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Do Minimum Wage Increases Benefit Intended Households? Evidence from the Performance of Residential Leases*

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Abstract

Prior studies debating the effects of changes to the minimum wage concentrate on impacts on household income and spending or employment. We extend this debate by examining the impact of changes to the minimum wage on expenses associated with shelter, a previously unexplored area. Increases in state minimum wages significantly reduce the incidence of renters defaulting on their lease contracts by 1.29 percentage points over three months, relative to similar renters who did not experience an increase in the minimum wage. This represents 25.7% fewer defaults post treatment in treated states. To put this into perspective, a 1% increase in minimum wage translates into a 2.6% decrease in rental default. This evidence is consistent with wage increases having an immediate impact on relaxing renter budget constraints. However, this effect slowly decreases over time as landlords react to wage increases by increasing rents. Our analysis is based on a unique data set that tracks household rental payments.

JEL Classifications: G0, G13, G18, G28, R3, R31, R38
Keywords: minimum wage increase, lease defaults, rental market, household income

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I Introduction

Economists have long been interested in household shifts in spending and debt utilization in response to temporary and permanent changes in income. The ability to effectively identify such responses is central to understanding and evaluating key government programs aimed at helping low-income households. One such program, first introduced in Australia and New Zealand in the 1890s, is the minimum wage, which is often the subject of contentious debate among economists and politicians.[1] For example, the introduction of the Raise the Wage Act of 2017 in the U.S. Senate (cosponsored by Senators Bernie Sanders (I-Vt.) and Patty Murray (D-Wa.)), which would increase the federal minimum wage to $15 per hour by 2024, reinvigorated the discussion and debate about the effects of increasing the minimum wage.[2]

Prior studies debating the effects of changes to the minimum wage tend to concentrate on examining responses of households with respect to spending and debt utilization (Aaronson et al., 2012), in estimating how minimum wage changes impact household incomes (Card and Krueger, 1994) or employment (Wellington, 1991; Galan and Puente, 2015; Hoffman, 2014; Cengiz et al., 2018), whether the minimum wage helps lower income individuals (MaCurdy, 2015; Dettling and Hsu, 2017), or even if the minimum wage differences across states alter worker commuting patterns (McKinnish, 2017). We extend this debate by examining the impact of changes to the minimum wage on expenses associated with housing, a previously unexplored area.

To contextualize our analysis, consider the following simple framework. Following Campbell and Cocco (2015), we assume that individual households have an income of Y_t in period t that can be described as

$$y_t = lnY_t = f(t, Z_t) + \upsilon_t + \omega_t, \tag{1}$$

where $f(t, Z_t)$ captures the pattern of income being a function of time (t) and individual characteristics (Z_t). Equation 1 also recognizes that income is affected by permanent (υ_t) and transitory (ω_t) random shocks.[3] Next, we assume that the household leases a unit of housing with an exogenously determined expense $r_t = ln(R_t(\hat{Y}))$, where $\hat{Y}$ is the household's yearly expected income and $\hat{Y} > R_t$. Under this setup, we define household's yearly net income as $y_t - r_t$ and note that the household's probability of lease default is

$$P[D_t] = \begin{cases} 0 & \text{if } y_t - r_t > 0 \\ 1 & \text{if } y_t - r_t \leq 0. \end{cases} \tag{2}$$

Thus, an increase in the minimum wage could have two possible impacts on the lease default rate. First, an increase in the minimum wage is a realized positive, permanent shock ($\varepsilon_t > 0$) to the household income

[1] See Waltman (2000) for a concise history of the minimum wage.

[2] See S.1242 - Raise the Wage Act, 115th Congress (2017-2018), https://www.congress.gov/bill/115th-congress/senate-bill/1242.

[3] We assume that υ_t is a permanent positive income shock (such as an increase in the minimum wage) and thus follows $\upsilon_t = \upsilon_{t-1} + \varepsilon_t$, where ε_t is log-normally distributed with a positive mean and variance σ_υ^2. In contrast, ω_t represents a transitory income shock (as in Campbell and Cocco, 2015) that is normally distributed with mean zero and variance σ_ω^2 ($\omega_t \sim N(0, \sigma_\omega^2)$).

(McKinnish, 2017; Draca et al., 2011) and thus, increases household net income (assuming no contemporaneous increase in housing costs), thereby reducing the probability of default.[4] However, increasing the minimum wage may also increase the probability of unemployment (Neumark et al., 2004; Galan and Puente, 2015), which would represent a negative transitory income shock ($\omega_t < 0$), and thus decrease household net income.[5] As a result, the probability of lease default increases with a rise in the unemployment rate. Thus, the impact of increasing the minimum wage is an open empirical question depending on the relative strength of the permanent or transitory shock.

We use a unique panel data set comprising the payment performance records on individual renters to identify the change in household rental payment risk (the probability of a late or defaulted payment) following various state-level changes in minimum wage laws. Our data come from RentBureau, a national credit repository that tracked the payment patterns of individual leases in multifamily properties from January 2000 to November 2009. The advantage of this data source is that it is a national database of rental performance covering over 1.8 million individual leases from approximately 2,600 multifamily properties in 41 states. The data contain the lease characteristics (start date, stop date, last payment date, and rent) and property location. Each month for up to 24 months prior to the last transaction date, the RentBureau data indicate whether or not the rent was paid on time. Thus, we have a vector of rent payments over time for each lease contract. However, the disadvantage is that the database contains limited information about individual renters. To overcome this shortcoming, we merge the RentBureau data with Census data based on the property's zip code to obtain neighborhood demographic information. Furthermore, we take advantage of the actual rents recorded from the individual leases to segment the data into high- and low-rent properties, which allows us to test the effect of changes in the minimum wage laws on the households most likely to be affected – those paying the lowest rent.

Similar to Aaronson et al. (2012), our identification strategy rests on the ability to control for property location, renter, and lease-year fixed effects, allowing us to compare the payment pattern for renters before and after an increase in the minimum wage with similar renters in states that did not experience a change in the minimum wage. However, the monthly reporting of rental payments allows us to more precisely isolate the impact of a state minimum wage change. Furthermore, by focusing directly on housing costs, our study examines a first-order expense (i.e., shelter) versus broader consumer consumption expenditures often studied in the literature.

Our analysis shows the following empirical findings: First, property owners in states that increased the minimum wage experienced a 1.29 to 1.89 percentage-point reduction in the three-month renter default rate following the wage increase relative to the average default rate in states that did not increase the minimum wage. We corroborate that these results hold for six-month default rates and that there is a positive correlation

[4]Supporting this view, Dettling and Hsu (2017) provide evidence that credit card delinquency rates declined following an increase in the minimum wage.

[5]Evidence for a positive relation between an increase in the minimum wage and unemployment is controversial as Dube et al. (2010) and Hoffman (2014) do not find a causal connection. Furthermore, Doucouliagos and Stanley (2009) provide a compelling meta-analysis of the literature suggesting that little to no evidence exists to link an increase in the minimum wage with unemployment.

between the size of the treatment effect and the increase in the level of the minimum wage. Second, we show that renter responses to minimum wage hikes rise over time, which is consistent with the increase in wages having an immediate impact on relaxing renter budget constraints. The results show that the effect peaks two months after the law change and then slowly diminishes. Third, when segmenting the sample by rent level, which should correlate for renter income, we show that the intensive effect is greatest for households having the lowest rent level, which are the households most likely to be impacted by the change in the minimum wage. Fourth, we show that landlords react by increasing rents beginning approximately three months after the change in minimum wage levels. This result is consistent with changes in the minimum wage operating through the demand channel allowing landlords to capitalize the wage increase.

We demonstrate that these results are robust to a variety of alternative explanations. For example, we confirm that our results are robust to alternative measures of renter payment risk (3-month and 6-month rental default rates). We further demonstrate that the results are robust to the key assumption that employment and residency location are the same by excluding properties in cross-state border metropolitan statistical areas (MSAs). We then exclude observations from 2007 and 2008 to assuage concerns that our results are driven by the rental contracts observed during the housing crisis period in the 2000s. We also control for the potential that local rental regulations, such as rent control, may impact lease defaults. Finally, we note that potential endogeneity between minimum wage increases and rental market risk should bias against our findings.

By focusing on the impact of changes in the minimum wage on housing, we study a unique question that has not been studied before. As a result, we contribute to the understanding of how changes in the minimum wage can affect consumption decisions of a first-order expense. Our unique data allow us to study this question using a clean identification strategy. Thus, we are able to establish a causal connection between the change in a state minimum wage law and the risk associated with rental housing. We identify the causal connection by showing that rental defaults decline while landlords do not raise rent in the short term in response to an increase in the minimum wage. However, we also show that this effect weakens in the long run as rents increase significantly approximately three months following the change.

Our study contributes to three streams in the literature. First, our study expands the literature that examines how consumption and credit use responds to income shocks. For example, recent studies have looked at how individual consumption decisions respond to changes in adjustable-rate mortgage payments (Di Maggio et al., 2017), sales tax holidays (Agarwal et al., 2017), increases in minimum payments on credit cards (d'Astous and Shore, 2017), tax rebates (Cui, 2017), and unanticipated fiscal policies (Agarwal and Qian, 2014). Since our results indicate that landlords partially capitalize the increase in the minimum wage through higher rents, our analysis provides an upper bound on the ability of low-income households to increase discretionary spending following an increase in the minimum wage.

We also add to the growing literature examining the economic impact of changes in policies and regulations. For example, Holmes (1998) demonstrates that state level right-to-work laws can impact business formations and locations. Hsu et al. (2018) provide evidence indicating that unemployment insurance helps reduce mortgage

defaults and thus stabilizes the housing markets. On the credit supply channel, Melzer (2011) shows how state-level regulations of payday lending can impact the risk of low-income households, while Pence (2006) and Wheelock (2008) demonstrate how state-level laws governing borrower rights can affect mortgage credit availability. Furthermore, Pennington-Cross and Ho (2008) provide evidence that state laws designed to protect borrowers from predatory lending practices lead to a modest increase in credit costs. Since our results show that renter risk declines following an increase in the minimum wage, our study suggests that policies designed to stabilize lower-income households do in fact reduce the riskiness of the target households, which is consistent with the results reported in Dettling and Hsu (2017) regarding the effect of increases in the minimum wage on credit utilization among lower-income adults.

Last, our study also adds to the growing literature on decisions regarding shelter. For example, Ambrose and Diop (2014) note how expansion of credit supply can alter the risk of the rental market. Contributing to the understanding of the interactions of macroeconomic policies and rental markets, our study suggests that rising incomes could offset the impact of household movement from renting to ownership. This is consistent with Abdallah and Lastrapes (2013) who provide evidence showing that state-level spending on consumption is sensitive to housing demand shocks.

The rest of our paper proceeds as follows. Section II provides a description of our administrative data set and the state-level minimum wage changes. Section III outlines the empirical method, and Section IV presents the results. Section V explores effects on the rental market, and Section VI describes the various robustness checks that confirm the primary findings. Section VII concludes.

II Main Data

Because of limited financial resources, minimum wage earners are more likely to be renters than homeowners. For this group of households, meeting rent payments on time probably represents one of their most important obligations, given the importance of shelter, although they may face more challenge making these payments than average households because of tighter budget constraints. Consequently, renters represent an ideal study group when examining the effects of minimum wage increases at the household level. For this reason, we base our empirical analysis on multifamily lease performance data compiled by Experian RentBureau from 2000 to 2008.[6] After matching leases to MSAs, our initial data set contains roughly 1.84 million leases on 2,648 properties located in 208 MSAs across 41 continental U.S. states. RentBureau maintains a national database on residential leases collected from property management companies that records lease characteristics (lease start date, lease termination date, tenant move-in date, tenant move-out date, last transaction date), property

[6]We obtained the data from the Wharton Research Data Service (WRDS). Unfortunately, the database has not been updated recently. Ambrose and Diop (2014, 2018) use the same data to examine the impact of the recent mortgage credit expansion on the rental market and the equilibrium effects of landlord regulations on rental market outcomes, respectively.

locations (city, state, and zip code), and rent payments.[7] RentBureau updates lease payment records monthly, noting whether the rent was paid on time or not, the type of payment delinquency, if applicable, the accrued number of late payments, and any write-off on rent and non-rental expenses due.

RentBureau reports monthly lease payments in 24-digit vectors, recording historical payments over the last 24 months ending the month of reporting or the month the lease ended.[8] Monthly rent payments in the RentBureau data are coded as P (on-time payment), L (late payment), N (insufficient funds or a bounced check), O (outstanding balance at lease termination), W (write-off of rent at lease termination), or U (write-off of non-rent amount owed at lease termination). We use these lease payment records to construct several lease performance measures for our difference-in-differences analysis of the effect of minimum wage increases on households' ability to meet rent payments developed in the next section.

