The Wage and Employment Effects of California's Fast-Food Minimum Wage

Naser Hamdi and David Sovich*

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Abstract

In April 2024, California raised the minimum wage for fast-food workers to $20 an hour. In this paper, we use payroll data to study the employment and wage effects of this historically large, sector-specific minimum wage policy. For incumbent fast-food employees, the policy resulted in significantly higher wages and lower turnover throughout the wage distribution. While fast-food firms hired fewer workers in response to the policy, these reductions failed to keep pace with the decline in turnover, causing employment to rise slightly. We find no evidence of wage or employment spillovers in other low-wage sectors, inconsistent with strategic wage-setting models.

*Hamdi is at Equifax (nhamdi@gmail.com). Sovich is at University of Kentucky, Gatton College of Business and Economics (davidsovich@uky.edu). This paper represents the views of the authors and not Equifax Inc.

1 Introduction

On April 1, 2024, the state of California raised the minimum wage for fast-food workers to $20 an hour, up 25% from the broader $16 an hour minimum wage in the state. In this paper, we examine the short-run effects of this policy on employment and wages, which is important to do for several reasons. First, both the $4 hourly wage increase and the $20 hourly wage level are far outside the ranges previously studied in the minimum wage literature (Dube and Lindner 2025). Second, by directly raising the wages of nearly 90% of California fast-food workers (Reich and Sosinsky 2024), the policy threatened to significantly compress the pay distribution within fast-food firms if employers did not take corrective actions (Dube, Giuliano, and Leonard 2019). Third, in contrast to the federal, state, and local minimum wages frequently studied in the literature, California's minimum wage policy only applied to a single sector. If the low-wage labor market is characterized by strategic wage-setting interactions between employers like in Berger, Herkenhoff, and Mongey 2022, then other low-wage employers may have raised their wages to ward off employee exodus to the fast-food sector. Fourth, the concurrent establishment of a "Fast-Food Council" with the power to unilaterally determine subsequent minimum wage increases may have caused some fast-food firms to reconsider expanding their operations in California (Aaronson et al. 2017).

To study the effects of California's fast-food minimum wage increase, we use monthly payroll data from thousands of firms with operations throughout the United States, many of which are in the fast-food industry. The anonymized data cover over 30 million workers each month and contain detailed information about each worker's hourly wage, dates of employment, job title, geographic location, and (sometimes) hours worked per week. By combining these data with a straightforward difference-in-differences design, we can precisely estimate both the direct effects of the policy on fast-food firms and the spillover effects on other low-wage employers. In addition, we can quantify the magnitude wage spillovers within fast-food firms across the entire hourly wage distribution, unlike most studies.

We estimate our difference-in-differences models at both the establishment level and

the employee level.[1] While the establishment-level analysis examines how California's fast-food minimum wage increase affected the total stock and flow of low-wage employment, the employee-level analysis estimates the policy's effects on incumbent low-wage workers that were employed prior to April 2024. For both analyses, we restrict the sample period to July 2023 to January 2025 (i.e., ±9 months from April 2024). We also require that non-fast-food establishments employ a sufficient fraction of low-wage labor, which we define as workers earning below $30 an hour (à la Jardim et al. 2022 and Derenoncourt and Weil 2025).

We begin by estimating the wage responses of incumbent fast-food employees to the policy. For "bound" employees previously earning below $20 an hour, we find that hourly wages rose almost exactly up to the new minimum wage rate. We then repeat the estimation across the entire hourly wage distribution to test for wage spillovers within fast-food firms. We find evidence of significant wage spillovers extending up to $25 an hour, or $5 above the new minimum wage. Many of these wage spillovers are just as large as the mandated wage increase for bound employees, consistent with firms aiming to preserve relative pay gaps between different classes of workers, such as shift managers and cashiers (Dube, Giuliano, and Leonard 2019).

We then estimate the employment effects of the policy for incumbent fast-food employees. We find that higher hourly wages led to significantly lower voluntary turnover and no material reductions in employment or hours worked per week. Our estimated elasticity of bound employee turnover to wages is 2.89, which implies a labor supply elasticity of 5.78 using the "doubling shortcut" from Manning 2003.[2] Overall, our results suggest that incumbent fast-food workers generally benefited from California's fast-food minimum wage policy, with bound employees' average monthly incomes rising by nearly $300.

1. The geographic locations reported in our payroll data correspond to places of residence, not places of employment. Therefore, we follow Gopalan et al. 2021 and Derenoncourt and Weil 2025 and define an establishment as a firm × core-based statistical area (CBSA) combination.

2. The magnitude of our estimated labor supply elasticity is consistent with estimates from prior studies, including Card et al. 2018, Azar, Berry, and Marinescu 2019, and Basier, Dube, and Naidu 2021. For context, a labor supply elasticity of 5.78 implies that wages were marked down relative to marginal revenue products by roughly 15% in a simple monopsonistic competition model (Card 2022).

Given the results of our employee-level analysis, we then turn towards estimating the effects of California's fast-food minimum wage policy at the establishment level. Consistent with Gopalan et al. 2021, we find that fast-food firms hired relatively fewer workers after the minimum wage increase. However, the slow-down in hiring failed to keep pace with the reduction in employee turnover, resulting in a slight increase in total employment. Our establishment-level estimates for wages and employment imply an employment elasticity with respect to own-wage (OWE) of 0.19 (s.e. = 0.14), which allows us to rule out elasticities more negative than -0.08 at the 95% confidence level. Thus, despite the historically large size of California's fast-food minimum wage increase, we find no evidence that disemployment effects ate away at pay raises, similar to the findings from Harasztosi and Lindner's 2019 analysis of the effects of Hungary's doubling of its minimum wage.

In our final set of analyses, we test for strategic wage and employment responses by other (i.e., non-fast-food) low-wage employers. Consistent with the literature on voluntary employer minimum wages (Derenoncourt and Weil 2025), we find that other low-wage employers did not respond to California's fast-food minimum wage increase by raising their own wages. At the same time, these employers did not experience heightened levels of attrition to the fast-food sector, likely because of the above-documented reduction in hiring at fast-food firms. The lack of employee attrition to the fast-food sector helps explain why other low-wage employers did not feel pressure to raise their wages (Berger, Herkenhoff, and Mongey 2025). It also suggests that California's fast-food minimum wage policy mainly reduced the amount of churn in the low-wage labor market, as opposed to affecting the quantity of labor supplied to different sectors (à la Derenoncourt and Weil 2025).

One way to interpret our results is that California's fast-food minimum wage policy improved workers' perceptions about job quality in the fast-food sector. Better perceived job quality, in turn, led to lower turnover, which likely lowered recruiting/training costs for employers and might have raised employee productivity.[3] As a result, fast-food firms may

3. Typically, turnover is high in low-wage industries such as fast-food (Giuliano 2013). Furthermore, industry reports suggest that the average fast-food worker requires over 50 hours of training to be able to

have felt less pressure to raise their prices after an increase in their labor costs, thereby explaining the muted impact on total employment. However, we caution that our results may not apply more broadly to minimum wage increases at the federal, state, or local level. Indeed, the primary mechanism holding down disemployment effects in our setting seems to be the reduction in voluntary turnover, which might not arise if all employers were forced to increase their wage rates (Gopalan et al. 2021). Stated differently, the wage and employment effects of a similarly-sized minimum wage increase at the federal, state, or local level may be vastly different than the effects of our sector-specific minimum wage increase (Dube and Lindner 2025).[4]

Our paper makes several contributions to the minimum wage literature. First, it provides new insights into the decades-long debate over the employment effects of the minimum wage (Card and Krueger 1995; Neumark and Wascher 2007; Belman and Wolfson 2019; Neumark and Shirley 2022; Dube and Lindner 2025). While prior studies mainly focus on relatively small changes in the minimum wage at the federal (Clemens and Wither 2019), state (Cengiz et al. 2019), and local level (Jardim et al. 2022), our paper examines the effects of a historically large, sector-specific minimum wage increase (Reich and Sosinsky 2024). As noted above, these differences could, in theory, result in vastly different employment effects. Although we find that fast-food firms hired fewer workers following the minimum wage increase like in Gopalan et al. 2021, the slow-down in hiring did not keep pace with the sharp drop-off in employee turnover, causing total headcount to rise. Our estimated own-wage elasticity of 0.19 is well within the historical range of estimates cataloged by Dube and Lindner 2025, despite the many unique features of our setting.

Closely related to our paper, there are a handful of studies on the employment effects of voluntary minimum wages adopted by large employers. Derenoncourt and Weil 2025 show that the voluntary adoption of a $15 an hour minimum wage at several large retailers led

perform their job effectively (Franchise Times 2024).

4. In their analysis of 72 published papers which primarily study federal and state-level variation in the minimum wage, Dube and Lindner 2025 find a median OWE of -0.13. They also find that OWE estimates tend to be lower for the nontradable sector and do not vary much by the size of the minimum wage increase.

to significant reductions in turnover and slight increases in employment. Raff and Summers 1987 and Emanuel and Harrington 2021 find similar turnover effects following the introduction of voluntary minimum wages at Ford Motor Company and an anonymous Fortune 500 warehouser, respectively. In contrast to the voluntary minimum wages studied in these papers, we focus on a sector-specific minimum wage increase mandated upon all employers, sharpening our identification. We also go beyond just studying the employment effects of this policy, as we estimate both within- and cross-firm wage spillovers as well.

Our paper also contributes to the literature on the effect of the minimum wage on wage inequality. By tracking incumbent employee wages over time, we do not have to assume away disemployment effects like other studies that infer wage spillovers from shifts in the wage distribution (DiNardo, Fortin, and Lemieux 1996; Lee 1999). Moreover, our precise hourly wage data allow us to overcome the various challenges associated with distinguishing true wage spillovers from survey-based measurement error (Autor, Manning, and Smith 2016). Similar to Cengiz et al. 2019 and Gopalan et al. 2021, we document that wage spillovers accrue to incumbent workers previously earning above the new minimum wage. However, our spillover estimates are noticeably larger and extend further up the wage distribution than estimates from prior studies, likely because of the historically large size of California's fast-food minimum wage increase. Furthermore, the fact that some of our spillover estimates are just as large as the minimum wage increase itself is consistent with relative pay concerns playing an important role in how employers set wages (Dube, Giuliano, and Leonard 2019).

Finally, our findings contribute to the search for the "correct" model of the low-wage labor market (Card 2022). One important issue in this discussion is whether models should incorporate strategic wage-setting interactions between low-wage employers (Berger, Herkenhoff, and Mongey 2022). Inconsistent with these interactions being quantitatively important, we find that higher wages in the fast-food sector did not induce non-fast-food employers to raise their wages. To explain this surprising fact, we show that total labor supplied to non-fast-food firms did not change, which is perhaps the key theoretical mechanism needed

to discipline non-fast-food employers to raise their wages. Our results are thus consistent Derenoncourt and Weil 2025, which finds no evidence of strategic wage or employment responses following the adoption of voluntary employer minimum wages.

