupations, I classify occupations based on their exposure to the minimum wage. I define Low-Wage Occupations as occupations in which over 1/3 of employment is in the smallest wage bin. Workers in these occupations are the most likely to be directly impacted by the minimum wage increase. These occupations include Home Health Aides, Janitors, and Cashiers. I define Spillover Occupations as occupations in which less than 10% of employment is in the smallest wage bin and over 1/3 of employment is in the second and third wage bin, earning between \$9.25 and \$14.74. Workers in these occupations are unlikely to be directly impacted by the minimum wage increase, but are likely to be indirectly impacted by the minimum wage, as low-wage workers' wages are increased. If employers have any concerns about equity or incentives, or if workers negotiate to preserve the wage structure, this is the group of occupations that are most likely to be impacted. These occupations include Medical Assistants, Bank Tellers, and Supervisors of

Food Service Workers.

In addition I define High-Wage Occupations as occupations that have less than 10% of employment in each of the bottom 3 wage bins (so less than 30% of employment earning below $14.74). Workers in these high-wage occupations are unlikely to be directly impacted by the minimum wage increase. If these workers' wages are impacted, it would reflect a larger cascade of wage increases throughout the wage hierarchy. These occupations include scientists, post-secondary teachers, and doctors. Finally, the balance of occupations are those with dispersed wage distributions that cannot be cleanly classified into the previous three groups.

In order to capture the wage structure of establishments, I construct several variables. Most simply, I measure the share of establishment employment in each of the 12 bins. However, most employment is in the lower bins, especially for establishments in low-wage industries. Thus, for each establishment, I also calculate the 10th, 25th, 50th, 75th, and 90th percentile log real wages, using the BLS constructed interpolated average wage within each wage bin.[5] Wages are deflated using CPI-U to 2018 levels.

In addition, I classify establishments based on their exposure to the minimum wage increase. I do this in two ways. First, I use the establishment's share of employment in the smallest wage bin in the period before the minimum wage increase. In particular, I construct seven groups: under 5% employment in bin 1, 5-15%, 15-25%, 25-35%, 35-75%, and over 75%.

Exposure based on the ex-ante wage structure provides a highly precise measure of what share of establishment employment is likely to be impacted by the minimum wage increase. However, there may be other differences between establishments that are associated with the choice to operate with a large share of low-wage labor. Thus, as an alternative, I classify establishments based on their industry's use of low-wage labor, as measured in 2003.[6] I use

[5]See *Survey Methods and Reliability Statement for the May 2018 Occupational Employment Statistics Survey* for more details.

[6]I use 2003 to avoid any changes in the wage structure induced by recessions.

the same grouping as for the establishments, however combine the largest two bins into one for 35% and up, as there are no industries with an aggregate share of employment in the smallest bin over 75%. See the Appendix for a list of industries in the highest-exposure group.

Finally, I identify establishments that closed. If the establishments were no longer in operation when the OEWS surveyed them, the establishment is flagged as closed.

2.3 Specifications

I estimate the effect of the minimum wage changes on wage and occupational employment for both the cross-sectional and the panel samples. The cross-sectional sample allows me to estimate the effect on all workers, inclusive of establishment entry and exit. The panel sample allows me to estimate the effect on workers in continuing establishments, and explore heterogeneity in response by establishment characteristics.

To estimate the cross-sectional specifications, I transform the data into weighted employment counts at the state by group by date level. These groups include the 12 wage bins, or different categories of occupational employment. In particular, I estimate

$$E_{sjt} = \alpha_{jt} + \alpha_{sj} + \sum_{j=1}^{J} \beta_j I_{sjt} + \epsilon_{sjt} \tag{2}$$

where j indicates the J employment groups, s is the state, and t is the year. E_{sjt} is the share of employment in bin j, either relative to total state employment or relative to the state population. I_{sjt} is a treatment dummy that is equal to 1 if the year is after 2014 and the state is a minimum wage increasing state, and zero otherwise. The main specification is estimated on data from 2012 through 2016, excluding 2014, since the minimum wage roll outs varied in timing throughout 2014. I include state by group fixed effects (α_{sj}) and group by year fixed effects (α_{jt}). This allows for heterogeneity in the distribution of employment across groups by state as well as variation over time in nationwide employment within groups. Standard errors are clustered at the state level. In addition, I estimate related specifications where I estimate the effect separately by year and extend the sample through 2018, to examine the evolution of employment across years before and after the policy change.

I estimate several related difference-and-difference style specifications using the panel data. I estimate the following specification

$$Y_{it} = \alpha_t + \alpha_i + \beta I_{it} + \epsilon_{it} \tag{3}$$

where β estimates the difference in the change in the dependent variable after the minimum wage increase for in treatment states compared with establishments in control states. I_{it} is a treatment dummy that is equal to 1 if the year is after 2014 and the establishment i is located in a minimum wage increasing state, and zero otherwise. I include establishment-level fixed effects (α_i) to estimate changes within establishments, and year by half-year fixed effects (α_t), to control for aggregate trends over time. I cluster standard errors at the state level and weight specifications using the QCEW-adjusted sampling weights.

In addition, I examine heterogeneity in the impact of the minimum wage increase based on exposure to low-wage employment, measured using either pre-period employment or industry exposure group. I then estimate the following

$$Y_{it} = \alpha_i + \alpha_{st} + \alpha_{tj} + \sum_{g=1}^{G} \beta_g I_{igt} + \epsilon_{it} \tag{4}$$

in which I_{igt} is a treatment dummy that is equal to 1 if the year is after 2014, the establishment i is located in a minimum wage increasing state and establishment i is in exposure group g in the pre-period. Otherwise I_{igt} is zero. α_{st} are state by time fixed effects, α_{tj} are time by exposure group fixed effects, and I again include establishment fixed effects (α_i). I cluster the standard errors at the state level, and weight using QCEW-adjusted sampling weights.

In this specification, the β_j's estimate the change in the dependent variable after the minimum wage increase for each exposure group, after controlling for both changes in the dependent variable for each exposure group in the control states, as well state-level changes over time. These state-level changes are estimated off of establishments with little expected direct exposure to the minimum wage increase. In this case, the identifying assumption is that the difference in the change in the dependent variable after the minimum wage increase between high and low predicted-exposure establishments is parallel to this respective change in the control states. Since the minimum wage policy applies to all establishments in the treatment states, the state by date fixed effects will absorb any market-level effects of the minimum wage increase. As long the effect of the minimum wage has the same sign for these low-exposure establishments as higher-exposure establishments, the β_g's provide a lower bound of the full effect.

For a few specifications, I measure changes within establishments, such as the reallocation index or an indicator for whether the establishment closed. In this case, I define an alternative sampling period, with the post-period defined as establishments surveyed in both the period before the minimum wage increases (November 2012 through November 2013) and again in the period after the minimum wage increases (November 2015 through November 2016). The pre-period is defined as establishments surveyed during November 2009 and November 2010, and again during November 2012 and November 2013.

I then estimate:

$$Y_{it} = \alpha_t + \alpha_s + \beta I_{it} + \epsilon_{it} \tag{5}$$

I_{it} is a treatment dummy that is equal to 1 if establishment i was surveyed before and after the minimum wage increase, and is located in a minimum wage increasing state, and zero otherwise. Since only a small share of establishments are observed in all three time periods, I can no longer include establishment fixed effects, so I instead include state fixed effects (α_s) as well as year by half-year fixed effects. I cluster the standard errors at the state level, and weight using QCEW-adjusted sampling weights. In addition, I run corresponding specifications where I examine heterogeneity by establishment exposure, as in Equation 4.

In that case I also include state by date fixed effects.

The identifying assumption of these difference-in-difference style research designs is that the evolution of employment across wage bins and occupations in minimum wage states would have moved in parallel with the control states if the policies had not been enacted. Although this assumption cannot be directly tested, I will show that there are no trends in the gap of the share of employment in low-wage bins between treatment and control states before the adoption of the minimum wage policies. In addition, I follow Cengiz et al. (2019) and interpret changes in the share of employment per population in the upper tails of the wage distribution as a falsification test, as there is little direct effect of the minimum wage at the top of the wage distribution. I will show that spillovers fade out within a few dollars of the minimum wage increase, and there is no evidence that the minimum wage policies affect employment in these higher wage bins. This provides evidence that employment changes are due to the minimum wage increase and not driven by other confounding trends differentially impacting minimum wage and treatment states.

Finally, the establishment-level matched panel specifications that vary with ex ante exposure to the minimum wage are able to show that the measured impact of the minimum wage increases with establishment-level exposure, providing further support that these estimates are identifying the causal impact of the minimum wage, rather than confounding trends across states.

