Now You See It, Now You Don't: Financial Constraints, Minimum Wage Policies, and Employment *

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This draft: 26 July 2023

Abstract

This article shows that firms' balance sheets play a crucial role in explaining the relationship between minimum wage policies and employment dynamics. Using a border discontinuity approach and establishment-level information on firms in the United States, we show that changes in the minimum wage do not affect employment. However, this average effect masks important corporate-level heterogeneity. The effect of changes in minimum wage policies on employment is indeed negative and meaningful for establishments that belong to financially constrained firms. We provide causal evidence about this relationship using the change in the federal minimum wage during the 2007-2008 financial crisis and an exogenous measure of financial frictions based on ex-ante heterogeneity in the long-term debt structure as a unique laboratory.

Keywords: Minimum Wage; Financial Frictions; Employment.

*We thank seminar participants at Fordham University for their valuable comments and suggestions.

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1 Introduction

Minimum wage policies have been at the center of recent policy debates in the United States. One of the primary concerns in this debate relates to the impact of minimum wage changes on employment. A considerable amount of research has been conducted in economics to shed light on this matter, finding mixed results. For example, Card and Krueger (1993) analyze the effect of an increase in New Jersey's minimum wage and show that fast-food restaurants in this area increased employment by 13 % relative to stores in Pennsylvania. Cengiz et al. (2019) find that the overall number of low-wage jobs remained essentially unchanged over the five years following a minimum wage change. On the other hand, Clemens and Wither (2019) find a negative effect on employment following the federal minimum wage increase during the 2007-2008 financial crisis.

The causal chain presented in this context lacks acknowledgment of the potential role that firms and their balance sheet characteristics may play in the matter. However, there are compelling reasons to believe that firms play a crucial role in this setting. Firms are the key decision-makers when it comes to firing or retaining employees, and exhibit heterogeneity in terms of their available resources and constraints. In line with this argument, recent empirical evidence emphasizes the importance of firms' balance sheet characteristics in comprehending aggregate employment dynamics (Giroud and Mueller, 2017, 2019). Understanding the role of firm characteristics in this context can aid policymakers in designing more effective minimum wage policies and can help reconcile previously mixed findings in the economic literature. Our paper aims to help fill this gap in the literature by analyzing whether financial frictions can contribute to explaining employment dynamics following minimum wage adjustments.

In a groundbreaking paper, Bernanke (1983) contends that the destruction of bank-specific intermediary capital curtailed certain borrowers' ability to secure credit, intensifying economic downturns. While this perspective has frequently been utilized to account for the prolonged decrease in output after financial crises, financial deficiencies can also present a plausible explanation for the increase in unemployment subsequent to a minimum wage hike (Clemens and Wither, 2019). Financially constrained firms may find it indeed more difficult to absorb the costs of a minimum wage increase and face short-term liquidity needs. Exposure to high minimum wage can also increase a firm's distress risk (Favilukis et al., 2020; Arellano et al., 2019), pushing firms to adjust to this additional risk by reducing the number of employees. Furthermore, in contrast to physical capital, labor cannot be used as collateral, which presents certain challenges for its financing. Hence, any impediments to securing external funding can significantly impact a firm's employment choices (Almeida et al., 2009; Benmelech et al., 2019). Despite the clear theoretical link between financial frictions, minimum wage changes, and employment decisions, there has not been any study analyzing this relationship empirically.

In order to advance our research, we first analyze the effect of changes in the minimum wage on employment. To do so, we collect information on the establishments that belong to a public corporation in the United States and the corporate balance-sheet characteristics of the firms to which they belong. The structure of our database allows us to compare establishments that belong to the same corporation, but are located in different states and therefore are exposed heterogeneously to minimum wage policies. Also, we consider in our empirical analysis that changes in minimum wages are not exogenous; the timing of minimum wage changes tends to be closely tied to the health of the local economy (Neumark et al., 2014; Allegretto et al., 2017). Therefore, an increase in the minimum wage could be correlated with changes in other local economic characteristics that could also affect corporate employment decisions. In order to deal with this problem, we follow the previous empirical literature (Card and Krueger, 1993; Cengiz et al., 2019; Dustmann et al., 2022), and combine the staggered changes in minimum wage levels with alternative border discontinuity designs. Our final database is made up of more than two million establishment-year observations and can therefore provide reliable estimators.

Using this empirical strategy, we consider the dynamic effect of changes in the minimum wage on the employment of the establishments exposed to these policy decisions. Importantly, we show that the parallel trend assumption beyond our identification assumption is likely to hold; specifically, establishments located along state borders have similar employment patterns before minimum wage changes. Also, we show that changes in minimum wages do not affect employment in subsequent years. This result is in line with many papers that do not find any average effect of changes in the minimum wage on employment during normal economic times (e.g., Cengiz et al., 2019; Dustmann et al., 2022).

In accordance with our research hypothesis, however, we show that the average effect of changes in minimum wages conceals significant heterogeneity at the corporate level. By examining the interaction between changes in minimum wages and alternative measures of corporate financial frictions, we document a substantial and adverse effect for establishments belonging to financially constrained firms. Our findings indicate that a one standard deviation change in the financial constraint indexes we use in our analysis leads to an average 0.2% reduction in employment at the establishments, in response to a one-dollar increase in the minimum wage. Furthermore, we also find that financially constrained firms react to minimum wage changes by reducing the number of establishments in exposed areas.

In our analysis, we take into account the possibility that managers may relocate employment from establishments that are subject to minimum wage regulations to those that are not, which could mean that the overall corporate employment of financially constrained firms remains largely unchanged following minimum wage changes. However, even when we examine our data at the firm level, we consistently find a large negative effect of minimum wage changes on employment for financially constrained firms, confirming the results obtained from our establishment-level analysis. Specifically, we do not observe any average effect of minimum wage changes on employment, but the negative effect is pronounced and statistically significant for firms that are financially constrained.

Our analysis at the firm level also indicates that exposure to minimum wage policies has the effect of reducing firm value. Also, we observe a reduction in corporate liquidity as well as research and development expenditures. As a matter of fact, these results suggest that companies subject to minimum wage policies are forced to acquire resources to meet short-term liquidity needs, potentially leading financially constrained firms to reduce their workforce.

In the last part of the paper, we provide *causal* evidence about the relationship between minimum wage changes, financial frictions, and employment using a unique laboratory experiment. More specifically, we first examine the increase in the federal minimum wage during the financial crisis and compare the employment dynamics of establishments located in state-bounded areas affected by the federal minimum wage change to those located in states with no minimum wage bounds (Clemens and Wither, 2019). This period is particularly relevant for our analysis since it is characterized by severe information asymmetries, uncertainty, and tight credit constraints (Brunnermeier, 2009; Bernanke, 2023). Using this identification strategy, we find that an increase in the minimum wage in this critical time decreases establishments' employment. We also show that the effect is immediate and persistent in subsequent years.

To establish the credibility of our empirical results showing the effect that financial frictions have on employment after changes in the minimum wage, it is necessary to introduce a shock to a firm's external financing access, which is unrelated to other corporate characteristics and investment prospects and affects their access to the credit market. To do so, we follow previous literature (Duval et al., 2020; Almeida et al., 2009; Benmelech et al., 2019), and leverage the ex-ante variation in long-term debt maturity across firms. Our exogenous measure of financial friction is derived from the long-term debt that matured at the onset of the financial crisis. The rationale behind this approach is that firms with a significant amount of debt maturing during this period are forced with serious constraints on rolling over maturing debt. Therefore, they are compelled to modify their behavior more extensively compared to similar firms that do not require the refinancing of their long-term obligations in the crisis period.

We find that establishments belonging to firms with a large amount of debt maturing at the onset of the financial crisis in states bound to the federal minimum wage requirements experienced a further decrease in their employment levels. Specifically, our analysis shows that a one standard deviation change in the financial friction measure led to a 0.4 % decrease in these establishments' employment. These results highlight the importance of financial constraints in explaining employment dynamics following changes in minimum wage policies and can provide insight into the heterogeneous effects of minimum wage policies on employment across countries and time periods, as documented in previous literature.

Our paper contributes to different strands of the literature. First, a growing literature in finance analyzes the effect of minimum wage laws on corporate policies. Gustafson and Kotter (2022) find that changes in the minimum wages lead public firms to cut capital expenditures. Geng et al. (2022) find opposite results; they analyze the effect of an increase in the minimum wage in China and find in a sample of manufacturing firms that a minimum wage rise is associated with an increase in capital investment and innovation. Using the same setting, Hau et al. (2020) find that changes in minimum wages accelerate the input substitution from labor to capital, reduce employment growth, and accelerate total factor productivity growth. They also show that this effect is particularly strong among the less productive firms under private both Chinese or foreign ownership, but not among state-owned enterprises. They argue that this heterogeneous effect can be explained by differences in management practices. Also, considering a large and persistent minimum wage increase in Hungary, Harasztosi and Lindner (2019) show that firms responded to the minimum wage by substituting capital for labor. Agarwal et al. (2023) exploit the staggered state-level changes in minimum wages in the United States from 2000 to 2008 and using a comprehensive data set from the hotel industry, they find that doubling the minimum wage reduces average hotel revenues by 6 % per year and occupancy rates by 3.1 %. Chava et al. (2023) document that increases in the federal minimum wage worsen the financial health of small businesses in the affected states. Furthermore, they show that increases in the minimum wage lead to lower bank credit, higher loan defaults, lower employment, lower firm entry, and a higher exit rate for small businesses.

We also contribute to the literature that analyzes the impact of financial frictions on real outcomes. Duval et al. (2020) show that financial frictions during the 2008 global financial crisis generated a negative and persistent effect on corporate productivity and innovation activities. Benmelech et al. (2019) provide evidence that the lack of access to credit along with financial frictions generate a negative causal effect of financial frictions on firm employment during the Great Depression. Chodorow-Reich (2014) shows that firms with weaker lender relationships had a harder time obtaining loans and paid higher interest rates after the Lehman bankruptcy. They also experienced greater reductions in employment compared to companies with stronger lender relationships. Giroud and Mueller (2017) discovered that businesses belonging to highly-leveraged firms suffered significantly greater reductions in employment when faced with a decrease in local consumer demand. Giroud and Mueller (2015) find that a positive shock to investment opportunities at one plant spills over to other plants within the same firm, but only if the firm is financially constrained. Gilchrist et al. (2017) document that firms with liquidity constraints raised prices during the financial crisis, while their unconstrained counterparts lowered prices. Furthermore, financial frictions have been shown to have a significant impact on various corporate decisions, including investment and capital structure choices, as well as stock returns (Hennessy and Whited, 2007; Lamont et al., 2001; Cao et al., 2019).

