Tenant Rights, Eviction, and Rent Affordability *

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Abstract

We use state-level differences in landlord-tenant laws to estimate their impact on rental housing affordability. We construct a Tenant Rights Index (TRI) spanning 1997 to 2016 to assess its effects on eviction rates and rental market outcomes. Increased TRI correlates with higher median rent, lower vacancy rates, and increased homelessness. To rationalize our findings, we develop a search and matching model of the rental market with free entry of both landlords and tenants, and an endogenous eviction mechanism. In our environment, more stringent eviction regulations reduce evictions and raise the relative demand for housing. However, stricter regulations also lead to higher rents and lower vacancy rates. We calibrate the model to the US rental market to quantitatively assess the mechanism in our model. An increase in eviction costs has a larger impact on the eviction rate and market tightness, with a relatively smaller effect on rents and vacancy rates. Our findings suggest that while stringent regulations may reduce evictions, they could lead to unintended consequences such as inflated house prices and heightened homelessness. Policymakers must carefully balance these potential drawbacks against the goal of tenant protection to avoid exacerbating existing housing affordability challenges.

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1 Introduction

"Eviction isn't just a condition of poverty; it's a cause of poverty."

–Matthew Desmond, *Evicted*

Every year, approximately 2.3 million evictions are filed in the U.S. Every minute, four renters in the U.S. are forced out of their homes.[1] Research has established considerable evidence that eviction-related residential mobility leads to many negative social and economic consequences, including adolescent violence (Sharkey and Sampson, 2010), poor school performance (Pribesh and Downey, 1999), and damage to physical and psychological well-being (Dong et al., 2005; Oishi, 2010). Moreover, these eviction-induced consequences are especially severe for the poor, minorities, women, and children (Desmond, 2012, 2016; South and Crowder, 1998; Sampson and Sharkey, 2008). As eviction becomes an increasingly pressing issue across the nation, growing tenant movements have been pushing for stronger tenant protections and restrictions on evictions as part of the fight against the housing affordability crisis (Desmond, 2012, 2016). Borsch-Supan (1986) and Bennett (2016) demonstrate that appropriate housing policy and statutory regulations are vital in ensuring the security of tenure for tenants. These issues gained particular salience in the United States during the COVID-19 pandemic amid calls for eviction moratoria at the federal and state levels.

However, overly strict regulations may impose unintended negative outcomes for tenants, such as higher rents or stricter screening by landlords (Ambrose and Diop, 2018; Been et al., 2019; Molloy, 2020; Vigdor and Williams, 2022; Miron, 1990).[2] Ambrose and Diop (2018) develop a theory in which landlords in high-regulation areas invest more in tenant screening because the return to screening out bad applicants exceeds its costs. They empirically show that tenant default rates are lower and rents are higher in these states, consistent with

[1] Gross, Terry. 2018. "First-Ever Evictions Database Shows: We're In the Middle Of A Housing Crisis", *NPR*, April 18, `https://www.npr.org/2018/04/12/601783346/first-ever-evictions-database-shows-were-in-the-middle-of-a-housing-crisis`.

[2] In contrast, studying the Canadian Residential Tenancy Acts that reduced tenants' litigation costs, Clarke and Gold (2024) find that the policy improved the quality of rental housing without increasing rent or reducing rental housing stock.

landlords imposing stricter screening and passing the cost of regulations to tenants. Been et al. (2019) study the wide variety of regimes that jurisdictions with rent regulation have adopted in practice in the US and find that when tenant protections increase landlords' costs of removing tenants, they respond by raising costs for all tenants. More generally, after surveying the literature, Molloy (2020) concludes that the effect of landlord-tenant regulations on housing affordability is not well understood, highlighting the need for further research.

Understanding the delicate balance between landlord regulations, evictions, and rent affordability is crucial for policymakers aiming to enhance tenants' welfare. Despite the extensive literature, the direct impact of tenant protection on evictions and rent affordability remains understudied due to the lack of comprehensive data on landlord regulations and eviction outcomes. To address this gap, our study examines the interplay between tenant rights, evictions, and rental housing market dynamics.

In the first part of our paper, we construct a Tenant Rights Index (TRI) using hand-collected data on landlord-tenant laws in each of the 50 U.S. states and the District of Columbia from 1997 to 2016. Following the approach of classic legal studies literature on tenant eviction protections (Bennett, 2016; Manheim, 1989), we identify the top twelve legal provisions that are most significant in landlord-tenant relationships. Based on our hand-collected landlord-tenant regulation data, the TRI is constructed similarly to the Wharton Residential Land Use Regulation Index (Gyourko et al., 2008), aggregating information from these legal provisions into a single numerical measure that reflects, by year and state, the "friendliness" of the state's legal framework towards tenants.

In the second part of the paper, we empirically investigate the relationship between improved tenant rights and rent affordability, along with other critical housing market outcomes affecting tenant welfare. Our analysis reveals a reduction in evictions as the TRI increases. Increasing the TRI by one standard deviation is associated with a reduction in the eviction rate by approximately 0.68 percentage points. On the other hand, we observe that rental units become less affordable in areas with stronger legal protection for tenants. Specifically, a one standard deviation increase in our TRI corresponds to a 10.5 percent increase in median rent, a decrease of 2.85 percentage points in the vacancy rate, and a 0.03 percentage point increase in the homeless population.

In the final section of the paper, we develop a search and matching model of the rental market to rationalize our empirical findings. The key elements in our model are the following. There are search frictions in the rental market, which capture that it takes time for landlords to find tenants and for unhoused tenants to find a property to rent. Upon matching, landlords and tenants bargain over rents. There is free entry of landlords and tenants, so both supply and demand are determined endogenously. This mechanism is important given the purpose of our paper since it allows landlords and tenants to adjust their participation in the market in response to policy changes in tenant protection. Finally, a key feature of our model is that some tenants receive idiosyncratic shocks that affect their ability to pay the full rent. If the fraction of unpaid rent is too large, landlords may choose to incur an eviction cost that increases the separation rate. This mechanism leads to an endogenous eviction decision by landlords and an endogenous eviction rate.