3 Results

3.1 Compliance and Aggregate Impacts

I begin by estimating the impact of the minimum wage increases at the state level. In Table 4, I estimate Equation 2, with the bin share of employment as the dependent variable. For each wage bin, this specification estimates the differential change in the employment share after the minimum wage increase for impacted states compared to control states, controlling for state-level heterogeneity in the wage structure and aggregate trends over time in employment share by bin. In the first column of Table 4, I show that the share of employment in the smallest wage bin (under $9.25) declines by 2.6 percentage points (pp) after the minimum wage increase, while employment in the second wage bin (up to $11.74) increases by 2.2 pp and employment in the third wage bin (up to $14.74) increases by 0.6 pp. As discussed above, by the end of the treatment period, four states had adopted further increases in the minimum wage, leading the minimum wage to be above the $9.25 cutoff for the smallest wage bin. In the second column, I restrict the analysis to treatment states for which the minimum wage increase is below $9.25 through 2016. For these states, compliance with the minimum wage increase does not require any change in employment across bins. Instead, we see a similar pattern as for the full sample of states, with a decline in the share of employment in the first bin of 2.3 pp and a corresponding increase in the second and third wage bins. This indicates that employers are increasing wages more than necessary to comply with the minimum wage law.

Figure 3 illustrates the event study version of Equation 2. Here we see trends are parallel for treated and control states in 2013 and 2014 for the employment share in both Bin 1 and Bin 2, but in 2015 the employment share falls in Bin 1 and rises in Bin 2 for treated states. By 2016 the differential differential share in the smallest wage bin stabilized, remaining roughly constant through 2018. The share in the second wage bin increases through 2016 but then declines through 2018, which corresponds to an increase in the share of employment in the third wage bin. The time series pattern of employment provides support that the changes in the employment distribution after 2014 are due to a substantive change in 2014, rather than pre-existing differences between states.

Figure 4 plots estimates of the changes in employment by wage bin divided by the state population (EPOP), using population data from the Local Area Unemployment Statistics (LAUS) program.[7] Here we see that the EPOP decreases in the lowest wage bin and increases

[7] The table is available in the Appendix.

in the second and third wage bin. However above $14.74 the change in employment returns to near zero and there is little evidence of impacts on the higher wage bins. The fact that the impact of the minimum wage on the state wage structure is limited to the region within a few dollars of the minimum wage provides further evidence that the measured changes we are observing are likely due to the minimum wage and not other state-level changes in employment and wages.

The black line in Figure 4 aggregates the cumulative change in employment across bins. Here we see that after the 4th wage bin, the cumulative effect stabilizes at around a 0.7 percentage point (pp) decline in the EPOP. To more directly address the impact of these policies on aggregate employment, in Table 5, I use QCEW-sourced employment data from Quarterly Workforce Indicators. See the Data Appendix for more details. In Column (1) I show that on average the EPOP increased by 0.1 pp more in minimum wage states after 2014 compared with control states. The 95% confidence interval rules out a decline larger than 0.7 pp and an increase larger than 0.9 pp. However, this may reflect other unrelated economic differences over time between minimum wage and control states. In Column (2) I include annual state gross domestic product per capita to control for these trends in economic conditions. Here we see that the point estimate declines to -0.3 pp, with a 95% confidence interval excluding a decline larger than 0.9 pp and an increase larger than 0.3 pp. In the Appendix I show similar point estimates using CPS data. Thus, to the extent that the change in state GDP is not driven by changes in the minimum wage legislation, these results indicate at most a modest decline in employment.

The state by wage bin level specifications show that minimum wage increases alter the wage structure of states, however this combines changes within establishments with those due to establishment entry and exit. To isolate changes within establishments, I next turn to the panel sample, which is restricted to establishments that were sampled before and after the minimum wage increase. In Columns (3) and (4) of Table 4, I replicate the state wage-bin specifications for the panel data set. Here we see similar point estimates, with declines in employment in the smallest wage bin and increases in the second wage bin. This shows that the panel sample is able to match the aggregate dynamics, despite the smaller sample size and excluding dynamics driven by establishment entry and exit.

To better focus on dynamics within establishments, I estimate Equation 3. This specification estimates the differential change in employment share within a particular wage bin before and after the minimum wage increase for establishments in treatment states compared with establishments in control states. The specification includes establishment fixed effects to measure the within establishment change. I further include year by half-year fixed effects to control for aggregate trends over time. In the top panel of Table 6, we again see a decline in the employment share in the smallest bin (4.4 pp) and an increase in the employment share in the second bin (4.8 pp), indicating the change in the wage structure is due at least in part to changes occurring within establishments. Although the decline in the smallest bin is only significant at the 10% level, in the Appendix I show estimates for the level of employment in the smallest bin declines and is statistically significant at the 1% level. These results confirm that firms respond to minimum wage increases by adjusting the wage structure within establishments.

To better understand the mechanism behind these changes in the wage structure, In Panels B and C of Table 6 I estimate Equation 4, to examine how this change in wage structure differs by establishment exposure. In addition to establishment fixed effects, I add state by date fixed effects, to control for state level trends in the wage structure. In Panel B, I separate establishments by pre-period industry, with bins based on the historic industry share of employment in Bin 1. Here we see that the key patterns (a decline in the employment share in the smallest wage bin and the increase in the employment in the second and third wage bin) all increase in magnitude with the industry exposure measure. For the most affected establishments, the employment share in the smallest wage bin decreases by 22.7 pp, while the employment in the second and third wage bins increase by 15.3 and 5.1 pp, respectively. In Panel C, I instead separate establishments by the share of employment in the smallest bin in the pre-period. Here we again see the decline in employment in Bin 1 and the increase in employment in bin 2 is largest for the most exposed establishments. In the Appendix I show these results are robust to alternative specifications, including estimates using employment levels rather than shares and restricting the set of treatment states to states with a minimum wage within the smallest wage bin through 2016.

In Figure 5, I replicate Figure 4 at the establishment-level, plotting the change in the number of employees per wage bin estimated from Equation 3.[8] Here we see a decline of about 1.1 employees per establishment in the smallest wage bin and an increase of 0.7 employees in the second wage bin. Similar to the cross-sectional results in Figure 4, point estimates for higher wage bins are small and not statistically distinguishable from zero.

The black line again plots the cumulative change in employment, with a total decline of 0.12 employees on average, or 0.8% of average establishment employment. To more directly address the change in employment within establishments, in the first column of Table 7, I measure the effect of minimum wage increases on log employment. Here the point estimate is a decline of about 0.4%, but confidence intervals are wide and include an increase or decrease of 3%. In the Appendix complementary QCEW-sourced data from the Business Employment Dynamics (BED) shows no statistically significant change in the share of establishments expanding or contracting.

In the second column of Table 7, I measure the probability that an establishment closes, estimating Equation 5. As discussed in Section 2.3, the closing establishments specifications compares establishments surveyed before and after the minimum wage increase with establishments surveyed between November 2009 and November 2010 and again between November 2012 and November 2013. Again we see no clear evidence that establishments were more likely to close, with the 95% confidence interval spanning 1% less likely to close to 2% more likely to close. Further, in the Appendix I show there is no evidence that more highly exposed establishments were more likely to lose employment or close, compared to

[8]Note that this is different from the estimates in Table 6, which measure the share of employment per bin, rather than the level. The corresponding table is available in the Appendix.

establishments as a whole. BED data shows no statistically significant change in the share of establishments that close.

In net, I have shown that the wage distribution shifts in states after a minimum wage increase, with fewer workers earning less than $9.25 per hour, and more workers earning between $9.25 and $11.74. I show that this change in the wage distribution occurs within establishments, and is particularly strong for establishments operating in industries with a high share of low-wage employment and establishments that employed a large share of low-wage employment before the minimum wage increase. Further, employment grows in wage bins above the strict minimum wage cutoff, indicating that either employers are minimum-wage workers' wages more than necessary to comply with the law, or the minimum wage is spilling over to other employees within the establishment. In the next sections, I examine evidence of these spillovers.

3.2 Characterizing Wage Spillovers

When a minimum wage law is enacted, employers have to decide how to adjust their internal pay scale. Dube et al. (2019) document how a large firm chose to implement a nationwide rule to increase wages throughout the wage distribution in response to a minimum wage increase. Knudsen (2018) provides qualitative research on how restaurant owners responded to an increase in the minimum wage and finds a variety of strategies, ranging from only raising wages for workers directly covered by the minimum wage legislation, to providing the same dollar raise to all workers, to something in between.