The minimum wage increase data we use in this paper is from Aaronson et al. (2012), who compiled the data from January issues of the *Monthly Labor Review* of the Bureau of Labor Statistics.[9] Because of rental data availability, we restrict our study to state minimum wage increases enacted from 2000 to 2008. Table 1 lists the 25 states that passed minimum wage increases during our study period. In aggregate, these states enacted 76 minimum wage increases, on average 3.04 wage hikes per state. The average wage increase was \$0.57, representing roughly 10% of the then-prevailing wage. Therefore, over the 9 years covered by our study, the average minimum wage earner in treated states earns \$1.73 (\$0.57*3.04) more per hour, representing a 30.4% wage increase.

For each treated state, we compile the tenants' payment performance over fixed time windows (3 and 6 months) pre and post that state's minimum wage increase(s). As Table 1 shows, some of these states, for example, California, experienced multiple treatments, generally 12-month spaced, during the study period. Next, we compile the performance of leases in control states pre and post the 24 minimum wage increase dates in treated states. After excluding leases with missing 3-month performance data pre and post the minimum wage event dates, those with missing rent data, and winsorizing the data by eliminating extreme rent values, we end up with a final sample of 991,000 individual leases executed between 2000 and 2008.[10] Our final sample highly reflects the geographic distribution of the initial RentBureau data. It contains 2,248 properties located in 173 MSAs across 39 states, 25 of which enacted minimum wage increases.

[7] To maintain tenant and property owner privacy, RentBureau provides limited information on individual tenants and property locations.

[8] The reported payment records are therefore left censored since records older than 24 months are missing. As most residential leases are short term in nature (a year or less), issues associated with the left censoring of tenant payment records are minimized since problem tenants' leases are generally not renewed.

[9] The original data set is listed in Table A2 of the online appendix of Aaronson et al. (2012).

[10] We eliminate observations corresponding to leases with rent below 1% (\$384) and above 99% (\$2,226) of the rent distribution. However, our findings are the same when we don't winsorize the data.

III Methodology

We analyze the effect of state minimum-wage increases on renters' payment performance using a pooled difference-in-differences (DID) regression methodology in a manner somewhat similar to Cengiz et al. (2018). More specifically, we estimate a DID model of renters' likelihood of lease default pre and post minimum-wage increases in treated states and in states that did not enact minimum wage increases during our study period. Our DID model takes the following general form:

$$\begin{aligned} Pr(Default_{is}) &= \beta_1\, MWI + \beta_2\, Post + \beta_3(Post \times MWI) + \mathbf{X}_i'\,\Lambda + \mathbf{Z}'\,\Theta \\ &\quad + Lease\,Year + Property + Renter + \xi_{is}. \end{aligned} \tag{3}$$

The dependent variable, $Default_{is}$, is a binary variable indicating the default status of lease i during a specified observation window, 3 or 6 months, pre and/or post the month of minimum wage increase s.[11] Our default variable indicates whether a lease was ever in default during the specified time period. We consider a lease to be in default in a given month if its status is not coded as on-time payment (P) or late payment (L) in the RentBureau data. For leases in treated states listed in Table 1, we compile their performance pre and post their respective state's minimum wage increase(s). For leases in control states, also listed in at the bottom of Table 1, we track their performance pre and post all treatment dates (24 in total). In addition, we also check the sensitivity of our results to our lease default definition by considering a more restrictive case in which any lease status other than P is assumed to be an event of default.

Our first indicator variable, MWI, identifies (equals 1 for) states that passed minimum wage increases with β_1 representing the difference in average lease default between treated and control states pre treatment. *Post* is another indicator variable identifying (set to 1 during) the post-treatment period with the coefficient, β_2, indicating the average change in default in control states post treatment. The interaction of these two indicators, $Post \times MWI$, represents our variable of interest – capturing the difference in default between treated and control states post treatment. Conditional on DID assumptions being met, a negative β_3 means that increases in state minimum wages lead to lower lease defaults and vice versa, ceteris paribus. We present both unconditional estimates and estimates conditioned on lease characteristics ($\mathbf{X}$), housing market and macroeconomic variables ($\mathbf{Z}$), and time, property, and renter fixed effects. The last element of Equation (3) represents error terms. Table 2 summarizes the variables.

IV Empirical Results

In this section, we discuss our baseline results, investigate the parallel trend assumption required for DID validity, and check the intensive effect of minimum wage increases over time and across renter income groups.

[11] Table 1 shows that states' multiple minimum wage increases are generally implemented at least 12 months apart. Consequently, the risk of overlap between successive observations is minimized.

A Baseline Results

Unconditional Results

The summary statistics reported in Panel A of Table 3 show an increase in lease defaults over time. For our sample of 990,785 individual leases, the average 3-month (6-month) default was 1.19 (1.52) percentage points higher during the 3-month (6-month) period following state minimum wage increases.[12] Panels B and C of same table compare pre and post treatment average default rates in control and treated states, respectively. Panel B shows that average default rates post treatment were significantly higher than pre-treatment default rates in control states. The average 3-month (6-month) default rate in these states post treatment was 4.54% (6.92%), compared with 3.2% (5.23%) pre treatment. The trend in 6-month defaults is similar, albeit higher in magnitude because of the longer observation window. In contrast, average pre and post treatment default rates in treated states are statistically identical: 3.55% vs. 3.73% for 3-month defaults and 6.01% vs. 6.35% for 6-month defaults. This evidence seems to suggest that minimum wage increases enacted from 2000 to 2008 led to fewer lease defaults in those states when compared with states that did not passed minimum wage increases.

We confirm these results using a DID model similar to Equation (3) omitting lease characteristics and macroeconomic factors but including various fixed effects with standard errors clustered at the property level. Table 4 presents these unconditional DID estimation results, which confirm our previous findings. The coefficients of the interaction term $Post \times MWI$ from the various model specifications are negative and significantly different from zero. In states that enacted minimum wage increases, renters experienced on average 0.87 to 1.17 percentage points fewer defaults, depending on the model specification, during the three months following minimum wage increases compared with the three preceding months. These figures represent 18.9% to 23.9% fewer defaults post treatment.[13] The 6-month default estimations in Table 4 also lead to the same conclusion. Renters in states that passed the minimum wage experienced 0.83 to 1.35 percentage points fewer defaults over the 6 months afterward than renters in states with no minimum wage increases. In magnitude, the estimates represent 13.8% to 22.5% of average pre treatment 6-month default rate of 6.01% in Panel C of Table 3 in those states, respectively.

Multivariate Results

Next, we check whether the unconditional results obtain when we fully implement our DID model as specified in Equation (3). Compared with our previous model specifications, we now control for contract (lease) and market (MSA) rents, per capita income (MSA); inflation (region); unemployment (MSA); changes in renter population (percentage of states' populations in the 20-year-old to 34-year-old age group); 3-digit zip code house price index (HPI); rental supply, proxied by the number of building permits issued in the state; supply of affordable housing, proxied by the number of Low Income Housing Tax Credit (LIHTC) units built in the state; and state-level rental vacancy rates.

[12] The number of default observations is larger than the number of individual leases because most states passed multiple minimum wage increases.

[13] The average 3-month default rate in treated states post treatment is 3.73% (Panel C of Table 3), which gives the following: 0.87/(3.73+0.87)=18.9% and 1.17/(3.73+1.17)=23.9%.

Table 5 presents results from our baseline DID estimation of 3-month lease defaults. Again, our dependent variable indicates whether a tenant has ever defaulted on any given month during the three months pre or post minimum wage increases. The model in column (1) not controlling for time (lease year), property, and renter fixed effects confirms our previous findings. Again, the average default rate in control states is significantly (1.29 percentage points) higher post-minimum wage increases. Pre treatment, states that enacted minimum wage increases experienced more defaults (0.95 percentage points) than control states. These differences in default are statistically and economically significant. However, the difference in default between the two groups turns negative in the post-treatment period. Post treatment, states that passed minimum wage increases experienced on average 1.29 percentage points fewer defaults than our control state group, which amounts to 25.7% fewer default post treatment in those states.[14] The average minimum wage increase in our sample is \$0.57/hour or 10%. To put these results into perspective, a 1% increase in the minimum wage corresponds to 2.6% decrease in default.

We add lease-year fixed effects to our model specification in column (2) of Table 5 to control for time invariant factors at lease signing. This model specification leads to an even larger difference in default between treated and control groups post treatment, the coefficient of our DID default measure jumping from -1.29 to -1.74 percentage points. The difference in defaults is even slightly larger when we add property fixed effects in column (3). Although our DID default estimate remains almost unchanged to the inclusion of renter fixed effects in column (4), the explanatory power of our model increases considerably. In conclusion, our main finding remains robust to the various model alterations presented in Table 5: State-level minimum wage increases appear to be strongly associated with a significant reduction in lease defaults, ceteris paribus. Furthermore, the magnitude of this effect is stronger than that derived from unconditional estimations reported in Table 4. As noted earlier, we cluster standard errors at the property level. The statistical significance of our estimates are unchanged when we cluster standard errors at the state level (Table A.1).

The effects of the other explanatory variables included in Equation (3) on lease defaults seem plausible, thus reinforcing the validity of our DID default outcome. Both contract and market rents are negatively related to default in column (1) and (2) of Table 5, likely because of their proxying for tenant quality and rental market risk, respectively. However, the inclusion of property fixed effects in column (3) leads to a positive relation between lease rent and default, while causing market rent to turn insignificant. Both rent measures become insignificant when we control for renter heterogeneity in column (4). Per capita income also turns insignificant in the models with property and renter fixed effects in columns (3) and (4). Inflation is positively related to default in all specifications, possibly because of income lagging inflation. Except in column (4), unemployment is negatively related to default. As expected, an increase in demand (renter population) leads to fewer defaults. Also, affordable housing supply also has a similar effect on default as the remaining renter pool becomes probably less risky. On the other hand, more rental housing supply appears to have a small positive effect on default. Finally, increases in house prices are expectedly negatively related to default, but the effect is small.

[14] 1.29/(3.73+1.29)=25.7%, where 3.73% is the average 3-month default rate in treated states post treatment reported in Panel C of Table 3.

The sample used in our baseline estimations in Table 5 pools three types of lease performance data: lease for which we observe the pre-treatment period only, those for which we observe the post-treatment period only, and those for which both periods are available. To confirm that the results are not biased by the sample construction, we restrict the sample to the group of leases with non-missing pre and post 3-month default values. This restriction reduces our sample from 984,376 to 726,332 leases. These estimation results tabulated in Table 6 are in all respects similar to the results derived from the larger sample in Table 5, thus confirming the appropriateness of our original sample. We also check if our results persist in 6-month lease defaults (Table 7) and again find that minimum wage increases are strongly, positively related to lower lease defaults in treated states compared with states with no increase in minimum wage.

Next, we reestimate Equation (3) for each treated state separately and compare DID default estimates to average minimum increases in those states. If the predicted effect of minimum wage increase on lease defaults holds, it should then lead to a positive correlation between our state DID estimates and average state wage increases. Figures 1 and 2 display the spacial distribution of the states' average minimum wage increases and their DID default estimates (decrease in 3-month lease default post treatment), respectively. These two heat maps have relatively similar spacial color distribution, confirming the expected positive relation between state DID default estimates and states' wage increases.

B Parallel Trends Test

A key identifying assumption for validity of DID estimates is the parallel trends assumption. The DID methodology implicitly assumes that the outcome of interest (i.e., lease defaults) trends similarly for the treated and control groups during the pre-treatment period and would have followed the same trend post treatment in the absence of treatment. In the context of our paper, we need to ascertain that lease defaults trend similarly in states that enacted minimum wage increases compared with our control group of states with no minimum wage increases.

First, we point out that our DID estimations control for most factors likely to affect household risk and rental default at the MSA or state level. These factors include local rent, income, unemployment, house price, rental supply and demand factors, and inflation in the region (see Equation (3) and Table 5). We feel that these factors capture most causes of heterogeneity in lease defaults across the states, thus allowing us to extract the true value of the treatment effect. As noted in our discussion of the baseline estimation results in the previous section, DID estimates from multivariate estimations show significant differences in lease defaults between treated and control states following minimum wage increases.

Second, we test the parallel trends assumption non-parametrically by examining the behavior of average lease defaults in treated and control states pre and post treatment. To implement this, we compare each treated state with a neighboring untreated state. Table A.2 in the Appendix lists treated states and matched control states.[15] A potential challenge we face is the multiplicity of treatment dates in some states. For simplicity, we

[15]When there is no neighboring untreated state, we select a non-neighboring, but relatively similar untreated

focus on one treatment date for each treated state and compare its average monthly (3- and 6-month) lease defaults pre and post that treatment date with its matched control state's corresponding default rates. We select the treatment dates listed in Table A.2 as to minimize potential contamination from other treatments.

Figure 3 shows the outcomes from these parallel trends tests. The top graph represents monthly average default rates during the 12 months pre and post treatment in treated and control states. Although average treated and control monthly defaults behaved similarly pre treatment, they significant diverged post treatment as average defaults in treated states edged lower. The trends in quarterly (middle graph) and six-month (bottom graph) average defaults are similar to trends in average monthly default rates. These graphs imply satisfaction of the parallel trends assumption critical for validity of DID estimates.