We use our model to study the effect of more stringent tenant protection rights on the rental market. Through the lens of our model, we view improvements in eviction protection rights as an increase in eviction costs or, equivalently, as an increase in eviction length. Higher eviction costs lead to lower eviction rates and higher market tightness (the ratio of rent-seekers to vacant properties). However, they also worsen affordability in the rental market by raising rents and lowering the vacancy rate. We calibrate the model to the US rental market to quantitatively assess the mechanism in the model. We find that an increase in eviction costs has a relatively larger effect on eviction rates compared to the effect on market tightness, rents and the vacancy rate. In addition, we find that both the number of households and landlords increased. All these results are consistent with our empirical findings.

Advocates of tenant rights often propose strict landlord regulation as a means to prevent eviction and address the significant social and economic costs associated with the eviction crisis. However, our findings reveal that while stricter landlord regulation (measured by a higher level of TRI) may be effective, it can also have unintended negative consequences, such as increased house prices, housing scarcity, and heightened homelessness. Policymakers must carefully weigh these potential drawbacks against the goal of tenant protection to avoid exacerbating the housing affordability challenges already facing many cities. For a comprehensive policy evaluation, it is essential to compare the benefits experienced by tenants who avoid eviction with the loss of consumer surplus for others. However, such analysis is beyond the scope of this paper, leaving room for future research to explore this area further.

The rest of the paper is organized as follows: We outline the construction method and provide descriptive and validation statistics of the TRI in Section 2. Next, we detail the empirical methodology and present descriptive statistics in Section 3, followed by reporting our OLS estimates in Section 4. In Section 5, we introduce the theoretical model and calibrate it to illustrate our theoretical mechanism quantitatively. Section 6 concludes.

2 Tenant Rights Index

2.1 Index Construction

Landlord-tenant laws govern the rental of residential property in the U.S. It is composed primarily of state statutes that are guided by the Uniform Residential Landlord and Tenant Act (URLTA).[3] We conduct a comprehensive survey of landlord-tenant laws in each of the 50 U.S. states and the District of Columbia from 1997 to 2016, and hand collect data on statutes that are crucial for tenant protection.

[3] Landlord-Tenant Law, Cornell Law School, `https://www.law.cornell.edu/wex/landlord-tenant_law` and the Uniform Law Commission's Uniform Residential Landlord-Tenant Act `https://d1unatz8mcf3a5.cloudfront.net/uploads/Uniform-Residential-Landlord-and-Tenant-Act.pdf`

Been et al. (2019) provide a comprehensive examination of landlord-tenant regulations across jurisdictions in the United States. Through their analysis, they identified four complementary categories of tenant protection provisions: Rent Increase, Maintenance, Eviction and Termination, and Deposit Withholding. These categories play distinct roles in safeguarding tenant welfare, aiming to ensure fair and equitable treatment and protect their rights within the rental housing market. The first category (Rent Increase) shields tenants from rent increases that could render housing unaffordable, while the second category (Maintenance) ensures landlords maintain satisfactory service and quality housing for tenants. However, the benefits of the first two categories can be undermined if landlords have the discretion to evict or terminate tenants benefiting from rent and maintenance regulations. Therefore, the third category (Eviction and Termination) strives to prevent evictions and unexpected terminations. Finally, the last category (Deposit Withholding) protects tenants from the financial burden of termination or eviction costs. Laws governing deposit withholding are crucial in landlord-tenant regulation, as they ensure the effectiveness of the protections provided by the first three categories. Without such laws, landlords could potentially charge excessively high security deposits and withhold them from tenants upon separation, thus undermining the intended safeguards. Additionally, Been et al. (2019) point out that individual provisions are correlated for the reasons described above; therefore, when studying the level of tenant protection, an aggregated measure of tenant rights should be used instead of focusing on a subgroup of regulations.

We draw upon the classic legal studies literature on tenant protection (Bennett, 2016; Manheim, 1989) to identify twelve legal provisions that are most significant in landlord-tenant relationships to create our Tenant Rights Index (TRI). In this section, we offer a brief summary of each statute. For comprehensive definitions and score calculations, please refer to Table 1.

We identify the following two statutes that directly govern Rent Increase in landlord-tenant law:

- *Rent Increase Notice.* Landlords are required to provide advance notice in order to increase rent in a month-to-month tenancy. The amount of notice varies between 7 and 60 days.

- *Rent Control Preemption.* This law takes the value of 1 if a state does not have legislation preventing local governments from passing rent control laws.

We identify the following two statutes that directly govern Maintenance in landlord-tenant law:

- *Rent Withholding.* When landlords fail to perform proper maintenance to keep the property habitable, many states allow tenants to withhold rent payment until the problem is fixed. Generally, tenants are not allowed to do so if there are no statutes that explicitly permit this action.

- *Repair and Deduct.* This is similar to the provision above, except that instead of withholding rent, tenants can make the repair themselves and deduct the cost from rent.

We identify the following five statutes that directly govern Eviction and Termination in landlord-tenant law:

- *Regular Termination.* Landlords can end a month-to-month tenancy by giving tenants a notice, typically 30 days in advance. The shortest notice allowed is 3 days in Connecticut, while the longest is 60 days in Georgia and Delaware.

- *Nonpayment Termination.* For nonpayment of rent, on average, landlords need to give tenants a 7-day notice to vacate before they can file an eviction lawsuit with the court.[4] Legally, landlords in Alabama and Georgia can start the eviction proceeding as soon

[4] In addition to the notice requirement, some states also have a statutory grace period. For example, in Maine, landlords must wait until the rent is at least 7 days late, upon which they can issue a 7-day notice to the tenants. Effectively, the total wait period for landlords is 14 days. We, therefore, use the sum of the grace period and notice requirement in our calculation.

as rent is due. At the other end of the spectrum, those in the District of Columbia must wait for 30 days before they can start filing.[5]

- *Lease Violation Termination.* Similar to nonpayment, landlords must give proper notice if they want tenants to vacate due to a major lease violation, which can range from 0 to 30 days.