Knudsen (2018) further found employers were concerned about employee perceptions of fairness and status and believed that wage compression would lead to morale issues for workers who were paid above the previous minimum wage. Consistent with managers' perceptions, workers at restaurants that did not maintain pay hierarchies after minimum wage increases reported feeling undervalued. This is in line with laboratory experiments that find minimum wages influence workers' reservation wages (Falk, Fehr, & Zehnder, 2006).

Card, Mas, Moretti, and Saez (2012) find employees that learn they are underpaid relative to their peers have lower job satisfaction and are more likely to search for work and Dube et al. (2019) find quits increase in response to wage disparities among peers. Thus, forward-looking employers may respond to a minimum wage increase by adjusting wages throughout the hierarchy to avoid potential negative productivity impacts on higher-pay workers.

In addition, wage hierarchies can provide incentives throughout the organization as workers compete for promotions. If firms only raise wages for workers that are covered by the minimum wage, this will compress the pay hierarchy and can reduce incentives for minimum-wage workers (Grossman, 1983). Thus, while pay compression induced by the minimum wage can negatively affect the performance of workers who were paid just above the minimum wage due to status and fairness concerns, the same pay compression can negatively affect the performance of workers directly impacted by the minimum wage due to reduced promotion incentives.

Crucially, while negative consequences from status concerns may affect any group of workers that earn above the minimum wage, consequences from promotion incentives will only apply to groups of workers for whom there is a promotion pathway between the positions. To investigate evidence of wage spillovers for workers for whom wage compression may be particularly salient, I identify Spillover Occupations as occupations for which there are few workers in the smallest wage bin (under \$9.25), but many workers in the second and third wage bin (up to \$14.74). To capture the impact of promotion incentives, I focus on supervisory occupations. Supervisors are often promoted directly from front-line positions and have close contact with their direct reports. In addition, I compare the effects on spillover occupations and supervisors with other groups, including Low-Wage and High-Wage occupations. See Section 2.2 for more details on the definition of occupation groups.

In Table 8, I begin by examining the effect of the minimum wage on the wage structure of Low-Wage occupations. I estimate Equation 4 to show heterogeneity with the share of employment in the smallest wage bin in the pre-period. In Panel A, I show that Low-

Wage occupations experience a strong direct effect of the minimum wage increase. The most exposed establishments exhibit a 37 pp decline in the share of Low-Wage occupation employment in the smallest wage bin and a 33 pp increase in the second wage bin.

In Panel B, I focus on Spillover Occupations, for whom status concerns from pay compression are likely to be the most salient. Here there is much less of a direct effect in the lowest wage bin, which is consistent with these occupations employing few workers in this bin. However, for the most exposed establishments we now see a robust decline in employment in the second wage bin of 19 pp and a corresponding increase of 10 pp in the third wage bin. Thus, at the same time as these highly-exposed establishments are shifting a large share of Low-Wage occupational employment into the second wage bin, they are also shifting a substantial share of Spillover occupational employment *out* of the second wage bin and into higher wage bins.

Despite strong spillover effects for these just-above minimum wage workers, in the Appendix I show there is little impact of the minimum wage on High-Wage occupations and the unclassified balance occupations. In addition, in the Appendix I show there is no evidence of this spillover wage pattern for Spillover Occupations on average within the state, instead the effect is only present for workers at highly-exposed establishments. This indicates that the response is at the establishment level, rather than driven by outside options or other market-wide dynamics.

To better understand whether these spillovers for just-above minimum wage workers are due to equity concerns versus promotion incentives, I separate the Spillover Occupations into those that are supervisors and those that are non-supervisory. I again estimate Equation 4 to show heterogeneity with the share of employment in the smallest wage bin in the pre-period.

In Panel A of Table 9, I show supervisory Spillover Occupations exhibit a similar pattern to Table 8, with a large decline in the employment share in the second bin for highly-exposed establishments. In addition, point estimates are consistent with an increase in the employment share in higher wage bins, although estimates are not statistically significant.

In contrast, in Panel B I show there is no evidence of spillovers for the non-supervisory spillover occupations. Finally, in Panel C I include all supervisor occupations (not just those classified as Spillover Occupations), and here we see a similar pattern to Panel A, with a decline in the employment share in the second wage bin and an increase in the third wage bin for highly-exposed establishments. In the Appendix, I further examine the change in the wage structure for different groups of occupations, including managers and professional occupations, and find no evidence of spillovers.

Overall, I conclude one mechanism for minimum wage spillovers in establishments is through the management hierarchy, with wages increasing for the direct supervisors of minimum wage workers. The fact that these spillovers are clearly observed for supervisors but not other near-minimum wage occupations suggests that general concerns about wage compression are not driving the wage spillovers. Supervisors are an occupation for which relative pay differentials to minimum wage workers are likely to be particularly salient, and supervisory positions are frequently staffed via promotion from low-wage positions. Thus, increasing wages for supervisors likely addresses fairness concerns while also improving incentives for minimum wage workers.

The fact that that wage spillovers are concentrated in supervisory positions but do not extend to other near minimum-wage and higher-wage occupations suggests that overall pay becomes more compressed within establishments after minimum wage increases. To investigate this directly, in Table 10, I measure the impact of the minimum wage on the within-establishment wage inequality, measured by within-establishment ratios of log wage percentiles. In Panel A, I show the minimum wage increases lead to a decline in the 50/10 ratio of 2.9 pp. However, the point estimate for the 90/50 ratio is not statistically significant and is positive. In Panel C, I show that, across levels of ex ante employment share in the smallest wage bin, the 50/10 and 90/10 both decline by more than the 90/50, with none of the 90/50 point estimates statistically distinguishable from zero. These results indicate that, while wages increase in the bottom of the wage distribution, the wage structure is preserved for the top half of the wage distribution.

Thus, although I have shown that wages increase above the strict minimum wage threshold and wages spill over to supervisors, these effects fade out in the top half of the establishment wage distribution. What are the consequences of such wage compression? It depends on how salient the wage increases at the bottom are for these higher-paid workers and whether there are promotion pathways for the lower-wage workers. If the higher-wage workers perceive the wage compression as a reduction in their value or status, this could lead to increased dissatisfaction or turnover, or spur negotiations for higher wages. Similarly, if there are promotion pathways from the near-minimum wage jobs to the higher-pay jobs, increased wage compression could reduce incentives and effort. However, if higher wages at the bottom directly improve effort due to efficiency wages (Shapiro & Stiglitz, 1984) or gift-exchange (Akerlof, 1982), this may outweigh any disincentives from pay compression within the promotion hierarchy. In the Appendix, I show that QWI measures of separations and turnovers weakly decline after the minimum wage increases, suggesting that any negative impact from increased wage compression does not outweigh the positive direct effects for low-wage workers.

3.3 Occupational Structure

I next turn to the occupational structure of establishments. The distribution of occupations present in an establishment provides insight into how the establishment produces. An increase in the minimum wage can make it relatively more expensive to produce using low-wage labor, which may induce employers to switch to a more capital-intensive production process. If this is the case, we would expect to see a decline in employment in the occupations that are heaviest hit by the minimum wage, and potentially an increase in employment in occupations that are necessary for adopting and maintaining the new capital stock (such as information technology related occupations, professional occupations, or managerial occupations).

I begin by examining the occupational distribution at an aggregated level. I focus on five mutually exclusive occupational groups: managers and supervisors, sales/clerical, production, service, and professional. In the Appendix, I show that service occupations are most affected by the minimum wage increase, with a smaller effect on sales/clerical workers, but no direct effect on management or professional occupations.[9]

In particular, I estimate Equation 2, with bins defined as the five mutually exclusive occupational group. This specification estimates the differential change in the employment as a share of the population for each occupation after the minimum wage increase for impacted states compared to control states, controlling for state-level heterogeneity in the wage structure and aggregate trends over time in employment share by bin. In Table 11 I report estimates from this specification, showing there is little change in employment across occupations.

I next turn to within-establishment results, to investigate whether the aggregate results may mask occupational reallocation occurring within establishments. In Table 12, I investigate whether the employment share within different occupational categories changed in response to minimum wage increases. Here I show there is no evidence of a change in employment shares across the five occupational categories, even among establishments that are most likely to have a large share of employees for whom the minimum wage binds.

In order to more fully examine whether establishments make any narrower changes in occupational structure, I next construct the reallocation index described in Equation 1 which measures what percent of employment is shifted between 6-digit occupations. This provides a within-establishment measure of reallocation. In the last column of Table 12, I show there is no differential increase in the reallocation index after a minimum wage increase. In the Appendix I show additionally there is no evidence of an increase in reallocations measured at the 3 digit level or calculated within occupational sub-groups.