To the best of our knowledge, there is not any other paper that analyzes the relationship between minimum wage changes, employment, and corporate balance sheet characteristics. The only paper that takes into account financial frictions in this literature is Arabzadeh et al. (2023); they consider a change in the minimum wage in Germany and use employee-employer information and a structural model to investigate the relationship between minimum wage changes, financial frictions, and within-firm wage dispersion. More specifically, they find that within-firm wage dispersion decreases more with higher minimum wages when firms are financially constrained.

Our paper is also inspired by recent literature arguing that optimal government policies should take into account financial frictions (Itskhoki and Moll, 2019; Caballero and Lorenzoni, 2014). When faced with financial frictions, it is crucial for governments to prioritize policy interventions that involve the temporary reduction of wages and the increase of labor supply. By doing so, they can accelerate the accumulation of entrepreneurial wealth and promote higher labor productivity and wages over time. Our empirical results confirm empirically this hypothesis by focusing on the effect of minimum wage policies on employment, one of the most discussed government interventions in the economy. In line with this strand of the literature, our results show that government should avoid increasing minimum wages during periods of financial stress.

2 Data

In order to advance our research, we collect information on minimum wage policies across US states, establishment characteristics, and the balance-sheet characteristics of the corporations to which each establishment belongs. The sources of information are described in more detail below.

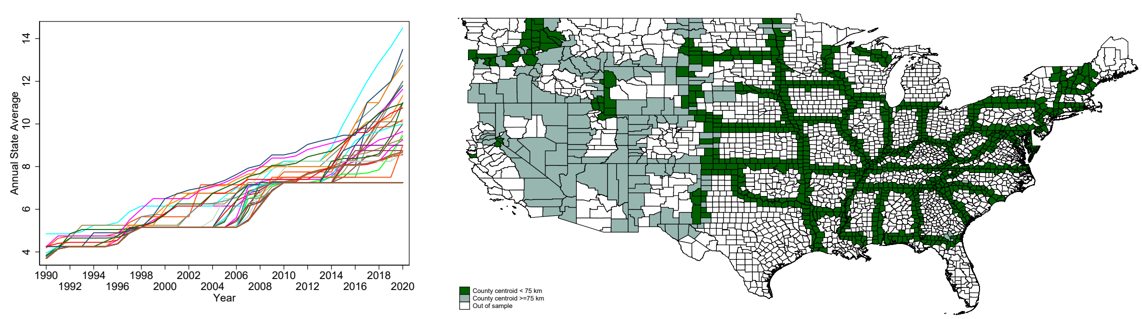
Minimum wage changes. Our source of information for minimum wage policies comes from Vaghul and Zipperer (2019). They provide details about the variations in the state-level minimum wage spanning from 1974 to 2020. However, since we only possess information regarding the establishments from 1990 to 2020, our analysis is primarily centered on this time frame. Moreover, the results of our analysis may be significantly affected by the inclusion of data from the 1980s, as there were minimal changes to the minimum wage prior to the year 1990 (Neumark et al., 2014; Allegretto et al., 2017).

Figure 1(a) illustrates minimum wage dynamics for each state. Our empirical analysis takes advantage of this significant variability in minimum wage changes across both states and time periods.

We also take into account that changes in the minimum wage can be endogenous since they are strongly tied to changes in local economic patterns. In order to deal with this problem, we follow previous literature and focus our attention on geographically adjacent treated and control counties located along states' borders to ensure that omitted variables do not affect our results. In this way, we compare counties that are heterogeneously exposed to changes in the minimum wage because they are located in different states, but are geographically adjacent and therefore are expected to be similar in both observable and unobservable economic conditions.

To ensure the validity of our analysis, we take into account the concern raised in Dube et al. (2010) that counties on a state's borders in the western US are much larger and irregular in shape. As such, we further investigate county pairs that share a state border and whose centroids are within 75 km of each other. This distance cutoff has been determined through a data-driven randomization inference procedure, which minimizes the mean squared error of the estimator (Dube et al., 2010). In Figure 1(b), we highlight these counties by shading them in dark green.

Figure 1: Minimum wage changes and counties on the states' border



(a) Changes in minimum wage policies

(b) Counties on states' borders

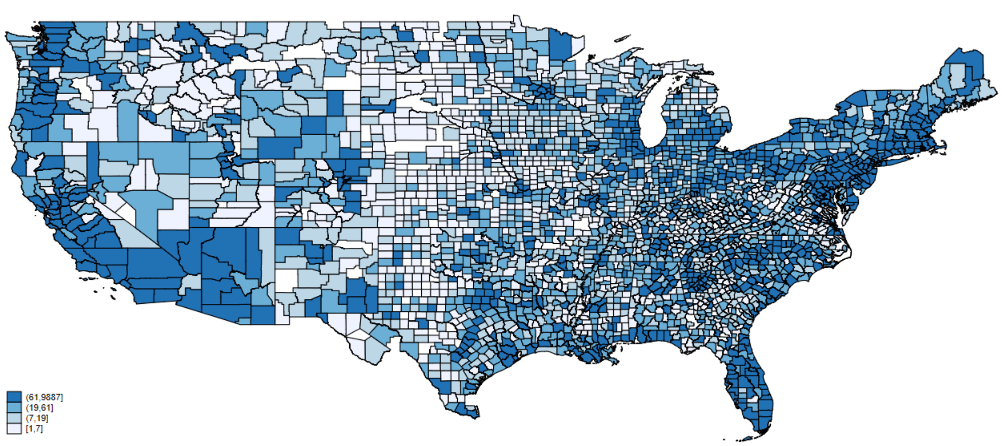
Notes: Figure 1(a) shows changes in minimum wage policies for each state. Figure 1(b) shows counties located on the border of the states. The areas shaded in dark green represent pairs of counties that share a border between them and have their centroids within a 75 km distance of each other.

Establishment level information. We gather data on public corporations' establishments in the United States through the National Establishment Time Series (NETS) database (Addoum et al., 2020). It contains comprehensive information on the location and number of employees of these establishments from 1990 to 2020. By using this data, we can accurately analyze the impact of minimum wage changes on employment trends. One advantage of this database is that it is not subject to survivorship bias, which is an important factor in our analysis as explained later.

We merge this database with minimum wage levels and information on corporate balance sheet characteristics from Compustat. We also remove establishments that belong to firms that operate in the utility and financial sectors (SIC code equal to 60 and 49). Our final database is composed of 2,340,503 establishment-year observations.

We provide a graphical representation of the geographical distribution of establishments in our sample in Figure 2. It is worth noting that there is at least one establishment belonging to a public corporation in almost all the counties across the United States. This wide geographic coverage of establishments enables us to effectively study the impact of changes in minimum wages by analyzing the counties on state borders, as well as the entire country.

Figure 2: Geographical distribution of the establishments



Notes: Figure 2 displays the number of establishments in our sample across the counties in the US.

Corporate balance sheet characteristics. Through Compustat, we are able to obtain comprehensive information regarding the balance-sheet characteristics of publicly traded companies in the United States. Using this database, we develop alternative metrics for evaluating financial frictions at the corporate level.

Our first approach involves using size as an indicator of financial frictions, as previous research has shown that smaller firms are more financially constrained (Gertler and Gilchrist, 1994; Siemer, 2019). We next consider the Whited and Wu (WW) financial constraint index (Whited and Wu, 2006). To create the index, the authors propose estimating an Euler Equation derived from a structural model of investment. The index is composed of six components, namely cash flows, assets, dividends, debt, and sales growth, which are analyzed on both industry and firm levels.

To enhance the robustness of our findings, we also include the size-age (SA) index as an additional measure of corporate financial constraints (Hadlock and Pierce, 2010). The SA index is constructed by sorting firms according to characteristics that are closely linked to financial constraints. In particular, Hadlock and Pierce (2010) have identified corporate size and age as the factors that are most strongly associated with financial constraints. These two features are considered to be much less endogenous compared to other variables that are commonly used to estimate financial constraints, such as cash levels and leverage, which can be subject to discretionary decisions made by the firm's management. The SA index suggests that financial constraints decrease substantially as young and small firms mature and grow.

We next construct an exogenous measure of financial frictions based on the ex-ante variation across firms in the long-term debt maturing during the financial crisis. The rationale behind this approach is that the financial crisis's shock to credit conditions was unexpected and firms could not deliberately schedule their debt to mature just before the crisis to mitigate rollover risk. Therefore, the debt structure of firms before the occurrence of this unexpected event is unlikely to be correlated with any other unobserved firm characteristics or to the exposure of each establishment to changes in the minimum wage (Duval et al., 2020; Almeida et al., 2009; Benmelech et al., 2019).

Figure OA1 shows the distribution of long-term debt maturities for corporations. As expected, there is great heterogeneity in debt maturity across the years. We exploit this heterogeneity in our empirical analysis. More specifically, we consider as distinct variables the amount of debt maturing over the financial crisis and the amount of debt maturing in the other years. We scale the two values with total corporate sales before the beginning of the crisis.

Finally, we also use Compustat to build variables that allow us to understand how exposure to minimum wage changes affects overall corporate policies and performance, such as Tobin's Q, cash availability, corporate debt, and research and development expenditures.

Summary statistics. We use these alternative databases to understand how exposure to minimum wages affects corporate employment decisions at different levels. First, we use an establishment-level database to analyze whether establishments exposed to minimum wage rises change their employment level and whether firm corporate balance sheet characteristics play a role in explaining employment dynamics. The final sample is composed of 2,340,503 establishment years the spanning period 1990-2020. We report summary statistics in Panel A of Table 1. A detailed description of the variables included in this sample is reported in Panel A of Table OA1.

We additionally consolidate the data at the firm level to verify our findings and gain insight into how exposure to minimum wage adjustments impacts corporate performance and policies. This database is composed of 90,782 firm year observations spanning period 1990-2020. We report the summary statistics in Panel B of Table 1. A detailed description of the variables included in this sample is reported in Panel B of Table OA1.