C Post-Treatment Time Effect

Next, we explore the intensity of the treatment effect over time for our baseline default model. For this, we estimate the following variant of Equation (3) comparing monthly lease defaults during the first six months post treatment with the three months before treatment.

$$\begin{aligned} Pr(Default_{is}) \quad = \quad & \beta_1\, MWI + \sum_{t=1}^{6} \beta_2^t\, Post^t + \sum_{t=1}^{6} \beta_3^t\, (Post \times MWI^t) + \mathbf{X}_i'\, \Lambda \\ & + \mathbf{Z}'\, \Theta + \, Lease\, Year + Property + Renter + \zeta_{is}. \end{aligned} \tag{4}$$

The variables in the previous model have the same meaning as in Equation (3). The time superscript t indicates the post treatment months ($t = 1 \cdots 6$). As previously noted, our focus is on the double interaction term $Post \times MWI^t$. Table 8 reports multivariate monthly default estimation results. Regardless the specification used, the estimated coefficients of the interaction terms are negative and significant. Generally, F-tests unequivocally reject the null hypotheses of equality between successive interaction coefficient estimates. For example, all F-test results of the specification in column (4) are statistically significant at 0.1%, except for months 1 and 2. These results are consistent with minimum wage increases having an immediate positive impact on renters' ability to timely meet rent payments by relaxing their tight budget constraints. Renter benefits from a minimum wage hike increase over time, peaking roughly four months after the wage increase and then decreasing the following two months. Unfortunately, concerns about possible contagion from other wage increases and potential confounding factors limit our ability to extend our post-treatment time analysis beyond six months.

D Effect by Income Groups

The rationale for the need to explore the response to a minimum wage increase by various income groups is obvious. Increases in minimum wages should be more consequential for low-income earners. For example, Card and Krueger (1994) document that the 1992 New Jersey minimum wage increase did not affect the employment of non-minimum wage earners. Similarly, we expect minimum wage increases to differentially affect various

state, or in rare cases a neighboring treated state with no overlapping treatment period.

income groups, with lower-income earners likely seeing the largest effect. Normally, the intensive effect of minimum wage increases on lease default should be negatively related to household income. We do not directly observe income in the RentBureau data.[16] But since contract rent, which is reported in the data, should be strongly correlated to household income, we use it as a proxy for income to separate our sample into income groups.

Tables 9 and 10 report DID results from 3-month default regressions by tercile and quintile income (rent) groups, respectively. After winsorization, our rent variable ranges from $384 to $2,226 (Table 2). Results from the tercile regressions in Panels A and B of Table 9 lead to the same conclusion: The intensive effect of minimum wage increases on lease defaults appears to be significantly larger for households in the lower rent tercile. However, the results in Panel A indicate some degree of non-monotonicity. We explore this further using a more granular rent grouping. Results from quintile group regressions in Panels A and B of Table 10 point to a hump-shaped relationship. Focusing on the multivariate results in Panel B, the amplitude of the DID default estimate goes up from 1.89 percentage points for the lowest rent quintile group to 2.13 percentage points for the third quintile, before dropping to 1.4 percentage points for the top quintile. First, it does not come as a surprise that all rent groups are affected by increases in minimum wage given the high propensity of renters to belong in the low-income category. Second, the intensive effect of minimum wage hikes on the low-rent group is significantly larger than the response of the high-rent group, which proves that low-income households are more likely to benefit from minimum wage increases. But why does the middle group register the largest effect? A possible explanation is that households in the lower-rent group likely face tighter budget constraints and consequently have to spend less on other necessities, such as food and utilities. As a result, they may have to spend additional wage increases on those other necessities, in addition to rent.

V Rental Market Effects

A Landlord Response

Changes in the minimum wage do not happen in isolation. It is possible that a minimum wage increase may alter the prevailing rental market equilibrium. Everything else the same, higher wages may lead to higher rents because of the resulting increase in demand. Furthermore, depending on the structure of the rental market, landlords may try to capitalize on this opportunity by raising rents. As long as any resulting increase in rents does not overwhelm the direct effect of the wage increase on lease performance, the net effect on rent default should be negative.

In this section, we test the effect of minimum wage increases on rents and thereby pin down the net benefit

[16] Because of privacy concerns, RentBureau only collects limited information on renters beyond lease characteristics.

households derive from wage increases. We estimate the following model of rents:

$$\begin{aligned} R_i &= \beta_1 MWI + \sum_{t=1}^{6} \beta_2^t Post + \sum_{t=1}^{6} \beta_3^t (Post \times MWI^t) + \mathbf{X}_i' \Lambda + \mathbf{Z}' \Theta \\ &\quad + Property + \zeta_i, \end{aligned} \tag{5}$$

where R_i are rents on new leases in the month before and the 6 months after minimum wage increases. The superscript t indicates the months following the minimum wage change, and the other variables have the same meaning as in Equation (3).

Table 11 reports the estimation results. Again, focusing on the interaction terms ($Post \times MWI^t$), we note that the estimated coefficients are positive and statistically significant starting 3 months after the minimum wage increase. Thus, the results suggest that landlords do tend to capitalize the permanent nature of the minimum wage shocks into rents. For example, column (4), which includes market and property control variables, shows that rents in months 4 through 6 following the minimum wage increase are approximately \$65.6 higher than rents in the 3 months prior to the increase in the minimum wage, which represents an increase of 7.4%.[17] To put this in perspective, the average of the 76 state-level minimum wage changes was \$0.57/hour or 10% and ranged from 1.6% to 35% with the average increase in rents taking up 66.4% of the average income increase.[18]

B Tenants' Housing Decision

We have established that minimum wage increases leads to higher rents in those markets, as compared with prevailing rents in states with no wage increases. Next, we consider tenants' housing consumption decisions after wage increases. More specifically, we explore whether wage increases alter household mobility. To that effect, we estimate the likelihood of a household moving to a different rental unit as a result of a minimum wage increase using the following DID linear probability model:

$$\begin{aligned} Pr(Move_i) &= \beta_1 Post + \beta_2 MWI + \beta_3 (Post \times MWI) + \mathbf{X}_i' \Lambda \\ &\quad + \mathbf{Z}'\Theta + State + Year + \omega_i, \end{aligned} \tag{6}$$

where $Move_i$ is a dummy variable indicating whether tenant i moved following a minimum wage increase, and $\mathbf{X}_i$ and $\mathbf{Z}$ have the same meanings as in Equation (3). *State* and *Year* are state and minimum wage change year fixed effects, respectively.

We estimate this model for tenants whose leases expired within 3 months following a minimum wage increase and who entered into new leases between 3 to 9 months after the wage change. Therefore, we only examine tenants with repeat leases, which results in a sample of 15,056 leases or 7,528 tenants. Our DID coefficient estimate in column (1) of Table 12 shows that tenants in states that enacted minimum wage increases are 8.4

[17] (0.0148+0.0204+0.0303)*1000=\$65.6, which divided by average rent of \$886 in Table 2 gives 7.4%.

[18] The average monthly income increase is \$0.57*40*52/12=\$98.8. Thus, the ratio of rent to income is \$65.6/\$98.8=66.4%.

percentage points more likely to move to a different unit after wage changes. Next, we explore the likelihood of moving for different rent groups. For this, we divide our tenants into two groups and identify those whose rents are less or equal to MSA fair market rents as the low-rent group. Column (2) shows that tenants in the low rent group are less likely to move following minimum wage increases. Though somewhat unexpected, this result makes sense if high-rent households are likely to have more than one income earner and are therefore less financially constrained after wage increases when making housing choices. This evidence indicates that wage increases further benefit targeted households by allowing them to adjust housing consumption. Unfortunately, our data are not rich enough to allow us to further elaborate on tenant housing decisions.

VI Robustness Checks

A Alternative Default Measure

So far, we have assumed a lease to be in default if its status in the RentBureau data is not coded as P (i.e., rent paid on time) or L (i.e., late rent payment). To make sure that this default measure is not driving our results, we also use an alternative, more restrictive default measure considering non-timely rent payments as default events as well. As expected, this alternative default measure leads to more defaults (see resulting average default rates in Appendix Table A.3, compared with default rates based on the former measure in Table 3). The average 3-month default rate pre (post) minimum wage increase based on this new default measure is 15.2% (16.8%) in Panel A of Table A.3, compared with 3.2% (4.4%) in Panel A of Table 3. More important, this new default measure also shows a significant increase in default in control states post treatment (Panel B of Table A.3) and no material change in default post treatment in treated states (Panel C of Table A.3). We find the same results when we use 6-month defaults. Furthermore, unconditional and multivariate estimation results in Tables A.4, A.5, and A.6 in the Appendix confirm our previous DID default results. However, post-treatment effects based on this alternative default measure are larger, probably because of the higher incidence of default resulting from this measure.

B Employment Location

A key assumption of our analysis is that residency and employment location are the same. Although this assumption is realistic since our analysis is at the state level, it would be problematic in MSAs sprawling over several states, such as Charlotte-Concord-Gastonia MSA (NC and SC) and Cincinnati MSA (OH, KY and IN), which include treated and untreated areas.[19] In these MSAs, it is possible that some people commute to a neighboring state for work. Furthermore, a minimum wage increase in one state may cause neighboring state residents to seek work in that state, which muddles our DID identification framework since some people may choose treatment. Since 20 of the 173 MSAs making our sample span across several states, it is important that

[19]Of the 382 MSAs listed on Bureau of Economic Analysis website, 47 span over two or more states (https://www.bea.gov/regional/docs/msalist.cfm).

we control for potential cross-state border employment. Thus, we reestimate our model on a sample excluding leases from properties located in those 20 cross-state border MSAs. We summarize these results in Table 13. Despite our smaller sample size, our previous results hold. In treated states, 3-month lease defaults were 1.3 to 1.9 percentage points lower following minimum wage increases, compared with a mean pretreatment default rate of 3.55% in those states.

C Impact of the 2007-08 Crisis

Our study period spanning 2000 to 2008 almost coincides with the recent housing market boom that has seen a substantial surge in homeownership that adversely affected the riskiness of the rental market as documented by Ambrose and Diop (2014). Table 1 shows the wage increases covered in this study were not uniformly distributed over that period. The distribution is negatively skewed with 2007 and 2008, probably the most critical years of that period, accounting for 50% of wage increases (38 out of 76). Even though it is unclear how the increase in rental market risk during that period because of the surge in homeownership differentially affected treated and control areas, prudence dictates that we check if our findings hold when we exclude the later years from our study.[20] Even though our sample size drops considerably when we exclude 2007 and 2008 minimum wage increases, the estimation results reported in Appendix Table A.7 confirm that our previous findings are not confined to those years. Depending on the specification we use, our DID 3-month lease default estimates range from -0.5 to -3 percentage points, compared with a mean pre-treatment default rate of 3.55% in treated states.

D Local Regulations

Local rent control and other municipal regulations, such as city-level minimum or living wage requirements, are also likely to affect local rental markets. First, we acknowledge that there may be heterogeneity in local responses to state minimum wage increases, and municipal wage regulations are likely to exist and may even be significant. However, this study focuses on cross-state, rather than within-state, variations in lease defaults in response to state minimum wage changes. State minimum wage requirements are generally less aggressive than most cities' living wages, but tend to be more binding on employers.[21] Even though there may be differences in city living wages across states, we do not expect these differences to result in significant variations in lease defaults across states as documented by this study.

As far as rent control regulations are concerned, they should normally cause payment defaults to fall by making rents more affordable for generally riskier tenants. Consequently, these regulations should normally

[20] Although the migration of lower risk tenants to homeownership described by Ambrose and Diop (2014) should lead to increase default in the rental market, ceteris paribus. This transition of some renters to homeownership should also lower rents, hence leading to fewer defaults. Thus, the net effect is unclear. Also, it is unclear why this would affect treated and control states differently.

[21] For example, the City of Madison, WI, has steadily increased mandated living wages from $9.01 in 2001 to $13.01 in 2018, while the state minimum wage has remained at the federal level of $7.25 since 2009. However, Madison's living wage only applies to persons directly employed by the city or employed city contractors or recipient of city financial assistance. As a side note, Madison's living wage was recently nullified by 2017 Wis. Act 327, which became effective April 18, 2018. (Source: https://www.cityofmadison.com/finance/wage/factsheet.cfm)

bias against finding significant differences in lease defaults.[22] Nonetheless, we formally control for rent control regulations by excluding from our sample states with rent control cities, namely, California, Maryland, and New York. This leaves our main result unchanged (Appendix Table A.8).

VII Conclusions

In this paper, we estimate the impact of changes in state-level minimum wage laws on renter lease payment performance. Our analysis is based on a pooled difference-in-difference regression method that employs property, renter, and lease-year fixed effects allowing us to compare the payment pattern for renters before and after an increase in the state minimum wage relative with similar renters in states that did not change the minimum wage. We find four key results.

First, we find a 1.76 percentage point decline in the average 3-month default rates following an increase in the minimum wage relative to similar renters in states that did not increase the minimum wage. Second, we report that renter responsiveness to changes in the minimum wage increases over time. This is consistent with the theory that increases in the minimum wage have an immediate impact by relaxing renter budget constraints. Third, our analysis indicates that renters most likely in the lower-income segment of the population (those with the lowest rent levels) experience the greatest reduction in rental default rates following an increase in the minimum wage. Finally, we find that landlords partially capitalize the minimum wage increases into rents starting approximately 3 months following the minimum wage law change.