As a final margin of adjustment, in the Appendix I investigate whether employment shifts

[9]This is consistent with worker-level data from the CPS, in which 75% of minimum wage workers are in service sector occupations. See *Characteristics of minimum wage workers* (2018).

away from occupations that are particularly likely to be at risk from offshoring or automation. I find modest evidence that establishments may have shifted away from low-wage cognitive routine employment, as in Aaronson and Phelan (2017). However, there is no evidence that such restructuring increased in establishments with a large ex ante share of low-wage workers, making it more likely that the aggregate change is spurious. In addition, in the Appendix I investigate state-wide changes in the occupational structure through 2018. I see some evidence state employment shifts away from clerical/sales employment, which would be consistent with a reduction in cognitive-routine employment at the establishment-level. However, there is no state-level evidence of a decline in cognitive-routine employment, nor is there establishment-level evidence of a decline in clerical/sales employment, indicating the results are not robust across specifications. Overall, I conclude it does not appear that the increase in the minimum wage leads to a broad shift in the occupational structure within states.

These results indicate that establishments did not not find it optimal to substantially restructure the production process following the minimum wage increases in 2014. This could be for a few reasons. First, the time horizon could be too short to observe restructuring.[10] Second, employers may deem that alternative production arrangements would be less profitable than accepting the higher wage bill from the higher minimum wage. Third, this may be an example of the putty-clay hypothesis, in that continuing employers find it prohibitively expensive or difficult to change the production process. Although I did not find any clear evidence of an increase in establishment closures, there may be subtle changes in the organization of newly entering establishments that I am unable to observe.

4 Discussion and Conclusions

In this paper, I have investigated the effect of minimum wage increases on the wage and occupational structure of establishments. I find that minimum wage increases lead to

[10] See Clemens (2021) for a discussion of longer-run dynamics.

spillovers, with wage increases up to several dollars an hour above the minimum wage cutoff. I show that little of this can be attributed to occupational restructuring within continuing establishments. However, the wage spillovers can partially be explained by wage increases within the supervisory structure. These are precisely the workers that are most likely to be aware of relative wages compared with low-wage workers. Further, given promotion pathways, increasing supervisory wages maintains career incentives for the low-wage workers for whom wages were increased by the minimum wage. Despite these spillovers, I show that wage compression increases within affected establishments, with particular compression in the bottom half of the wage distribution.

I find little evidence that the minimum wage increases lead to decreases in employment, either in aggregate or within continuing establishments. Further, I find no evidence that establishment are more likely to close after a minimum wage increase, even among establishments with large shares of minimum wage workers.

It is important to emphasize that establishments may be responding to the minimum wage increase in other ways that I am not able to capture. Employers may be changing the composition of their workforce to more-educated or more-experienced workers (Clemens et al., 2021) or paying for the wage increases with cuts to other benefits (Clemens, Kahn, & Meer, 2018). These changes could be reflected in the spillovers we see up the across the wage distribution, if employers are unable to enact human resource policies that sufficiently differentiate between minimum wage and other workers. Further, team production and other interactions between workers may result in productivity spillovers across workers within in a firm. Thus, while I have shown that wage spillovers to supervisors is one mechanism behind aggregate wage spillovers, and have ruled out short-run occupational restructuring as another mechanism, this is non-exhaustive.

In addition, while I have focused on spillover mechanisms within employers, there are a variety of market-level mechanisms that can also generate spillovers. For instance, heterogeneity in amenities across occupations can lead to market-level wage spillovers as employers increase wages to preserve labor supply for higher-wage but less desirable jobs (Phelan, 2019). Further, differences across industries in the bite of the minimum wage and the capacity of establishments to adjust to the policy change can lead to heterogeneity in responses, resulting in aggregate changes in the wage distribution. Thus, although I have shown wage spillover occur within establishments, additional market-level dynamics may be at play.

More broadly, the wage increases I observe may be paid for by some combination of increased productivity, decreased profits, increased prices, or other adjustments to worker compensation. The results in this paper cannot speak to aggregate welfare without knowing the ownership structure of establishments and the incidence of price and other pass-throughs.

References

Aaronson, D., French, E., Sorkin, I., & To, T. (2018). Industry dynamics and the minimum wage: a putty-clay approach. *International Economic Review*, *59*(1), 51–84.

Aaronson, D., & Phelan, B. J. (2017). Wage shocks and the technological substitution of low-wage jobs. *The Economic Journal*, *129*(617), 1–34.

Akerlof, G. A. (1982). Labor contracts as partial gift exchange. *The quarterly journal of economics*, *97*(4), 543–569.

Ashenfelter, O., & Jurajda, Š. (2022). Minimum wages, wages, and price pass-through: The case of mcdonald's restaurants. *Journal of Labor Economics*, *40*(S1), S179–S201.

Autor, D. H., Manning, A., & Smith, C. L. (2016). The contribution of the minimum wage to us wage inequality over three decades: a reassessment. *American Economic Journal: Applied Economics*, *8*(1), 58–99.

Baek, J., Lee, C., & Park, W. (2021). The impact of the minimum wage on the characteristics of new establishments: Evidence from south korea. *Labour Economics*, *72*, 102059.

Brown, C. (1999). Minimum wages, employment, and the distribution of income. *Handbook of labor economics*, *3*, 2101–2163.

Brummund, P., & Strain, M. R. (2020). Does employment respond differently to minimum wage increases in the presence of inflation indexing? *Journal of Human Resources*, *55*(3), 999–1024.

Card, D., Mas, A., Moretti, E., & Saez, E. (2012). Inequality at work: The effect of peer salaries on job satisfaction. *American Economic Review*, *102*(6), 2981–3003.

Cengiz, D., Dube, A., Lindner, A., & Zipperer, B. (2019, 05). The Effect of Minimum Wages on Low-Wage Jobs. *The Quarterly Journal of Economics*, *134*(3), 1405-1454. doi: 10.1093/qje/qjz014

Characteristics of minimum wage workers (Tech. Rep. No. 1078). (2018). https://www.bls.gov/opub/reports/minimum-wage/2018/home.htm: Bureau of Labor Statistics.

Chava, S., Oettl, A., & Singh, M. (2023). Does a one-size-fits-all minimum wage cause financial stress for small businesses? *Management Science*.

Chen, Y. (2019). *What do establishments do when wages increase? evidence from minimum wages in the united states* (Tech. Rep.).

Clemens, J. (2021). How do firms respond to minimum wage increases? understanding the relevance of non-employment margins. *Journal of Economic Perspectives*, *35*(1), 51–72.

Clemens, J., Kahn, L. B., & Meer, J. (2018). *The minimum wage, fringe benefits, and worker welfare* (Tech. Rep.). National Bureau of Economic Research.

Clemens, J., Kahn, L. B., & Meer, J. (2021). Dropouts need not apply? the minimum wage and skill upgrading. *Journal of Labor Economics*, *39*(S1), S107–S149.

Clemens, J., & Strain, M. R. (2021). *The heterogeneous effects of large and small minimum wage changes: Evidence over the short and medium run using a pre-analysis plan* (Tech. Rep.). National Bureau of Economic Research.

Clemens, J., & Strain, M. R. (2022). Does measurement error explain the increase in subminimum wage payment following minimum wage increases? *Economics Letters*, 110638.

Dey, M., & Handwerker, E. W. (2016). Longitudinal data from the occupational employment statistics survey. *Monthly Labor Review*, 370–73.

Dube, A., Giuliano, L., & Leonard, J. (2019). Fairness and frictions: The impact of unequal raises on quit behavior. *American Economic Review*, *109*(2), 620–63.

Dustmann, C., Lindner, A., Schönberg, U., Umkehrer, M., & Vom Berge, P. (2022). Reallocation effects of the minimum wage. *The Quarterly Journal of Economics*, *137*(1), 267–328.

Falk, A., Fehr, E., & Zehnder, C. (2006). Fairness perceptions and reservation wages—the behavioral effects of minimum wage laws. *The Quarterly Journal of Economics*, *121*(4), 1347–1381.

Forsythe, E. C. (2019). The occupational structures of low-and high-wage service sector establishments. *Economic Development Quarterly*, *33*(2), 76–91.

Fortin, N. M., Lemieux, T., & Lloyd, N. (2021). Labor market institutions and the distribution of wages: The role of spillover effects. *Journal of Labor Economics*, *39*(S2), S369–S412.