3 Minimum wage and corporate employment

We evaluate how changes in the minimum wage affect establishments' employment. To do so, we consider in our empirical analysis that changes in minimum wages are not exogenous; the timing of minimum wage increases tends indeed to be closely tied to the health of the local economy (Neumark et al., 2014; Allegretto et al., 2017). A consequence is that changes in our minimum wage exposure variable could be associated

Table 1: Descriptive statistics

Variables	(1) Count	(2) Mean	(3) SD	(4) p25	(5) p50	(6) p75
				Panel A: Establishment level		
Employment	2,340,503	51.9045	99.3581	6.0000	15.0000	46.0000
Log(Employment)	2,340,503	2.9544	1.3555	1.9459	2.7726	3.8501
Minimum Wage	2,340,503	6.3455	1.7173	5.1500	6.1579	7.2500
Log(Size)	2,314,911	7.6621	2.1169	6.1942	7.6285	9.0865
WW Index	2,254,576	-0.3699	0.1118	-0.4472	-0.3716	-0.2941
SA index	2,314,911	-0.9798	1.4520	-2.2112	-1.3329	-0.0687
RoA	2,312,564	0.0345	0.1129	0.0134	0.0519	0.0866
Tangibility	2,311,521	0.3587	0.2088	0.1833	0.3506	0.5011
RoI	2,252,552	0.0647	0.2354	0.0239	0.0838	0.1445
MA Score	2,255,423	0.0536	0.1688	-0.0638	0.0114	0.1427
				Panel B: Firm level		
Employment	90,782	5.3823	15.2164	0.0880	0.5130	3.1000
Log(Employment)	90,782	0.9100	1.1038	0.0843	0.4141	1.4110
Exposure MW	90,782	6.1307	1.8002	4.8837	5.4006	7.2582
Log (Size)	90,782	4.8289	2.3673	3.0950	4.7870	6.5043
WW Index	83,403	-0.2244	0.1570	-0.3230	-0.2329	-0.1434
SA Index	90,782	1.5594	2.5778	-0.3284	1.2806	3.0387
Leverage	90,313	0.1964	0.2627	0.0000	0.0978	0.3024
R&D	90,576	0.0865	0.2011	0.0000	0.0000	0.0833
Tobin's Q	83,841	3.8828	9.7361	1.1476	1.6462	2.8568
Cash	89,912	0.1635	0.2058	0.0237	0.0836	0.2175

Notes: This table shows descriptive statistics of our analysis. See Table OA1 for a detailed description of every variable and its source.

with changes in other local economic characteristics that could also affect corporate employment decisions, therefore affecting our results. In order to deal with this problem, we follow previous empirical literature (Card and Krueger, 2000; Cengiz et al., 2019; Dustmann et al., 2022), and combine the staggered changes in minimum wage policies with a border discontinuity design.

Dynamic effects. We estimate the dynamic effects of changes in the minimum wage on the level of employment. To do so, we consider the following distributed-lag model:[1]

$$Log(Employment)_{i,t} = \sum_{w=-3}^{5} \beta_w MW_{s,t} + \eta_i + \theta_t + \epsilon_{i,t} \tag{1}$$

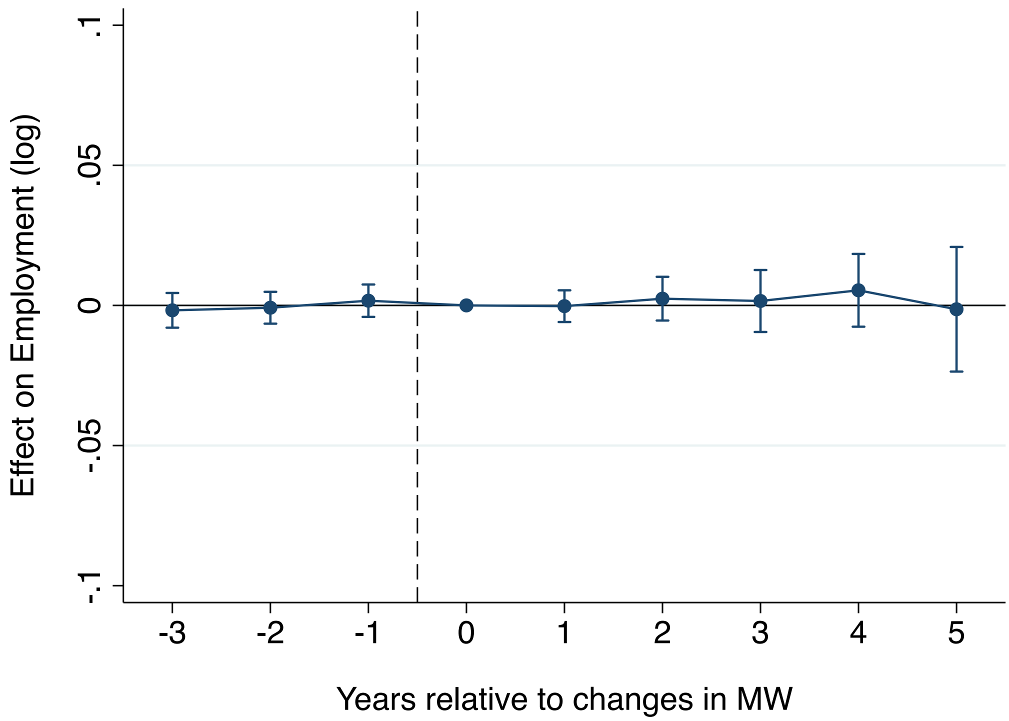
In Equation (1), *Log(Employment)* is the natural logarithm of the number of employees at establishment i at time t. MW is the effective minimum wage of state s at time t. η_i and θ_t are respectively establishment and year fixed effects. β gives us the dynamic treatment effect for the w period after ($w > 0$) or before ($w < 0$) the event. We focus our sample on the counties located along state borders. Finally, we cluster the standard errors at the state level, that is the level at which the minimum wage treatment takes place (Bertrand et al., 2004; Abadie et al., 2023).

Figure 3 reports graphically the estimates from Equation (1) and shows the dynamic effect of changes in the minimum wage on employment. The plot provides several critical results. First, we take the absence of significant coefficients before the event to indicate that contiguous counties in our sample are likely to follow parallel trends in terms of employment dynamics before minimum wage changes, a crucial assumption for the validity of our difference-in-differences estimator. Second, we do not find any evidence that changes in minimum wage policies affect employment in the subsequent years.[2]

[1]Note that the distributed lag model is equivalent to an event study model with binned endpoints (Schmidheiny and Siegloch, 2019).

[2]Recent studies have highlighted the drawbacks of pre-event trend testing and expressed concerns regarding its limited ability to detect significant deviations from parallel trends (Roth, 2022; Kahn-Lang and Lang, 2020). To evaluate the robustness of our test, we perform a sensitivity analysis based on the methodology suggested by Rambachan and Roth (2023). Importantly, Figure OA2 demonstrates that the fixed length confidence intervals are also not statistically different from zero when allowing for violations of parallel trends that are approximately linear and for larger degrees of possible non-linearity in the violation of parallel trends.

Figure 3: Dynamics effect



Notes: Figure 3 shows the yearly treatment effects from Equation (1). The outcome variable is the natural logarithm of employment in the establishment. The plot exhibits yearly point estimates and 95% confidence intervals based on standard errors clustered by state.

Differences-in-differences. After analyzing the dynamic effect of changes in the minimum wage on employment, we estimate a more efficient difference-in-differences model:

$$Log(Employment)_{i,t} = \beta MW_{s,t} + \delta_{f,t} + \eta_i + \epsilon_{i,t} \tag{2}$$

In Equation (3), *Log(Employment)* is the natural logarithm of the number of employees at establishment i at time t. MW is the effective minimum wage of the county i in state s at time t. η_i and $\delta_{f,t}$ are respectively establishment and firm times year fixed effects.

This approach allows us to estimate how minimum wage policies affect the employment decisions of establishments that belong to the same firm but that are heterogeneously exposed to changes in the minimum wage because they are in different states.

Also, $\delta_{f,t}$ allows us to control for any time variant corporate characteristic. We estimate this equation for three alternative samples: (i) all counties in the United States, (ii) all counties on the states' border, and (iii) county pairs that share a state border and whose centroids are within 75 km of each other.

We report the results in Table 2. We do not find any evidence that minimum wage affects corporate employment on average; indeed, the three coefficients of interest are not statistically significant. The results are consistent with several papers in the previous literature that analyzes the effect of minimum wage changes in normal economic times (e.g., Cengiz et al., 2019; Dustmann et al., 2022).

Table 2: Difference-in-difference

	(1)	(2)	(3)
	All counties	Counties on borders	Counties on borders ($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
MW	-0.002	0.002	-0.002
	(0.002)	(0.002)	(0.003)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,340,503	707,713	625,679
Adjusted R-squared	0.931	0.932	0.932

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Employment (log)*. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

The role of financial frictions. Our hypothesis is that corporate balance sheet characteristics affect corporate employment dynamics after changes in the minimum wage. More specifically, we expect that financially constrained firms will be more likely to react to minimum wage changes to face short-term liquidity needs. Furthermore, in contrast to physical capital, labor cannot be used as collateral, and any impediments in securing external funding can significantly impact a firm's employment choices.

To investigate this hypothesis, we estimate the following Equation:

$$Log(Employment)_{i,t} = \beta_0 MW_{s,t} + \beta_1 MW_{s,t} \times Financial\ Frictions_{f,t-1} + \delta_{f,t} + \eta_i + \epsilon_{i,t} \tag{3}$$

Financial frictions are three alternative proxies of financial constraints experienced by firm f at time t-1 associated with a firm's establishments. More specifically, as we explained in the data section, we use firm size, the SA index, and the WW index as our measures of a firm's financial constraints. In this setting, β_1 captures the average effect of financial frictions on the relationship between minimum wage and employment dynamics.

We report estimation results for the three alternative financial constraint measures in Table 3. These results all suggest that corporate financial frictions play a crucial role in explaining employment dynamics following changes in a state's minimum wage. Indeed, the coefficient of interest β_1 is positive and statistically significant when we consider the variable corporate size, as smaller firms are more financially constrained. On the other side, the coefficients are negative and statistically significant when we use the WW and SA indexes. Indeed, a higher value of the indexes indicates a greater financial constraint.

In terms of magnitude, the effect is consistent across the three alternative proxies. More specifically, according to the results reported in the last column, we find that one standard deviation change in the three financial friction variables decreases establishments' employment by 0.2 % with respect to the average value of this variable after a 1$ increase in the minimum wage. The effect is economically meaningful considering that it is also equal to 0.45 % with respect to the value of a one standard deviation change in the outcome variable.

Table 3: Heterogenous effect

	(1)	(2)	(3)
	All counties	Counties on borders	Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
	Panel A: interaction with corporate size		
MW	-0.015***	-0.023***	-0.031***
	(0.005)	(0.008)	(0.010)
MW $\times$ Log(Size)	0.002**	0.003***	0.003**
	(0.001)	(0.001)	(0.001)
Establishment FE	✓	✓	✓
Year $\times$ Firm FE	✓	✓	✓
Observations	2,283,862	690,721	610,632
Adjusted R-squared	0.931	0.933	0.933
	Panel B: interaction with the WW index		
MW	-0.017***	-0.020***	-0.030***
	(0.006)	(0.008)	(0.009)
MW $\times$ WW Index	-0.036**	-0.053***	-0.066***
	(0.016)	(0.018)	(0.023)
Establishment FE	✓	✓	✓
Year $\times$ Firm FE	✓	✓	✓
Observations	2,186,212	661,777	584,829
Adjusted R-squared	0.932	0.934	0.934
	Panel C: interaction with the SA index		
MW	-0.005***	-0.006**	-0.010***
	(0.001)	(0.003)	(0.003)
MW $\times$ SA Index	-0.002	-0.005***	-0.005**
	(0.001)	(0.002)	(0.002)
Establishment FE	✓	✓	✓
Year $\times$ Firm FE	✓	✓	✓
Observations	2,283,862	690,721	610,632
Adjusted R-squared	0.931	0.933	0.933

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Employment (log)*. All the regressions include the establishment and year $\times$ firm fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

4 Robustness checks

We show that our main results are robust to a set of robustness checks. To save space, we provide all the tables from this section in the Online Appendix.