- *Self-help Eviction.* This provision deals with the penalty for landlords engaging in illegal self-help eviction, such as locking out tenants or utility shutoff. In most cases, tenants can sue for at least the actual damages they suffer, but several states allow more severe penalties up to 3 times that amount.

- *Right to Stay.* In some states, tenants have the right to remain in the property after an illegal self-help eviction.

We identify the following three statutes that directly govern Deposit Withholding in landlord-tenant law:

- *Maximum Deposit.* This is the state rule on the maximum security deposit landlords can collect from tenants to cover potential property damages or unpaid rent.[6] It ranges from one to three months' rent in our sample, with an average of 1.5 months.

- *Deposit Interest.* This statute requires landlords to pay tenants the interests due on their security deposit.

- *Deposit Return.* Landlords are required to return the security deposit within a certain time after tenants move out.[7] The average deadline among all states is 30 days, but it

[5]Note that filing a lawsuit with the court is just the beginning of the eviction process. Landlords must then wait for the court to schedule a hearing (if the tenants do not already leave voluntarily), which may take anywhere from a few days to several weeks or months in big cities with a huge backlog. Only after they are granted a judgment can they have law enforcement remove the tenants.

[6]The limit may vary depending on various factors, such as the age of the tenants, whether the unit is furnished, and whether the tenant has pets. We use the deposit limit for the most general case of an unfurnished apartment with no pets.

[7]Some states have different deadlines depending on whether there are deductions made. In our calculation, we use the deadline applied to the case of no deductions.

can range from as little as 10 days to 60 days.

We assign a score to each law provision to measure the degree of tenant protection for each state in each year. Following the approach of the Wharton Residential Land Use Regulation Index created by Gyourko et al. (2008) and Gyourko et al. (2021), we standardize the scores of each law provision so that they have a mean of zero and a standard deviation of one. Then, we conduct a principal component analysis (PCA) on the twelve statutes and utilize the first component as our TRI.

2.2 Descriptive and Validation Statistics

Figure 1 illustrates the average index for each state. Generally, states situated on the West and East coasts demonstrate a higher inclination towards tenant-friendly legislation, whereas Southern states exhibit a propensity for offering greater protection to landlords. Hawaii records the highest index value of 3.47, succeeded by Delaware, Rhode Island, and Massachusetts. In contrast, Utah emerges as the state with the most landlord-friendly legal framework, featuring an index value of -3.36, followed by Colorado, Idaho, and West Virginia.

Table A.2 displays the coefficients from regressing the index on various state-level characteristics, including population, minority (non-white) population, median income, poverty rate, median house value, political affiliation (share of votes for the Democratic party in presidential elections), and land use regulation strictness (Ganong and Shoag, 2017). Notably, states with stronger tenant rights tend to have a smaller population and a preference for the Democratic party.

In Panel (a) of Figure A.2, we compare the state-level Wharton Residential Land Use Regulation Index (WRLURI) created by Gyourko et al. (2008) with our TRI in 2008 to directly contrast the two indexes at that time. The correlation between the two indexes is 0.43. In addition, we create an alternative state-level Land Regulation Index following the method in Ganong and Shoag (2017),[8] and plot this index against the TRI in Panel (b) of Figure A.2. The correlation between the two indexes is 0.17. Overall, the positive correlations between the TRI and the two land regulation indices indicate that states with stringent land use regulations also tend to have robust landlord-tenant laws. However, the relatively low correlation also implies that land use regulation alone does not determine tenant rights regulation. The finding is intuitive because land use control is intended to regulate development, while landlord-tenant laws are intended to provide a legal framework for landlords. This distinction in purpose suggests that although there may be some correlation between the two regulatory frameworks, they serve distinct functions within the realm of housing-related policy.

Panel A of Figure 2 depicts the average TRI across all states over our study period. Overall, state laws were slightly more landlord-friendly in 1997 but steadily moved towards more tenant protection over time, with the most significant increases occurring in the early 2000s. In Panel B, we present that the majority of states changed their landlord-tenant laws between 1997 and 2016: the index increased in 25 states, decreased in 9 states, and remained the same in 16 states. The average state experienced a 0.3 point increase over this period, once again confirming an overall upward trend in the index. Figure A.1 maps the standard deviation of the TRI for each state. We do not observe any geographical pattern in the volatility of TRI.

We examine the pairwise correlations between the twelve legal provisions used to construct the index in Table 3. The majority of their correlation coefficients are positive, suggesting that state laws tend to be consistent across several aspects of the landlord-tenant relationship. However, the magnitude of the coefficients is relatively low, with 80 percent of them staying below 0.30.

Given their low correlation, it is important to validate that the aggregate index we create is able to best capture the information contained in these twelve components. As described

[8] In particular, the index is the number of legal cases that involve the term “land use” in each state in each year.

earlier, we use the first component from PCA as our aggregate TRI. Table 4 shows that the index loads positively on all twelve statutes and most heavily on Rent Withholding, Self-help Eviction, and Right to Stay. Their correlations are also the highest at 0.66-0.67. This suggests that these provisions have a substantial influence on the overall index. However, it is noteworthy that all the other statutes also exhibit significant impacts on the aggregate index, as their loadings are not considerably lower than those of the top three factors. These results validate the effectiveness of our aggregate index in encapsulating the diverse dimensions of tenant rights legislation.

Hence, one possible concern arising from using PCA to create a single-dimensional index is the potential discarding of a substantial amount of valuable data. To investigate this concern, we construct an alternative index by summing all twelve statutes (standardized to have a mean 0 and standard deviation of 1) and comparing it with our TRI derived from PCA (Gyourko et al., 2008). Figure 3 shows that the two indices are remarkably similar. In fact, they exhibit a correlation of 0.99. Therefore, we are confident that our TRI effectively represents the overall level of tenant protection in each state.