Gopalan, R., Hamilton, B. H., Kalda, A., & Sovich, D. (2021). State minimum wages, employment, and wage spillovers: Evidence from administrative payroll data. *Journal of Labor Economics*, *39*(3), 673–707.

Grossman, J. B. (1983). The impact of the minimum wage on other wages. *Journal of Human Resources*, 359–378.

Harasztosi, P., & Lindner, A. (2019). Who pays for the minimum wage? *American Economic Review*, *109*(8), 2693–2727.

Katz, L. F., & Krueger, A. B. (1992). The effect of the minimum wage on the fast-food industry. *ILR Review*, *46*(1), 6–21.

Knudsen, M. L. (2018). *What's in a wage: Minimum wage increases and workplace hierarchies in the restaurant industry* (Unpublished doctoral dissertation). Northwestern

University.

Lazear, E. P., & Rosen, S. (1981). Rank-order tournaments as optimum labor contracts. *Journal of political Economy*, *89*(5), 841–864.

Lee, D. S. (1999). Wage inequality in the united states during the 1980s: Rising dispersion or falling minimum wage? *The quarterly journal of economics*, *114*(3), 977–1023.

Lordan, G., & Neumark, D. (2018). People versus machines: The impact of minimum wages on automatable jobs. *Labour Economics*, *52*, 40–53.

Luca, D. L., & Luca, M. (2019). *Survival of the fittest: the impact of the minimum wage on firm exit* (Tech. Rep.). National Bureau of Economic Research.

MacLeod, W. B., & Malcomson, J. M. (1988). Reputation and hierarchy in dynamic models of employment. *Journal of Political Economy*, *96*(4), 832–854.

Phelan, B. J. (2019). Hedonic-based labor supply substitution and the ripple effect of minimum wages. *Journal of Labor Economics*, *37*(3), 905–947.

Shapiro, C., & Stiglitz, J. E. (1984). Equilibrium unemployment as a worker discipline device. *The American Economic Review*, *74*(3), 433–444.

Survey methods and reliability statement for the may 2018 occupational employment statistics survey (Tech. Rep.). (2018). https://www.bls.gov/oes/methods$_1$8.*pdf* : *BureauofLaborStatistics*.

Vaghul, K., & Zipperer, B. (2016). Historical state and sub-state minimum wage data. *Washington Center for Equitable Growth*.

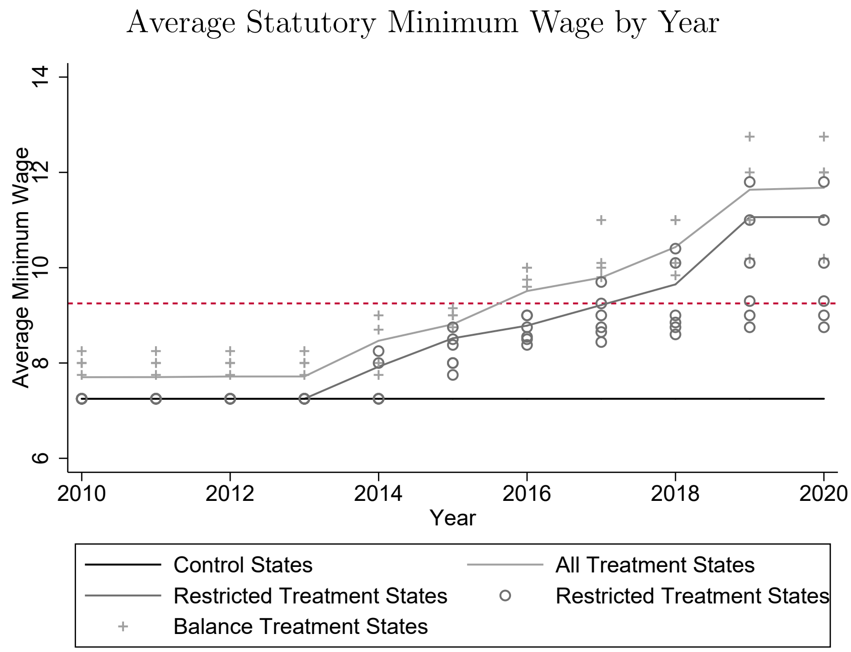

Figure 1: The lines plots average statutory minimum wage for the full treatment group, the restricted treatment group, and the control group, estimated using employment data from the CPS. The dotted line is the $9.25 cutoff for the smallest wage bin. The circles mark the statutory minimum wage for the restricted treatment states, and the pluses mark the minimum wage for the remaining states in the treatment group. All control states have a minimum wage of $7.25 through 2020.

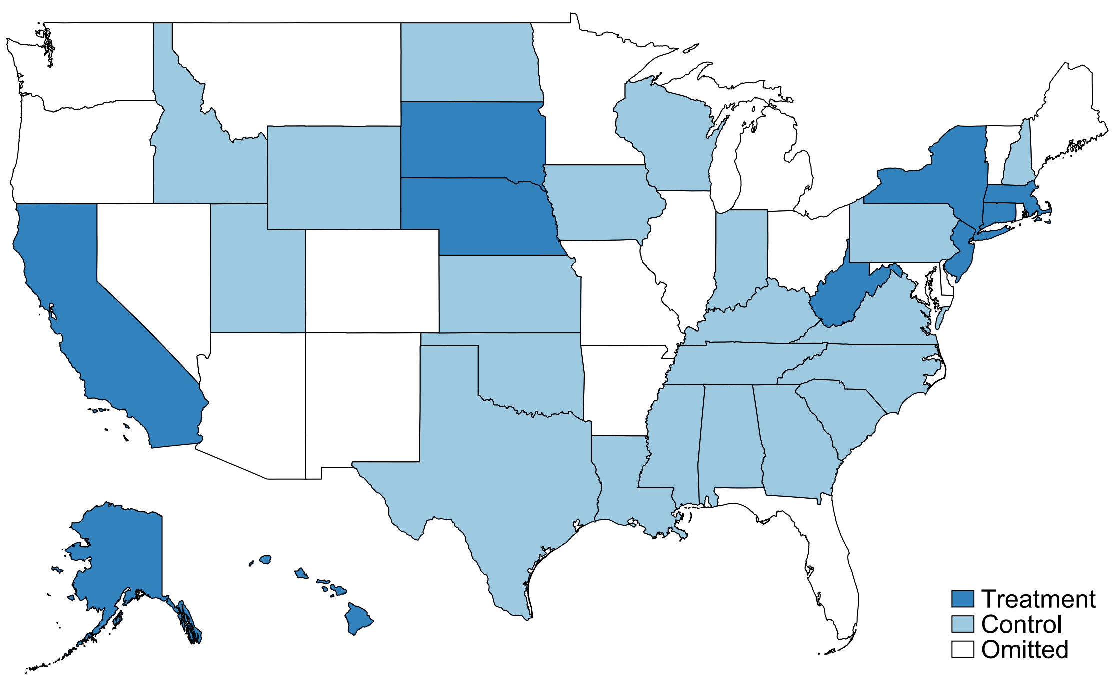

Figure 2: Map of minimum wage increasing states (treatment states) and control states. See Section 2.1 for definitions.

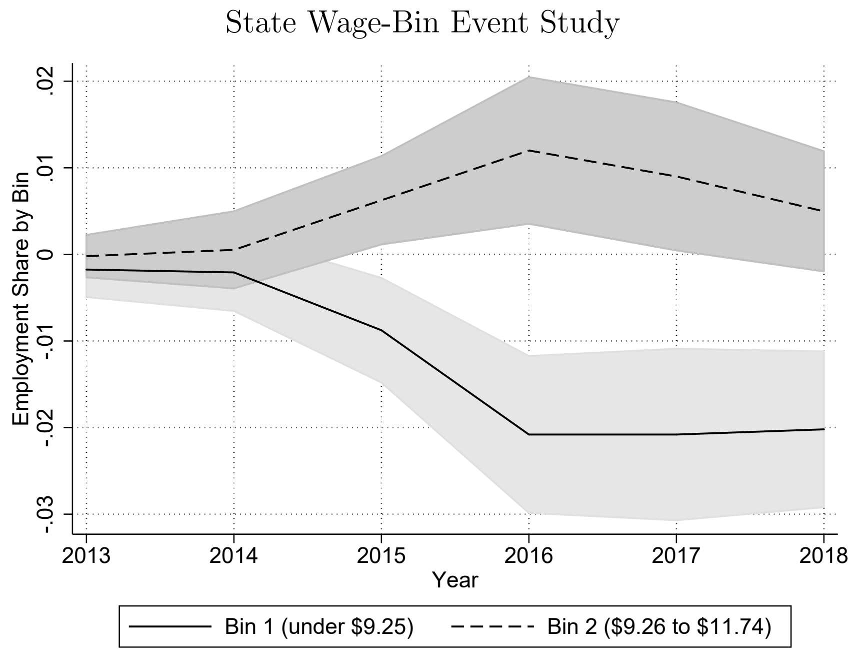

Figure 3: The lines plots the state-level change in the share of employment in Bins 1 (solid line) and 2 (dashed line), estimated from Equation 2. The grey areas plot 95% confidence intervals. State-level minimum wage increases occurred in between December 31, 2013 and January 1, 2015. See also Table 4.