Alternative staggered difference-in-differences estimators. Recent research in econometrics has found that even when treatment is assigned randomly, the accuracy of difference-in-differences regression estimates can be compromised. Using a standard two-way fixed effects (TWFE) model to estimate staggered treatment effects can indeed result in biased estimators. It occurs when earlier-treated units are mistakenly used as a comparison group for later-treated units (Baker et al., 2022; Goodman-Bacon, 2021).

To examine the potential bias of the staggered difference-in-differences approach in our setting, we assess the effects of minimum wage policies on establishments' employment by considering alternative estimation methods that are explicitly designed to deal with this concern. More specifically, we focus our analysis on counties located along states' borders and present in Figure OA3 annual point estimates of the effects of minimum wage changes on establishments' employment obtained using the methodologies introduced by De Chaisemartin and d'Haultfoeuille (2022) and Sun and Abraham (2021). We as well compare these estimators to the results obtained from a TWFE model.

The figure provides us with really important results. First, it shows that the parallel trend assumption still holds when we use these alternative methods. Second, in line with our baseline result, we do not find any evidence that changes in minimum wage policies substantially affect establishments' employment. Finally, it shows that the effects are consistent across alternative estimators.

Alternative fixed effects specification. In our main specification, we use establishment and firm times year fixed effects. This specification is particularly strong because it allows us to compare establishments that belong to the same corporations, but that are heterogeneously affected by changes in the minimum wage because located in different states. Also, it allows us to control for time-varying corporate characteristics.

In this section, we show that our results hold when we consider alternative specifications. More specifically, we show that our results hold when we only include: (i) establishment and year fixed effects, (ii) state and year fixed effects, and (iii) county and year fixed effects. We report estimation results in Table OA2, Table OA3, and Table OA4. In terms of magnitude, the financial friction coefficients are consistently higher with respect to our baseline results, suggesting that our main specification which includes firm times year fixed effects captures most of the endogeneity of the financial friction variables. Also, it highlights the importance of corporate characteristics in shaping employment patterns after changes in the minimum wage.

Alternative clustering. Our main specification employs clustering of standard errors at the state level, which we have selected as the appropriate cluster level since it is where the treatment is assigned (Abadie et al., 2023; Bertrand et al., 2004). In this section, we show that our results hold when we cluster standard errors at the establishment level, at the firm level, and also at the county level. We report estimation results in Table OA5, Table OA6, and Table OA7.

Other corporate characteristics. One potential concern regarding our analysis is that financially constrained firms may exhibit a more pronounced response to changes in the minimum wage not solely due to their financial constraints, but rather due to other corporate attributes that are correlated with financial constraints.

To mitigate this issue, we incorporate firm times year fixed effects into our main specification. This approach enables us to account for any time-varying firm attribute and to compare establishments belonging to the same firm, but with varying levels of exposure to minimum wage policies. We also address this concern in the final section of the paper, where we employ an exogenous measure of financially constrained firms based on ex-ante variation in the long-term debt structure before the financial crisis.

We demonstrate in this section that our findings remain robust even when we triple-interact changes in minimum wages with other time-varying corporate attributes. Specifically, we present evidence that our primary results hold when we incorporate alternative measures of corporate performance, efficiency, and tangibility in our regression analyses. We report our results in Table OA8. These findings align with our baseline results.

Geographic characteristics. Another potential concern of our analysis is that local economic characteristics could be positively related to changes in the minimum wage, thereby affecting our results. To address this issue, we follow the existing literature and employ a border discontinuity approach.

We demonstrate that our results remain robust even when we explicitly control for several local economic characteristics. More specifically, we control for the (log of the) county population, income per capita, and unemployment rate and report our results in Table OA9.

Heterogeneous effect across sectors. Prior research indicates that the impact of minimum wages varies significantly across sectors (Cengiz et al., 2019). In our study, we estimate the average effect of minimum wage changes on overall employment, while accounting for sectoral differences using establishment and firm times year fixed effects.

We examine this issue in greater depth by examining the impact of minimum wage changes and financial frictions on employment in different sectors. More specifically, we conduct separate analyses for establishments operating in companies that belong to minimum wage-sensitive industries and those that do not. To do so, we define minimum wag-sensitive industries following Gustafson and Kotter (2022). This classification includes restaurant, retail, and entertainment industries, that employ more than 70% of minimum wage labor.

We report estimation results in Table OA10 and Table OA11. We find strong and statistically significant results when we look at the sample of establishments operating in the industries that are most sensitive to minimum wage changes. In terms of magnitude, the estimated coefficients are slightly higher. When we look at the results for the sample of industries that are defined as not sensitive, we find that the coefficients are not statistically significant, even if they have the same sign as our baseline estimators.

Extensive margin. A crucial characteristic of our establishment-level database is that it is not affected by survivorship bias. In this paragraph, we estimate the effect of changes in minimum wage policies and financial frictions on the extensive margin, and in particular, we analyze whether there is an effect on the number of establishments located in a specific area exposed to a raise in the minimum wage rate.

To do so, we estimate the following Equation (4):

$$\begin{aligned} Log(Establishments)_{f,c,t} = \beta_0 MW_s + \\ \beta_1 MW_s \times Financial\ Frictions_{f,t-1} + \delta_{f,t} + \eta_c + \epsilon_{i,t} \end{aligned} \tag{4}$$

In this Equation, *Establishments* are the number of establishments that belong to firm f at time t in county c. Since we can not include establishment fixed effects, we consider county fixed effects (η_c).

We report the results in Table OA12 for the three alternative samples. We find that minimum wage policies decrease the number of establishments in exposed areas. In our preferred specification, all coefficients reported in Column (3) demonstrate negative and statistically significant associations, except for the coefficient linked to the SA index. Nonetheless, it's noteworthy that the coefficient remains negative. In terms of magnitude, according to the results reported in the last column, we find that one standard deviation change in the financial constraint indexes reduces the number of establishments by 0.8 % with respect to the average number of establishments at the beginning of our sample.

5 A firm-level analysis

We investigate how exposure to changes in the minimum wage affects overall corporate employment decisions and corporate policies.

Corporate employment. Managers may shift employment from exposed- to not exposed- to raising minimum wage establishments. This could imply that aggregate corporate employment changes little or perhaps not at all. To empirically investigate whether exposure to minimum wages for financially constrained firms also matters in the aggregate, we turn to firm-level regressions. More specifically, we measure corporate exposure to changes in minimum wage policies of the company f at time t using a shift-share approach as reported in the following equation:

$$Exposure\ MW_{f,t} = \sum_{n=1}^{51} Share\ Employees_{c,s,t} \times Minimum\ Wage_{s,t} \tag{5}$$

where *Share Employees* is the share of employees of the company f in state s at time t and *Minimum Wage* is the effective minimum wage in state s at time t.

We next estimate the following Equation:

$$\begin{aligned} Log(Employment)_{f,t} = \beta_0 Exposure\ MW_{f,t} + \\ \beta_1 Exposure\ MW_{f,t} \times Financial\ Frictions_{f,t-1} + \\ \beta_3 Financial\ Frictions_{f,t-1} + \eta_{s,t} + \theta_f + \epsilon_{i,t} \end{aligned} \tag{6}$$

where $\eta_{s,j}$ and θ_f are respectively sector-year and firm fixed effects. One limitation of this approach is that we are unable to control for firm-year fixed effects, which are collinear with our exposure to the minimum wage variable in this context. Additionally, we cannot utilize a border discontinuity approach.

We report estimation results in Table 4. These results are consistent with our previous findings at the establishment level. We still find that financially constrained firms decrease their employment after changes in the minimum wage. In terms of magnitude, this effect is even greater with respect to the results that we document at the establishment level. More specifically, we find that one standard deviation increase in financial frictions decreases overall corporate employment by 2 % with respect to the average value of the outcome variable after 1$ increase in the minimum wage exposure variable.

Table 4: Firm level analysis

Variables	(1) Employment (log)	(2) Employment (log)	(3) Employment (log)	Employment (log)
MW Exposure	0.013	-0.044***	0.015*	-0.007
	(0.009)	(0.008)	(0.009)	(0.008)
Size		0.163***		
		(0.017)		
MW Exposure × Log(Size)		0.008***		
		(0.002)		
SA Index			-0.046***	
			(0.013)	
MW Exposure × SA Index			-0.011***	
			(0.002)	
WW Index				-0.153
				(0.163)
MW Exposure × WW Index				-0.094***
				(0.020)
Firm FE	✓	✓	✓	✓
Year × Industry FE	✓	✓	✓	✓
Observations	90,782	88,186	88,186	76,519
Adjusted R-squared	0.932	0.953	0.942	0.939

Notes: This table shows regression results for Equation (6). We use as an outcome variable *Employment (log)*. All the regressions include the firm and year × industry fixed effects. Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

Corporate policies. Why do financially constrained firms reduce corporate employment? To answer this question, we investigate how exposure to minimum wage policies affects corporate performance and policies. Therefore, we estimate the following Equation:

$$Outcome_{f,t} = \beta_0 Exposure\ MW_{f,t} + \beta_1 Financial\ Frictions_{f,t-1} + \tag{7}$$
$$\beta_2 Exposure\ MW_{f,t} \times Financial\ Frictions_{f,t-1} + \eta_{s,t} + \theta_f + \epsilon_{i,t}$$

In Equation (7), *Outcome* represents alternative outcome variables. More specifically, we consider Cash, R&D, Leverage, and Tobin's Q. These variables are defined in detail in Table OA1.

We report the results in Table 5. We document negative effects of changes in the minimum wage on these outcomes. More specifically, the cash-to-assets ratio (Cash) decreases by 0.6 bps for one unit increase in the minimum wage exposure measure; given that the average cash ratio in our sample is 0.17, this decrease constitutes about 5 % with respect to the average cash holding ratio.

This result is likely to be explained by the increase in labor costs reducing profits so that corporations face short-term liquidity needs that arise due to the mismatch between labor cost payments and revenues. This, in turn, can explain a decrease in R&D in a logic similar to decreases in capital expenditures documented by Gustafson and Kotter (2022). We find that a one-unit increase in the minimum wage exposure variable is associated with a decrease in R&D expenditures scaled by total assets (R&D) by 0.4 bps, which corresponds to 4.6% average fall in R&D expenditures.