3 Data and Methodology

We explore the relationship between landlord-tenant laws and various housing market outcomes by estimating the following equation:

$$Y_{c,s,t} = \alpha + \beta TRI_{s,t} + \theta X'_{c,s,t} + \delta L_c + \varepsilon_{c,s,t}, \quad (1)$$

where c, s, and t denote city, state, and year, respectively. Our independent variable of interest is the state-level Tenant Rights Index, $TRI_{s,t}$, described in Section 2 above. The regression controls for a set of local demographic variables, $X'_{c,s,t}$: population, population density, minority (non-white) population, median household income, homeownership rate, and unemployment rate. We also account for property characteristics at the city level, namely the median number of rooms, median property age, and median property tax paid. In addition, we include two state-level control variables: the real GDP output of the tourism industry,[9] and the land regulation index we create from counting the number of legal cases that include the phrase "land use" in each state in each year, following the method used in Ganong and Shoag (2017). Our regression model includes a set of location fixed effects L_c, and standard errors are clustered at the city level, except in the homeless rate regression, where it is clustered at the state level.

We are interested in six housing market outcomes as the dependent variables in Equation (1). Our first outcome variable of interest is median gross rent, defined by the Census Bureau as the contract rent plus the estimated average monthly cost of utilities. As a robustness test, we also verify our results using the lowest 30th percentile rent in place of median rent to address the concern that eviction costs likely affect the lowest segment of the rental market.

Our second outcome of interest is the demand for rental housing as measured by the number of households (in log) in a city. The third variable is the number of housing units (in log) in a city as a proxy for housing supply. We then proceed to examine the impact of landlord regulation on vacancy rate, which is defined as the number of vacant units divided by the total number of rental units and multiplied by 100. The fifth dependent variable under consideration is the homeless rate, calculated as the number of persons in homeless shelters divided by the total population and multiplied by 100. Due to the availability of homeless population data, we utilize state-year level data in this regression analysis.

Lastly, we investigate whether stronger tenant protection correlates with a lower eviction rate. We employ two measures for the dependent variable: the eviction filing rate and eviction rate. The eviction filing rate represents the ratio of eviction lawsuits filed in a city to the number of renter-occupied homes in that city. This measure includes all eviction cases filed in an area, encompassing multiple lawsuits filed against the same address in the same year. On the other hand, the eviction rate denotes the subset of homes that received an

[9] We use the Accommodation and Food industry as defined by the Census.

eviction judgment, where renters were ordered to vacate. This measure only considers the number of unique addresses that received eviction judgments in a year.

Our sample covers the period from 2005 to 2016. Unless otherwise noted, our data come from the American Community Survey estimates by the Census Bureau. Table 5 presents their summary statistics. The average city in our sample has a median rent of $984 per month, over 73,000 households, over 81,000 housing units, and a vacancy rate of 9.96%. We obtain estimates of the homeless population from the Annual Homeless Assessment Report provided by the Department of Housing and Urban Development. The data are available at the state level and cover from 2007 to 2016. Notably, the District of Columbia registered the highest homeless rate during this period at 0.55%.

Turning to our eviction measures, we employ the eviction database recently released by the Eviction Lab at Princeton University. This is the first comprehensive national database compiled using more than 80 million formal eviction records collected from the courts, including eviction requests from landlords and eviction orders from judges. The Eviction Lab data contain all known information on the number of evictions filed in the United States and made publicly available by municipalities.[10] The average filing rate and eviction rate across all sample cities from 2005 to 2016 are 6.62% and 3.10%, respectively. The city with the highest eviction filing rate of 62.13% is East Orange (New Jersey) in 2006, and the highest eviction rate of 20.98% is observed in Flint (Michigan) in 2006.

4 Empirical Results

In this section, we empirically document the association between the TRI, which is our proxy for tenant protection and eviction cost, and the outcomes in the rental housing market discussed above. These observations provide the motivation for our theoretical model in section 5.

[10] For more details, see the Eviction Lab: `https://evictionlab.org/methods`

4.1 Rent Affordability

We begin by relating the TRI to rent affordability by estimating equation (1). We hypothesize that landlords may perceive higher costs associated with rental activities in areas where landlord regulation is strict, implying a positive relationship between the index and rent levels. The results presented in Table 6 strongly support this hypothesis.

Using the median gross rent from the Census Bureau, we estimate that a one standard deviation increase in our TRI is associated with a 10.9% rent increase[11] in column (1). Given that the average median rent in our sample is $984 per month, this is equivalent to a $107 increase in rents. More notably, it amounts to an approximately $403 difference in rent costs when we compare the most tenant-friendly state (index value of 3.47) to the most landlord-friendly state (index value of -3.36), holding all other factors constant.

In the second column, we add two more control variables measured at the state level: our Land Regulation Index created using the method described in Ganong and Shoag (2017), and the GDP output of the tourism industry. Land use regulation is associated with lower rent, while rent is higher in states with a more significant tourism industry. Most importantly, the inclusion of these additional controls does not significantly alter our point estimates of the landlord-tenant regulation index and other controls.

Many cities have enacted rent control policies to combat fast-rising rents. Although such laws may keep rents below market levels for tenants in controlled units, the uncontrolled sector may see increased rents as a result of constrained supply (Early, 2000; Diamond et al., 2019) and, therefore, distort the rent observed in these cities. In the third column of Table 6, we exclude 38 cities with active rent control policies in our sample. It is reassuring that eliminating these cities has little effect on our index's coefficient.

Since eviction and its associated costs likely matter more to landlords and tenants in the lower-priced segment of the rental market, we rerun our baseline model using the lowest 30th percentile rent in place of median rent as the dependent variable in column (4). Although

[11] This is calculated as 1.82*0.06=0.109

the sample is reduced by over 68% due to the lack of data for smaller cities, we do not observe any notable change in the coefficient estimate on the TRI. More specifically, a one standard deviation increase in the TRI is associated with a $78 increase in rent the lower-priced segment of the rental market.[12] Hence, we find no evidence that tenant protection is more critical for the lower-income segment than the average market.