[22] Low-Income Housing Tax Credit (LIHTC) developments should also result in lowering lease defaults. We try to limit LIHTC leases from making it into our sample by excluding leases with rent below $384 per month.

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Table 1: State Minimum Wage Increases from 2000 to 2008

State	*Date*	*Increase* ($)	*New Minimum Wage* ($)	*State*	*Date*	*Increase* ($)	*New Minimum Wage* ($)
Arizona	Jan-07	1.60	6.75	Massachusetts	Jan-01	0.75	6.75
Arizona	Jan-08	0.15	6.90	Massachusetts	Jan-07	0.75	7.50
Arkansas	Oct-06	1.10	6.25	Massachusetts	Jan-08	0.50	8.00
California	Jan-01	0.50	6.25	Michigan	Oct-06	1.80	6.95
California	Jan-02	0.50	6.75	Michigan	Jul-07	0.20	7.15
California	Jan-07	0.75	7.25	Michigan	Jul-08	0.25	7.40
California	Jan-08	0.50	8.00	Minnesota	Aug-05	1.00	6.15
Colorado	Jan-07	1.70	6.85	Missouri	Jan-07	1.35	6.50
Colorado	Jan-08	0.17	7.02	Missouri	Jan-08	0.15	6.65
Connecticut	Jan-00	0.50	6.15	Nevada	Nov-06	1.00	6.15
Connecticut	Jan-01	0.25	6.40	Nevada	Jan-07	0.18	6.33
Connecticut	Jan-02	0.30	6.70	New Hampshire	Sep-07	1.35	6.50
Connecticut	Jan-03	0.20	6.90	New Hampshire	Sep-08	0.75	7.25
Connecticut	Jan-04	0.20	7.10	New York	Jan-05	0.85	6.00
Connecticut	Jan-06	0.30	7.40	New York	Jan-06	0.75	6.75
Connecticut	Jan-07	0.25	7.65	New York	Jan-07	0.40	7.15
Delaware	Oct-00	0.50	6.15	North Carolina	Jan-07	1.00	6.15
Delaware	Jan-07	0.50	6.65	Ohio	Jan-07	1.70	6.85
Delaware	Jan-08	0.50	7.15	Ohio	Jan-08	0.15	7.00
Florida	Jan-06	1.25	6.40	Oregon	Jan-03	0.40	6.90
Florida	Jan-07	0.27	6.67	Oregon	Jan-04	0.15	7.05
Florida	Jan-08	0.12	6.79	Oregon	Jan-05	0.20	7.25
Illinois	Jan-04	0.35	5.50	Oregon	Jan-06	0.25	7.50
Illinois	Jan-05	1.00	6.50	Oregon	Jan-07	0.30	7.80
Illinois	Jan-07	1.00	7.50	Oregon	Jan-08	0.15	7.95
Illinois	Jan-08	0.25	7.75	Pennslyvania	Jan-07	1.10	6.25
Iowa	Apr-07	1.05	6.20	Pennslyvania	Jul-07	0.90	7.15
Iowa	Jan-08	1.05	7.25	Washington	Jan-00	0.80	6.50
Kentucky	Jun-07	0.70	5.85	Washington	Jan-01	0.22	6.72
Maine	Jan-02	0.60	5.75	Washington	Jan-02	0.18	6.90
Maine	Jan-03	0.50	6.25	Washington	Jan-03	0.11	7.01
Maine	Jan-05	0.10	6.35	Washington	Jan-04	0.15	7.16
Maine	Jan-06	0.15	6.50	Washington	Jan-05	0.19	7.35
Maine	Oct-06	0.25	6.75	Washington	Jan-06	0.28	7.63
Maine	Oct-07	0.25	7.00	Washington	Jan-07	0.30	7.93
Maine	Oct-08	0.25	7.25	Washington	Jan-08	0.14	8.07
Maryland	Jan-07	1.00	6.15	Wisconsin	Jun-05	0.55	5.70
Massachusetts	Jan-00	0.75	6.00	Wisconsin	Jun-06	0.80	6.50

This study spans minimum wage increases from 2000 to 2008 passed by 25 of the 39 states represented in the RentBureau lease performance data used in our study. These 25 states constitute our initial treatment group, with our initial control group consisting of the remaining 14 states, namely Alabama, Georgia, Idaho, Indiana, Kansas, Louisiana, Mississippi, Nebraska, Oklahoma, South Carolina, Tennessee, Texas, Utah, and Virginia. The reported dates are in a month and two-digit year format.

Table 2: Variable Summary Statistics

Variable	*Description*	*# Obs*	*Mean*	*SD*	*Min*	*Max*
Minimum Wage Increase ($)	Dollar hourly wage increase	76	0.57	0.44	0.10	1.80
Minimum Wage Increase (%)	Percentage hourly wage increase	76	10	8.7	1.6	35.0
Rent ($000s)	Contract rent	984,376	0.886	0.353	0.384	2.226
Market Rent ($000s)	Lagged MSA fair market rent, yearly (HUD)	839	0.640	0.170	0.407	1.471
PC Income (log)	Lagged MSA per capita income, yearly (log)	839	10.37	0.20	9.58	11.07
Inflation	Lagged CPI region, yearly	33	189.08	15.14	163.60	215.20
Unemployment	Lagged MSA annual unemployment rate (%)	839	4.89	1.33	2.22	10.59
Change Renter Population	Lagged change state renter population, yearly (%)	179	0.67	1.04	-6.38	3.38
HPI	Lagged FHFA house price index (3-digit zip code), quarterly	2,604	184.16	50.00	110.89	374.19
Rental Supply (log)	Lagged building permits issued in state, yearly (log)	179	8.91	0.97	6.68	11.27
Affordable Housing Supply (log)	Lagged LIHTC units built in state, yearly (log)	179	7.54	1.01	2.94	9.80
Vacancy	Lagged state vacancy rate, yearly	179	0.110	0.029	0.042	0.181

Table 3: Summary Statistics of Three-Month and Six-Month Lease Defaults

	3-Month Defaults				*6-Month Defaults*			
	# Leases	*# Obs*	*Mean*	*SD*	*# Leases*	*# Obs*	*Mean*	*SD*
Panel A: Full Sample								
Pre MWI	830,319	2,678,930	0.0324	0.1770	671,117	2,017,577	0.0532	0.2244
Post MWI	934,065	2,944,237	0.0443	0.2058	819,884	2,396,450	0.0684	0.2525
Difference & t-statistic			*-0.0119*				*-0.0152*	
			(73.33)				*(66.40)*	
Panel B: Control Group								
Pre MWI	564,632	2,365,570	0.0320	0.1759	471,749	1,791,783	0.0523	0.2227
Post MWI	598,237	2,554,093	0.0454	0.2081	534,900	2,076,022	0.0692	0.2538
Difference & t-statistic			*-0.0134*				*-0.0169*	
			(76.92)				*(68.93)*	
Panel C: Treated Group								
Pre MWI	265,687	313,360	0.0355	0.1851	199,368	225,794	0.0601	0.2377
Post MWI	335,828	390,144	0.0373	0.1894	284,984	320,428	0.0635	0.2438
Difference & t-statistic			*-0.0017*				*-0.0034*	
			(3.87)				*(5.12)*	

This table reports summary statistics of 3-month and 6-month lease defaults pre and post state minimum wage increases passed from 2000 to 2008. Our treated group regroups the 25 states that enacted minimum wage increases during that period, whereas the control group consists of the 14 other states in the RentBureau data that did not pass any minimum wage increase (see Table 1). Our sample consists of 990,785 individual leases signed between 2000 and 2008. We observe the performance of each lease for up to 24 months. We consider a lease current (not in default) in a given month if RentBureau records its status as either P (on-time payment) or L (late payment). Three-month (six-month) defaults indicate whether leases have been in default during any one month during the three (six) months pre and post a minimum wage increase.

Table 4: Unconditional Difference-in-Differences Estimation of the Effect of State Minimum Wage Increases on Three- and Six-Month Lease Defaults

	3-Month Default				*6-Month Default*			
	(1)	*(2)*	*(3)*	*(4)*	*(1')*	*(2')*	*(3')*	*(4')*
Post	0.0134***	0.0146***	0.0136***	0.0144***	0.0169***	0.0206***	0.0177***	0.0204***
	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0007)	(0.0006)	(0.0007)
MWI	0.0036**	0.0027*	-0.0035	-0.0050	0.0078***	0.0074***	0.0212	0.0235
	(0.0011)	(0.0012)	(0.0339)	(0.0338)	(0.0019)	(0.0019)	(0.0407)	(0.0413)
Post x MWI	-0.0117***	-0.0098***	-0.0104***	-0.0087***	-0.0135***	-0.0106***	-0.0115***	-0.0083***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0014)	(0.0014)	(0.0014)	(0.0014)
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lease-Year FE	No	Yes	No	Yes	No	Yes	No	Yes
Property FE	No	No	Yes	Yes	No	No	Yes	Yes
# Leases	*990,785*	*990,785*	*990,785*	*990,785*	*907,035*	*907,035*	*907,035*	*907,035*
Adjusted R2	*0.001*	*0.003*	*0.012*	*0.013*	0.001	0.004	0.017	0.020

This table reports unconditional difference-in-differences OLS estimation results of variations in lease defaults in treated and control states pre- and post-minimum wage increases. The dependent variable is a 3-month (6-month) lease default indicator tracking whether tenants have missed a payment during the 3-month (6-month) period pre and the 3-month (6-month) period post a minimum increase - our 3-month (6-month) default sample consists of 990,785 (907,035) individual leases. We consider a lease to be current (not in default) in a given month if RentBureau records its status as either P (on-time payment) or L (late payment). For leases in treated states, we track their performance pre and post each minimum wage increase in that state. For leases in control states (i.e., states that did not pass any minimum wage increase during the study period), we track the leases' performance pre and post the minimum wage increase dates in the treated states. *Post* stands for the post treatment period and *MWI* indicates treated states. The figures in parentheses are the coefficients' standard errors clustered at the property level. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively.

Table 5: Multivariate Difference-in-Differences Estimation of the Effect of State Minimum Wage Increases on Three-Month Lease Defaults

	(1)	*(2)*	*(3)*	*(4)*
	3-mo. Default	*3-mo. Default*	*3-mo. Default*	*3-mo. Default*
Post	0.0129***	0.0118***	0.0110***	0.0094***
	(0.0006)	(0.0005)	(0.0005)	(0.0005)
MWI	0.0095***	0.0079***	-0.0123	-0.0435*
	(0.0017)	(0.0017)	(0.0330)	(0.0205)
Post x MWI	-0.0129***	-0.0174***	-0.0189***	-0.0176***
	(0.0011)	(0.0012)	(0.0012)	(0.0016)
Rent (Lease)	-0.0088***	-0.0053**	0.0213***	0.0191
	(0.0020)	(0.0018)	(0.0015)	(0.0101)
Market Rent	-0.0077	-0.0164**	0.0135	-0.0054
	(0.0063)	(0.0062)	(0.0112)	(0.0153)
PC Income	0.0130*	0.0246***	-0.0005	0.0447
	(0.0064)	(0.0065)	(0.0222)	(0.0263)
Inflation	0.0001*	0.0014***	0.0018***	0.0025***
	(0.0001)	(0.0001)	(0.0002)	(0.0002)
Unemployment	0.0008	-0.0002	-0.0055***	0.0029*
	(0.0006)	(0.0007)	(0.0010)	(0.0014)
Change Renter Population	-0.0008	-0.0014*	-0.0002	0.0002
	(0.0006)	(0.0006)	(0.0006)	(0.0007)
HPI	-0.0000	-0.0001**	-0.0002***	0.0004***
	(0.0000)	(0.0000)	(0.0000)	(0.0001)
Rental Supply	0.0022	0.0045***	-0.0026	0.0026
	(0.0012)	(0.0012)	(0.0026)	(0.0035)
Affordable Housing Supply	-0.0026*	-0.0051***	-0.0077***	-0.0059***
	(0.0011)	(0.0011)	(0.0010)	(0.0011)
Vacancy	0.0208	0.0603*	-0.0781*	0.0320
	(0.0272)	(0.0286)	(0.0361)	(0.0459)
Constant	Yes	Yes	Yes	Yes
Lease-Year FE	No	Yes	Yes	Yes
Property FE	No	No	Yes	No
Renter FE	No	No	No	Yes
# Leases	*984,376*	*984,376*	*984,376*	*984,376*
Adjusted R2	*0.001*	*0.005*	*0.016*	*0.242*

This table reports multivariate difference-in-differences OLS estimation results of lease defaults in treated and control states pre- and post-minimum wage increases. The dependent variable is a 3-month lease default indicator tracking whether tenants have missed a payment during the 3-month periods pre and post a minimum increase – a lease is current (not in default) in a given month if RentBureau records its status as either P (on-time payment) or L (late payment). For leases in treated states, we track their performance pre and post each minimum wage increase in that state. For leases in control states (i.e., states that did not pass any minimum wage increase during the study period), we track the leases' performance pre and post the minimum wage increase dates in the treated states. *Post* stands for the post treatment period and *MWI* indicates treated states. The figures in parentheses are the coefficients' standard errors clustered at the property level. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively.