The coefficient for leverage is statistically significant at ten percent with one unit increase in the minimum wage measure being associated with a 0.8 bps increase in average in the leverage ratio, which is about 4.2 % of the mean leverage ratio in our sample. This result is also important since it highlights the need for corporations to access financing after changes in minimum wage policies.

Finally, these negative changes in cash, research and development expenditures, and leverage are negatively associated with firm value. More specifically, we document a decrease in Tobin's Q after a one-unit increase in the minimum wage exposure variable equal to 25 bps, which corresponds to about 6.4% drop in the average value of Tobin's

Q for our sample.

In summary, our findings indicate that changes in minimum wage policies expose firms to the need to acquire additional resources to address short-term liquidity requirements, potentially leading financially constrained firms to cut employment.

Table 5: Firm level analysis

Variables	(1) Cash	(2) R&D	(3) Leverage	(4) Tobin's Q
MW Exposure	-0.006**	-0.004***	0.008***	-0.250***
	(0.002)	(0.001)	(0.003)	(0.069)
Firm FE	✓	✓	✓	✓
Year × Industry FE	✓	✓	✓	✓
Observations	89,896	90,569	90,301	83,640
Adjusted R-squared	0.548	0.635	0.513	0.539

Notes: This table shows regression results for Equation (7). We use alternative outcome variables as reported in the second row. All the regressions include the firm and year × industry fixed effects. Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

6 The financial crisis, the federal minimum wage, and corporate employment

We presented empirical evidence suggesting that changes in the minimum wage have no effect on employment levels. However, we also uncovered significant variations in the response of different firms to such changes, particularly among those struggling with financing challenges. These findings provide valuable insights into the dynamics of minimum wage policies, but they do not necessarily establish causal relationships. This is because financial frictions faced by firms may be associated with other corporate characteristics that also influence employment decisions.

In this section, we focus our attention on a unique experiment that allows us to understand whether financial frictions *causally* affect corporate employment. More specifically, we exploit two sources of exogenous variation in the data. One comes from an increase in the federal minimum wage during the 2007-2008 financial crisis, which heterogeneously affected corporate establishments across the country. This period is particularly relevant for our analysis since it is characterized by severe information asymmetries, uncertainty, and tight credit constraints (Brunnermeier, 2009; Bernanke, 2023). The second source of exogenous variation comes from the structure of corporate debt and ex-ante variation in long-term debt maturity across firms. Indeed, the financial crisis hit the country unexpectedly, and therefore managers did not have the chance to adjust their corporate debt structure to face rollover risk.

In the following exercise, we limit our sample to the period around the 2007-2008 crisis period, the years from 2003 to 2011. We report the summary statistics for this sample in Table OA13.

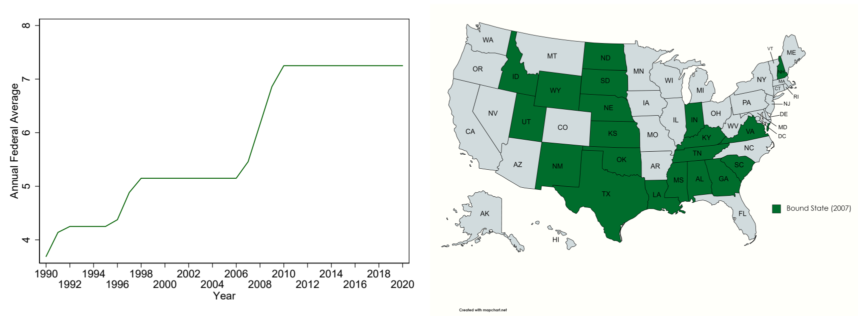
The change in the federal minimum wage during the financial crisis. Prior to the 2007 financial crisis, the federal minimum wage level was \$5.15 per hour which was established in 1997. The minimum wage remained at \$5.15 per hour until 2007, when it was increased to \$5.85 per hour, followed by subsequent increases to \$6.55 per hour in 2008 and \$7.25 per hour in 2009. Figure 4(a) shows the dynamics of the federal minimum wage across our sample years.

At the time of the change, some states have their own minimum wage laws that were higher than the federal minimum wage and therefore were not exposed to the federal policy. Figure 4(b) displays the states affected by the federal minimum wage changes. Thus, in our analysis, we compare establishments situated in affected states to those in unaffected states (Clemens and Wither, 2019; Gustafson and Kotter, 2022).

Employment dynamics. To determine whether employment levels of establishments in affected states decrease, we estimate the following Equation:

$$Log(Employment)_{i,t} = \sum_{t=2003, t\neq 2007}^{t=2011} \beta_t Bound_s \times Year_t + \eta_i + \theta_t + \epsilon_{i,t} \tag{8}$$

Figure 4: The federal minimum wage change



(a) Changes in the federal MW (b) Bounded vs unbounded states

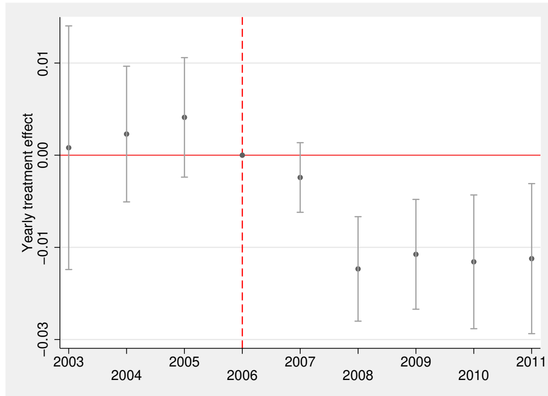
Notes: Figure 4(a) shows changes in the federal minimum wage across years. Figure 4(b) illustrates the states that fall into the categories of affected (bounded) and unaffected (unbounded).

In Equation (8), *Bound* is an indicator variable that equals to one if the establishment is located in a state bound to the federal minimum wage and is zero otherwise. η_i and θ_t are respectively establishment and year fixed effects. In this model, we interact *Bound* with a complete set of year dummies using the change in the federal minimum wage year as a reference. We consider three lags and four leads around the change. Thereby, the coefficients β_t report the differential effect of belonging to a state bound by the federal minimum wage on establishments' employment for a particular year compared to the year before the change in the federal minimum wage.

We present the β coefficients estimated from Equation (8) and the 95% confidence intervals in Figure 2. The graphs provide several important results. First, the yearly point estimates show significant negative effects every year after the rise in the minimum wage. In terms of economic magnitude, we find that establishments that belong to a state bound by the federal minimum wage change decrease their employment by 0.3 % with respect to the average employment level. Also, we find that the yearly treatment effects are not significant before the changes in the minimum wage, suggesting that the parallel trend assumption holds and that we are comparing similar establishments.

Difference-in-differences. Event study estimates from Equation (8) identify treatment effects over time and provide evidence that the parallel trend assumption sup-

Figure 2: Yearly treatment coefficients



Notes: Figure 2 shows the yearly treatment effects from equation (8) with the establishment and year fixed effects. The outcome variable is the natural logarithm of employment in the establishment. The plot exhibits yearly point estimates and 95% confidence intervals based on standard errors clustered by state.

porting the validity of our approach. Since we show the effect is long-lasting and persistent, we consider a more efficient difference-in-differences approach and estimate the following Equation (9):

$$Log(Employment)_{i,t} = \beta Bound_s \times Post_t + \eta_i + \theta_{f,s} + \epsilon_{i,t} \tag{9}$$

In this setting, the variable *Post* is an indicator variable equal to 1 after 2007 and 0 otherwise.

We report estimation results in Table 6. In line with the earlier event study results, we find that establishments located in states bound by the federal minimum wage change decrease their employment. More specifically, according to the coefficient reported in the last column, employment decreased by 0.45 % with respect to its average value.

Financial frictions. We test the role of financial frictions in this setting by exploiting as an exogenous measure of financial frictions the ex-ante variation in long-term debt levels maturing during at the onset of the crisis across firms (Duval et al., 2020; Almeida et al., 2009; Benmelech et al., 2019). This measure is expected to be unrelated to corporate investment prospects and other corporate characteristics and affects their

Table 6: Difference-in-difference

	(1)	(2)	(3)
	All counties	Counties on borders	Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
Event × Bound	-0.005	-0.014***	-0.013**
	(0.004)	(0.005)	(0.005)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	714,091	217,077	192,622
Adjusted R-squared	0.955	0.957	0.957

Notes: This table shows regression results for Equation (9). We use as an outcome variable *Employment (log)*. All the regressions include the establishment and year × firm fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) all counties on the states' border whose centroids is less than 70 km in Column (3). Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

cost of credit intermediation.

We use this exogenous measure of corporate financial frictions and estimate the following Equation:

$$Log(Employment)_{i,t} = \beta_0 Bound_i \times Post_t + \beta_1 Bound_i \times Post_t \times Financial\ Frictions_f + \eta_i + \theta_{f,s} + \epsilon_{i,t} \tag{10}$$

In this setting, the variable *Post* is a dummy variable equal to 1 after 2007 and 0 otherwise. On the other side, *Financial Frictions (Short)* is our exogenous measure of firms facing financial constraints, that is the debt maturing in 2008 adjusted by total sales.

We report estimation results in Table 7. We find that financial constraints significantly affect employment dynamics for establishments located in states bound by the change in the federal minimum wage. More specifically, according to the results reported in the last column, we find that one standard deviation change in the financial friction measure further decreases employment by 0.4 % with respect to the average value of the outcome.

We also look at the effect of long-term debt maturing after the financial crisis (*Financial Frictions (long)*). However, in line with our hypothesis, we do not find any evidence that it affects establishments' employment. The coefficients reported in Panel B are indeed equal to 0 and not statistically significant.

Table 7: Financial frictions

	(1)	(2)	(3)
	All counties	Counties on borders	Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
		Panel A: short-term frictions	
Post × Bound	-0.003	-0.006	-0.006
	(0.004)	(0.006)	(0.006)
Post × Bound × Frictions (short)	0.000	-0.005*	-0.005*
	(0.002)	(0.002)	(0.003)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	611,520	185,902	164,925
Adjusted R-squared	0.953	0.955	0.955
		Panel B: long-term frictions	
Post × Bound	-0.003	-0.014**	-0.011
	(0.005)	(0.007)	(0.007)
Post × Bound × Frictions (long)	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	553,573	168,518	150,449
Adjusted R-squared	0.958	0.959	0.960

Notes: This table shows regression results for Equation (10). We use as an outcome variable *Employment (log)*. All the regressions include the establishment and year × firm fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) all counties on the states' border whose centroids is less than 70 km in Column (3). Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

7 Conclusions

A large literature in economics analyzes the effect of minimum wage policies on employment, finding mixed results (e.g., Card and Krueger, 2000; Cengiz et al., 2019; Clemens and Wither, 2019). Our paper aims to originally contribute to this literature by analyzing whether corporate balance sheet characteristics can contribute to explaining employment dynamics following minimum wage adjustments.