2 Institutional Background

2.1 California's Fast-Food Minimum Wage

On April 1, 2024, the state of California enacted AB 1228, establishing a $20 an hour minimum wage for hourly employees at large fast-food chains with more than 60 locations nationwide.[5] Most iconic American fast-food chains were subject to this law, including Burger King, KFC, McDonald's, Panera Bread, Starbucks, and Taco Bell. Exempt from the law were smaller fast-food chains with fewer than 60 locations nationwide, as well as full-service restaurant chains (e.g., Applebee's and Chili's) and other low-wage employers (e.g., big-box retailers).[6] In addition to establishing a $20 an hour minimum wage for the fast-food sector, AB 1228 also created a "Fast-Food Council" with the power to set future minimum wage increases for fast-food workers (capped at 3.5% per year or the increase in the CPI, whichever was smaller) and recommend, but not mandate, standards for working conditions and training practices in the sector.

AB 1228 was passed on September 28, 2023 as the result of negotiations between the state of California, the International Franchise Association, and various fast-food labor organizations. It replaced an earlier law, AB 257, that was originally passed in September 2022 but had a good chance of being invalidated by a state ballot initiative.[7] Supporters of AB 1228

5. According to the law, both limited-service restaurant chains and snack/non-alcoholic beverage chains were considered to be fast-food chains. See State of California Department of Industrial Relations 2024.

6. There were also several one-off exemptions to the law. For example, locations of fast-food chains inside of airports, stadiums, and a few other places – which tend to be managed by food services companies such as Aramark – were exempt from the law. We do our best to remove exempt locations from the analysis.

7. Under AB 257, the fast-food minimum wage could be set as high as $22 an hour instead of $20 an hour. Moreover, the Fast-Food Council had the power to regulate working conditions and training practices in the fast-food sector, not just recommend standards.

included Democratic California Governor Gavin Newsom, who said that it would improve the lives of hundreds of thousands of fast food workers in the state (Wall Street Journal 2024b). Opponents of the law said that it would reduce employment and raise fast-food prices (Wall Street Journal 2024c), while also showing favoritism towards fast-food workers and failing to lift many families out of poverty (Wall Street Journal 2024d).

Along with establishing one of the first sector-specific minimum wages in the United States, AB 1228 differed from other minimum wage laws in many ways. First, since nearly 90% of hourly fast-food employees in California were paid less than $20 an hour before AB 1228 was enacted (Figure IA.1), the policy effectively had more than twice the bite of any previous minimum wage law.[8] Second, the $20 an hour final wage rate established under AB 1228 was significantly higher than the minimum wage in every other state and the overwhelming majority of locality-specific minimum wages (Figure IA.2).[9] Finally, the $4 an hour size of the mandated wage increase was much larger than other recently-enacted minimum wage increases across the country. Between 2013 and 2023, the size of the average state-wide minimum wage increase was $0.62 per hour, with the largest single increase being for $2.25 per hour in Virginia in 2021 (Figure IA.3). California itself took over five years to raise its minimum wage by $4 from $12 an hour in 2019 to $16 an hour in 2024.

2.2 Selection of Control States

Our main analysis compares fast-food employees and establishments in California to observably similar employees and establishments in 22 control states that did not increase their minimum wage between 2022 and 2024. Figure IA.4 plots the 23 states in our analysis, and Table IA.1 describes these states' minimum wage policies as of January 2024. In most of the control states, the binding minimum wage is the federal minimum wage of $7.25 an hour. The only exceptions are Arkansas, which last increased its minimum wage to $11 an hour in

8. Similarly, Reich and Sosinsky 2024 estimate that roughly 90% of non-managerial fast-food employees in California were paid less than $20 an hour before AB 1228 was enacted.

9. As of 2024, the only exception is the $20.29 minimum wage for large employers in two parts of Seattle, which covers significantly fewer workers than California's fast-food minimum wage.

2021, and West Virginia, which last increased its minimum wage to $8.75 an hour in 2016. While there are no locality-specific minimum wages in any of the control states, there are over 40 localities in California with their own minimum wage. As of 2024, most of these locality-specific minimum wages were around $17.50 an hour, with the highest being $19.36 an hour in the city of Emeryville.[10]

Figure IA.5 compares the average macroeconomic conditions in California and the control states during the decade leading up to the enactment of AB 1228. In general, California and the control states were trending similarly in terms of macroeconomic growth rates during this period. However, unemployment was persistently higher in California than the control states between 2013 and 2023, and household income levels and GDP per capita were predictably higher in California as well.

3 Data and Sample

3.1 Data

Our analysis uses monthly payroll records from Equifax for over 5,000 large employers in the United States. These highly accurate payroll records are sourced directly from employers and are primarily used for income and employment verification purposes.[11]

Our anonymized payroll data cover over 30 million employees each month. We observe whether each employee is hourly or salary, along with each employee's exact pay rate, dates of employment, job title, ZIP code of residence, and (for around 20% of employees) hours worked per week. We also observe numerous details about each employer, including their six-digit NAICS code, which allow us to precisely identify large fast-food chains subject to

10. The vast majority of locality-specific minimum wages in California are in the Bay Area and Greater Los Angeles Area, defined broadly. See UC Berkeley Labor Center 2025.

11. For example, many state agencies in charge of administering Medicaid, SNAP, and unemployment insurance request income and employment information from Equifax to determine benefit eligibility. Lenders also request such information to evaluate loan applications. We observe snapshots of Equifax's payroll database as of the end of each month, with employers typically updating their records on a bi-weekly basis.

California's fast-food minimum wage policy.

Specifically, we follow Reich and Sosinsky 2024 and identify large fast-food chains using the following two conditions. First, the employer (which could be a large franchisee) must belong to one of the following six-digit NAICS industries: 722513 (limited-service restaurants), 722514 (cafeterias), or 722515 (snack and non-alcoholic beverage bars). Second, the employer must be/operate one of the top 50 fast-food chains in the United States by sales, as determined by QSR Magazine 2024. We drop fast-food firms outside the top 50 from our sample to avoid committing any classification errors.

Relative to nationally representative employment data, our payroll data overweights low-wage, high-turnover industries such as food services, retail trade, and warehousing (Gopalan et al. 2021). In addition, the average firm in our data is significantly larger than the average firm in the United States (Derenoncourt and Weil 2025). However, within industries, our payroll data closely matches the population, particularly in terms of average employee incomes and median job tenures (Hamdi, Kalda, and Sovich 2025). Overall, our payroll data is uniquely well-suited for studying the wage and employment effects of California's fast-food minimum wage policy.

3.2 Sample

We conduct our analysis at both the employee level and the establishment level. Below, we describe our employee-level and establishment-level samples in more detail.

3.2.1 Incumbent Employee Samples

Our employee-level analysis primarily focuses on hourly fast-food workers that were employed at some point during the pre-treatment period of July 2023 to March 2024.[12] We categorize these employees as either "bound" employees or "non-bound" employees based on their pre-treatment hourly wage. Bound employees have pre-treatment hourly wages below $20 an

12. Although we focus exclusively on hourly employees, our results are quantitatively similar if we also include salary employees. In our data, salary employees account for fewer than 5% of fast-food workers.

hour; in California, these employees were directly affected by the fast-food minimum wage and hence are of policy interest (Neumark 2019). Non-bound employees have pre-treatment hourly wages greater than or equal to $20 an hour and are informative about the spillover effects of the policy throughout the wage distribution.

The top part of Panel A in Table 1 reports descriptive statistics for our sample of 416,363 incumbent fast-food employees. Prior to treatment, the median fast-food employee earns $15 per hour, works 20 hours per week (conditional on having hours data), and has been employed for 5 months. Treated employees from California predictably earn higher wages, on average, than control employees from lower cost-of-living states that did not increase the minimum wage. However, the average wage difference between employees in California and the control states is much smaller than the difference in these states' minimum wages.

To later test for strategic wage and employment responses by other low-wage employers, we also construct a parallel sample of hourly non-fast-food employees. The bottom part of Panel A in Table 1 reports descriptive statistics for our sample of 8,638,448 incumbent non-fast-food workers, from which we take a 500,000 random sample to conduct our supplemental analysis.[13] The median non-fast-food employee earns $17 an hour, works 40 hours per week, and has been employed for 9 months. Roughly 73% of non-fast-food workers are bound employees, significantly less than the 93% of fast-food workers.

In terms of sample construction, we restrict employee entry to the pre-treatment period for both our fast-food and non-fast-food samples. Employees are dropped from both samples beginning one month after they separate from their initial employer. The sample period runs from July 2023 to January 2025, which is a 9-month window before and after the April 2024 treatment month.

13. We exclude payroll records from employers whose NAICS codes indicate they are in the restaurant industry, but do not specify whether they are in the full-service or limited-service restaurant industry, to avoid classification errors. Our results are not sensitive to reincluding these employers in the analysis.

3.2.2 Establishment Samples

Our establishment-level analysis mainly focuses on employer × core-based statistical area (CBSA) combinations (hereafter, establishments) from the fast-food sector.[14] We also construct a parallel sample of non-fast-food establishments to test for strategic wage and employment responses.

For an establishment to be included in either sample, we require that it employed at least 25 hourly wage workers as of the beginning of the sample period. We also require that at least 10% of the establishment's initial headcount was made up of low-wage labor, which we define as hourly wage workers earning below $30 per hour (à la Jardim et al. 2022 and Derenoncourt and Weil 2025). Similar to our employee-level analysis, the sample period for our establishment-level analysis runs from July 2023 to January 2025. However, we now allow for both establishment entry and exit throughout the sample period.

The top part of Panel B in Table 1 reports descriptive statistics for the 1,097 establishments (23 distinct firms) in our fast-food establishment sample. Prior to treatment, the median fast-food establishment has 67 employees, 94% of which are low-wage workers. The median fast-food establishment hires 5 new employees each month and loses the same amount to turnover. Treated establishments in California are predictably larger than control establishments in states that did not increase their minimum wage, albeit the fractions of low-wage employment are similar.

The bottom part of Panel B in Table 1 reports descriptive statistics for the 24,212 establishments (982 distinct firms) in our non-fast-food establishment sample. On average, non-fast-food establishments are slightly larger than fast-food establishments and employ a lower fraction of low-wage labor.

14. Recall that employee locations in our payroll data correspond to places of residence, not places of employment. Thus, we define an establishment as a firm × CBSA combination, similar to the definition of an establishment in Gopalan et al. 2021 and Derenoncourt and Weil 2025.

4 Results

4.1 Fast-Food Employee Wages

We begin by examining the wage responses of bound fast-food employees. Doing so serves two purposes. First, it allows us to highlight the quality of our data by documenting how bound employees' wages immediately reacted to the California's fast-food minimum wage increase. Second it allows us to visually inspect the validity of the parallel trends assumption and test for differential pre-trends.

Let i denote employees, f denote firms, j denote job titles, h denote hiring months, s denote states, and t denote months. We estimate the following model:

$$W_{i,f,j,h,s,t} = \alpha + \sum_{\tau=-9}^{9} \Gamma_\tau \cdot Treated_s \cdot D_{t,\tau} + \delta_i + \delta_{f,j,h,t} + \varepsilon_{i,f,j,h,s,t}, \tag{1}$$

where $W_{i,f,j,h,s,t}$ is employee i's hourly wage in month t; $Treated_s$ is equal to one if state s is California, and zero otherwise; $D_{t,\tau}$ is equal to one if month t is τ months from April 2024, and zero otherwise; δ_i are employee fixed effects; and $\delta_{f,j,h,t}$ are firm $\times$ job title $\times$ hiring month $\times$ month fixed effects. We set the Γ_τ coefficient for October 2023 equal to zero as the reference period, which is 6 months before the treatment date and 3 months before California increased its state-level minimum wage by \$0.50 to \$16 an hour. Standard errors are clustered at the state level to match the assignment of treatment.