4.2 Housing Demand, Supply, Vacancy, and Homeless Rates

In this section, we discuss our empirical estimates for the relationship between TRI and several other rental market outcomes.

Column (1) of Table 7 presents the regression estimates for the total number of households, including the TRI and several other variables. As anticipated, the TRI exhibits a positive coefficient, although it is statistically insignificant. A positive relationship might be expected given that the demand for housing is anticipated to increase in tenant-friendly environments, which would also align with the observed increase in rent in the previous table. What is perhaps less expected is the positive coefficient for TRI in the next column, which has the total number of housing units as the market outcome. This is unexpected because one might fear a reduction in housing supply in tenant-friendly environments. However, in fact, the number of units increased by nearly the same amount as the number of households. We will revisit this point in the discussion of the theoretical model that follows.

The fact that the number of households increased slightly more than the number of units suggests a decrease in the vacancy rate as the TRI rises, and that is precisely the case in column (3). For every one standard deviation increase in the index, the vacancy rate is reduced by 2.85 percentage points, equivalent to a 28.6% decrease, considering that the average vacancy rate is 9.96

We next examine the correlation between the TRI and homelessness. Contrary to common expectations, we observe a positive relationship between the TRI and the homeless rate

[12] This is calculated as 1.82*0.054*795=$78

in a state. The homeless population increases by 0.03 percentage points, or 17.6% in an average state with a 0.17% homeless rate, for every one standard deviation increase in our index. In other words, our results indicate that tenant-friendly laws are correlated with more homelessness, possibly due to increased demand, higher rent, and lower vacancy.

To eliminate concerns that our results might be driven by cities with rent control policies, we repeat the above estimations, excluding these cities and present the results in the last three columns. Again, all coefficients are comparable in magnitude to the full sample estimates.

4.3 Eviction

Thus far, our analysis suggests that more stringent landlord regulations can paradoxically, but unsurprisingly, be detrimental to tenants, leading to higher rents, lower vacancy rates, and increased homelessness. Meanwhile, advocates of tenant rights argue for their benefits in addressing the eviction crisis in the U.S. Table 8 presents our empirical results on the relationship between evictions and the TRI. We present the results using the full sample and excluding rent-control cities in columns (1) and (2), respectively. Both coefficients are statistically significant at the 1% level, and their magnitudes are comparable. Increasing the TRI by one standard deviation reduces the eviction rate by approximately 0.68 percentage points, corresponding to a 21.9% decrease, given that the average eviction rate across all cities during our study period is 3.1%.

The last two specifications in Table 8 use the eviction filing rate as the dependent variable, which may include multiple filings against the same address. We find no clear relationship between tenant protection and the eviction filing rate: landlords seem to file for eviction as frequently in landlord-friendly states as they do in regions more favorable to tenants. However, our estimates for eviction rates indicate that landlords are less likely to successfully obtain eviction judgments in areas with robust tenant rights protection.

In summary, our empirical findings suggest that a higher TRI, indicating stronger tenant protection, attracts households to enter the rental market (as shown by the positive coefficient of the index in the households regression) and drives up rents. Consequently, landlords face a trade-off between increased housing demand and higher eviction costs. The influx of more households into a market with a fixed number of units inevitably leads to a lower vacancy rate and a higher rate of families without shelter. Hence, policymakers must acknowledge the delicate balance between tenant protections and rent affordability: while stringent landlord regulations may shield tenants from eviction-related hardships, they could lead to higher rent levels overall and potentially contribute to decreased vacancy rates and increased homelessness in the long term. Assessing the welfare effects of tenant rights hinges on weighing the significant benefits for those who evade eviction against the potential loss of consumer surplus for other housing consumers.

5 Theoretical Model

In this section, we construct a search model in the manner of Pissarides (2000) applied to the rental housing market. Similar to labor market models concerning wage and unemployment determination, a search model enables us to simultaneously model rent, vacancy, and homelessness within an equilibrium framework. The main components of the model include search frictions in the rental market, wherein landlords and renters seek each other. Upon finding a match, landlords and renters negotiate rents. Both landlords and renters can freely enter the market, resulting in an endogenous supply and demand of rental properties. Additionally, there exists an endogenous eviction decision by landlords driven by tenant heterogeneity. Landlords have the option to evict problematic tenants, but they incur a cost in doing so. If the portion of rent that tenants can afford is insufficient, landlords will opt to initiate eviction proceedings. Although we do not explicitly model the source of the eviction cost, in our subsequent empirical tests, we hypothesize that it depends on the extent of statutory regulations imposed on landlords by the state.

Time is continuous. There are two types of infinitely-lived agents: landlords and households/tenants. All agents are risk-neutral and discount the future at rate r. We assume free entry of both landlords and households. Households can either be rental seekers, tenants or idle (i.e. they do not participate in the rental market). Landlords can enter the rental market by paying a fixed cost ξ to own a single unit. The property can be in one of two states, occupancy (O) or vacancy (V). Landlords with a vacancy search for tenants at a flow cost before it becomes occupied. All properties are identical.

We assume search frictions in the rental market to capture that it takes time and costly effort for landlords to find a tenant and for rental seekers to find a property to rent. Similar to the labor and housing literature, we model these frictions by assuming a matching function à la Pissarides (2000). Let $\mathcal{V}$ and $\mathcal{R}$ denote the measure of vacancies and rental seekers. The number of matches is given by a matching function $M(\mathcal{V}, \mathcal{R})$. This matching function satisfies the usual properties: it is increasing in each term, homogeneous of degree one and displays diminishing returns. The matching function properties imply that rental seekers find a suitable rental unit at rate $\mu(\theta) \equiv M(1/\theta, 1)$ and that landlords find tenants at a rate $\lambda(\theta) \equiv M(1, \theta)$, where $\theta = \mathcal{R}/\mathcal{V}$ is the rental market tightness. Intuitively, an increase in market tightness lowers the rate at which rental seekers find properties as vacancies become scarcer relative to the size of rental seekers. Similarly, when market tightness is high, rental seekers are more abundant relative to vacancies, so landlords find tenants at a faster rate. Once a match between a landlords and a tenant is formed, separations occur at an exogenous Poisson rate δ.