Table 6: Multivariate Difference-in-Differences Estimation of the Effect of State Minimum Wage Increases on Three-Month Default Using a Restricted Sample

	(1) *3-mo. Default*	*(2)* *3-mo. Default*	*(3)* *3-mo. Default*	*(4)* *3-mo. Default*
Post	0.0202***	0.0168***	0.0158***	0.0133***
	(0.0008)	(0.0007)	(0.0007)	(0.0006)
MWI	0.0099***	0.0082***	-0.0060	-0.0524
	(0.0016)	(0.0016)	(0.0377)	(0.0362)
Post x MWI	-0.0117***	-0.0169***	-0.0199***	-0.0176***
	(0.0014)	(0.0015)	(0.0015)	(0.0018)
Rent (Lease)	-0.0059**	-0.0027	0.0215***	0.0132
	(0.0018)	(0.0017)	(0.0015)	(0.0110)
Market Rent	-0.0106	-0.0192***	0.0043	-0.0174
	(0.0059)	(0.0058)	(0.0105)	(0.0149)
PC Income	0.0123*	0.0235***	0.0049	0.0064
	(0.0060)	(0.0060)	(0.0205)	(0.0259)
Inflation	0.0001	0.0012***	0.0016***	0.0023***
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
Unemployment	0.0008	-0.0000	-0.0057***	0.0015
	(0.0006)	(0.0006)	(0.0009)	(0.0014)
Change Renter Population	-0.0011	-0.0017**	-0.0005	-0.0002
	(0.0006)	(0.0005)	(0.0005)	(0.0006)
HPI	-0.0000	-0.0001*	-0.0001***	0.0003***
	(0.0000)	(0.0000)	(0.0000)	(0.0001)
Rental Supply	0.0022*	0.0044***	-0.0023	0.0014
	(0.0011)	(0.0011)	(0.0024)	(0.0034)
Affordable Housing Supply	-0.0028**	-0.0051***	-0.0073***	-0.0062***
	(0.0010)	(0.0011)	(0.0010)	(0.0011)
Vacancy	-0.0017	0.0303	-0.0653	0.0210
	(0.0273)	(0.0286)	(0.0341)	(0.0465)
Constant	Yes	Yes	Yes	Yes
Lease-Year FE	No	Yes	Yes	Yes
Property FE	No	No	Yes	No
Renter FE	No	No	No	Yes
# Leases	*726,332*	*726,332*	*726,332*	*726,332*
Adjusted R2	*0.003*	*0.006*	*0.016*	*0.197*

The dependent variable is a 3-month lease default indicator showing whether a tenant has missed a payment during that period. For each lease, we measure its default status over 3 months pre- and post-state minimum wage increases. The above multivariate OLS difference-in-differences estimations are restricted to leases with no missing values of the dependent variable before and after minimum wage increases. *Post* stands for the post-treatment period, and *MWI* indicates treated states. The figures in parentheses are the coefficients' standard errors clustered at the property level. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively.

Table 7: Multivariate Difference-in-Differences Estimation of the Effect of State Minimum Wage Increases on Six-Month Lease Defaults

	(1)	*(2)*	*(3)*	*(4)*
	6-mo. Default	*6-mo. Default*	*6-mo. Default*	*6-mo. Default*
Post	0.0174***	0.0136***	0.0106***	0.0030***
	(0.0007)	(0.0007)	(0.0007)	(0.0005)
MWI	0.0163***	0.0136***	0.0043	-0.0461
	(0.0028)	(0.0028)	(0.0399)	(0.0339)
Post x MWI	-0.0139***	-0.0171***	-0.0173***	-0.0122***
	(0.0016)	(0.0017)	(0.0017)	(0.0018)
Rent (Lease)	-0.0078**	-0.0030	0.0356***	0.0395*
	(0.0030)	(0.0028)	(0.0025)	(0.0185)
Market Rent	-0.0290**	-0.0415***	0.0123	0.0446*
	(0.0101)	(0.0101)	(0.0161)	(0.0211)
PC Income	0.0196*	0.0400***	0.0503	0.1088**
	(0.0099)	(0.0100)	(0.0325)	(0.0387)
Inflation	-0.0002	0.0019***	0.0023***	0.0042***
	(0.0001)	(0.0001)	(0.0002)	(0.0003)
Unemployment	0.0019	0.0022*	-0.0038**	0.0129***
	(0.0010)	(0.0011)	(0.0014)	(0.0024)
Change Renter Population	-0.0024**	-0.0031***	-0.0011	-0.0015
	(0.0009)	(0.0009)	(0.0008)	(0.0010)
HPI	-0.0000	-0.0001**	-0.0002***	0.0004***
	(0.0000)	(0.0000)	(0.0000)	(0.0001)
Rental Supply	0.0028	0.0080***	-0.0038	0.0104
	(0.0017)	(0.0018)	(0.0039)	(0.0056)
Affordable Housing Supply	-0.0024	-0.0087***	-0.0129***	-0.0034
	(0.0015)	(0.0016)	(0.0015)	(0.0023)
Vacancy	-0.0992*	-0.0457	-0.2873***	-0.1286
	(0.0480)	(0.0499)	(0.0496)	(0.0693)
Constant	Yes	Yes	Yes	Yes
Lease-Year FE	No	Yes	Yes	Yes
Property FE	No	No	Yes	No
Renter FE	No	No	No	Yes
# Leases	*894,831*	*894,831*	*894,831*	*894,831*
Adjusted R2	*0.002*	*0.007*	*0.023*	*0.407*

This table reports multivariate difference-in-differences OLS estimation results of lease defaults in treated and control states pre- and post-minimum wage increases. The dependent variable is a 6-month lease default indicator tracking whether tenants have missed a payment during the 6-month periods pre and post a minimum increase – a lease is current (not in default) in a given month if RentBureau records its status as either P (on-time payment) or L (late payment). *Post* stands for the post-treatment period, and *MWI* indicates treated states. The figures in parentheses are the coefficients' standard errors clustered at the property level. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively.

Table 8: Difference-in-Differences Estimation of the Effect of Minimum Wage Increases on Lease Performance over Time

	(1) *Default*	*(2)* *Default*	*(3)* *Default*	*(4)* *Default*
MWI	0.0090***	0.0071***	0.0101	-0.0623***
	(0.0015)	(0.0015)	(0.0169)	(0.0109)
Post (Month 1)	-0.0054***	-0.0060***	-0.0064***	-0.0101***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Post (Month 2)	-0.0066***	-0.0067***	-0.0070***	-0.0082***
	(0.0006)	(0.0006)	(0.0006)	(0.0006)
Post (Month 3)	-0.0059***	-0.0055***	-0.0056***	-0.0047***
	(0.0006)	(0.0006)	(0.0006)	(0.0007)
Post (Month 4)	-0.0036***	-0.0027***	-0.0026***	0.0003
	(0.0006)	(0.0006)	(0.0006)	(0.0007)
Post (Month 5)	-0.0059***	-0.0045***	-0.0042***	0.0008
	(0.0006)	(0.0006)	(0.0006)	(0.0008)
Post (Month 6)	-0.0026***	-0.0007	-0.0003	0.0063***
	(0.0006)	(0.0006)	(0.0006)	(0.0008)
Post x MWI (Month 1)	-0.0080***	-0.0144***	-0.0170***	-0.0188***
	(0.0015)	(0.0015)	(0.0015)	(0.0018)
Post x MWI (Month 2)	-0.0106***	-0.0170***	-0.0195***	-0.0198***
	(0.0012)	(0.0012)	(0.0012)	(0.0017)
Post x MWI (Month 3)	-0.0107***	-0.0173***	-0.0197***	-0.0202***
	(0.0011)	(0.0012)	(0.0012)	(0.0018)
Post x MWI (Month 4)	-0.0124***	-0.0190***	-0.0213***	-0.0223***
	(0.0011)	(0.0012)	(0.0012)	(0.0019)
Post x MWI (Month 5)	-0.0085***	-0.0151***	-0.0175***	-0.0193***
	(0.0012)	(0.0012)	(0.0013)	(0.0019)
Post x MWI (Month 6)	-0.0098***	-0.0164***	-0.0186***	-0.0209***
	(0.0011)	(0.0012)	(0.0012)	(0.0020)
Rent (Lease)	-0.0141***	-0.0099***	0.0114***	0.0106*
	(0.0015)	(0.0014)	(0.0009)	(0.0045)
Market Rent	0.0001	-0.0155**	-0.0100	-0.0510**
	(0.0047)	(0.0049)	(0.0101)	(0.0176)
PC Income	0.0112*	0.0253***	0.0035	0.0462*
	(0.0046)	(0.0049)	(0.0165)	(0.0233)
Inflation	0.0000	0.0015***	0.0020***	0.0036***
	(0.0000)	(0.0001)	(0.0001)	(0.0002)
Unemployment	0.0017**	-0.0002	-0.0048***	0.0051***
	(0.0006)	(0.0006)	(0.0008)	(0.0015)
Change Renter Population	-0.0000	-0.0014***	0.0002	-0.0009
	(0.0004)	(0.0004)	(0.0004)	(0.0005)
HPI	-0.0000	-0.0000	-0.0001*	0.0008***
	(0.0000)	(0.0000)	(0.0000)	(0.0001)
Rental Supply	0.0001	0.0020	-0.0028	0.0134***
	(0.0011)	(0.0011)	(0.0018)	(0.0037)
Affordable Housing Supply	-0.0011	-0.0024*	-0.0037***	-0.0008
	(0.0010)	(0.0010)	(0.0008)	(0.0013)
Vacancy	0.0507*	0.0975***	-0.0308	0.1110*
	(0.0209)	(0.0227)	(0.0312)	(0.0543)
Control Variables	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
Lease-Year FE	No	Yes	Yes	Yes
Property FE	No	No	Yes	No
Renter FE	No	No	No	Yes
Adjusted R2	*0.001*	*0.006*	*0.016*	*0.153*
# Leases	*1,006,391*	*1,006,391*	*1,006,391*	*1,006,391*

This table reports difference-in-differences OLS estimation results of lease defaults in treated and control states pre- and post-minimum wage increases, comparing defaults in the three months before minimum wage changes to defaults during each of the following six months after. *Post* stands for the post-treatment period, and *MWI* indicates treated states. Our model includes the same control variables as in Table 5. The figures in parentheses are the coefficients' standard errors clustered at the property level. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively.

Table 9: Difference-in-Differences Estimation of the Effect of Minimum Wage Increases on Lease Performance by Rent Tercile Group

	(1) *3-mo. Default Tercile 1*	*(2)* *3-mo. Default Tercile 2*	*(3)* *3-mo. Default Tercile 3*
Panel A: Unconditional Results			
Post	0.0170***	0.0136***	0.0098***
	(0.0010)	(0.0007)	(0.0006)
MWI	0.0026	0.0042**	0.0041*
	(0.0016)	(0.0015)	(0.0017)
Post x MWI	-0.0122***	-0.0135***	-0.0097***
	(0.0017)	(0.0015)	(0.0013)
Constant	Yes	Yes	Yes
Adjusted R2	*0.002*	*0.001*	*0.001*
Panel B: Multivariate Results			
Post	0.0144***	0.0113***	0.0074***
	(0.0009)	(0.0006)	(0.0005)
MWI	-0.0000	0.0356	-0.0314
	(0.0068)	(0.0253)	(0.0304)
Post x MWI	-0.0202***	-0.0198***	-0.0163***
	(0.0020)	(0.0018)	(0.0016)
Control Variables	Yes	Yes	Yes
Lease-Year FE	Yes	Yes	Yes
Property FE	Yes	Yes	Yes
Adjusted R2	*0.018*	*0.017*	*0.016*
# Leases	*332,620*	*329,429*	*328,736*

This table reports by rent groups unconditional multivariate difference-in-differences OLS estimation results of lease defaults in treated and control states pre- and post-minimum wage increases. *Post* stands for the post-treatment period, and *MWI* indicates treated states. We divide the 990,785 leases of our study sample into rent tercile groups. Our model includes the same control variables as in Table 5. The figures in parentheses are the coefficients' standard errors clustered at the property level. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively

Table 10: Difference-in-Differences Estimation of the Effect of Minimum Wage Increases on Lease Performance by Rent Quintile Group

	(1) *3-mo. Default Quintile 1*	*(2)* *3-mo. Default Quintile 2*	*(3)* *3-mo. Default Quintile 3*	*(4)* *3-mo. Default Quintile 4*	*(5)* *3-mo. Default Quintile 5*
Panel A: Unconditional Results					
Post	0.0170***	0.0160***	0.0138***	0.0114***	0.0092***
	(0.0011)	(0.0009)	(0.0008)	(0.0007)	(0.0006)
MWI	0.0011	0.0043*	0.0048**	0.0027	0.0052**
	(0.0019)	(0.0017)	(0.0017)	(0.0018)	(0.0019)
Post x MWI	-0.0112***	-0.0126***	-0.0146***	-0.0115***	-0.0091***
	(0.0021)	(0.0019)	(0.0018)	(0.0017)	(0.0015)
Constant	Yes	Yes	Yes	Yes	Yes
Adjusted R2	*0.002*	*0.001*	*0.001*	*0.001*	*0.001*
Panel B: Multivariate Results					
Post	0.0145***	0.0132***	0.0116***	0.0087***	0.0069***
	(0.0010)	(0.0008)	(0.0008)	(0.0006)	(0.0006)
MWI	0.0108	0.0539	0.0430	0.0090	-0.0426
	(0.0080)	(0.0541)	(0.0310)	(0.0222)	(0.0290)
Post x MWI	-0.0189***	-0.0201***	-0.0213***	-0.0193***	-0.0140***
	(0.0024)	(0.0022)	(0.0021)	(0.0018)	(0.0019)
Control Variables	Yes	Yes	Yes	Yes	Yes
Lease-Year FE	Yes	Yes	Yes	Yes	Yes
Property FE	Yes	Yes	Yes	Yes	Yes
Adjusted R2	*0.020*	*0.018*	*0.018*	*0.019*	*0.016*
# Leases	*199,221*	*198,866*	*199,451*	*195,354*	*197,893*

This table reports by rent groups multivariate difference-in-differences OLS estimation results of lease defaults in treated and control states pre- and post-minimum wage increases. For each state, we divide leases into rent quintile groups and estimate our models for each group separately. *Post* stands for the post-treatment period, and *MWI* indicates treated states. We divide the 990,785 leases of our study sample into rent quintile groups. Our model includes the same control variables as in Table 5. The figures in parentheses are the coefficients' standard errors clustered at the property level. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively.