Panel A in Figure 1 plots the coefficient estimates from Equation 1. We find that bound employees' hourly wages immediately increased after the policy change. The pooled average increase in wages was \$3.01 an hour, which is slightly higher than the \$2.78 needed to bring the average bound employee's wage up to the new \$20 an hour fast-food minimum wage. Moreover, consistent with the parallel trends assumption being satisfied, we find no evidence of differential wage pre-trends. Overall, both the timing and the magnitude of the wage response support the validity of our experimental setting.

We next examine wage responses throughout the rest of the hourly wage distribution. To do so, we start by reincorporating non-bound employees into the sample and assigning each employee to a $1 wage bin based on their pre-treatment hourly wage.[15] We then estimate the following model:

$$W_{i,f,j,h,s,t,b} = \alpha + \sum_{b'=16}^{25} \Gamma_{b'} \cdot Treated_s \cdot Post_t \cdot Bin_{b,b'} + \delta_i + \delta_{f,j,h,t} + \delta_{b,t} + \varepsilon_{i,f,j,h,s,t,b}, \quad (2)$$

where $Bin_{b,b'}$ is equal to one for employees in wage bin $b = b'$, and zero otherwise; $Post_t$ is equal to one for all months t beginning April 2024, and zero otherwise; and $\delta_{b,t}$ are wage bin $\times$ month fixed effects. The Γ_b coefficients measure the average relative wage response for treated employees in each wage bin, pooled over the post-treatment period.

Figure 2 plots the coefficient estimates from Equation 2. There are two striking results. First, most fast-food employees who were earning below $18 an hour were moved up to exactly the new $20 an hour fast-food minimum wage. Since most of these employees were earning either the state-level minimum wage or their locality's specific minimum wage, this result suggests that California's fast-food minimum wage policy eliminated many regional differences in binding pay floors that were established over the prior decade.

Second, the policy generated significant wage spillovers for fast-food employees who were earning above $18 per hour. Many of these spillovers were nearly as large as the size of the minimum wage increase, consistent with firms aiming to preserve internal wage hierarchies/relative pay gaps between different classes of workers (Dube, Giuliano, and Leonard 2019). We find that wage spillovers extend up to around $25 per hour, or $5 above the new minimum wage. Furthermore, for non-bound employees previously earning above $20 an hour, the magnitudes of these spillovers are monotonically decreasing with pre-treatment hourly wages.

The wage spillovers in Figure 2 are both larger and broader than those documented

15. We cap the wage bins above at $25 an hour and below at $16 an hour because there are a limited number of fast-food employees in California beyond these bins. See Figure IA.1.

in prior studies.[16] One reason for this could be the historically large size of California's fast-food minimum wage increase, which was almost $2 an hour higher than the largest state-level minimum wage increase between 2013 and 2023. Not only is it likely that this minimum wage increase was more salient to higher-paid employees than previous minimum wage changes, but it was likely not an option for employers to leave higher-paid employees' wages unchanged, as doing so would have eroded most of the relative pay gaps between, say, managers and their subordinates.

4.2 Fast-Food Employee Turnover

We next examine the effect of California's fast-food minimum wage policy on employee turnover. Focusing again on bound employees, we estimate the following model:

$$Turnover_{i,f,j,h,s,t} = \alpha + \sum_{\tau=-9}^{9} \Gamma_\tau \cdot Treated_s \cdot D_{t,\tau} + \delta_i + \delta_{f,j,h,t} + \varepsilon_{i,f,j,h,s,t}, \tag{3}$$

where $Turnover_{i,f,j,h,s,t}$ is equal to one if employee i is no longer employed by their initial employer as of month t, and zero otherwise. Since we drop employees from the sample beginning one month after they separate from their initial employer, the Γ_τ coefficients measure the policy's effects on bound employees' monthly turnover hazard rates.

Panel B in Figure 1 plots the coefficient estimates from Equation 1. While turnover rates trended similarly in California and the control states during the pre-treatment period, treated employees' turnover rates declined sharply soon after the enactment of the fast-food minimum wage. The magnitude of the effect is economically large; on average, turnover rates declined by 2.2% per month, which is a 50% reduction relative to the pre-treatment average turnover hazard rate of 4.4% per month. Dividing the 50% reduction in turnover

16. Examining a series of state-level minimum wage changes averaging $0.94 an hour, Gopalan et al. 2021 find an average spillover effect of $0.05 an hour that extends up to around $2.50 an hour above the new minimum wage. Similarly-sized effects are documented in Cengiz et al. 2019 and Brochu et al. 2023. Both Cengiz et al. 2019 and Gopalan et al. 2021 find that wage spillovers are larger in the non-tradable sector and for firms that employ a larger fraction of minimum wage labor, which is closer to our setting.

by the 17% (= \$3.01 / \$17.75) increase in average wages for bound employees in California, we estimate that the (absolute) elasticity of bound employee turnover to own wages is 2.89, giving us a labor supply elasticity of 5.78 using Manning's 2003 doubling shortcut.

Instead of terminating employees, fast-food firms may have reacted to the minimum wage increase by reducing employee hours. To test this hypothesis, Panel C in Figure 1 re-estimates Equation 3 after replacing $Turnover_{i,f,j,h,s,t}$ with the number of hours worked per week ($Hours_{i,f,j,h,s,t}$). We find that bound employees' hours trended slightly downwards after the policy change. However, the average effect size is economically small (≈ -1 hour per week), and most of the coefficient estimates are barely significant at the 5% level. Overall, the reduction in turnover rates and the null effect on hours suggests that bound employees' incomes rose as a result of the policy change.[17]

Given that non-bound employees also received wage increases (Figure 2), it is natural to examine their turnover and hours responses as well. Figure IA.6 re-estimates Equation 2 on our sample of non-bound employees with $Turnover_{i,f,j,h,s,t}$ and $Hours_{i,f,j,h,s,t}$ as the outcome variables. Similar to bound employees, we find that non-bound employees' turnover rates sharply declined after the policy change. Furthermore, we find no significant reductions in hours worked per week throughout the entire post-treatment period.

Lower employee turnover may have generated substantial cost savings for fast-food firms in the form of lower training and recruitment expenses (Giuliano 2013). Moreover, relatively higher wages in the fast-food sector may have boosted employee productivity and made it easier for fast-food firms to recruit better workers going forward.[18] The existence of such indirect benefits may have partially offset the cost of paying higher wages, thereby reducing the pressure on firms to raise prices. Ultimately, the net cost of the policy to fast-food firms

17. Specifically, we estimate that bound employees' incomes rose by \$273 per month following the policy change. This is equal to the average wage effect in Figure 1 (\$3.01 an hour) multiplied by the pre-treatment average hours worked per week in Table 1 (21) multiplied by the number of weeks per month (52/12).

18. Anecdotal evidence is consistent with these mechanisms being active. For example, several franchisees reported unexpected cost reductions due to lower worker turnover (Franchise Times 2024). Both Dave's Hot Chicken and Raising Cane's also highlighted noticeable improvements in the quantity and quality of job applicants (Wall Street Journal 2024a).

should show up downstream via employment, which we examine in the next section.

4.3 Fast-Food Establishment Employment

We now turn towards examining the employment effects of California's fast-food minimum wage increase at the establishment level. Let f denote firms, c denote CBSAs, s denote states, and t denote months. We estimate the following model:

$$\log Employment_{f,c,s,t} = \alpha + \Gamma \cdot Treated_s \cdot Post_t + \delta_{f,c} + \delta_{f,t} + \varepsilon_{f,c,s,t}, \tag{4}$$

where $Employment_{f,c,s,t}$ is the number of employees at fast-food establishment f, c in month t; $Treated_s$ and $Post_t$ are defined as before; $\delta_{f,c}$ are establishment fixed effects; and $\delta_{f,t}$ are firm $\times$ month fixed effects. The coefficient of interest, Γ, measures the average relative change in employment at fast-food establishments in California, net of firm-specific time shocks. Establishment-level observations are weighted by beginning-of-period employment, and standard errors are clustered at the state level to match the assignment of treatment.

Table 2 reports the coefficient estimates from Equation 4. We find no evidence that California's minimum wage increase led to significant disemployment effects in the fast-food sector. On average, employment at fast-food establishments increased (not decreased) by 2.26% (column 1) after the policy change, with a 95% confidence interval of -1.01% to 5.53%. At the same time, average hourly wages increased by 12.13% (column 2), confirming the bite of the policy. As shown in Table IA.2, we find similarly null employment effects when we re-estimate Equation 4 with low-wage employment (i.e., $<$ \$30 an hour employment) as outcome variable.

To more easily compare our results to the minimum wage literature, we convert our wage and employment estimates into an own-wage elasticity (OWE). The OWE measures the percentage change in employment relative to the percentage change in wages and represents the labor demand elasticity in the standard competitive model. Dividing the 2.26% increase

in employment in column 1 of Table 2 by the 12.13% increase in hourly wages in column 2, we arrive at an OWE of 0.19, which is slightly higher than the median OWE of -0.13 from the 72 published studies analyzed by Dube and Lindner 2025. Furthermore, despite the historically large size of California's minimum wage increase, we can rule out OWEs more negative than -0.08 at the 95% confidence level.[19] The muted disemployment effect is consistent with Harasztosi and Lindner 2019, which finds an OWE close to 0 for the nontradable sector following the doubling in Hungary's national minimum wage.

What drives the marginally positive employment effect? To answer this question, we re-estimate Equation 4 with monthly hiring and turnover as the outcome variables. Consistent with Gopalan et al. 2021, we find that fast-food establishments hired relatively fewer workers following the increase in the minimum wage. However, the 6.46% decline in hiring (column 3) failed to keep pace with the 14.79% reduction in turnover (column 4), causing total employment to rise.[20] As we show in Section 4.4 below, one driving factor behind this result may have been the lack of wage responses outside the fast-food sector, which might have increased the attractiveness of fast-food jobs relative to other forms of low-wage labor.

We complement the pooled analysis above by conducting a dynamic analysis of the effects of California's fast-food minimum wage increase. Specifically, we estimate the following model:

$$\log Y_{f,c,s,t} = \alpha + \sum_{\tau=-9}^{9} \Gamma_\tau \cdot Treated_s \cdot D_{t,\tau} + \delta_{f,c} + \delta_{f,t} + \varepsilon_{f,c,s,t}. \tag{5}$$

where the outcome variable, $Y_{f,c,s,t}$, is either establishment employment, average hourly wages, hiring, or turnover. Like our employee-level anslysis, we set Γ_τ equal to zero for the

19. Standard errors for our OWE estimate are computed using the delta method and assuming the independence of the wage and employment estimates. As shown in Table IA.3, formal estimates of the OWE from a two-stage least squares regression produce similar results. The main alternative to reporting the OWE is reporting the elasticity of employment to the minimum wage. By dividing our 2.26% employment estimate by the 25% increase in California's fast-food minimum wage, we estimate an elasticity of employment to the minimum wage of 0.09, which is well above both the "old" consensus range of -0.3 to -0.1 (Brown, Gilroy, and Kohen 1982) and the "new" consensus range of -0.12 to -0.05 (Belman and Wolfson 2019).

20. Our estimates imply an establishment-level (absolute) elasticity of turnover to own wage of 1.22, which gives us an establishment-level labor supply elasticity of 2.44. Our establishment-level elasticities are lower than our employee-level elasticities because the turnover rate of bound employees is more sensitive to wages than the turnover rate of the average employee.