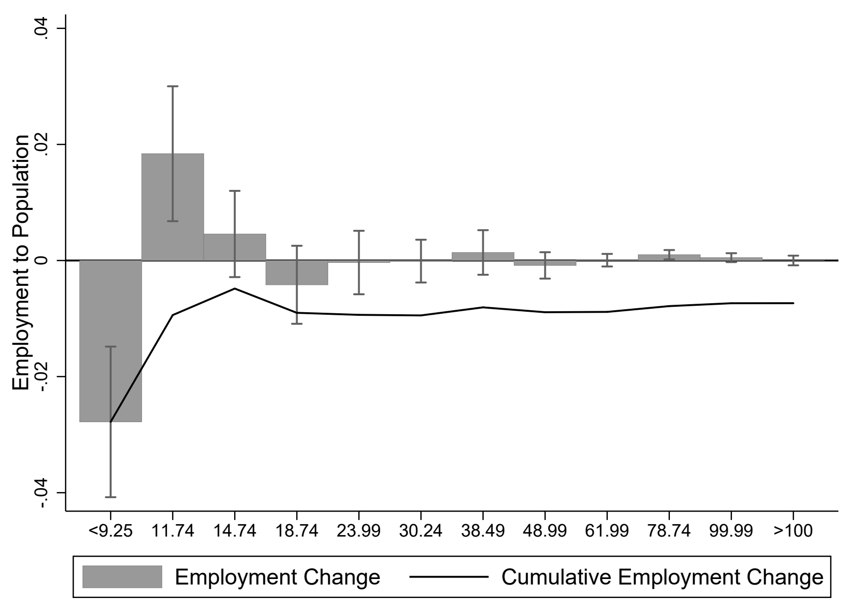

Figure 4: Figure shows the estimated change in employment per population in each bin from the state-bin specification (see Equation 2) with 95% confidence intervals. The black line measures the cumulative change in employment. See the Online Appendix for the corresponding table.

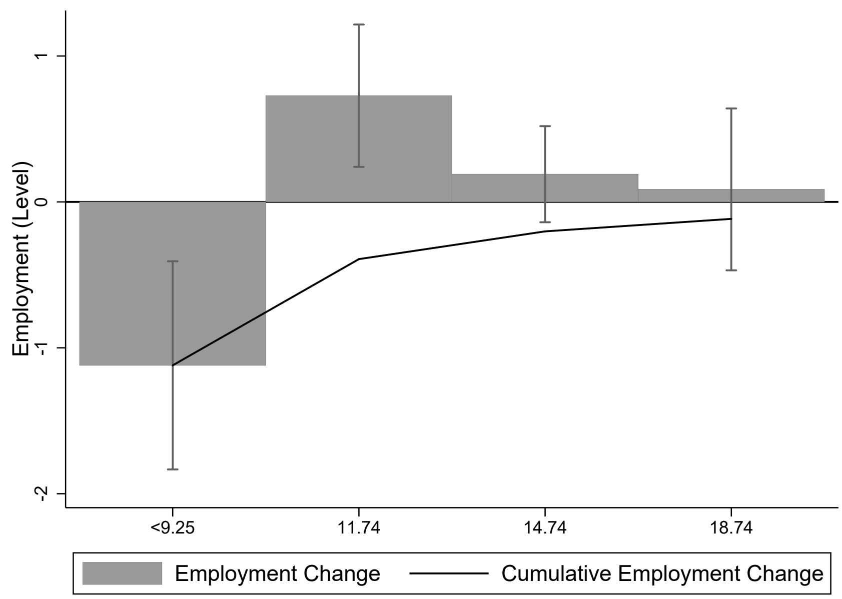

Figure 5: Each figure shows the estimated change in the number of employees in each bin from the panel specification (see Equation 2) with 95% confidence intervals. The black line measures the cumulative change in employment. See the Online Appendix for the corresponding table.

Table 1: States with Substantive Minimum Wage Increases in 2014 and 2015

State	Date	Previous Minimum	Initial Increase	2016 Level
New York	December 31, 2013	7.25	0.75	9.00
Connecticut	January 1, 2014	8.25	0.45	9.60
California	July 1, 2014	8.00	1.00	10.00
New Jersey	July 1, 2014	7.25	1.00	8.36
West Virginia	December 31, 2014	7.25	0.75	8.75
Alaska	January 1, 2015	7.75	1.00	9.75
Hawaii	January 1, 2015	7.25	0.50	8.50
Massachusetts	January 1, 2015	8.00	1.00	10.00
Nebraska	January 1, 2015	7.25	0.75	9.00
South Dakota	January 1, 2015	7.25	1.25	8.55

Note: States included in the treatment group. Previous minimum is the state or federal binding minimum wage in 2013. Initial increase is the amount the minimum wage increased at the date listed. 2016 level is the ultimate minimum wage as of 2016.

Table 2: Wage Bin Definitions by Year

Bins:	1	2	3	4	5	6	7	8	9	10	11	12
2000-2005	≤ 6.75	8.49	10.74	13.49	16.99	21.49	27.24	34.49	43.74	55.49	69.99	≥ 70
2006-2008	≤ 7.5	9.49	11.99	15.24	19.24	24.49	30.99	39.24	49.79	63.24	79.99	≥ 80
2009-2013	≤ 9.25	11.49	14.49	18.24	22.74	28.74	35.99	45.24	56.99	71.49	89.99	≥ 90
2014-2018	≤ 9.25	11.74	14.74	18.74	23.99	30.24	38.49	48.99	61.99	78.74	99.99	≥ 100

Note: Cutoffs for wage bins by year in OEWS establishment wage data.

Table 3: Summary Statistics

	Full Sample	Pre-period Treatment	Pre-period Control	Post-Period Treatment	Post-Period Control	Difference in Difference
Panel A: Cross-Section Sample						
Establishment Size	16.13	16.39	15.70	16.17	16.36	-0.88
	(0.08)	(0.19)	(0.13)	(0.18)	(0.14)	
Share Bin 1 (≤ $9.25)	0.17	0.17	0.23	0.08	0.19	-0.04
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Share Bin 2 ($9.26-$11.74)	0.15	0.13	0.14	0.18	0.14	0.04
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Share Bin 3 ($11.75-$14.74)	0.15	0.14	0.15	0.15	0.15	0.02
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Share Bin 4+ (≥$14.74)	0.53	0.57	0.48	0.59	0.52	-0.02
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Binding Minimum	7.74	7.67	7.25	9.17	7.25	1.50
Wage	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Observations	982,030	164,916	324,905	166,170	326,039	
Panel B: Matched Panel Sample						
Establishment Size	16.5	15.9	15.2	18.0	17.3	-0.11
	(0.10)	(0.25)	(0.17)	(0.28)	(0.17)	
Share Bin 1 (≤ $9.25)	0.16	0.16	0.22	0.07	0.17	-0.04
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	
Share Bin 2 ($9.26-$11.74)	0.14	0.12	0.13	0.17	0.14	0.05
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Share Bin 3 ($11.75-$14.74)	0.14	0.13	0.15	0.14	0.15	0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Share Bin 4+ (≥$14.74)	0.55	0.58	0.50	0.61	0.54	-0.01
	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)	
Binding Minimum	7.75	7.67	7.25	9.25	7.25	1.57
Wage	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)	
Observations	279,120	48,689	90,871	48,689	90,871	

Note: Means and standard errors of key variables, weighted using QCEW-adjusted sampling weights. Additional summary statistics are in the Appendix.