We further assume there is idiosyncratic heterogeneity across tenants. This is a key feature of the model that delivers an endogenous eviction mechanism. More specifically, we assume that tenants are heterogeneous in terms of their ability to pay the full rent. Good tenants (G) are able to pay the full rent. At an exogenous Poisson rate σ good tenants become bad (B) and are only able to pay an idiosyncratic fraction of the rent y, which we model as a draw from a uniform distribution $U(0, 1)$. This shock captures verifiable events outside the control of tenants, such as job/income loss or a health shock that lowers their income, not a strategic behavior on the part of tenants. Bad tenants continue to receive a shock to their ability to pay rent and draw a new y from the same distribution $U(0,1)$ at the same rate σ. For ease of exposition we refer to y as the *inability to pay rent.* We allow for tenants to reestablish their good standing, and assume that at a rate ϕ bad tenants become good and are able to once again pay the full rent.[13] This way of modeling endogenous eviction decisions is in the spirit of endogenous separations in the labor search literature (Mortensen and Pissarides, 1994).

Since there is heterogeneity in tenants' quality and free entry of tenants, we assume that landlords only accept good tenants at the matching stage, so only good tenants enter the market. This type of assumption would follow from a ranking mechanism such as in Blanchard and Diamond (1994).[14]

5.1 Landlords

Landlords with an occupied property receive rents R if they have a good tenant, but receive only $R(1-y)$ if the tenant is bad and cannot pay y. Landlords posting a vacancy and looking for tenants incur flow costs $c(\mathcal{V})$. We assume that these search costs are increasing in the number of landlords posting a vacancy $\mathcal{V}$ due to congestion externalities. This assumption is similar to Gabrovski and Ortego-Marti (2019, 2021) for the housing market and allows for an endogenous entry of both landlords and tenants.[15] Mechanically, just as in any model of entry, a cost or price must increase as more agents enter the market to deliver an endogenous measure of entrants. In our frameworks, $c(\mathcal{V})$ is the price that regulates landlords' entry. A

[13]For exposition purposes, we do not model the repayment of back rent since one would have to track the full distribution of unpaid balances, which would make the model significantly more intractable—the distribution of back rent becomes a state variable. However, the main mechanism would remain the same. Only some of the magnitudes would change because in this alternative environment, eviction becomes less appealing for landlords than in our current environment.

[14]One can prove that if all types are able to enter and be matched, only one single type enters—the one with the highest value function.

[15]Such a mechanism leads to an upward-sloping Beveridge Curve in the housing market, consistent with the housing market stylized facts. Recently, Badarinza et al. (2023) find that the Beveridge Curve in the rental market (the relationship between rent seekers and rental vacancies) is also robustly upward-sloping, so our framework is also consistent with this empirical stylized fact.

constant or decreasing cost $c(\mathcal{V})$ corresponds to a version of our model without endogenous entry of landlords (i.e. either all landlords enter or no one does). In this case, the measure of vacancies $\mathcal{V}$ follows a law of motion similar to unemployment in labor search models.

Let Π_V denote the value function of a landlord posting a vacancy and Π_O^G denote the value function of a landlord with a good tenant. The value function Π_V satisfies the following Bellman equation

$$r\Pi_V = -c(\mathcal{V}) + \lambda(\theta)(\Pi_O^G - \Pi_V). \tag{2}$$

The above equation can be interpreted as an asset equation, in which the return on the asset Π_V equals the net dividend flows and changes in its capital value. It captures that landlords pay flow costs $c(\mathcal{V})$ while posting a vacancy. At a rate $\lambda(\theta)$, they find a tenant, which carries a net gain $\Pi_O^G - \Pi_V$.

Similarly, let $\Pi_O^B(y)$ denote the value function of a property occupied by a bad tenant with inability to pay y and with no eviction. Similarly, $\Pi_O^E(y)$ denotes the corresponding value function when the landlord decides instead to evict. The value function Π_O^G satisfies the following Bellman equation

$$\begin{aligned} r\Pi_O^G = R &+ \delta(\Pi_V - \Pi_O^G) \\ &+ \sigma\left(\int \max\{\Pi_O^B(x) - \Pi_O^G, \Pi_O^E(x) - \Pi_O^G\} dG(x)\right). \end{aligned} \tag{3}$$

Equation (3) captures that when a landlord's property is occupied by a good tenant, the landlord receives the full rent flow R. At a rate δ there is a separation shock and the property becomes vacant, which carries a net loss $\Pi_O^G - \Pi_V$. The last term of equation (3) captures that at a rate σ the tenant becomes a bad tenant and draws an inability to repay x from the distribution $G(.)$. The landlord must then decide whether to evict the landlord or not, taking into account that not evicting carries a net loss $\Pi_O^G - \Pi_O^B(x)$, whereas evicting carries a net loss $\Pi_O^G - \Pi_O^E(x)$. Similarly, the following Bellman equations hold for bad tenants with and without eviction

$$
\begin{aligned}
r\Pi_O^B(y) =& R(1-y) + \delta(\Pi_V - \Pi_O^B(y)) \\
&+ \sigma\left(\int \max\{\Pi_O^B(x) - \Pi_O^B(y), \Pi_O^E(x) - \Pi_O^B(y)\} dG(x)\right) \\
&+ \phi(\Pi_O^G - \Pi_O^B(y)). \qquad (4) \\
r\Pi_O^E(y) =& R(1-y) - d + (\delta + \varepsilon)(\Pi_V - \Pi_O^E(y)) \\
&+ \sigma\left(\int \max\{\Pi_O^B(x) - \Pi_O^E(y), \Pi_O^E(x) - \Pi_O^E(y)\} dG(x)\right) \\
&+ \phi(\Pi_O^G - \Pi_O^E(y)). \qquad (5)
\end{aligned}
$$

Compared to the Bellman equation for good tenants (3), the above equations capture that the landlord receives only $R(1-y)$ from a bad tenant with inability to pay y. At a rate σ, the tenant draws a new inability to pay x from $G(.)$ and the landlord decides whether to evict or not given this new inability to pay x. Tenants become good at a rate ϕ, and exogenous separations continue to occur at a rate δ. Relative to (4), equation (5) further takes into account the eviction mechanism. When the landlord chooses to evict, they must pay eviction flow costs d. By doing so, separations occur at an additional rate ε.