October 2023 reference period. The Γ_τ coefficients capture average differential changes in the outcome variable for fast-food establishments in California.

Figure IA.7 plots the coefficient estimates from Equation 5. We continue to find that employment trended upward at treated establishments during the post-treatment period, albeit most of the coefficient estimates are statistically insignificant. Panel B confirms that average hourly wages increased immediately after the treatment date, and Panels C and D show that both hiring and turnover declined significantly following the policy change. We find no evidence of differential pre-trends for any of our outcome variables, consistent with our results capturing the causal effects of California's fast-food minimum wage increase.

4.4 Spillover Effects on Other Low-Wage Employers

Finally, we test for strategic wage and employment responses by other (i.e., non-fast-food) low-wage employers. To do so, we start by re-estimating Equation 1 on our sample of bound non-fast-food employees, which is the group of employees that should have the strongest incentive to seek out employment in the fast-food sector if their employers did not raise their wages. Panel A in Figure 3 plots the coefficient estimates from the model. There are two main takeaways. First, although bound non-fast-food employees' wages rose somewhat in 2024, the timing of their wage increase corresponded to the increase in California's state-level minimum wage in January 2024, not the enactment of the fast-food minimum wage in April 2024. Second, the magnitude of their pooled average wage increase is less than \$0.05 per hour, which is far below the \$3.01 an hour average wage increase observed among bound fast-food employees.

Panels B and C in Figure 3 repeat the analysis for turnover rates and hours worked per week, respectively. In general, we find that bound non-fast-food employees' turnover rates decreased (not increased) slightly in 2024, with the initial timing of the effect again corresponding to the January 2024 state-level minimum wage increase. We also find no significant changes in bound non-fast-food employees' hours worked per week, similar to our

results for bound fast-food employees.

The results in Figure 3 suggest that other low-wage employers outside the fast-food sector did not strategically raise their wages in response to California's fast-food minimum wage increase. One reason for this may have been the slow-down in hiring in the fast-food sector, which effectively prevented non-fast-food employees from leaving en masse by easily obtaining higher-paying jobs in the fast-food sector. To further confirm these results, we re-estimate our establishment-level models on our sample of non-fast-food establishments. As shown in Panel B in Table 2, we continue to find no significant wage or employment effects at non-fast-food establishments. While hiring and turnover both rose slightly (the latter primarily for non-bound employees), the net effect on establishment employment was zero. In addition, Figure IA.8 plots the dynamics of the coefficient estimates and documents no economically significant evidence of differential pre-trends.

5 Conclusion

On April 1, 2024, the state of California raised the minimum wage for fast-food workers by $4 an hour to $20 an hour. In this paper, we use payroll data for thousands of firms to study the effects of this policy on employment and wages. We document four main results. First, incumbent fast-food workers experienced significant wage increases and reductions in turnover following the policy. Second, wage gains accrued to both directly affected fast-food workers earning below $20 an hour as well as to higher-paid fast-food workers further up the wage distribution. Third, while fast-food firms reduced their hiring following California's fast-food minimum wage increase, it was not enough to keep pace with the dramatic reduction in employee turnover. As a result, total employment at fast-food firms increased. Fourth, there were no spillover effects on wages or employment in other low-wage sectors, inconsistent with models of strategic wage-setting.

We caution that our employment results might not generalize to minimum wage increases

at the federal, state, or local level. More specifically, the employment effects of a similarly-sized minimum wage increase that applies to all low-wage employers may be vastly different than the effects of California's sector-specific minimum wage increase (Dube and Lindner 2025). One reason for this is that the primary mechanism holding down disemployment effects in our setting seems to be the reduction in voluntary turnover among incumbent fast-food employees and its subsequent effects on training/retention costs. If instead all low-wage employers were forced to (or chose to) raise their wages, then voluntary turnover at fast-food firms might not have declined, forcing fast-food firms to raise their prices more to offset their now-higher labor costs (Gopalan et al. 2021). Under this alternative scenario, fast-food firms may have reduced their total headcount following the minimum wage increase, with the magnitude of the disemployment effect depending on the magnitude of their adopted price increase and the relevant price elasticity of demand.

Finally, our employment results should be interpreted with two additional caveats in mind. First, we only estimate the short-run effects of California's fast-food minimum wage policy. In theory, long-run employment effects may be significantly different than short-run effects (Aaronson et al. 2017), although Dube and Lindner 2025 find little heterogeneity across the time horizon studied. Second, our employment results are specific to the fast-food industry. Prior studies have documented substantial heterogeneity in the employment effects of the minimum wage are across industries, with disemployment effects generally being more pronounced in the tradable sector than the nontradable sector (Harasztosi and Lindner 2019).

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Table 1: Descriptive Statistics

Panel A: Employee-Level Samples

	Mean	SD	P25	P50	P75	Treated	Control	Diff
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hourly Fast-Food Employees								
Bound Employee? (1/0)	0.93	0.26	1.00	1.00	1.00	0.83	0.96	-0.13
Hourly Wage	14.60	3.37	12	15	16.38	17.75	13.70	4.05
Average Weekly Hours	21	15.14	5	20	40	22.62	20.47	2.15
Annualized Income	19,175	12,475	10,415	16,441	24,491	22,126	18,181	3,945
Tenure (Months)	18.67	32.51	1	5	20	25.46	15.34	10.12
Hourly Non-Fast-Food Employees								
Bound Employee? (1/0)	0.73	0.45	0.00	1.00	1.00	0.61	0.75	-0.14
Hourly Wage	17.83	4.50	15	17	20.30	19.95	17.32	2.63
Average Weekly Hours	32.23	13.44	29	40	40	33.32	32.03	1.29
Annualized Income	33,169	20,082	17,352	31,498	45,544	35,142	32,682	2,460
Tenure (Months)	39.54	71.06	1	9	40	44.60	38.34	6.26

Panel B: Establishment-Level Samples

	Mean	SD	P25	P50	P75	Treated	Control	Diff
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fast-Food Establishments								
Employment	244	789	39	67	172	805	191	614
Low-Wage Employment	227	741	35	61	159	756	178	578
% Low-Wage Employment	92%	8%	91%	94%	97%	93%	93%	0%
Monthly Hires	18	51	2	5	15	37	16	21
Monthly Turnover	16	38	2	5	13	37	14	23
Non-Fast-Food Establishments								
Employment	311	1,366	40	75	186	517	281	236
Low-Wage Employment	209	897	27	51	130	337	190	147
% Low-Wage Employment	70%	26%	50%	81%	93%	67%	71%	-4%
Monthly Hires	14	60	1	3	9	20	14	6
Monthly Turnover	12	44	1	3	8	16	11	5

NOTE.—Panel A reports descriptive statistics for our employee-level samples. Panel B reports descriptive statistics for our establishment-level samples. Descriptive statistics are as of the first month each employee or establishment enters the sample. Columns 6 through 8 are defined as follows: *Treated* is the mean for observations in California, *Control* is the mean for observations in the 22 control states, and *Diff* is the difference in means between treated and control observations. In Panel B, *Low-Wage Employment* is defined as the number of employees at an establishment earning below $30 an hour.

Table 2: Effect on Establishment Wages and Employment

Panel A: Fast-Food Establishments

	log Employment	log Hourly Wage	log Hiring	log Turnover
	(1)	(2)	(3)	(4)
Treated × Post	0.0226	0.1213***	-0.0646**	-0.1479***
	(0.0167)	(0.0072)	(0.0266)	(0.0100)
Establishment FE	Y	Y	Y	Y
Firm × Month FE	Y	Y	Y	Y
N	19,729	19,729	19,729	19,729
R^2	0.99	0.95	0.93	0.97

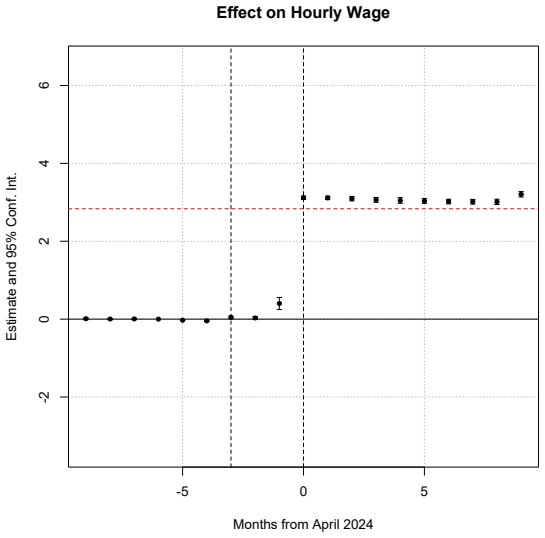
Panel B: Non-Fast-Food Establishments

	log Employment	log Hourly Wage	log Hiring	log Turnover
	(1)	(2)	(3)	(4)
Treated × Post	-0.0004	0.0015	0.0274***	0.0311***
	(0.0033)	(0.0019)	(0.0058)	(0.0044)
Establishment FE	Y	Y	Y	Y
Firm × Month FE	Y	Y	Y	Y
N	442,891	442,891	442,891	442,891
R^2	0.99	0.96	0.94	0.96

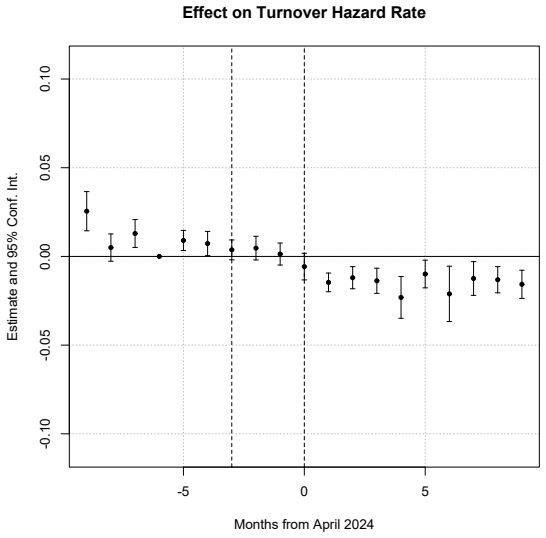
NOTE.—This table reports coefficient estimates from Equation 4. Panel A is for the sample of 1,097 fast-food establishments. Panel B is for the sample of 24,212 non-fast-food establishments. The sample period runs from July 2023 to January 2025. The outcome variables are defined as follows. *Employment* is the total headcount at an establishment. *Hourly Wage* is the average hourly wage at an establishment. *Hiring* is the total number of employees hired at an establishment during a given month. *Turnover* is the total number of separations at an establishment during a given month. Standard errors, reported below the coefficient estimates, are clustered at the state level. *, **, and *** denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Figure 1: Bound Fast-Food Employees: Effects on Wages and Turnover