Table 4: Change in State Employment Share by Wage Bin

	(1)	(2)	(3)	(4)
T × Post × :				
Bin 1 (≤\$9.25)	-0.026***	-0.023**	-0.023*	-0.022*
	(0.007)	(0.007)	(0.009)	(0.009)
Bin 2 (≤ \$11.74)	0.022***	0.015***	0.022***	0.016**
	(0.005)	(0.004)	(0.006)	(0.006)
Bin 3 (≤ \$14.74)	0.006*	0.004**	-0.002	-0.002
	(0.003)	(0.001)	(0.003)	(0.003)
Bin 4 (≤ \$18.74)	-0.004	-0.003	-0.006	-0.009
	(0.002)	(0.003)	(0.004)	(0.005)
Bin 5 (≤ \$23.99)	-0.000	0.000	-0.002	-0.001
	(0.002)	(0.002)	(0.003)	(0.004)
Bin 6 (≤ \$30.24)	0.000	-0.000	-0.000	0.000
	(0.001)	(0.002)	(0.002)	(0.002)
Bin 7 (≤ \$38.49)	0.002	0.003	0.005	0.007
	(0.002)	(0.002)	(0.003)	(0.005)
Bin 8 (≤ \$48.99)	-0.001	0.001	0.002	0.004
	(0.001)	(0.002)	(0.002)	(0.003)
Bin 9 (≤ \$51.99)	0.000	0.000	-0.000	0.001
	(0.001)	(0.001)	(0.002)	(0.001)
Bin 10 (≤ \$78.74)	0.001*	0.001	0.002	0.001
	(0.000)	(0.001)	(0.001)	(0.001)
Bin 11 (≤ \$99.99)	0.001	0.001	0.002**	0.002**
	(0.000)	(0.001)	(0.001)	(0.001)
Bin 12 (≥ \$100)	0.000	0.001	0.000	0.001
	(0.000)	(0.000)	(0.001)	(0.001)
Observations	1488	1296	1488	1296
Sample	Cross-section		Panel (matched)	
Set of Treatment States	Full	Restricted	Full	Restricted

Note: State-by-bin-level specifications, 2012 through 2016, with 2014 omitted. Estimates include state by bin and year by bin fixed effects. Estimates are weighted using QCEW-adjusted sampling weights. T indicates minimum wage increasing states, Post indicates after 2014. Restricted treatment states include only states with a minimum wage below \$9.25 at the end of 2016. Standard errors are clustered at the state level. *** p<0.001, ** p<0.01, * p<0.05.

Table 5: State Change in Employment to Population Ratio

	(1)	(2)
T × Post	0.001	-0.003
	(0.004)	(0.003)
Observations	494	494
State Per Capita GDP	N	Y

Notes: State by quarter level QWI employment and annual LAUS civilian non-institutional population data from 2012 through 2016, with 2014 omitted. 2016Q3 and Q4 QWI data unavailable from Alaska. Estimates include state and quarter-by-year fixed effects. T indicates minimum wage increasing states, Post indicates after 2014. State GDP per capita measured annually. Standard errors are clustered at the state level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

Table 6: Within Establishment Change in Employment Share by Bin

	$9.25 Bin 1	$11.74 Bin 2	$14.74 Bin 3	$18.74+ Bins 4 to 12
Panel A: Difference in Difference				
T × Post	-0.043	0.048***	0.009	-0.013*
	(0.027)	(0.012)	(0.014)	(0.005)
Panel B: Heterogeneity by Industry Exposure				
T × Post × Industry 5 to 15% Bin 1	-0.016	0.008	0.008	0.000
	(0.022)	(0.007)	(0.021)	(0.017)
T × Post × Industry 15 to 25% Bin 1	-0.127*	0.070***	0.006	0.051
	(0.053)	(0.014)	(0.025)	(0.033)
T × Post × Industry 25 to 35% Bin 1	-0.150***	0.125***	0.024	0.001
	(0.040)	(0.026)	(0.016)	(0.021)
T × Post × Industry over 35% Bin 1	-0.227***	0.153***	0.051***	0.024
	(0.057)	(0.040)	(0.007)	(0.020)
Panel C: Heterogeneity by Pre-Period Employment in Bin 1 (under $9.25)				
T × Post × 5 to 15% Bin 1	-0.028	0.004	0.002	0.022
	(0.015)	(0.009)	(0.012)	(0.028)
T × Post × 15 to 25% Bin 1	-0.053	0.007	-0.001	0.048
	(0.036)	(0.009)	(0.014)	(0.036)
T × Post × 25 to 35% Bin 1	-0.047**	0.030*	0.030*	-0.013
	(0.016)	(0.013)	(0.014)	(0.015)
T × Post × 35 to 75% Bin 1	-0.179*	0.131***	0.007	0.042
	(0.078)	(0.035)	(0.020)	(0.032)
T × Post × $\geq$ 75% Bin 1	-0.274	0.212*	0.023	0.039
	(0.165)	(0.082)	(0.034)	(0.052)
Observations	279120	279120	279120	279120

Note: Establishment-level specifications, November 2012 through November 2016, with 2014 and May 2015 omitted. All specifications include establishment and year by half-year fixed effects, Panels B and C additionally include state by year by half-year fixed effects. Estimates are weighted using QCEW-adjusted sampling weights. T indicates minimum wage increasing states, Post indicates after 2014. Exposure groups defined in Section Ṡtandard errors are clustered at the state level. *** p<0.001, ** p<0.01, * p<0.05.

Table 7: Employment and Closing

	(1) Log Emp.	(2) Closed
T $\times$ Post	-0.004	0.004
	(0.015)	(0.007)
Observations	279120	295902

Note: Establishment-level specifications, weighted using QCEW-adjusted sampling weights. T indicates minimum wage increasing states, Post indicates after 2014. Column (1) includes establishment fixed effects and is estimated using data November 2012 through November 2016, with 2014 and May 2015 omitted. Column (2) includes two waves of matched data from November 2009 through November 2016. Log emp refers to the log of total establishment employment, closed is an indicator for the establishment closing within the next three years. Standard errors are clustered at the state level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

Table 8: Wage Spillovers by Occupation Type

	\$9.25 Bin 1	\$11.74 Bin 2	\$14.74 Bin 3	\$18.74+ Bins 4 to 12
Panel A: Low-Wage Occupations				
T× Post × Bin 1 Emp. 5% to 15%	-0.070	0.045	-0.085	0.110*
	(0.038)	(0.053)	(0.042)	(0.042)
T× Post × Bin 1 Emp. 15% to 25%	-0.049	0.067	-0.029	0.011
	(0.068)	(0.039)	(0.035)	(0.049)
T× Post × Bin 1 Emp. 25% to 35%	-0.110**	0.140*	-0.079*	0.049
	(0.036)	(0.066)	(0.035)	(0.041)
T× Post × Bin 1 Emp. 35% to 75%	-0.277**	0.258**	-0.056	0.075*
	(0.082)	(0.078)	(0.045)	(0.034))
T× Post × Bin 1 Emp. ≥75%	-0.368*	0.330**	-0.045	0.084*
	(0.146)	(0.118)	(0.051)	(0.031)
N	83112	83112	83112	83112
Panel B: Spillover Occupations				
T × Post × Bin 1 Emp. 5% to 15%	-0.034	-0.002	0.039*	0.040
	(0.023)	(0.025)	(0.017)	(0.032)
T × Post × Bin 1 Emp. 15% to 25%	-0.069*	-0.040	0.002	0.124
	(0.033)	(0.029)	(0.044)	(0.061)
T × Post × Bin 1 Emp. 25% to 35%	-0.006	-0.049	0.010	0.055
	(0.022)	(0.043)	(0.027)	(0.035)
T × Post × Bin 1 Emp. 35% to 75%	-0.111**	-0.015	0.061*	0.052
	(0.040)	(0.040)	(0.024)	(0.033)
T × Post × Bin 1 Emp. ≥75%	-0.005	-0.185***	0.104*	0.103
	(0.088)	(0.035)	(0.051)	(0.056)
N	111416	111416	111416	111416

Note: Establishment-level specifications, November 2012 through November 2016, with 2014 and May 2015 omitted. All specifications include establishment and year by half-year fixed effects, Panels B and C additionally include state by year by half-year fixed effects. Estimates are weighted using QCEW-adjusted sampling weights. T indicates minimum wage increasing states, Post indicates after 2014. Occupation groups and exposure groups defined in Section 2.2. Standard errors are clustered at the state level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