Table 11: Difference-in-Differences Estimation of the Effect of Minimum Wage Increases on Rent over Time

	(1) *Rent*	*(2)* *Rent*	*(3)* *Rent*	*(4)* *Rent*
MWI	0.1877***	-0.1036***	0.1029*	0.0715
	(0.0206)	(0.0220)	(0.0518)	(0.0555)
Post (Month 1)	-0.0057**	-0.0055**	-0.0003	-0.0015*
	(0.0020)	(0.0017)	(0.0006)	(0.0006)
Post (Month 2)	-0.0098***	-0.0096***	-0.0032***	-0.0044***
	(0.0023)	(0.0019)	(0.0008)	(0.0007)
Post (Month 3)	-0.0116***	-0.0196***	-0.0035***	-0.0052***
	(0.0030)	(0.0028)	(0.0010)	(0.0010)
Post (Month 4)	-0.0111***	-0.0226***	-0.0031**	-0.0036***
	(0.0025)	(0.0024)	(0.0010)	(0.0009)
Post (Month 5)	-0.0098***	-0.0261***	-0.0055***	-0.0064***
	(0.0028)	(0.0026)	(0.0010)	(0.0009)
Post (Month 6)	-0.0007	-0.0253***	-0.0040***	-0.0047***
	(0.0028)	(0.0027)	(0.0010)	(0.0009)
Post x MWI (Month 1)	-0.0113	-0.0043	0.0037	-0.0063*
	(0.0076)	(0.0065)	(0.0028)	(0.0030)
Post x MWI (Month 2)	0.0127	-0.0039	0.0059*	-0.0044
	(0.0082)	(0.0071)	(0.0029)	(0.0030)
Post x MWI (Month 3)	0.0387***	0.0361***	0.0150***	0.0058
	(0.0104)	(0.0076)	(0.0030)	(0.0032)
Post x MWI (Month 4)	0.0548***	0.0545***	0.0246***	0.0148***
	(0.0079)	(0.0076)	(0.0031)	(0.0034)
Post x MWI (Month 5)	0.0624***	0.0613***	0.0304***	0.0204***
	(0.0084)	(0.0075)	(0.0030)	(0.0031)
Post x MWI (Month 6)	0.0734***	0.0887***	0.0378***	0.0303***
	(0.0101)	(0.0089)	(0.0032)	(0.0037)
Market Rent		0.9074***		-0.1719***
		(0.0608)		(0.0364)
Inflation		-0.0016**		-0.0000
		(0.0005)		(0.0003)
Income		0.0245		0.2903***
		(0.0557)		(0.0405)
Unemployment		0.0045		-0.0181***
		(0.0054)		(0.0018)
HPI		0.0014***		0.0003**
		(0.0002)		(0.0001)
Vacancy		-1.5944***		-0.2959**
		(0.2847)		(0.0950)
Constant	Yes	Yes	Yes	Yes
Property FE	No	No	Yes	Yes
Adjusted R2	*0.055*	*0.317*	*0.734*	*0.738*
# Leases	*791,974*	*789,196*	*791,974*	*789,196*

This table reports difference-in-differences OLS estimation results of rent (in '000s) in treated and control states pre- and post-minimum wage increases, comparing rents pre minimum wage increases rents over the next six months after. Our sample consists of 845,871 leases. *Post* stands for the post-treatment period, and *MWI* indicates treated states. The figures in parentheses are the coefficients' standard errors clustered at the property level. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively.

Table 12: Difference-in-Differences Estimation of the Likelihood of a Renter Moving After a Minimum Wage Increase

	(1)	(2)
Post	0.2416***	0.2418***
	(0.0124)	(0.0124)
MWI	-0.1332*	-0.1339*
	(0.0732)	(0.0733)
Post x MWI	0.0842***	0.1032***
	(0.0233)	(0.0252)
Post x MWI x Low-Rent Group		-0.0673**
		(0.0343)
Rent (Lease)	0.0448***	0.0396***
	(0.0145)	(0.0146)
Market Rent	-0.1430**	-0.1405**
	(0.0598)	(0.0598)
Inflation	0.0009	0.0009
	(0.0015)	(0.0015)
PC Income	0.3098***	0.3138***
	(0.0557)	(0.0556)
Unemployment	0.0379***	0.0378***
	(0.0067)	(0.0067)
HPI	-0.0007***	-0.0007***
	(0.0002)	(0.0002)
Vacancy	-0.3176	-0.3410
	(0.3731)	(0.3730)
MWI Year FE	Yes	Yes
State FE	Yes	Yes
# Observations	*15,046*	*15,046*
Adjusted R2	*0.101*	*0.101*

This table reports difference-in-differences OLS estimation of tenants' probability of moving after minimum wage increase. Our sample consists of tenants with leases expiring with 3 months after minimum wage increases who entered into new leases between 3 and 9 months after wage increases. *Low Rent Group* is a dummy variable equal to 1 if contract rent is less or equal to MSA fair market rent. The figures in parentheses are the coefficients' white robust standard errors. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 10%, 5%, or 1%, respectively.

Table 13: Difference-in-Differences Estimation of the Effect of State Minimum Wage Increases on Three-Month Lease Defaults *Excluding Cross-State Border MSAs*

	(1)	*(2)*	*(3)*	*(4)*
	3-mo. Default	*3-mo. Default*	*3-mo. Default*	*3-mo. Default*
Post	0.0136***	0.0124***	0.0115***	0.0097***
	(0.0006)	(0.0006)	(0.0006)	(0.0005)
MWI	0.0076***	0.0074***	-0.0179	-0.0253
	(0.0022)	(0.0021)	(0.0375)	(0.0214)
Post x MWI	-0.0132***	-0.0179***	-0.0190***	-0.0180***
	(0.0012)	(0.0012)	(0.0013)	(0.0017)
Rent (Lease)	-0.0000***	-0.0000*	0.0000***	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Market Rent	0.0000	-0.0000	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
PC Income	0.0078	0.0194**	-0.0266	0.0345
	(0.0067)	(0.0068)	(0.0232)	(0.0279)
Inflation	0.0001	0.0014***	0.0020***	0.0026***
	(0.0001)	(0.0001)	(0.0002)	(0.0002)
Unemployment	-0.0003	-0.0011	-0.0048***	0.0045**
	(0.0007)	(0.0007)	(0.0010)	(0.0015)
Change Renter Population	-0.0009	-0.0017**	-0.0003	0.0001
	(0.0006)	(0.0006)	(0.0006)	(0.0007)
HPI	-0.0000	-0.0000*	-0.0001	0.0005***
	(0.0000)	(0.0000)	(0.0000)	(0.0001)
Rental Supply	0.0027	0.0061***	-0.0010	0.0035
	(0.0015)	(0.0015)	(0.0029)	(0.0038)
Affordable Housing Supply	-0.0028*	-0.0059***	-0.0093***	-0.0061***
	(0.0013)	(0.0014)	(0.0012)	(0.0014)
Vacancy	0.0339	0.0911**	-0.0762*	0.0488
	(0.0279)	(0.0286)	(0.0388)	(0.0506)
	(0.0652)	(0.0670)	(0.2321)	(0.2859)
Constant	Yes	Yes	Yes	Yes
Lease-Year FE	No	Yes	Yes	Yes
Property FE	No	No	Yes	No
Renter FE	No	No	No	Yes
# Leases	*884,406*	*884,406*	*884,406*	*884,406*
Adjusted R2	*0.001*	*0.005*	*0.016*	*0.242*

This table reports multivariate difference-in-differences OLS estimation results of lease defaults in treated and control states pre- and post-minimum wage increases, *excluding cross-state border MSAs*. The dependent variable is a 3-month lease default indicator tracking whether tenants have missed a payment during the 3-month periods pre and post a minimum increase – a lease is current (not in default) in a given month if RentBureau records its status as either P (on-time payment) or L (late payment). For leases in treated states, we track their performance pre and post each minimum wage increase in that state. For leases in control states (i.e., states that did not pass any minimum wage increase during the study period), we track the leases' performance pre and post the minimum wage increase dates in the treated states. *Post* stands for the post-treatment period, and *MWI* indicates treated states. The figures in parentheses are the coefficients' standard errors clustered at the property level. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively.