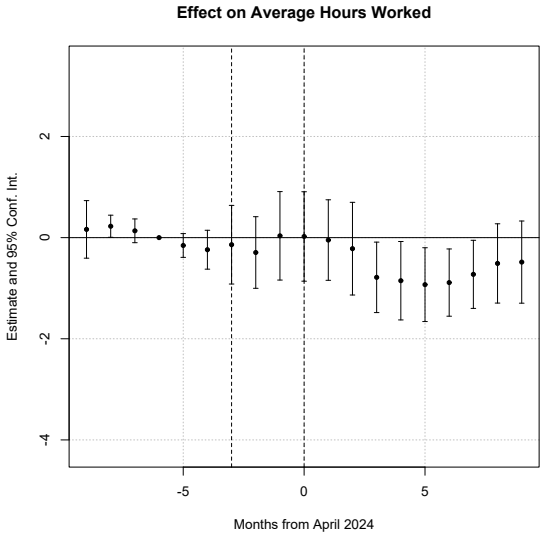
(a) Hourly Wages



(b) Turnover

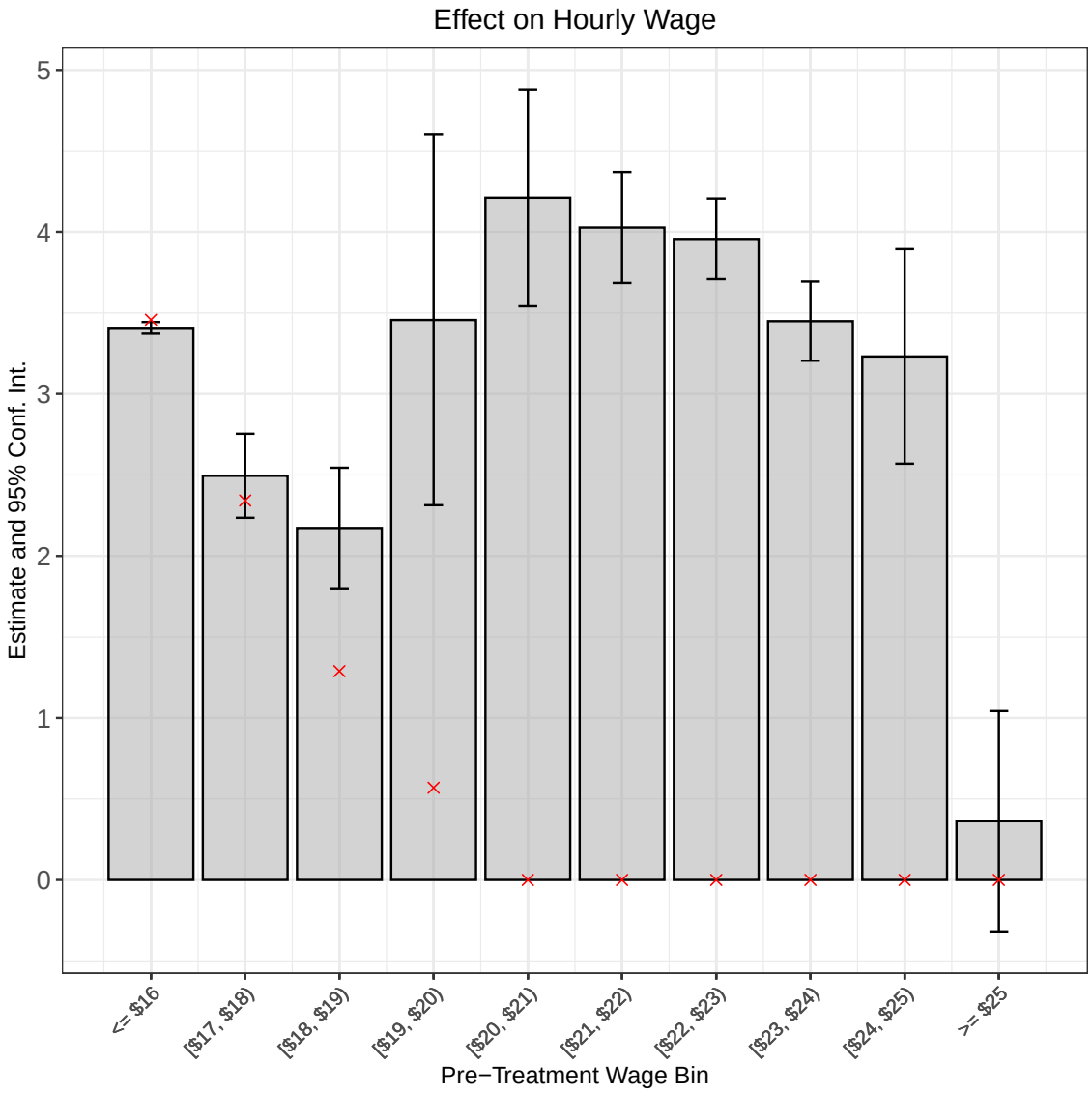


(c) Hours Worked Per Week



NOTE.——This figure plots coefficient estimates from Equation 1 for our sample of bound fast-food employees. The sample period runs from July 2023 to January 2025. The first dashed vertical line corresponds to January 2024, which is when California increased its state-wide minimum wage from \$15.50 per hour to \$16.00 per hour. The second dashed vertical line corresponds to the April 2024 treatment date. The dashed horizontal line corresponds to the pre-treatment wage gap between bound employees' wages in California and the \$20 an hour fast-food minimum wage. Circles correspond to coefficient estimates, and vertical bars correspond to 95% confidence intervals. The reference month is October 2023. Standard errors are clustered at the state level.

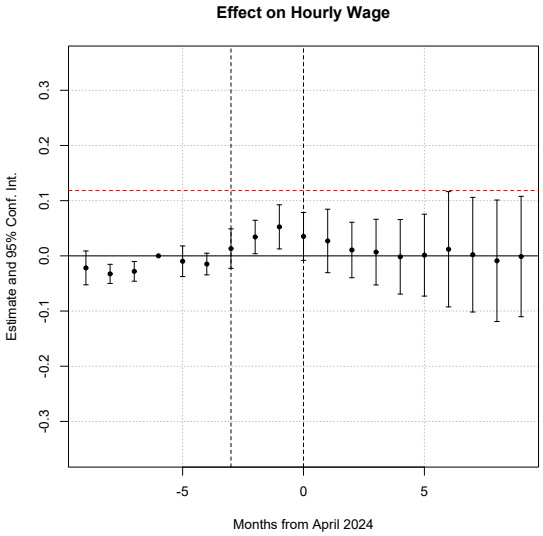
Figure 2: Wage Responses Throughout the Fast-Food Wage Distribution



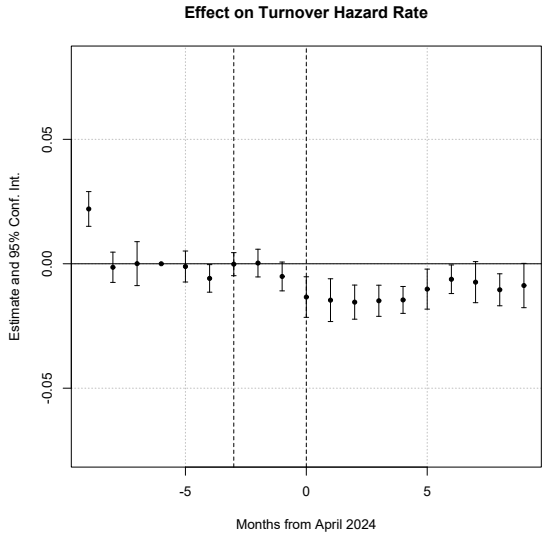
NOTE.——This figure plots the coefficient estimates from Equation 2 for our full sample of incumbent fast-food employees. The heights of the bars correspond to coefficient estimates, and the vertical bars correspond to 95% confidence intervals. The red markers correspond to pre-treatment wage gaps for each wage bin, defined as the difference between the $20 fast-food minimum wage and the pre-treatment average wage of fast-food workers in California in each wage bin (capped below at 0). Standard errors are clustered at the state level.

Figure 3: Bound Non-Fast-Food Employees: Effects on Wages and Turnover

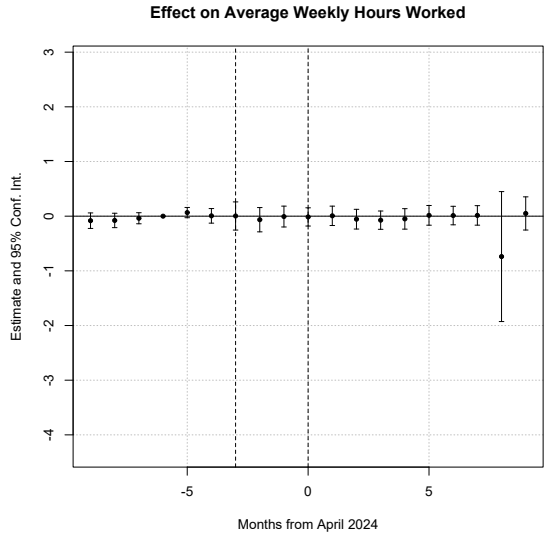
(a) Hourly Wages



(b) Turnover



(c) Hours Worked Per Week



NOTE.——This figure plots coefficient estimates from Equation 1 for our sample of bound non-fast-food employees. The first dashed vertical line corresponds to January 2024, which is when California increased its state-wide minimum wage to $16.00 per hour. The second dashed vertical line corresponds to the April 2024 treatment date. The dashed horizontal line corresponds to the pre-treatment wage gap between bound non-fast-food employees' wages in California and the $16 an hour state-level minimum wage. Circles correspond to coefficient estimates, and vertical bars correspond to 95% confidence intervals. The reference month is October 2023. Standard errors are clustered at the state level.

Internet Appendix

Table IA.1: Minimum Wage Policies in California and the Control States

	Jan 2022 MW (1)	Jan 2023 MW (2)	Jan 2024 MW (3)	Federal MW? (4)	# Local MWs (5)
Treated States					
CA	15.00	15.50	16.00	No	41
Control States					
AL	7.25	7.25	7.25	Yes	0
AR	11.00	11.00	11.00	No	0
GA	7.25	7.25	7.25	Yes	0
ID	7.25	7.25	7.25	Yes	0
IN	7.25	7.25	7.25	Yes	0
IA	7.25	7.25	7.25	Yes	0
KS	7.25	7.25	7.25	Yes	0
KY	7.25	7.25	7.25	Yes	0
LA	7.25	7.25	7.25	Yes	0
MS	7.25	7.25	7.25	Yes	0
NH	7.25	7.25	7.25	Yes	0
NC	7.25	7.25	7.25	Yes	0
ND	7.25	7.25	7.25	Yes	0
OK	7.25	7.25	7.25	Yes	0
PA	7.25	7.25	7.25	Yes	0
SC	7.25	7.25	7.25	Yes	0
TN	7.25	7.25	7.25	Yes	0
TX	7.25	7.25	7.25	Yes	0
UT	7.25	7.25	7.25	Yes	0
WV	8.75	8.75	8.75	No	0
WI	7.25	7.25	7.25	Yes	0
WY	7.25	7.25	7.25	Yes	0

NOTE.—This table describes state-level minimum wage policies as of January 2024.