In order to advance our research, we collect information on the establishments that belong to a public corporation in the United States and the corporate balance-sheet characteristics of the firms that own them. Using a border discontinuity approach (Card and Krueger, 2000; Cengiz et al., 2019; Dustmann et al., 2022), we do not find any evidence that the minimum wage affects employment. However, in line with our research hypothesis, we document that this average effect masks important corporate-level heterogeneity. When we interact changes in minimum wages with alternative measures of corporate financial frictions, we find a large and negative effect for these firms. These results are confirmed by a firm-level analysis.

We next provide causal evidence about the relationship between minimum wage changes, financial frictions, and employment using as a unique experiment the increase in the federal minimum wage during the 2007-2008 financial crisis and leveraging the ex-ante variation in long-term debt levels maturing during the credit crisis period across firms. Using this clean identification strategy, we find that financially constrained firms in states bound by the federal minimum wage further decrease their employment level.

These results highlight the importance of financial constraints in explaining employment dynamics after changes in minimum wage policies, and can therefore help to explain the heterogeneous effect minimum wage changes have on employment documented by the previous literature. Our research has also implications for policymakers by helping them to better understand how firm characteristics impact the effectiveness of minimum wage policies and how employment policies targeted at a specific set of firms may be more effective.

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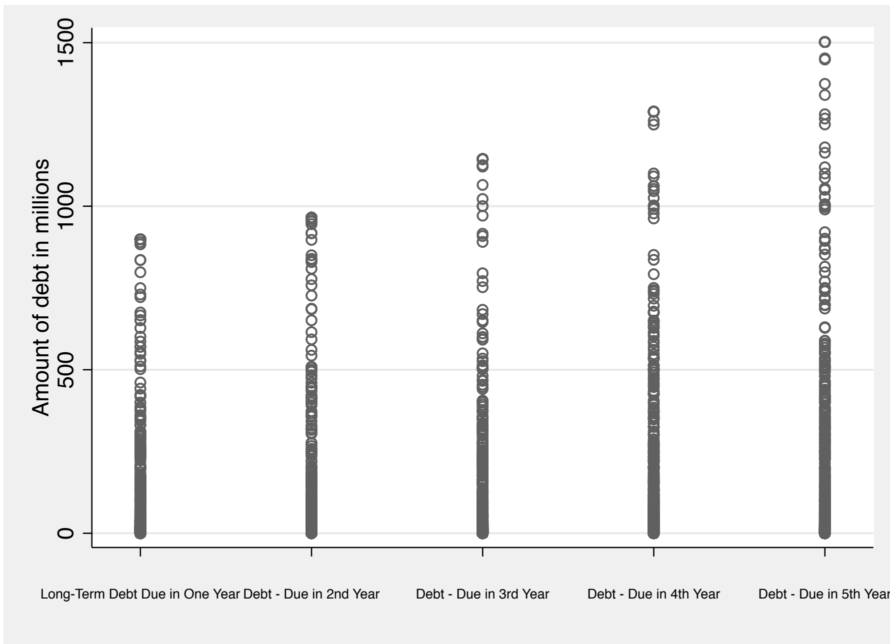
Online Appendix

This Appendix is for Online Publication (OA) and provides further details on the data and the results of the paper "Now You See It, Now You Don't: Financial Frictions, Minimum Wage Policies, and Employment".

OA1 Figures

Corporate debt structure during the financial crisis. Figure OA1 illustrates the wide variation in long-term debt maturity across different years.

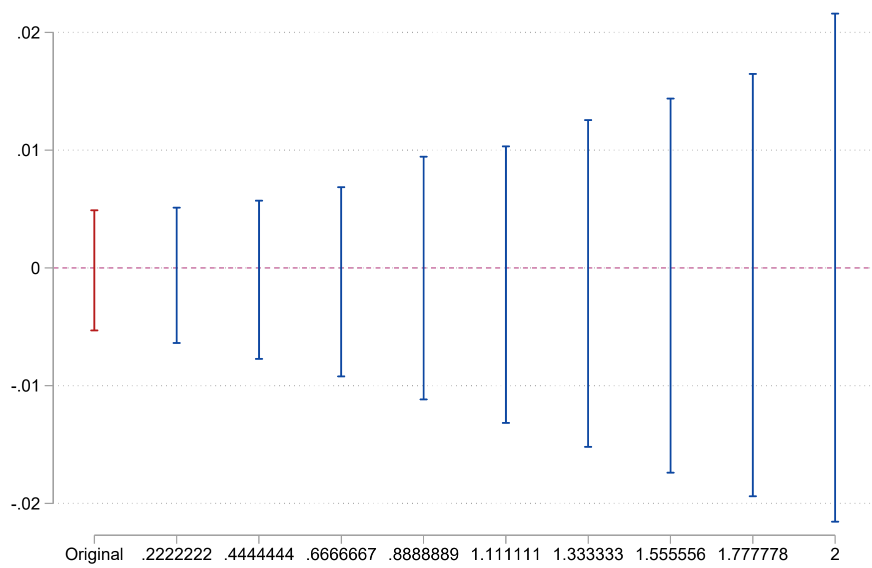
Figure OA1: Corporate debt structure



Notes: Figure OA1 illustrates the wide variation in debt maturity across different years.

Sensitivity test. Figure OA2 shows the results of the sensitivity test proposed by Rambachan and Roth (2023). We calculate 95 % confidence intervals for our main estimators under varying assumptions of the value M, the upper limit for the change between two consecutive time periods in the slope of the underlying linear trend. We show that the fixed length confidence intervals are similar to those from our baseline estimator when allowing for violations of parallel trends that are approximately linear and for larger degrees of possible non-linearity in the violation of parallel trends.

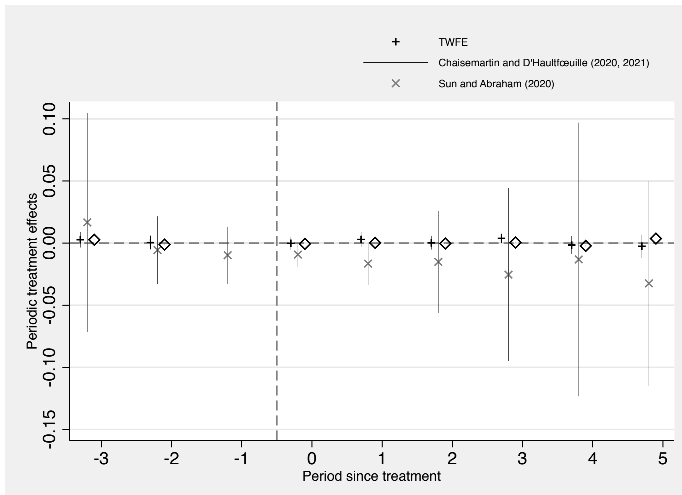
Figure OA2: Sensitivity test



Notes: Figure OA2 provides the results of a formal sensitivity analysis that relates the magnitude of violations of parallel trends to the robustness of treatment estimates in post-treatment periods (Rambachan and Roth, 2023). It shows 95 % confidence intervals for our main estimators under varying assumptions of the value M on the x-axis.

Alternative staggered difference-in-differences estimators. We focus our analysis on counties located along states' borders and present in Figure OA3 annual point estimates of the effect of minimum wage changes on employment obtained using the methodologies introduced by De Chaisemartin and d'Haultfoeuille (2022) and Sun and Abraham (2021). We as well compare these estimators to the results obtained from a two-way fixed effects (TWFE) model.

Figure OA3: Alternative estimators



Notes: Figure OA3 depicts the annual treatment effects utilizing the two-way fixed effects (TWFE) estimator and compares them with the estimators introduced by De Chaisemartin and d'Haultfoeuille (2022) and Sun and Abraham (2021). The outcome variable is the natural logarithm of employment in the establishment. The plot exhibits yearly point estimates and 95% confidence intervals based on standard errors clustered by state.

OA2 Tables

Variable definition. Table OA1 contains detailed information on the variables that we use in the empirical analysis, their description, and their sources.

Table OA1: Variable description

Variable name	**Description**	**Source**
	Panel A: Establishment Level	
Employment	The number of employees working at the establishment	NETS
Minimum Wage (MW)	State-level effective minimum wage	Vaghul and Zipperer (2019)
Size	A measure of the firm's total assets (item AT) measured in millions of dollars	Compustat
SA Index	Following Hadlock and Pierce (2010), the SA index is defined as (-0.737 $\times$ log(AT))+(0.043 $\times$ log(AT^2)) $-$ (0.040$\times$ Age). Age is defined as the number of years the firm is present in Compustat. Size is winsorized at (the log of) \$4.5 billion, and Age is winsorized at 37 years. A higher value of the index indicates a greater financial constraint	Compustat
WW Index	Following Whited and Wu (2006), the WW index is defined as (-0.091 $\times$ CF) - (0.062 $\times$ DIVPOS)+(0.021 $\times$ TLTD) - (0.044 $\times$ log(AT)) + (0.102 $\times$ ISG) - (0.035 $\times$ SG), where CF is the ratio of cash flow (item IB + item DP) to total assets (item AT), DIVPOS is an indicator variable equal to one if the firm pays cash dividends (item DVT) and zero otherwise, TLTD is the ratio of long-term debt (item DLTT) to total assets (item AT), ISG is the firm's 3-digit SIC industry sales (item SALE) growth, SG is firm sales (item SALE) growth. A higher value of the index indicates a greater financial constraint	Compustat
RoA	Ratio of firm's income before extraordinary items (item IB) to total assets (item AT)	Compustat
Tangibility	Ratio of a firm's property, plant, and equipment (item PPENT) to total assets (item AT)	Compustat
Bound	An indicator variable equal to one if the establishment is located in a bounded state to the federal minimum wage change, zero otherwise	Authors
Frictions (short)	Ratio of firm's long-term debt due in one year (item DD1) to sales (item SALE). This variable is measured as in the fiscal year 2007. We report the value in % by multiplying it by 100	Compustat

Notes: This table shows a detailed description of each variable and its source.