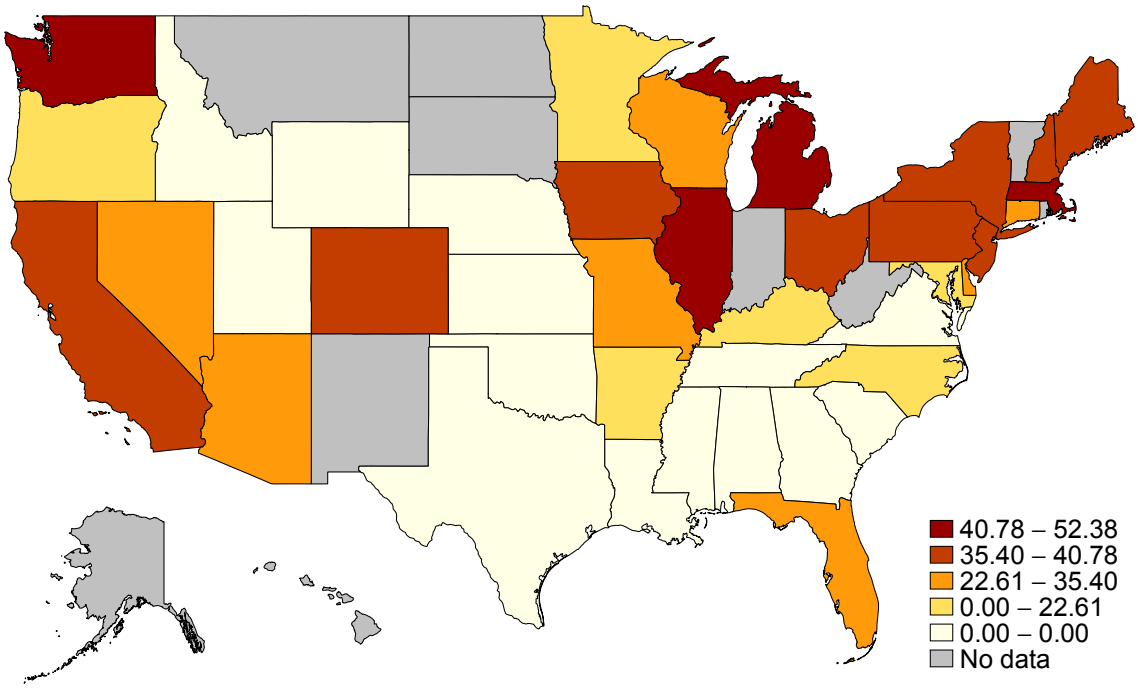

Figure 1: Percentage Increase in Minimum Wage by State from 2000 to 2009

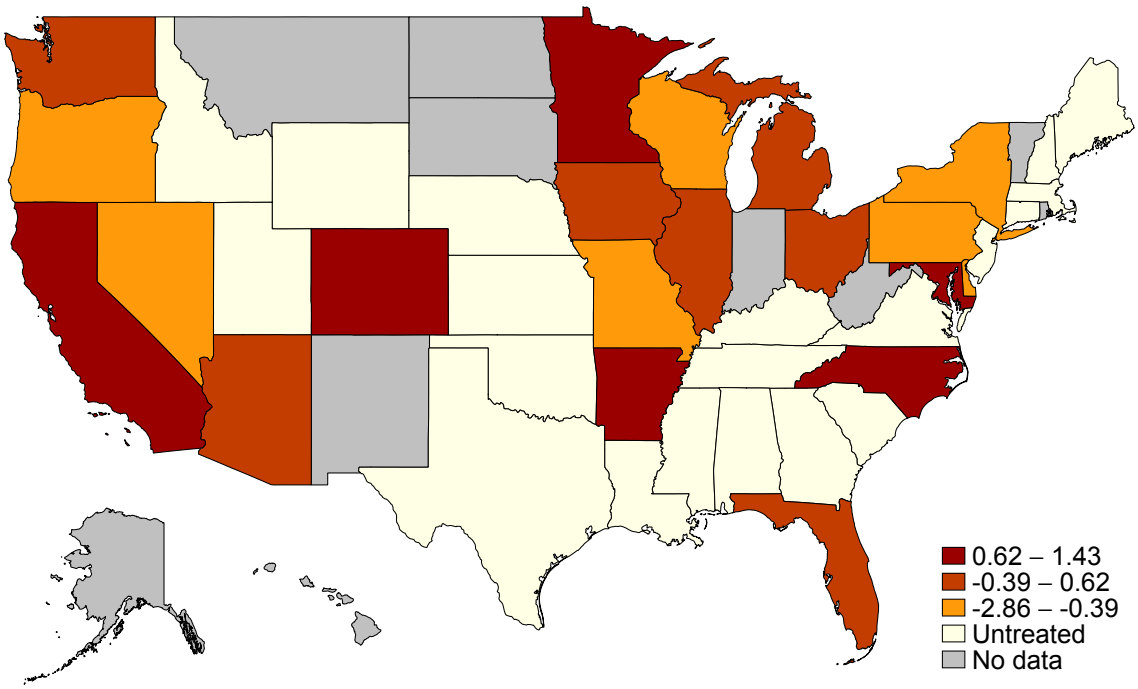

Figure 2: DID Treatment Effects on 3-Month Defaults

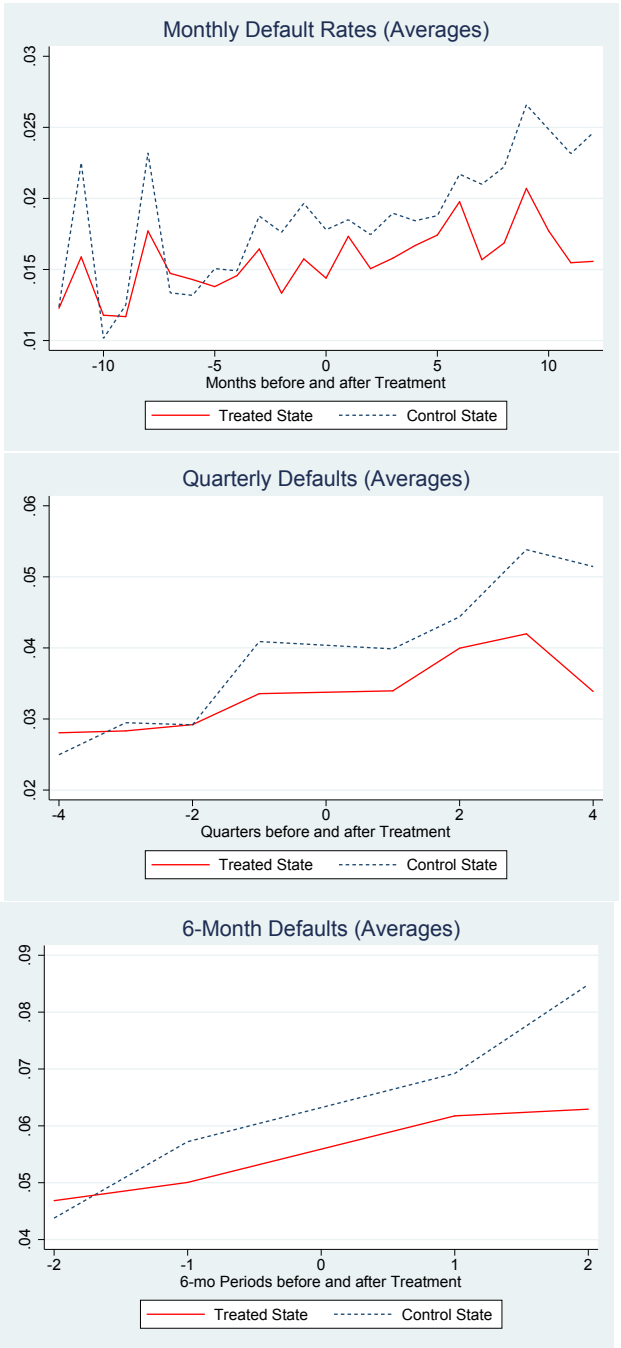

Figure 3: Parallel Trends Tests Using Monthly, Three-Month, and Six-Month Default Pre- and Post-Treatment Using Restricted Sample

A Appendix

Table A.1: Difference-in-Differences Estimation of the Effect of State Minimum Wage Increases on Three-Month Lease Defaults with *State-Clustered SE*

	(1) *3-mo. Default*	*(2)* *3-mo. Default*	*(3)* *3-mo. Default*	*(4)* *3-mo. Default*
Post	0.0129***	0.0118***	0.0110***	0.0094***
	(0.0012)	(0.0010)	(0.0010)	(0.0009)
MWI	0.0095**	0.0079	-0.0123	-0.0435
	(0.0031)	(0.0046)	(0.0270)	(0.0247)
Post x MWI	-0.0129***	-0.0174***	-0.0189***	-0.0176***
	(0.0023)	(0.0026)	(0.0033)	(0.0046)
Rent (Lease)	-0.0000**	-0.0000**	0.0000***	0.0000*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Market Rent	-0.0000	-0.0000	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
PC Income	0.0130	0.0246*	-0.0005	0.0447
	(0.0092)	(0.0096)	(0.0357)	(0.0452)
Inflation	0.0001*	0.0014***	0.0018***	0.0025***
	(0.0001)	(0.0002)	(0.0003)	(0.0004)
Unemployment	0.0008	-0.0002	-0.0055***	0.0029
	(0.0012)	(0.0013)	(0.0013)	(0.0021)
Change Renter Population	-0.0008	-0.0014	-0.0002	0.0002
	(0.0008)	(0.0008)	(0.0007)	(0.0014)
HPI	-0.0000*	-0.0001**	-0.0002	0.0004
	(0.0000)	(0.0000)	(0.0001)	(0.0003)
Rental Supply	0.0022	0.0045	-0.0026	0.0026
	(0.0018)	(0.0028)	(0.0042)	(0.0067)
Affordable Housing Supply	-0.0026	-0.0051	-0.0077*	-0.0059*
	(0.0020)	(0.0029)	(0.0031)	(0.0028)
Vacancy	0.0208	0.0603	-0.0781	0.0320
	(0.0513)	(0.0677)	(0.0687)	(0.0725)
Constant	Yes	Yes	Yes	Yes
Lease-Year FE	No	Yes	Yes	Yes
Property FE	No	No	Yes	No
Renter FE	No	No	No	Yes
# Leases	*984,376*	*984,376*	*984,376*	*984,376*
Adjusted R2	*0.001*	*0.005*	*0.016*	*0.242*

This table reports multivariate difference-in-differences OLS estimation results of lease defaults in treated and control states pre- and post-minimum wage increases. The dependent variable is a 3-month lease default indicator tracking whether tenants have missed a payment during the 3-month periods pre and post a minimum increase – a lease is current (not in default) in a given month if RentBureau records its status as either P (on-time payment) or L (late payment). For leases in treated states, we track their performance pre and post each minimum wage increase in that state. For leases in control states (i.e., states that did not pass any minimum wage increase during the study period), we track the leases' performance pre and post the minimum wage increase dates in the treated states. *Post* stands for the post-treatment period, and *MWI* indicates treated states. The figures in parentheses are the coefficients' ***state clustered standard errors***. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively.

Table A.2: Treated and Control State Used in Parallel Trend Analysis

Treated State	*Treatment Date*	*Control State*
Arkansas	Oct-06	Tennessee
Arizona	Jan-07	Utah
California	Jan-07	Texas
Colorado	Jan-07	Utah
Connecticut*	Jan-06	Massachussetts
Delaware	Jan-07	Virginia
Florida	Jan-06	Georgia
Illinois	Jan-05	Indiana
Iowa	Apr-07	Nebraska
Kentucky	Jun-07	Tennessee
Maine*	Oct-06	New Hampshire
Maryland	Jan-07	Virginia
Massachusetts	Jan-07	Virginia
Michigan	Oct-06	Indiana
Minnesota	Aug-05	Nebraska
Missouri	Jan-07	Kansas
Nevada	Nov-06	Utah
New Hampshire	Sep-07	Virginia
New York*	Jan-06	Pennsylvania
North Carolina	Jan-07	South Carolina
Ohio	Jan-07	Indiana
Oregon	Jan-07	Idaho
Pennslyvania	Jan-07	Virginia
Washington	Jan-07	Idaho
Wisconsin	Jun-06	Nebraska

The 25 treated states and paired control states for selected treatment dates in month and two-digit year format. Treated states with * subscript, located in the Northeast region of the country (where most states are treated), are paired with neighboring states whose treatment periods do not overlap.

Table A.3: Summary Statistics of Three-Month and Six-Month Lease Defaults Characterized as *Not On-Time Rent Payments*

	3-Month Defaults				*6-Month Defaults*			
	# Leases	*# Obs*	*Mean*	*SD*	*# Leases*	*# Obs*	*Mean*	*SD*
Panel A: Full Sample								
Pre MWI	830,319	2,678,930	0.1517	0.3587	671,117	2,017,577	0.2144	0.4104
Post MWI	934,065	2,944,237	0.1681	0.3740	819,884	2,396,450	0.2364	0.4248
Difference & t-statistc			*-0.0164*				*-0.0219*	
			(53.09)				*(54.83)*	
Panel B: Control Group								
Pre MWI	564,632	2,365,570	0.1505	0.3575	471,749	1,791,783	0.2118	0.4086
Post MWI	598,237	2,554,093	0.1692	0.3749	534,900	2,076,022	0.2370	0.4252
Difference & t-statistic			*-0.0187*				*-0.0251*	
			(56.65)				*(59.05)*	
Panel C: Treated Group								
Pre MWI	265,687	313,360	0.1608	0.3674	199,368	225,794	0.2354	0.4242
Post MWI	335,828	390,144	0.1610	0.3675	284,984	320,428	0.2325	0.4224
Difference & t-statistic			*-0.0002*				*0.0028*	
			(0.17)				*(2.44)*	

This table reports summary statistics of 3-month and 6-month lease defaults pre- and post-state minimum wage increases passed from 2000 to 2008. Our treated group regroups the 25 states that enacted minimum wage increases during that period, whereas the control group consists of the 14 other states in the RentBureau data that did not pass any minimum wage increase (see Table 1). Our sample consists of 990,785 unique leases signed between 2000 and 2008. We observe the performance of each lease for up to 24 months. We consider a lease current (not in default) in a given month if RentBureau records its status as P (on-time payment). Three-month (six-month) defaults indicate whether leases have been in default during any one month during the three (six) months pre and post a minimum wage increase.

Table A.4: Unconditional Difference-in-Differences Estimation of Three- and Six-Month Lease Defaults Characterized as *Not On-Time Rent Payments*

	3-Month Default				*6-Month Default*			
	(1)	*(2)*	*(3)*	*(4)*	*(1')*	*(2')*	*(3')*	*(4')*
Post	0.0187***	0.0194***	0.0198***	0.0195***	0.0251***	0.0269***	0.0277***	0.0271***
	(0.0009)	(0.0009)	(0.0008)	(0.0008)	(0.0014)	(0.0012)	(0.0012)	(0.0011)
MWI	0.0104	0.0038	0.0619	0.0459	0.0235***	0.0155*	0.1062	0.0862
	(0.0053)	(0.0055)	(0.0599)	(0.0573)	(0.0071)	(0.0073)	(0.0729)	(0.0699)
Post x MWI	-0.0186***	-0.0139***	-0.0102***	-0.0074**	-0.0280***	-0.0209***	-0.0131***	-0.0086*
	(0.0027)	(0.0026)	(0.0025)	(0.0025)	(0.0040)	(0.0039)	(0.0036)	(0.0035)
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lease-Year FE	No	Yes	No	Yes	No	Yes	No	Yes
Property FE	No	No	Yes	Yes	No	No	Yes	Yes
# Leases	*990,785*	*990,785*	*990,785*	*990,785*	*907,035*	*907,035*	*907,035*	*907,035*
Adjusted R2	*0.001*	*0.003*	*0.058*	*0.062*	*0.001*	*0.004*	*0.067*	*0.071*

This table reports unconditional difference-in-differences OLS estimation results of variations in lease defaults in treated and control states pre- and post-minimum wage increases. The dependent variable is a 3-month (6-month) lease default indicator tracking whether tenants have missed a payment during the 3-month (6-month) period pre and the 3-month (6-month) period post a minimum increase – a lease is current (not in default) in a given month if RentBureau records its status as P (on-time payment). For leases in treated states, we track their performance pre and post each minimum wage increase in that state. For leases in control states (i.e., states that did not pass any minimum wage increase during the study period), we track the leases' performance pre and post the minimum wage increase dates in the treated states. *Post* stands for the post-treatment period, and *MWI* indicates treated states. The figures in parentheses are the coefficients' standard errors clustered at the property level. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively.