Table IA.2: Effect on Establishment Low-Wage Employment and Wages

Panel A: Fast-Food Establishments

	log Employment	log Hourly Wage	log Hiring	log Turnover
	(1)	(2)	(3)	(4)
Treated × Post	0.0271	0.1350***	-0.0562*	-0.1494***
	(0.0175)	(0.0031)	(0.0310)	(0.0105)
Establishment FE	Y	Y	Y	Y
Firm × Month FE	Y	Y	Y	Y
N	19,729	19,729	19,729	19,729
R^2	0.99	0.99	0.93	0.96

Panel B: Non-Fast-Food Establishments

	log Employment	log Hourly Wage	log Hiring	log Turnover
	(1)	(2)	(3)	(4)
Treated × Post	-0.0057*	0.0015	0.0186***	0.0321***
	(0.0034)	(0.0019)	(0.0057)	(0.0066)
Establishment FE	Y	Y	Y	Y
Firm × Month FE	Y	Y	Y	Y
N	442,891	442,891	442,891	442,891
R^2	0.99	0.96	0.96	0.94

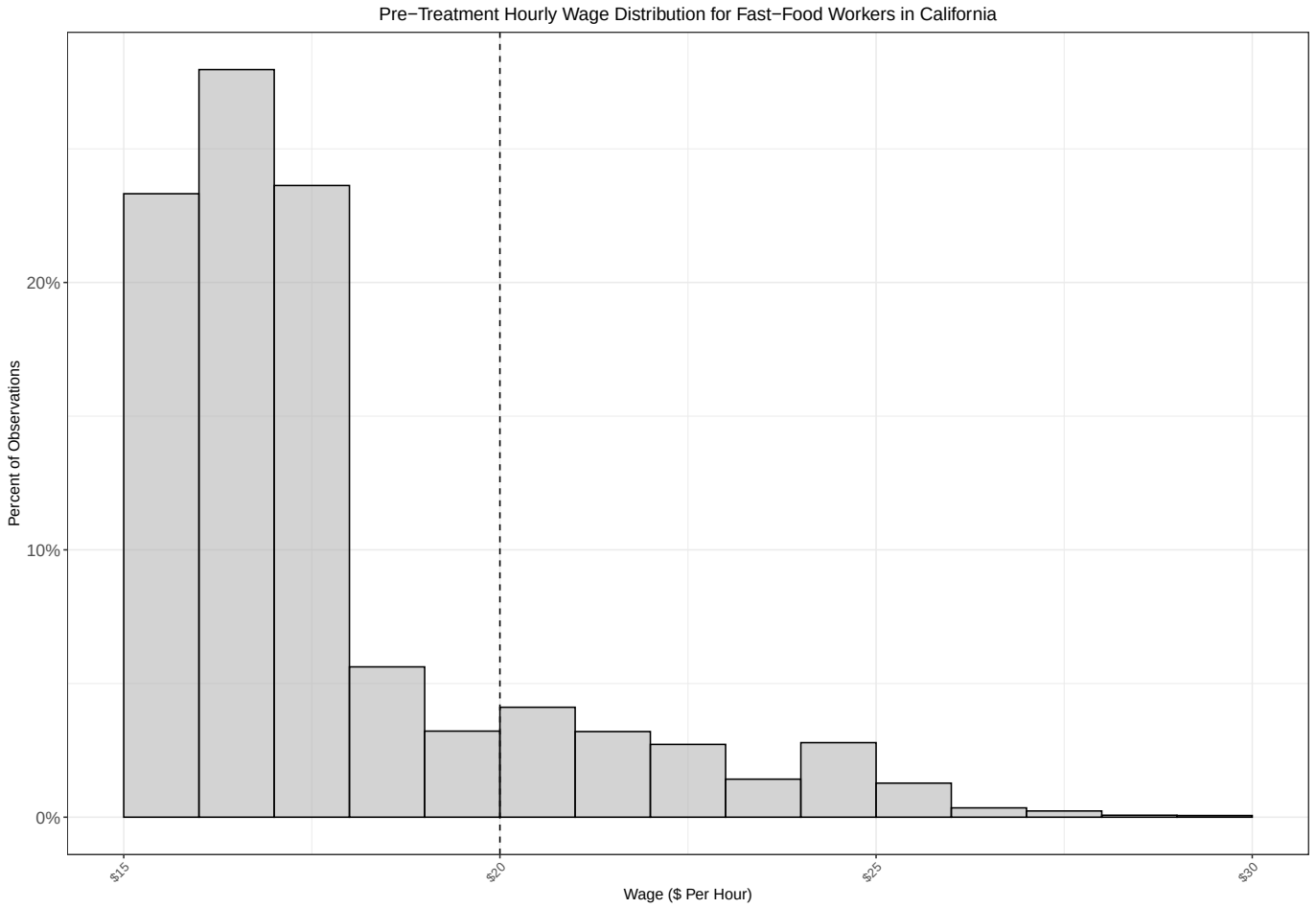
NOTE.—This table reports coefficient estimates from Equation 4. Panel A is for the sample of 1,097 fast-food establishments. Panel B is for the sample of 24,212 non-fast-food establishments. The sample period runs from July 2023 to January 2025. The outcome variables are defined as follows. *Employment* is establishment low-wage employment (i.e., < $30 an hour employment). *Hourly Wage* is the average hourly wage at the establishment for low-wage employees. *Hiring* is the total number of low-wage employees hired at the establishment during the month. *Turnover* is the total number of low-wage separations at the establishment during the month. Standard errors, reported below the coefficient estimates, are clustered at the state level. *, **, and *** denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table IA.3: Establishment Own-Wage Elasticity

	log Employment (1)	log Employment (2)
Log Average Wage	0.1868	-0.4258
	(0.1446)	(2.040)
Sample	Fast-Food	Non-Fast-Food
F-Statistic (First Stage)	5,102	3
Wald Statistic (First Stage)	284	0.5
Establishment FE	Y	Y
Firm × Month FE	Y	Y
N	19,729	442,570
R^2	0.99	0.99

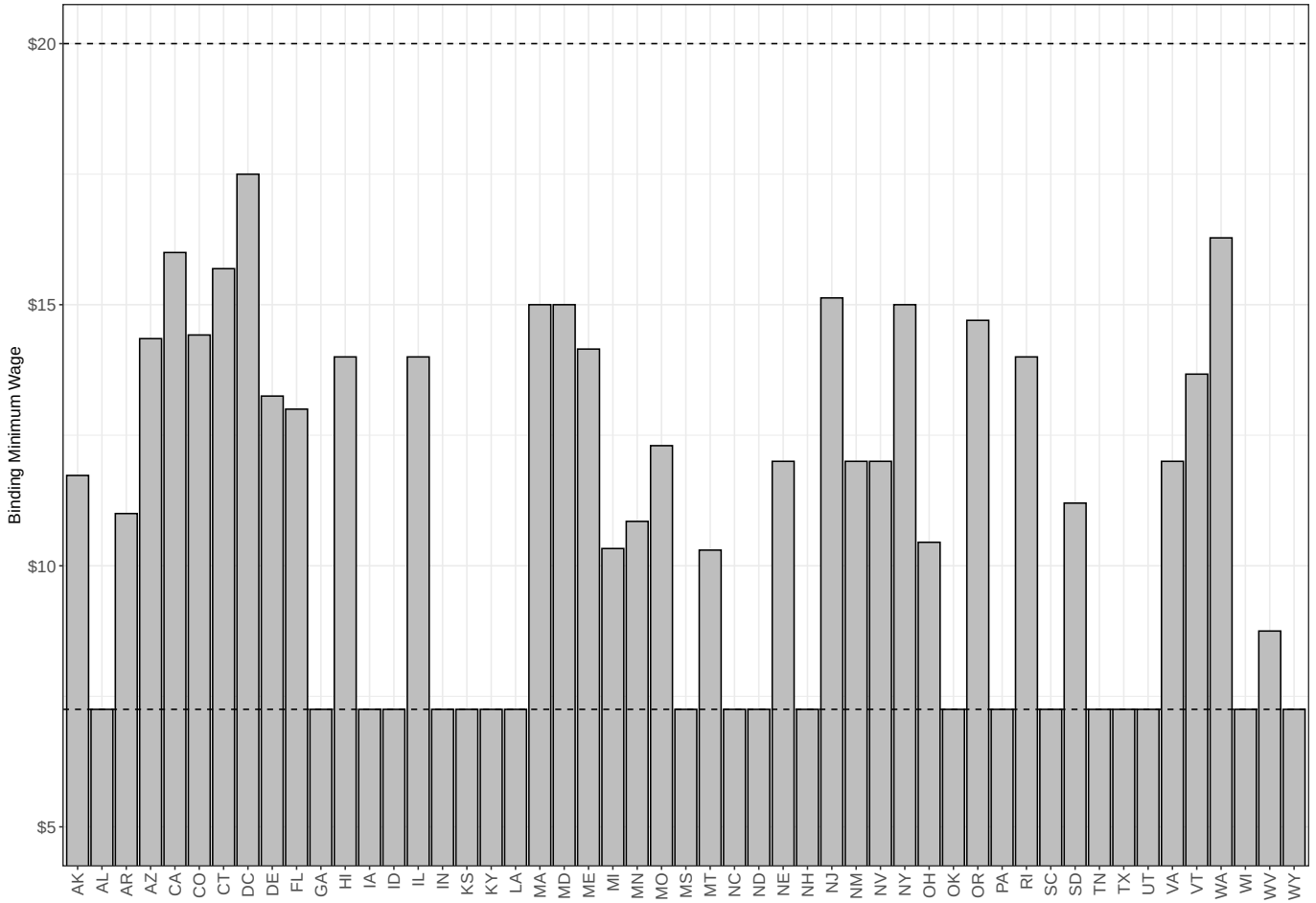
NOTE.—This table reports coefficient estimates from a two-stage least squares regression of the natural logarithm of establishment employment on the natural logarithm of average establishment wages. Wages are instrumented with the interaction between the treatment variable and the post variable. Column 1 reports estimates for fast-food establishments and column 2 reports estimates for non-fast-food establishments. Standard errors, reported below the coefficient estimates, are clustered at the state level. *, **, and *** denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Figure IA.1: Distribution of Hourly Wages for Fast-Food Employees in California