It is straightforward from equations (4) and (5) that there is a unique eviction threshold y^R such that the landlord finds it optimal to evict the tenant if $y > y^R$, and chooses not to evict if $y \leq y^R$. Section (5.4) derives some conditions under which y^R is in $(0, 1)$, i.e., there are some evictions in equilibrium, but not all bad tenants are evicted. In that case, y^R satisfies $\Pi_O^B(y^R) = \Pi_O^E(y^R)$, i.e. landlords are indifferent between evicting or keeping the tenant for the marginal rent $R(1-y^R)$. Note that a threshold y^R equal to 0 corresponds to an environment in which the landlord always evicts bad tenants. When y^R equals 1, the landlord never chooses to evict bad tenants, regardless of their inability to pay.[16]

[16]When the equilibrium y^R equals 1 landlords may still find it optimal to keep tenants who cannot pay any rent because landlords take into account that at a certain rate tenants will be able to pay the rent in the future, and this benefit may outweigh the costs of evicting and posting a new vacancy. This is akin to labor hoarding in some search models of the labor market, see for example Lagos (2006).

5.2 Tenants

Tenants derive a flow utility z when housed and a flow utility ρ when unhoused. If tenants are unhoused but searching for a rental property, they incur search costs k. Let J^I denote the value functions of an idle household (i.e. not participating in the rental market). Using J_U^G and J_H^G to denote an unhoused and a housed good tenant, the following Bellman equation holds

$$rJ_U^G = \rho - k + \mu(\theta)(J_H^G - J_U^G) - \sigma(J_U^G - J_I). \tag{6}$$

Unhoused good tenants derive net utility $\rho - k$ while searching. They find a property and become housed at a rate $\mu(\theta)$, which carries a net gain $J_H^G - J_U^G$. They become bad tenants at a rate σ, at which point they are unable to participate in the market and go back to being idle, which implies a net loss $J_U^G - J_I$.

Similarly, let $J_H^B(y)$ denote the value function of a housed bad tenant with inability to pay y, for $y \leq y^R$, i.e. the tenant is not being evicted. Similarly, let $J_H^E(y)$ denote the value function when the bad tenant is facing eviction, i.e. for $y > y^R$. Note that whether the tenant is facing eviction is the landlord's choice, not the tenant's. The following Bellman equation holds for housed good tenants

$$\begin{aligned} rJ_H^G =& z - R + \delta(J_U^G - J_H^G) \\ &+ \sigma\left[\int_0^{y^R}(J_H^B(x) - J_H^G)dG(x) + \int_{y^R}^1 (J_H^E(x) - J_H^G)dG(x)\right]. \end{aligned} \tag{7}$$

A good tenant derives flow utility z and pays rent R. At a rate δ an exogenous separation occurs. The last term captures that the tenant becomes bad at rate σ and draws an inability to pay x from $G(.)$. If $x < y^R$ the tenant is not evicted, so their value function changes by $J_H^B(x) - J_H^G$. If $x \geq y^R$ the landlord initiates eviction proceedings, which implies a net change of $J_H^E(x) - J_H^G$. Similarly, the following Bellman equations hold for bad tenants without eviction and with eviction

$$
\begin{aligned}
rJ_H^B(y) &= z - R(1-y) + \delta(J_U^G - J_H^B(y)) + \phi(J_H^G - J_H^B(y)) \\
&\quad + \sigma \left[\int_0^{y^R} (J_H^B(x) - J_H^B(y)) dG(x) + \int_{y^R}^1 (J_H^E(x) - J_H^B(y)) dG(x) \right], \text{for } y < y^R. \quad (8) \\
rJ_H^E(y) &= z - R(1-y) + (\delta + \varepsilon)(J_U^G - J_H^E(y)) + \phi(J_H^G - J_H^E(y)) \\
&\quad + \sigma \left[\int_0^{y^R} (J_H^B(x) - J_H^E(y)) dG(x) + \int_{y^R}^1 (J_H^E(x) - J_H^E(y)) dG(x) \right], \text{for } y \geq y^R. \quad (9)
\end{aligned}
$$

The intuition is similar, the only changes are that tenants pay $R(1-y)$, become good tenants at a rate ϕ, and tenants who are being evicted face the additional separation shock ε.

5.3 Rents

As is standard in the labor and housing search literature, we assume that rents are determined by Nash Bargaining (Nash, 1950). When the landlord forms a match with a tenant they receive π_O^G. Their outside option in the bargaining is π_V. For tenants, matching yields J_H^G and their outside option is J_U^G. Rents solve the following Nash Bargaining problem

$$
R = \arg \max_R (\pi_O^G - \pi_V)^\eta (J_H^G - J_U^G)^{1-\eta}, \quad (10)
$$

where η captures landlords' bargaining strength. The terms $\pi_O^G - \pi_V$ and $J_H^G - J_U^G$ correspond to the landlord and tenant surpluses from matching. The first order condition to the above Nash problem gives the sharing rule

$$
(1-\eta)(\pi_O^G - \pi_V) = \eta(J_H^G - J_U^G). \quad (11)
$$

Intuitively, the above sharing rule implies that each party get their outside option, and in addition the landlord and tenant get a fraction β and $1-\beta$ of the total match surplus $S = \pi_O^G - \pi_V + J_H^G - J_U^G$. In other words, $\pi_O^G = \pi_V + \eta S$ and $J_H^G = J_U^G + (1-\eta)S$.