Table OA1: Variable description (continued)

Frictions (long)	Ratio of firm's long-term debt due in two, three, four, and five years (item DD2, DD3, DD4, and DD5) to sales (item SALE). This variable is measured as in the fiscal year 2007. We report the value in % by multiplying it by 100	Compustat
RoI	Ratio of firm's income before extraordinary items (item IB) to invested capital (item ICAPT)	Compustat
	Panel B: Corporate Level	
Employment	The number of employees working at the firm measured in thousands of units	Compustat
MW Exposure	Corporate exposure to minimum wage policies measured as state minimum wages weighted by the number of employees at the firm's establishments across the states	Vaghul and Zipperer (2019)
Log(Size)	Natural logarithm of the firm's total assets	Compustat
SA Index	Following Hadlock and Pierce (2010), the SA index is defined as (-0.737 $\times$ log(AT))+(0.043 $\times$ log(AT)^2) $-$ (0.040$\times$ Age). Age is defined as the number of years the firm is present in Compustat. Size is winsorized at (the log of) \$4.5 billion, and Age is winsorized at 37 years. A higher value of the index indicates a greater financial constraint.	Compustat
WW Index	Following Whited and Wu (2006), the WW index is defined as (-0.091 $\times$ CF) - (0.062 $\times$ DIVPOS)+(0.021 $\times$ TLTD) - (0.044 $\times$ log(item AT)) + (0.102 $\times$ ISG) - (0.035 $\times$ SG), where CF is the ratio of cash flow (item IB + item DP) to total assets (item AT), DIVPOS is an indicator variable equal to one if the firm pays cash dividends (item DVT) and zero otherwise, TLTD is the ratio of long-term debt (item DLTT) to total assets (item AT), ISG is the firm's 3-digit SIC industry sales (item SALE) growth, SG is firm sales (item SALE) growth. A higher value of the index indicates a greater financial constraint	Compustat
Cash	Ratio of cash and short-term equivalents (item IB + item DP) to total assets (item AT)	Compustat
R&D	Ratio of research and development expenses (item RD) to total assets (item AT)	Compustat

Notes: This table shows a detailed description of each variable and its source.

Table OA1: Variable description (continued)

Leverage	Ratio of long-term debt (item DLTT) to total assets (item AT)	Compustat
Tobin's Q	Ratio of the market value of equity (item AT + (item CSHO $\times$ item PRCC˙F) $-$ item CEQ) to book value of equity (item AT).	Compustat

Notes: This table shows a detailed description of each variable and its source.

Alternative fixed effects specification. We show that our results hold when we consider alternative specifications. More specifically, we show that our results hold when we only include: (i) establishment and year fixed effects; (ii) state and year fixed effects; and (iii) county and year fixed effects. We report estimation results in Table OA2, Table OA3, and Table OA4.

Table OA2: Alternative FE - Establishments and Year

	(1)	(2)	(3)
	All counties	Counties on borders	Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
	Panel A: interaction with corporate size		
MW	-0.026***	-0.034***	-0.040***
	(0.009)	(0.009)	(0.009)
Log(Size)	0.036***	0.025***	0.023***
	(0.007)	(0.008)	(0.008)
MW × Log(Size)	0.003***	0.005***	0.005***
	(0.001)	(0.001)	(0.001)
Establishment FE	✓	✓	✓
Year FE	✓	✓	✓
Observations	2,283,871	703,268	623,075
Adjusted R-squared	0.924	0.924	0.924
	Panel B: interaction with the WW index		
MW	-0.026***	-0.031***	-0.037***
	(0.008)	(0.008)	(0.008)
WW	0.060	0.177	0.220*
	(0.102)	(0.114)	(0.116)
MW × WW Index	-0.068***	-0.089***	-0.097***
	(0.017)	(0.018)	(0.018)
Establishment FE	✓	✓	✓
Year FE	✓	✓	✓
Observations	2,186,234	672,897	595,830
Adjusted R-squared	0.926	0.926	0.926
	Panel C: interaction with the SA index		
MW	-0.008**	-0.008**	-0.012***
	(0.003)	(0.003)	(0.003)
SA Index	-0.020**	-0.003	-0.001
	(0.009)	(0.008)	(0.009)
MW × SA Index	-0.006***	-0.008***	-0.008***
	(0.001)	(0.001)	(0.001)
Establishment FE	✓	✓	✓
Year FE	✓	✓	✓
Observations	2,283,871	703,268	623,075
Adjusted R-squared	0.924	0.924	0.924

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Employment (log)*. All the regressions include the establishment and year fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

Table OA3: Alternative FE - State and Year

	(1) All counties	(2) Counties on borders	(3) Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
	Panel A: interaction with corporate size		
MW	-0.140***	-0.153***	-0.153***
	(0.043)	(0.039)	(0.040)
Log(Size)	0.085***	0.071***	0.070***
	(0.026)	(0.026)	(0.025)
MW × Log(Size)	0.015***	0.018***	0.018***
	(0.005)	(0.005)	(0.005)
State FE	✓	✓	✓
Year FE	✓	✓	✓
Observations	2,285,340	703,767	623,534
Adjusted R-squared	0.0782	0.0806	0.0783
	Panel B: interaction with the WW index		
MW	-0.160***	-0.170***	-0.171***
	(0.040)	(0.036)	(0.038)
WW Index	-1.062**	-0.831*	-0.797
	(0.499)	(0.485)	(0.476)
MW × WW Index	-0.367***	-0.409***	-0.413***
	(0.100)	(0.089)	(0.089)
State FE	✓	✓	✓
Year FE	✓	✓	✓
Observations	2,191,990	674,675	597,454
Adjusted R-squared	0.0770	0.0792	0.0770
	Panel C: interaction with the SA index		
MW	-0.061***	-0.059***	-0.059***
	(0.011)	(0.011)	(0.014)
SA Index	-0.003	0.014	0.011
	(0.032)	(0.032)	(0.032)
MW × SA Index	-0.033***	-0.036***	-0.036***
	(0.008)	(0.007)	(0.006)
State FE	✓	✓	✓
Year FE	✓	✓	✓
Observations	2,285,340	703,767	623,534
Adjusted R-squared	0.0499	0.0504	0.0503

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Employment (log)*. All the regressions include the state and year-fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

Table OA4: Alternative FE - County and Year

	(1)	(2)	(3)
	All counties	Counties on borders	Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
		Panel A: interaction with corporate size	
MW	-0.138***	-0.148***	-0.148***
	(0.042)	(0.039)	(0.040)
Log(Size)	0.089***	0.076***	0.076***
	(0.025)	(0.025)	(0.024)
MW × Size	0.015***	0.017***	0.017***
	(0.005)	(0.005)	(0.004)
County FE	✓	✓	✓
Year FE	✓	✓	✓
Observations	2,285,340	703,767	623,534
Adjusted R-squared	0.0992	0.104	0.101
		Panel B: interaction with the WW index	
MW	-0.158***	-0.165***	-0.165***
	(0.038)	(0.035)	(0.037)
WW Index	-1.115**	-0.912*	-0.897*
	(0.479)	(0.461)	(0.465)
MW × WW Index	-0.366***	-0.403***	-0.402***
	(0.097)	(0.086)	(0.087)
County FE	✓	✓	✓
Year FE	✓	✓	✓
Observations	2,191,982	674,670	597,450
Adjusted R-squared	0.0980	0.103	0.0998
		Panel C: interaction with the SA index	
MW	-0.061***	-0.058***	-0.058***
	(0.011)	(0.011)	(0.013)
SA Index	-0.002	0.013	0.008
	(0.030)	(0.030)	(0.031)
MW × SA Index	-0.034***	-0.037***	-0.036***
	(0.007)	(0.006)	(0.006)
County FE	✓	✓	✓
Year FE	✓	✓	✓
Observations	2,285,340	703,767	623,534
Adjusted R-squared	0.0713	0.0745	0.0737

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Employment (log)*. All the regressions include the county and year firm fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

Alternative cluster. Our main specification employs clustering of standard errors at the state level, which we have selected as the appropriate cluster level since it is where the treatment is assigned (Abadie et al., 2023; Bertrand et al., 2004). In this paragraph, we show that our results hold when we cluster standard errors at the establishment level, at the firm level, and also at the county level. We report estimation results in Table OA5, Table OA6, and Table OA7.

Table OA5: Alternative Cluster - Establishment

	(1)	(2)	(3)
	All counties	Counties on borders	Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
	Panel A: interaction with corporate size		
MW	-0.015***	-0.023**	-0.031***
	(0.005)	(0.009)	(0.010)
MW × Log(Size)	0.002**	0.003**	0.003**
	(0.001)	(0.001)	(0.001)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,283,862	690,721	610,632
Adjusted R-squared	0.931	0.933	0.933
	Panel B: interaction with the WW index		
MW	-0.017***	-0.020**	-0.030***
	(0.005)	(0.008)	(0.009)
MW × WW Index	-0.036***	-0.053**	-0.066***
	(0.012)	(0.021)	(0.024)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,186,212	661,777	584,829
Adjusted R-squared	0.932	0.934	0.934
	Panel C: interaction with the SA index		
MW	-0.005**	-0.006*	-0.010***
	(0.002)	(0.003)	(0.004)
MW × SA Index	-0.002*	-0.005**	-0.005**
	(0.001)	(0.002)	(0.002)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,283,862	690,721	610,632
Adjusted R-squared	0.931	0.933	0.933

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Employment (log)*. All the regressions include the establishment and year × firm fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the establishment level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

Table OA6: Alternative Cluster - Firm

	(1) All counties	(2) Counties on borders	(3) Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
	Panel A: interaction with corporate size		
MW	-0.015**	-0.023**	-0.031***
	(0.007)	(0.010)	(0.011)
MW × Log(Size)	0.002*	0.003**	0.003**
	(0.001)	(0.001)	(0.001)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,283,862	690,721	610,632
Adjusted R-squared	0.931	0.933	0.933
	Panel B: interaction with the WW index		
MW	-0.017**	-0.020**	-0.030***
	(0.008)	(0.009)	(0.010)
MW × WW Index	-0.036*	-0.053**	-0.066***
	(0.020)	(0.023)	(0.024)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,186,212	661,777	584,829
Adjusted R-squared	0.932	0.934	0.934
	Panel C: interaction with the SA index		
MW	-0.005**	-0.006	-0.010**
	(0.002)	(0.004)	(0.004)
MW × SA Index	-0.002	-0.005*	-0.005*
	(0.002)	(0.002)	(0.003)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,283,862	690,721	610,632
Adjusted R-squared	0.931	0.933	0.933

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Employment (log)*. All the regressions include the establishment and year × firm fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the firm level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

Table OA7: Alternative Cluster - County

	(1)	(2)	(3)
	All counties	Counties on borders	Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
		Panel A: interaction with corporate size	
MW	-0.015***	-0.023**	-0.031***
	(0.005)	(0.010)	(0.011)
MW × Log(Size)	0.002**	0.003**	0.003**
	(0.001)	(0.001)	(0.001)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,283,862	690,721	610,632
Adjusted R-squared	0.931	0.933	0.933
		Panel B: interaction with the WW index	
MW	-0.017***	-0.020**	-0.030***
	(0.005)	(0.008)	(0.009)
MW × WW Index	-0.036***	-0.053***	-0.066***
	(0.013)	(0.020)	(0.024)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,186,212	661,777	584,829
Adjusted R-squared	0.932	0.934	0.934
		Panel C: interaction with the SA index	
MW	-0.005***	-0.006*	-0.010***
	(0.002)	(0.003)	(0.004)
MW × SA Index	-0.002*	-0.005***	-0.005**
	(0.001)	(0.002)	(0.002)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,283,862	690,721	610,632
Adjusted R-squared	0.931	0.933	0.933

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Employment (log)*. All the regressions include the establishment and year × firm fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the county level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

Other corporate characteristics. We present evidence that our primary results hold when we incorporate alternative measures of corporate performance, tangibility, and managerial ability in our regression analyses. We report our results in Table OA8.