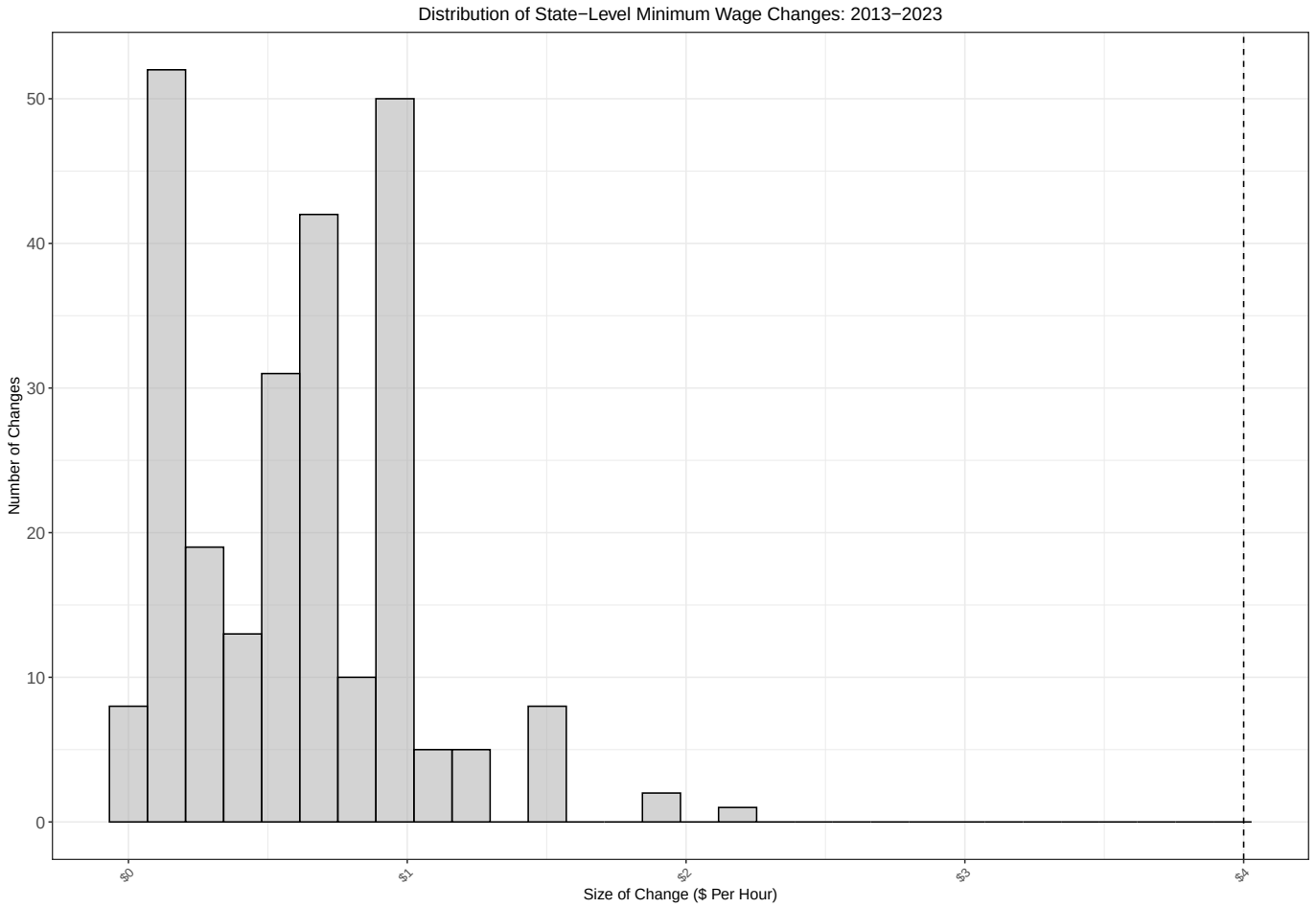
NOTE.——This figure plots the hourly wage distribution of fast-food workers in California prior to April 2024. The dashed vertical line corresponds to California's $20 an hour fast-food minimum wage.

Figure IA.2: State-Level Minimum Wages as of 2024



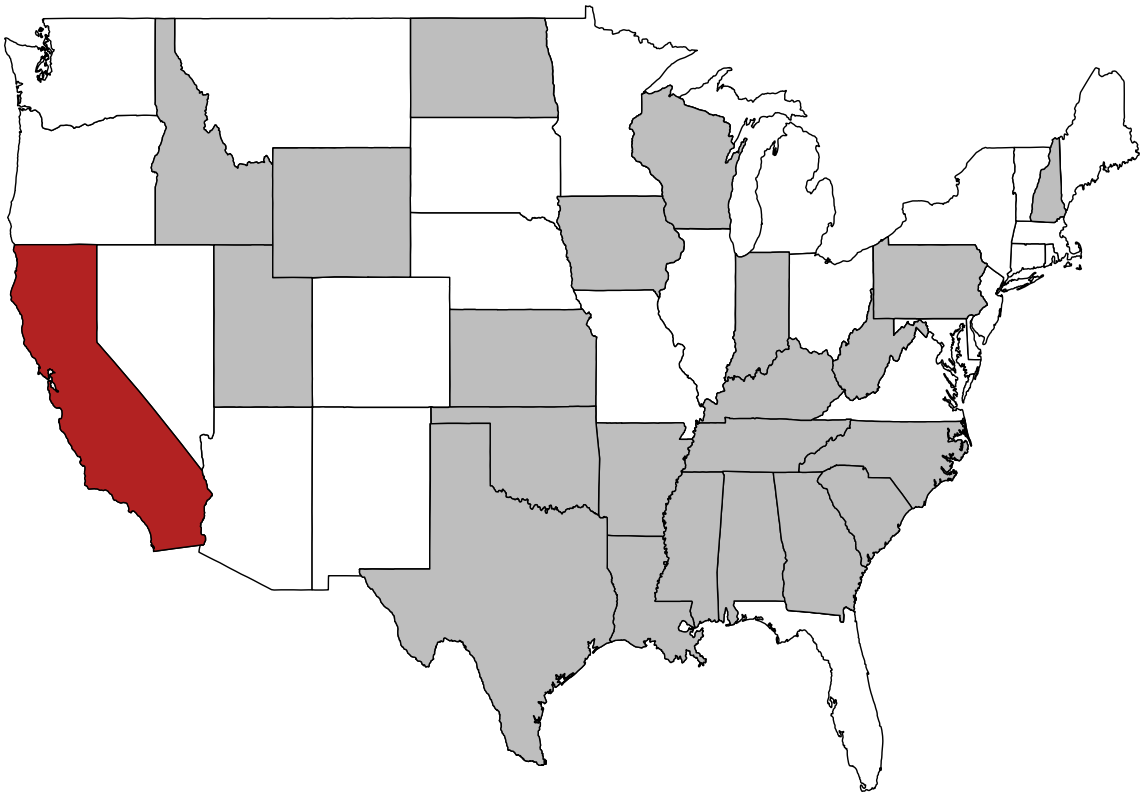
NOTE.——This figure plots the minimum wage in each state as of January 2024. The top dashed horizontal line corresponds to California's $20 an hour fast-food minimum wage. The bottom dashed horizontal line corresponds to the federal minimum wage of $7.25 an hour.

Figure IA.3: Distribution of State-Level Minimum Wage Changes



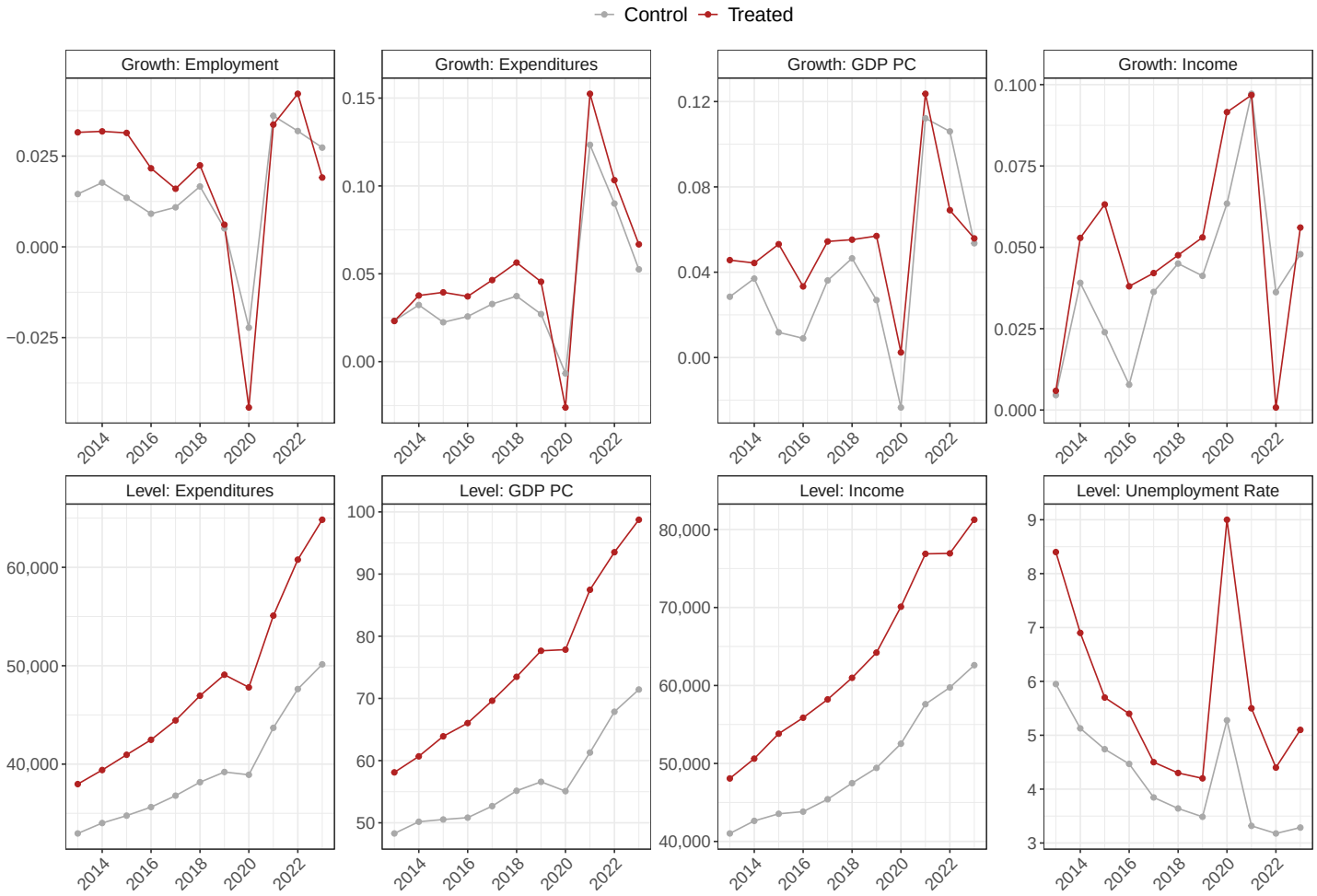
NOTE.——This figure plots the distribution of state-level minimum wage changes between 2013 and 2023. The dashed vertical line corresponds to the $4 an hour size of California's fast-food minimum wage change.

Figure IA.4: Geographic Distribution of Treated and Control States



NOTE.——This figure plots the geographic distribution of the treated state (dark red shading) and 22 control states (gray shading). States shaded in white are excluded from the analysis.

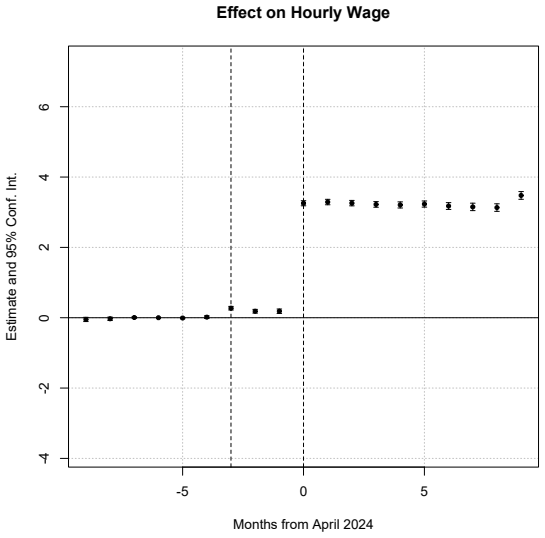
Figure IA.5: Macroeconomic Conditions in Treated and Control States



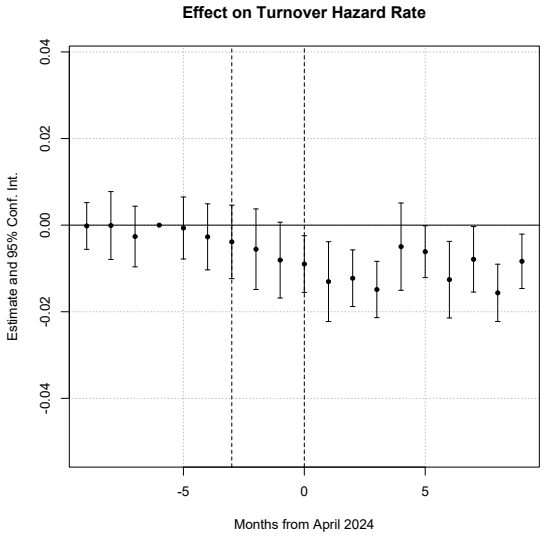
NOTE.——This figure plots average macroeconomic conditions in the treated state (dark red) and 22 control states (gray) between 2013 and 2023.