Table A.5: Multivariate Difference-in-Differences Estimation of Three-Month Lease Defaults Characterized as *Not On-Time Rent Payments*

	(1) *3-mo. Default*	*(2)* *3-mo. Default*	*(3)* *3-mo. Default*	*(4)* *3-mo. Default*
Post	0.0144***	0.0136***	0.0106***	0.0074***
	(0.0009)	(0.0009)	(0.0008)	(0.0008)
MWI	0.0414***	0.0375***	0.0892	-0.0711
	(0.0079)	(0.0080)	(0.0667)	(0.0444)
Post x MWI	-0.0297***	-0.0313***	-0.0346***	-0.0268***
	(0.0032)	(0.0032)	(0.0031)	(0.0033)
Rent (Lease)	-0.0792***	-0.0773***	0.0594***	0.0162
	(0.0089)	(0.0089)	(0.0054)	(0.0213)
Market Rent	-0.0504*	-0.0435	0.0298	-0.0260
	(0.0244)	(0.0243)	(0.0403)	(0.0443)
PC Income	0.0554*	0.0638**	0.2371**	0.3566***
	(0.0242)	(0.0240)	(0.0737)	(0.0768)
Inflation	0.0018***	0.0030***	0.0035***	0.0044***
	(0.0002)	(0.0003)	(0.0005)	(0.0005)
Unemployment	0.0013	0.0002	-0.0069*	0.0082*
	(0.0033)	(0.0034)	(0.0031)	(0.0035)
Change Renter Population	-0.0036	-0.0041	-0.0028	-0.0006
	(0.0022)	(0.0023)	(0.0019)	(0.0019)
HPI	-0.0002*	-0.0003**	-0.0007***	0.0009***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Rental Supply	-0.0057	-0.0018	0.0235*	0.0157
	(0.0055)	(0.0055)	(0.0095)	(0.0094)
Affordable Housing Supply	0.0055	0.0005	-0.0174***	-0.0120***
	(0.0046)	(0.0046)	(0.0031)	(0.0032)
Vacancy	-0.0448	0.0065	-0.0648	0.1882
	(0.1182)	(0.1250)	(0.1181)	(0.1310)
Constant	Yes	Yes	Yes	Yes
Lease-Year FE	No	Yes	Yes	Yes
Property FE	No	No	Yes	No
Renter FE	No	No	No	Yes
# Leases	*984,376*	*984,376*	*984,376*	*984,376*
Adjusted R2	*0.008*	*0.012*	*0.066*	*0.452*

This table reports multivariate difference-in-differences OLS estimation results of lease defaults in treated and control states pre and post minimum wage increases. The dependent variable is a 3-month lease default indicator tracking whether tenants have missed a payment during the 3-month periods pre and post a minimum increase – a lease is current (not in default) in a given month if RentBureau records its status as P (on-time payment). For leases in treated states, we track their performance pre and post each minimum wage increase in that state. For leases in control states (i.e. states that did not pass any minimum wage increase during the study period), we track the leases' performance pre and post the minimum wage increase dates in the treated states. *Post* stands for the post-treatment period, and *MWI* indicates treated states. The figures in parentheses are the coefficients' standard errors clustered at the property level. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively.

Table A.6: Multivariate Difference-in-Differences Estimation of Six-Month Lease Defaults Characterized as *Not On-Time Rent Payments*

	(1)	*(2)*	*(3)*	*(4)*
	6-mo. Default	*6-mo. Default*	*6-mo. Default*	*6-mo. Default*
Post	0.0192***	0.0166***	0.0071***	-0.0069***
	(0.0014)	(0.0015)	(0.0013)	(0.0012)
MWI	0.0597***	0.0554***	0.0900	-0.1409*
	(0.0099)	(0.0101)	(0.0736)	(0.0646)
Post x MWI	-0.0387***	-0.0356***	-0.0257***	-0.0089*
	(0.0049)	(0.0048)	(0.0040)	(0.0038)
Rent (Lease)	-0.0752***	-0.0747***	0.0874***	0.0525
	(0.0108)	(0.0108)	(0.0077)	(0.0335)
Market Rent	-0.0858**	-0.0713*	0.0578	0.0787
	(0.0307)	(0.0308)	(0.0491)	(0.0544)
Income (PC)	0.0537	0.0677*	0.2799**	0.3087***
	(0.0309)	(0.0306)	(0.0888)	(0.0862)
Inflation	0.0018***	0.0032***	0.0036***	0.0068***
	(0.0003)	(0.0004)	(0.0006)	(0.0007)
Unemployment	0.0015	0.0032	-0.0012	0.0213***
	(0.0037)	(0.0038)	(0.0037)	(0.0037)
Change Renter Population	-0.0053	-0.0049	-0.0026	0.0004
	(0.0029)	(0.0029)	(0.0025)	(0.0026)
HPI	-0.0003**	-0.0004***	-0.0006***	0.0011***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Rental Supply	-0.0045	0.0033	0.0202	0.0078
	(0.0063)	(0.0064)	(0.0116)	(0.0109)
Affordable Housing Supply	0.0081	-0.0027	-0.0257***	-0.0093*
	(0.0050)	(0.0051)	(0.0041)	(0.0041)
Vacancy	-0.2201	-0.1943	-0.3472*	-0.1183
	(0.1475)	(0.1556)	(0.1437)	(0.1715)
Constant	Yes	Yes	Yes	Yes
Lease-Year FE	No	Yes	Yes	Yes
Property FE	No	No	Yes	No
Renter FE	No	No	No	Yes
# Leases	*894,831*	*894,831*	*894,831*	*894,831*
Adjusted R2	*0.008*	*0.012*	*0.076*	*0.579*

This table reports multivariate difference-in-differences OLS estimation results of lease defaults in treated and control states pre- and post-minimum wage increases. The dependent variable is a 6-month lease default indicator tracking whether tenants have missed a payment during the 6-month periods pre and post a minimum increase – a lease is current (not in default) in a given month if RentBureau records its status as P (on-time payment). *Post* stands for the post-treatment period, and *MWI* indicates treated states. The figures in parentheses are the coefficients' standard errors clustered at the property level. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively.

Table A.7: Difference-in-Differences Estimation of the Effect of State Minimum Wage Increases on Three-Month Lease Defaults *Excluding 2007 and 2008 Minimum Wage Increases*

	(1)	*(2)*	*(3)*	*(4)*
	3-mo. Default	*3-mo. Default*	*3-mo. Default*	*3-mo. Default*
Post	0.0123***	0.0106***	0.0086***	0.0048***
	(0.0007)	(0.0006)	(0.0007)	(0.0006)
MWI	0.0066*	0.0061*	0.0551**	-0.1360*
	(0.0027)	(0.0027)	(0.0169)	(0.0562)
Post x MWI	-0.0047*	-0.0093***	-0.0178***	-0.0300***
	(0.0021)	(0.0023)	(0.0027)	(0.0039)
Rent (Lease)	-0.0000**	-0.0000	0.0000***	0.0000*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Market Rent	-0.0000*	-0.0000**	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
PC Income	0.0235*	0.0306**	0.0298	-0.0416
	(0.0094)	(0.0095)	(0.0335)	(0.0467)
Inflation	-0.0002	0.0010***	0.0010**	0.0023***
	(0.0001)	(0.0001)	(0.0003)	(0.0004)
Unemployment	0.0019*	0.0011	-0.0046***	-0.0016
	(0.0008)	(0.0009)	(0.0014)	(0.0020)
Change Renter Population	-0.0024**	-0.0033***	-0.0025*	-0.0025*
	(0.0009)	(0.0008)	(0.0010)	(0.0011)
HPI	-0.0000	-0.0000	0.0004***	0.0012***
	(0.0000)	(0.0000)	(0.0001)	(0.0001)
Rental Supply	0.0041**	0.0042**	-0.0037	-0.0050
	(0.0016)	(0.0016)	(0.0042)	(0.0053)
Affordable Housing Supply	-0.0038**	-0.0031*	-0.0078***	-0.0081***
	(0.0014)	(0.0014)	(0.0014)	(0.0019)
Vacancy	0.1077**	0.0772*	-0.0517	0.2618***
	(0.0329)	(0.0343)	(0.0509)	(0.0733)
Constant	Yes	Yes	Yes	Yes
Lease-Year FE	No	Yes	Yes	Yes
Property FE	No	No	Yes	No
Renter FE	No	No	No	Yes
# Leases	*378,554*	*378,554*	*378,554*	*378,554*
Adjusted R2	*0.002*	*0.006*	*0.018*	*0.260*

This table reports multivariate difference-in-differences OLS estimation results of lease defaults in treated and control states pre- and post-minimum wage increases. We restrict the analysis to 2000 to 2006 minimum wage changes. The dependent variable is a 3-month lease default indicator tracking whether tenants have missed a payment during the 3-month periods pre and post a minimum increase – a lease is current (not in default) in a given month if RentBureau records its status as either P (on-time payment) or L (late payment). For leases in treated states, we track their performance pre and post each minimum wage increase in that state. For leases in control states (i.e., states that did not pass any minimum wage increase during the study period), we track the leases' performance pre and post the minimum wage increase dates in the treated states. *Post* stands for the post-treatment period, and *MWI* indicates treated states. The figures in parentheses are the coefficients' standard errors clustered at the property level. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively.

Table A.8: Difference-in-Differences Estimation of the Effect of State Minimum Wage Increases on Three-Month Lease Defaults *Excluding Rent-Control States*

	(1)	*(2)*	*(3)*	*(4)*
	3-mo. Default	*3-mo. Default*	*3-mo. Default*	*3-mo. Default*
Post	0.0130***	0.0117***	0.0109***	0.0094***
	(0.0006)	(0.0005)	(0.0005)	(0.0005)
MWI	0.0082***	0.0074***	-0.0101	-0.0464*
	(0.0017)	(0.0017)	(0.0341)	(0.0236)
Post x MWI	-0.0114***	-0.0160***	-0.0168***	-0.0158***
	(0.0012)	(0.0013)	(0.0013)	(0.0018)
Rent (Lease)	-0.0000***	-0.0000***	0.0000***	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Market Rent	-0.0000**	-0.0000**	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
PC Income	0.0217**	0.0307***	0.0035	0.0431
	(0.0069)	(0.0070)	(0.0228)	(0.0272)
Inflation	0.0001	0.0014***	0.0018***	0.0025***
	(0.0001)	(0.0001)	(0.0002)	(0.0002)
Unemployment	0.0005	-0.0002	-0.0053***	0.0031*
	(0.0007)	(0.0007)	(0.0010)	(0.0014)
Change Renter Population	-0.0000	-0.0013*	-0.0000	0.0002
	(0.0006)	(0.0006)	(0.0006)	(0.0007)
HPI	-0.0000	-0.0001**	-0.0002***	0.0004***
	(0.0000)	(0.0000)	(0.0000)	(0.0001)
Rental Supply	0.0021	0.0047***	-0.0027	0.0024
	(0.0012)	(0.0013)	(0.0026)	(0.0035)
Affordable Housing Supply	-0.0034**	-0.0055***	-0.0075***	-0.0058***
	(0.0011)	(0.0012)	(0.0010)	(0.0011)
Vacancy	0.0548	0.0659*	-0.0774*	0.0361
	(0.0306)	(0.0317)	(0.0363)	(0.0462)
Constant	Yes	Yes	Yes	Yes
Lease-Year FE	No	Yes	Yes	Yes
Property FE	No	No	Yes	No
Renter FE	No	No	No	Yes
# Leases	*894,473*	*894,473*	*894,473*	*894,473*
Adjusted R2	*0.002*	*0.005*	*0.016*	*0.245*

This table reports multivariate difference-in-differences OLS estimation results of lease defaults in treated and control states pre- and post-minimum wage increases, excluding rent-control states (CA, MD, and NY). The dependent variable is a 3-month lease default indicator tracking whether tenants have missed a payment during the 3-month periods pre and post a minimum increase – a lease is current (not in default) in a given month if RentBureau records its status as either P (on-time payment) or L (late payment). For leases in treated states, we track their performance pre and post each minimum wage increase in that state. For leases in control states (i.e., states that did not pass any minimum wage increase during the study period), we track the leases' performance pre and post the minimum wage increase dates in the treated states. *Post* stands for the post-treatment period, and *MWI* indicates treated states. The figures in parentheses are the coefficients' standard errors clustered at the property level. One, two, or three stars on top of coefficient estimates indicate statistical significance of coefficient estimates at 5%, 1%, or 0.1%, respectively.