Table OA8: Confounding corporate characteristics

	(1)	(2)	(3)
	All counties	Counties on borders	Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
		Panel A: interaction with corporate size	
MW	-0.018***	-0.023**	-0.031***
	(0.006)	(0.009)	(0.010)
MW × Log(Size)	0.001**	0.003***	0.003**
	(0.001)	(0.001)	(0.001)
MW × Tangibility	0.009**	0.002	0.004
	(0.005)	(0.009)	(0.008)
MW × RoI	-0.002	-0.002	-0.003
	(0.003)	(0.007)	(0.008)
MW × RoA	0.005	0.024**	0.028**
	(0.006)	(0.010)	(0.011)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,274,684	688,080	608,340
Adjusted R-squared	0.931	0.933	0.933
		Panel B: interaction with the WW index	
MW	-0.020***	-0.020**	-0.030***
	(0.007)	(0.008)	(0.010)
MW × WW Index	-0.035**	-0.048**	-0.062***
	(0.016)	(0.018)	(0.023)
MW × Tangibility	0.010**	0.002	0.004
	(0.005)	(0.009)	(0.009)
MW × RoI	-0.001	-0.002	-0.003
	(0.003)	(0.007)	(0.009)
MW × RoA	0.003	0.023**	0.024**
	(0.006)	(0.010)	(0.012)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,178,840	659,676	583,030
Adjusted R-squared	0.932	0.934	0.934

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Employment (log)*. All the regressions include the establishment and year × firm fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

Table OA8: Confounding corporate characteristics (continued)

	(1)	(2)	(3)
	All counties	Counties on borders	Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
		Panel C: interaction with the SA index	
MW	-0.008***	-0.006	-0.011**
	(0.003)	(0.004)	(0.004)
MW × SA Index	-0.002	-0.004**	-0.004*
	(0.001)	(0.002)	(0.002)
MW × Tangibility	0.009*	0.001	0.003
	(0.005)	(0.009)	(0.009)
MW × RoI	-0.002	-0.002	-0.003
	(0.003)	(0.007)	(0.008)
MW × RoA	0.006	0.024**	0.029**
	(0.006)	(0.010)	(0.011)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,274,684	688,080	608,340
Adjusted R-squared	0.931	0.933	0.933

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Employment (log)*. All the regressions include the establishment and year × firm fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

County characteristics. We demonstrate that our results remain robust even when we explicitly control for several local economic characteristics. More specifically, we control for the (log of the) county population, income per capita, and unemployment rate and report our results in Table OA9.

Table OA9: County characteristics

	(1)	(2)	(3)
	All counties	Counties on borders	Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
	Panel A: interaction with corporate size		
MW	-0.014**	-0.025***	-0.032***
	(0.006)	(0.009)	(0.011)
MW × Log(Size)	0.002**	0.003***	0.004***
	(0.001)	(0.001)	(0.001)
Income	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Unemployment	0.000	0.001	0.002
	(0.001)	(0.001)	(0.001)
Log(Population)	0.158***	0.124***	0.134***
	(0.024)	(0.037)	(0.043)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,252,915	677,627	597,507
Adjusted R-squared	0.931	0.933	0.933
	Panel B: interaction with the WW index		
MW	-0.016**	-0.021***	-0.030***
	(0.006)	(0.008)	(0.009)
MW × WW Index	-0.037**	-0.057***	-0.071***
	(0.016)	(0.018)	(0.022)
Income	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Unemployment	0.000	0.001	0.001
	(0.001)	(0.001)	(0.001)
Log(Population)	0.154***	0.119***	0.129***
	(0.024)	(0.038)	(0.044)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,156,576	649,319	572,343
Adjusted R-squared	0.932	0.934	0.934

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Employment (log)*. All the regressions include the establishment and year × firm fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

Table OA9: County characteristics (continued)

	(1)	(2)	(3)
	All counties	Counties on borders	Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
	Panel C: interaction with the SA index		
MW	-0.004**	-0.006*	-0.010***
	(0.002)	(0.003)	(0.004)
MW × SA Index	-0.002**	-0.005***	-0.005**
	(0.001)	(0.002)	(0.002)
Income	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Unemployment	0.000	0.001	0.002
	(0.001)	(0.001)	(0.001)
Log(Population)	0.158***	0.124***	0.134***
	(0.024)	(0.037)	(0.042)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	2,252,915	677,627	597,507
Adjusted R-squared	0.931	0.933	0.933

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Employment (log)*. All the regressions include the establishment and year × firm fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

Heterogeneous effect across sectors. We conduct separate analyses for establishments operating in companies that belong to minimum wage-sensitive industries and those that do not. We report estimation results in Table OA10 and Table OA11.

Table OA10: Minimum Wage - No Sensitive industries

	(1)	(2)	(3)
	All counties	Counties on borders	Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
	Panel A: interaction with corporate size		
MW	-0.010	-0.021	-0.028
	(0.007)	(0.014)	(0.018)
MW × Log(Size)	0.001	0.003	0.003
	(0.001)	(0.002)	(0.002)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	1,197,458	363,087	323,936
Adjusted R-squared	0.923	0.924	0.925
	Panel B: interaction with the WW index		
MW	-0.010*	-0.017	-0.026
	(0.006)	(0.013)	(0.016)
MW × WW Index	-0.017	-0.045	-0.057
	(0.015)	(0.031)	(0.039)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	1,141,421	346,718	309,263
Adjusted R-squared	0.925	0.925	0.926
	Panel C: interaction with the SA index		
MW	-0.004	-0.004	-0.008
	(0.003)	(0.005)	(0.006)
MW × SA Index	-0.001	-0.003	-0.004
	(0.002)	(0.003)	(0.003)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	1,197,458	363,087	323,936
Adjusted R-squared	0.923	0.924	0.925

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Employment (log)*. All the regressions include the establishment and year × firm fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

Table OA11: Minimum Wage - Sensitive Industries

	(1)	(2)	(3)
	All counties	Counties on borders	Counties on borders($\leq 75km$)
Variables	Employment (log)	Employment (log)	Employment (log)
		Panel A: interaction with corporate size	
MW	-0.020**	-0.025**	-0.033***
	(0.010)	(0.011)	(0.011)
MW $\times$ Log(Size)	0.002*	0.003**	0.004**
	(0.001)	(0.001)	(0.001)
Establishment FE	✓	✓	✓
Year $\times$ Firm FE	✓	✓	✓
Observations	1,086,404	327,634	286,696
Adjusted R-squared	0.938	0.941	0.940
		Panel B: interaction with the WW index	
MW	-0.045**	-0.024**	-0.034***
	(0.018)	(0.009)	(0.011)
MW $\times$ WW Index	-0.118**	-0.061**	-0.076***
	(0.050)	(0.023)	(0.027)
Establishment FE	✓	✓	✓
Year $\times$ Firm FE	✓	✓	✓
Observations	805,097	315,059	275,566
Adjusted R-squared	0.927	0.942	0.941
		Panel C: interaction with the SA index	
MW	-0.007***	-0.009**	-0.013***
	(0.002)	(0.004)	(0.003)
MW $\times$ SA Index	-0.004*	-0.006***	-0.006**
	(0.002)	(0.002)	(0.003)
Establishment FE	✓	✓	✓
Year $\times$ Firm FE	✓	✓	✓
Observations	825,645	327,634	286,696
Adjusted R-squared	0.926	0.941	0.940

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Employment (log)*. All the regressions include the establishment and year $\times$ firm fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

Intensive margin. We analyze the effect of changes in minimum wage policies and financial frictions on the number of establishments. To do so, we estimate Equation (4) and report the results in Table OA12.

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Table OA12: Intensive Margin

	(1) All counties	(2) Counties on borders	(3) Counties on borders($\leq 75km$)
Variables	Establishments (log)	Establishments (log)	Establishments (log)
	Panel A: interaction with corporate size		
MW	-0.033**	-0.014	-0.012
	(0.015)	(0.011)	(0.011)
MW × Log(Size)	0.005**	0.003*	0.002*
	(0.002)	(0.002)	(0.001)
County FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	1,357,683	432,431	383,861
Adjusted R-squared	0.304	0.272	0.272
	Panel B: interaction with the WW index		
MW	0.008**	-0.008	-0.009
	(0.004)	(0.007)	(0.008)
MW × WW Index	-0.002	-0.041*	-0.039*
	(0.001)	(0.023)	(0.022)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	1,298,461	414,659	368,057
Adjusted R-squared	0.305	0.274	0.273
	Panel C: interaction with the SA index		
MW	0.000	0.003	0.003
	(0.002)	(0.003)	(0.004)
MW × SA Index	-0.007*	-0.004*	-0.003
	(0.004)	(0.003)	(0.002)
Establishment FE	✓	✓	✓
Year × Firm FE	✓	✓	✓
Observations	1,357,683	432,431	383,861
Adjusted R-squared	0.304	0.272	0.272

Notes: This table shows regression results for Equation (3). We use as an outcome variable *Establishments (log)*. All the regressions include the county and year × firm fixed effects. We focus on three alternative samples: (i) all counties in the United States in Column (1), (ii) all counties on the states' border in Column (2), and (iii) county pairs that share a state border and whose centroids are within 75 km of each other in Column (3). Standard errors are clustered at the state level. ***, **, and * denote significance at 1, 5, and 10 percent level respectively. See Table OA1 for a detailed description of every variable and its source.

The financial crisis sample. We report the summary statistics for the financial crisis sample in Table OA13. We limit the spanning period of analysis to the period 2003-2011.

Table OA13: Descriptive statistics - Sample Crisis

Variables	(1) Count	(2) Mean	(3) SD	(4) p25	(5) p50	(6) p75
Employment	714,091	49.5111	92.3823	5.0000	15.0000	45.0000
Log(Employment)	714,091	2.9300	1.3470	1.7918	2.7726	3.8286
Bound	714,091	0.3436	0.4749	0.0000	0.0000	1.0000
Frictions (short) (%)	611,520	1.1970	2.2347	0.0089	0.2995	1.3910
Frictions (long) (%)	553,573	10.6749	15.6377	0.3172	3.4949	13.7329

Notes: This table shows descriptive statistics of our financial crisis analysis. See Table OA1 for a detailed description of every variable and its source.