Figure IA.6: Effect on Wages and Turnover for Non-Bound Fast-Food Employees

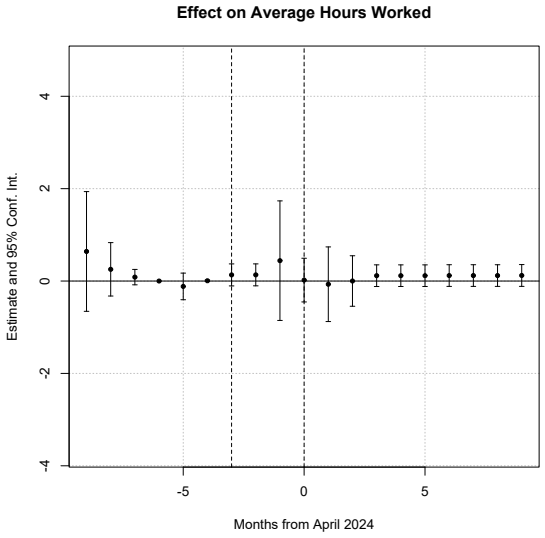
(a) Hourly Wages



(b) Turnover



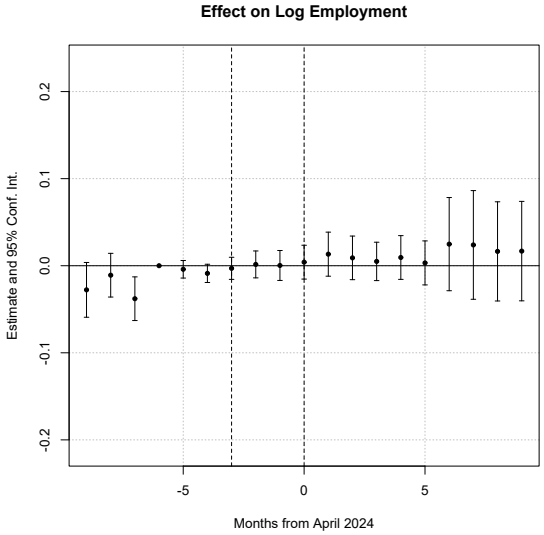
(c) Hours Worked Per Week



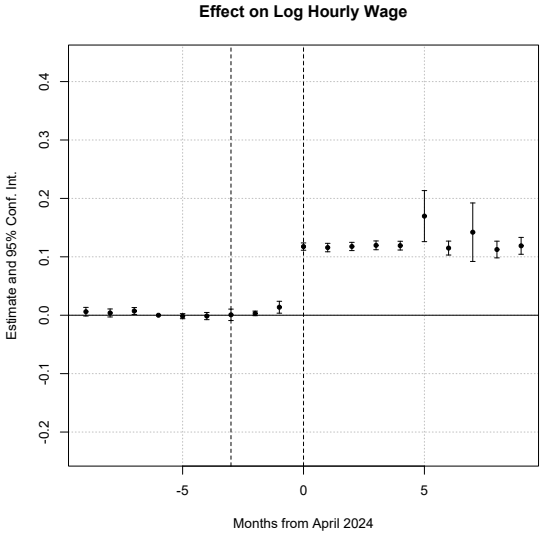
NOTE.——This figure plots coefficient estimates from Equation 1 for our sample of non-bound fast-food employees. The sample period runs from July 2023 to January 2025. The first dashed vertical line corresponds to January 2024, which is when California increased its state-wide minimum wage from $15.50 per hour to $16.00 per hour. The second dashed vertical line corresponds to the April 2024 treatment date. Circles correspond to coefficient estimates, and vertical bars correspond to 95% confidence intervals. The reference month is October 2023. Standard errors are clustered at the state level.

Figure IA.7: Effect on Wages and Employment for Fast-Food Establishments

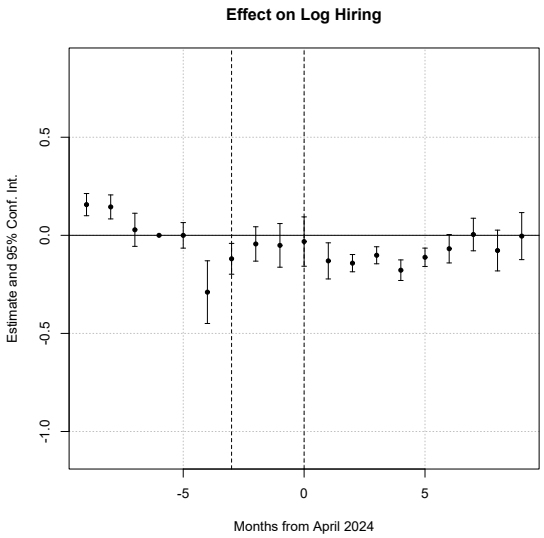
(a) Employment



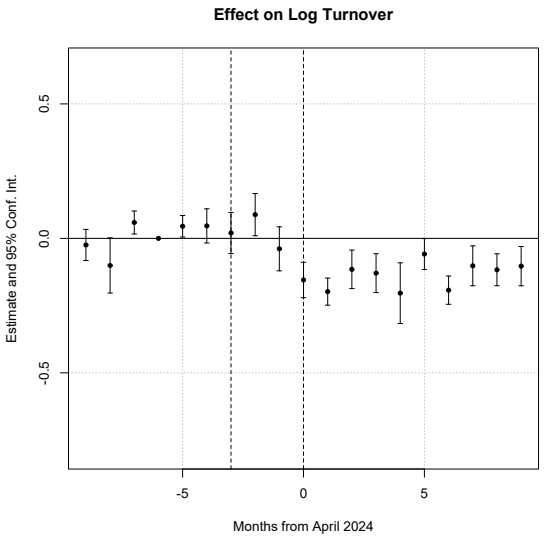
(b) Hourly Wages



(c) Hiring



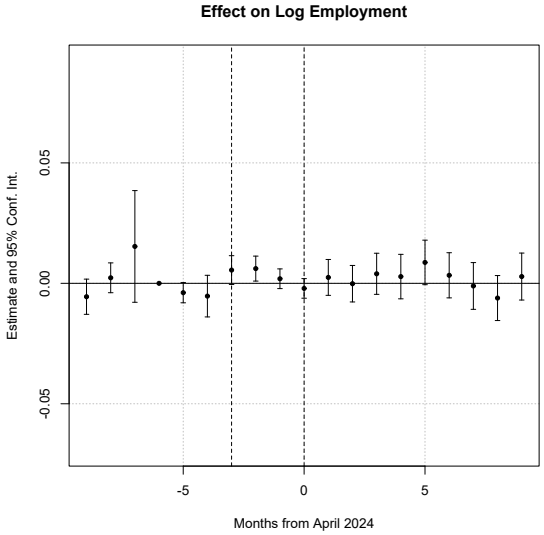
(d) Turnover



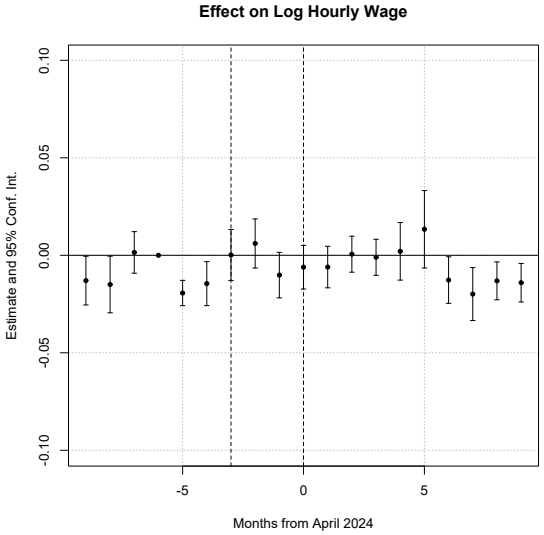
NOTE.——This figure plots coefficient estimates from Equation 5 for our sample of 1,097 fast-food establishments. The sample period runs from July 2023 to January 2025. The outcome variables are defined in Table 2. The first dashed vertical line corresponds to January 2024, which is when California increased its state-wide minimum wage from $15.50 per hour to $16.00 per hour. The second dashed vertical line corresponds to the April 2024 treatment date. Circles correspond to coefficient estimates, and vertical bars correspond to 95% confidence intervals. The reference month is October 2023. Standard errors are clustered at the state level.

Figure IA.8: Effect on Wages and Employment for Non-Fast-Food Establishments

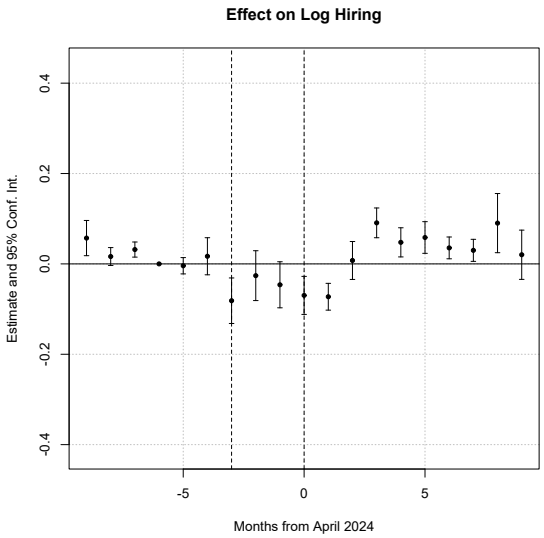
(a) Employment



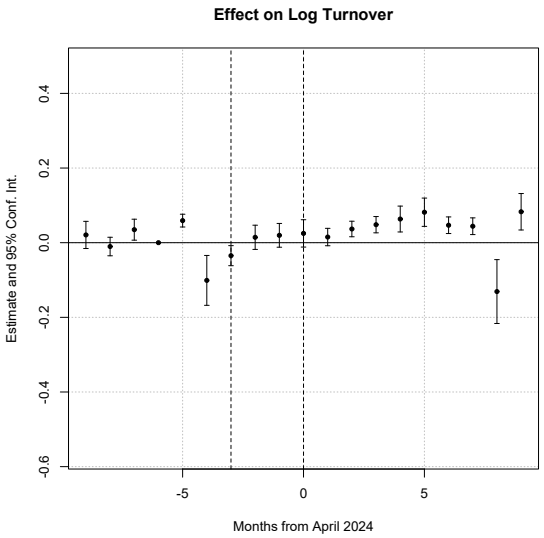
(b) Hourly Wages



(c) Hiring



(d) Turnover



NOTE.——This figure plots coefficient estimates from Equation 5 for our sample of 24,212 non-fast-food establishments. The sample period runs from July 2023 to January 2025. The outcome variables are defined in Table 2. The first dashed vertical line corresponds to January 2024, which is when California increased its state-wide minimum wage from \$15.50 per hour to \$16.00 per hour. The second dashed vertical line corresponds to the April 2024 treatment date. Circles correspond to coefficient estimates, and vertical bars correspond to 95% confidence intervals. The reference month is October 2023. Standard errors are clustered at the state level.