Table 9: Supervisors and Spillover Occupations

	\$9.25 Bin 1	\$11.74 Bin 2	\$14.74 Bin 3	\$18.74+ Bins 4 to 12
Panel A: Supervisor Spillover Occupations				
T × Post × 5 to 15% Bin 1	-0.037	-0.048	-0.196	0.280
	(0.029)	(0.109)	(0.269)	(0.215)
T × Post × 15 to 25% Bin 1	-0.020	-0.018	-0.135	0.176
	(0.033)	(0.107)	(0.218)	(0.171)
T × Post × 25 to 35% Bin 1	-0.006	-0.104	0.042	0.068
	(0.030)	(0.111)	(0.191)	(0.149)
T × Post × 35 to 75% Bin 1	-0.046	-0.105	0.056	0.094
	(0.033)	(0.118)	(0.187)	(0.152)
T × Post × ≥ 75% Bin 1	-0.050	-0.296**	0.134	0.213
	(0.034)	(0.082)	(0.144)	(0.136)
N	11752	11752	11752	11752
Panel B: Non-Supervisor Spillover Occupations				
T × Post × 5 to 15% Bin 1	-0.035	0.003	0.049*	0.024
	(0.023)	(0.023)	(0.022)	(0.033)
T × Post × 15 to 25% Bin 1	-0.083*	-0.042	0.017	0.125
	(0.039)	(0.029)	(0.039)	(0.065)
T × Post × 25 to 35% Bin 1	-0.014	-0.039	0.005	0.058
	(0.026)	(0.039)	(0.025)	(0.033)
T × Post × 35 to 75% Bin 1	-0.226**	0.004	0.079**	0.091
	(0.081)	(0.053)	(0.028)	(0.062)
T × Post × ≥ 75% Bin 1	0.063	-0.007	0.045	-0.083
	(0.326)	(0.159)	(0.057)	(0.181)
Observations	102530	102530	102530	102530
Panel C: All Supervisor Occupations				
T × Post × 5 to 15% Bin 1	0.001	0.009	0.012	-0.021
	(0.002)	(0.012)	(0.012)	(0.016)
T × Post × 15 to 25% Bin 1	0.008	0.005	0.029	-0.042
	(0.006)	(0.009)	(0.027)	(0.022)
T × Post × 25 to 35% Bin 1	0.001	-0.006	0.037	-0.032
	(0.004)	(0.009)	(0.029)	(0.026)
T × Post × 35 to 75% Bin 1	-0.013**	0.030	0.013	-0.030
	(0.004)	(0.021)	(0.024)	(0.021)
T × Post × ≥ 75% Bin 1	-0.012	-0.084**	0.076*	0.020
	(0.016)	(0.030)	(0.032)	(0.030)
Observations	118598	118598	118598	118598

Note: Establishment-level specifications, November 2012 through November 2016, with 2014 and May 2015 omitted. All specifications include establishment and year by half-year fixed effects, Panels B and C additionally include state by year by half-year fixed effects. Estimates are weighted using QCEW-adjusted sampling weights. T indicates minimum wage increasing states, Post indicates after 2014. Exposure groups and occupation groups defined in Section 2.2. Standard errors are clustered at the state level. *** p<0.001, ** p<0.01, * p<0.05.

Table 10: Pay Compression within Establishments

	(1) 90/10	(2) 90/50	(3) 50/10
Panel A: Difference in Difference			
T × Post	-0.034	0.011	-0.029*
	(0.034)	(0.014)	(0.013)
Panel B: Heterogeneity by Industry Exposure			
T × Post × 5 to 15% Bin 1	-0.071	-0.044	-0.008
	(0.040)	(0.037)	(0.024)
T × Post × Industry 15 to 25% Bin 1	-0.066	-0.054	0.026
	(0.060)	(0.041)	(0.021)
T × Post × Industry 25 to 35% Bin 1	-0.221**	-0.088	-0.080*
	(0.071)	(0.050)	(0.032)
T × Post × Industry over 35% Bin 1	-0.036	-0.096	0.028
	(0.079)	(0.051)	(0.017)
Panel C: Heterogeneity by Pre-Period Employment in Bin 1 (under $9.25)			
T × Post × 5 to 15% Bin 1	-0.172	0.033	-0.076
	(0.186)	(0.090)	(0.054)
T × Post × 15 to 25% Bin 1	-0.334**	-0.077	-0.135***
	(0.120)	(0.084)	(0.033)
T × Post × 25 to 35% Bin 1	-0.245*	-0.033	-0.112**
	(0.107)	(0.055)	(0.035)
T × Post × 35 to 75% Bin 1	-0.230***	-0.053	-0.116*
	(0.061)	(0.047)	(0.044)
T × Post × ≥ 75% Bin 1	-0.090	-0.083	-0.010
	(0.054)	(0.051)	(0.036)
N	279120	279120	279120

Note: Establishment-level specifications, November 2012 through November 2016, with 2014 and May 2015 omitted. All specifications include establishment and year by half-year fixed effects, Panels B and C additionally include state by year by half-year fixed effects. Estimates are weighted using QCEW-adjusted sampling weights. T indicates minimum wage increasing states, Post indicates after 2014. Dependent variables are the ratios of the log 90th percentile wage to the log 10th percentile wage, and so forth. Exposure groups defined in Section 2.2. Standard errors are clustered at the state level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

Table 11: State Level Change in Occupational Structure

	(1)
T $\times$ Post $\times$ Managers and Supervisors	-0.002
	(0.001)
T $\times$ Post $\times$ Professional	-0.000
	(0.002)
T $\times$ Post $\times$ Sales/Clerical	-0.002
	(0.002)
T $\times$ Post $\times$ Production	0.001
	(0.004)
T $\times$ Post $\times$ Service	-0.001
	(0.002)
Observations	620

Note: State by occupation group specification, 2012 through 2016 with 2014 omitted. T indicates minimum wage increasing states, Post indicates after 2014. Estimates include state by occupation group and year by occupation group fixed effects. Occupation groups are defined in Section 2.2. Standard errors are clustered at the state level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

Table 12: Within-Establishment Change in Occupational Structure

	Managers and Supervisors (1)	Professional (2)	Sales and Clerical (3)	Production (4)	Service (5)	Reallocation Index (6)
Panel A: Difference in Difference						
T × Post	-0.003	0.003	-0.006	0.009	-0.002	0.007
	(0.005)	(0.004)	(0.008)	(0.005)	(0.004)	(0.011)
Panel B: Heterogeneity by Industry Exposure						
T × Post × Industry ≤ 5% Bin 1	0.012*	0.004	-0.008	-0.011	-0.001	-0.032
	(0.007)	(0.006)	(0.009)	(0.008)	(0.004)	(0.028)
T × Post × Industry 5 to 15% Bin 1	0.023*	-0.003	-0.001	-0.021*	0.002	0.019
	(0.011)	(0.010)	(0.011)	(0.008)	(0.008)	(0.030)
T × Post × Industry 15 to 25% Bin 1	-0.000	0.012	-0.035*	0.007	0.016	-0.026
	(0.015)	(0.015)	(0.016)	(0.008)	(0.016)	(0.046)
T × Post × Industry over 35% Bin 1	0.024*	0.002	-0.011	-0.004	-0.011	-0.055
	(0.011)	(0.006)	(0.017)	(0.016)	(0.032)	(0.071)
Panel C: Heterogeneity by Pre-Period Employment in Bin 1 (under $9.25)						
T × Post × ≤ 5% Bin 1	0.007	0.006	-0.009	-0.012	0.007	-0.012
	(0.006)	(0.011)	(0.011)	(0.009)	(0.010)	(0.017)
T × Post × 5 to 15% Bin 1	0.022	0.004	0.004	-0.029	-0.002	0.001
	(0.012)	(0.013)	(0.022)	(0.014)	(0.009)	(0.019)
T × Post × 15 to 25% Bin 1	-0.019*	0.004	-0.005	-0.003	0.023***	-0.035
	(0.008)	(0.012)	(0.010)	(0.008)	(0.005)	(0.0190)
T × Post × 25 to 35% Bin 1	0.013	-0.005	-0.003	-0.006	0.001	0.026
	(0.010)	(0.009)	(0.011)	(0.009)	(0.005)	(0.0298)
T × Post × ≥ 75% Bin 1	0.024	0.004	-0.046	0.009	0.009	-0.065
	(0.014)	(0.013)	(0.030)	(0.007)	(0.013)	(0.073)
Observations	279120	279120	279120	279120	279120	279120

Note: Establishment-level specifications. Columns (1) through (5) use data from November 2012 through November 2016, with 2014 and May 2015 omitted. Column (6) includes two waves of matched data from November 2009 through November 2016. All specifications include year by half-year fixed effects, Panels B and C include state by year by half-year fixed effects. Columns (1) through (5) include establishment fixed effects, column (6) includes state fixed effects. T indicates minimum wage increasing states, Post indicates after 2014. Exposure groups defined in Section 2.2. Dependent variables for columns (1) through (5) are the share of employment in each occupational group. Column (6) dependent variable is the 6-digit reallocation index, defined in Section 2.2 . Standard errors are clustered at the state level. *** p<0.001, ** p<0.01, * p<0.05.