5.4 Equilibrium

This section describes the equilibrium. As an overview, tenant free entry, the endogenous eviction choice by landlords, and the rents given by bargaining determine the equilibrium market tightness θ, the eviction threshold y^R and the rent R. Given the equilibrium market tightness, free entry of landlords determines the equilibrium measure of vacancies $\mathcal{V}$. Finally, the vacancy and homelessness rates are determined by the laws of motion and flows in the rental market.

Free entry of landlords and tenants implies that $\pi_V = \xi$ and $rJ_U^G = rJ_I = \rho$. Combining the free entry condition for tenants and the Bellman equation (6) gives

$$J_H^G = \frac{\rho}{r} + \frac{k}{\mu(\theta)}. \tag{12}$$

The free entry condition captures that tenants keep entering until the value of being housed J_H^G compensates for the expected search costs $k/\mu(\theta)$ (the tenant pays a flow cost k for an expected search duration $1/\mu(\theta)$) and the present discounted value of foregone utility if idle ρ/r. Similarly, free entry of landlords and equation (2) gives

$$\frac{r\xi + c(\mathcal{V})}{\lambda(\theta)} = \pi_O^G - \pi_V. \tag{13}$$

The left-hand side of the above equation corresponds to landlords' expected search costs. Landlords pay the user cost $r\xi$ and search costs $c(\mathcal{V})$ while they search, where search has an expected duration $1/\lambda(\theta)$. Landlords keep entering until their surplus from matching $\pi_O^G - \pi_V$ compensates for these expected costs.

Combining the Bellman equations for the landlord (2), (3), (4) and (5) gives

$$\pi_O^B(y) = \pi_O^G - \frac{Ry}{r+\sigma+\delta+\phi}, \quad \text{for } y < y^R, \tag{14}$$

$$\pi_O^E(y) = \frac{(r+\sigma+\delta+\phi)\pi_O^G + \varepsilon\pi_V}{r+\sigma+\delta+\phi+\varepsilon} - \frac{Ry+d}{r+\sigma+\delta+\phi+\varepsilon}, \quad \text{for } y \geq y^R. \tag{15}$$

The value of having a bad tenant who is not facing eviction and is unable to pay y equals the value of having a good tenant, net of the present discounted value of missed rents, using the appropriate effective discount rate $r+\sigma+\delta+\phi$. The intuition is similar for a bad tenant facing eviction, except with a weighted average of the value of a good tenant and a vacancy, taking into account the additional eviction costs and the corresponding effective discount rate.

Following the same steps as with landlords gives the following for tenants, with similar intuition

$$J_H^B(y) = J_H^G + \frac{Ry}{r+\sigma+\delta+\phi}, \text{ for } y < y^R, \tag{16}$$

$$J_H^E(y) = \frac{(r+\sigma+\delta+\phi)J_H^G + \varepsilon J_I}{r+\sigma+\delta+\phi+\varepsilon} + \frac{Ry}{r+\sigma+\delta+\phi+\varepsilon}, \text{ for } y \geq y^R. \tag{17}$$

Substituting (14), (15), (16) and (17) into (3) and (6) gives

$$\left(r+\delta+\frac{\sigma\varepsilon(1-G(y^R))}{r+\sigma+\delta+\phi+\varepsilon}\right)(\pi_O^G - \pi_V) = R(1-\sigma\bar{y}) - r\xi - \frac{\sigma(1-G(y^R))d}{r+\sigma+\delta+\phi+\varepsilon}, \tag{18}$$

$$\left(r+\delta+\frac{\sigma\varepsilon(1-G(y^R))}{r+\sigma+\delta+\phi+\varepsilon}\right)(J_H^G - J_U^G) = z-(1-\sigma\bar{y})R-\rho, \tag{19}$$

where

$$\bar{y} \equiv \int_0^{y^R} \frac{y}{r+\sigma+\delta+\phi}dG(y) + \int_{y^R}^1 \frac{y}{r+\sigma+\delta+\phi+\varepsilon}dG(y) \tag{20}$$

is a pseudo-expectation of missed payments y, using the corresponding effective rate depending on the inability to pay and whether the tenant is being evicted.

We now derive the equilibrium conditions. As a general overview, substituting the above results into the free entry conditions for landlords and tenants and the Nash Bargaining rule, together with landlords' eviction decision, gives four conditions in the four equilibrium variables $\{\theta, y^R, R, \mathcal{V}\}$. The remaining endogenous variables follow readily from this solution.

First, substituting the free entry condition for tenants gives the Renter Entry (RE) condition

$$\textbf{RE:}\quad \frac{k}{\mu(\theta)} = (1-\eta)\frac{z-\rho-r\xi-\frac{\sigma(1-G(y^R)d}{r+\sigma+\delta+\phi+\varepsilon}}{r+\delta+\frac{\sigma\varepsilon(1-G(y^R))}{r+\sigma+\delta+\phi+\varepsilon}}. \tag{21}$$

Renters enter the market and search for properties until the expected search cost (the left-hand-side of (21)) equals renters surplus from matching (the right-hand-side of (21), which equals $J^G_H - J^G_U$. As we show in the appendix in the proof for proposition 1, the RE condition is upward-sloping in the $\{\theta, y^R\}$ space. Intuitively, an increase in y^R lowers the effective discount rate used by landlords, since it includes the rate $\sigma(1-G(y^R))$. At the same time, it lowers the chance of eviction so the landlord incurs lower expected eviction costs. All in all these two effects increase the expected match surplus, some of which goes to tenants due to bargaining, so tenants have more incentives to enter the market.

The eviction threshold y^R satisfies $\pi^B_O(y^R) = \pi^E_O(y^R)$, i.e. is the value that makes the landlord indifferent between eviction and no eviction. Using (14) and 15 together with the free entry condition for tenants (12) and the Nash sharing rule (11) yields the Eviction (EE) condition

$$\textbf{EE:}\quad y^R R = (r+\sigma+\delta+\phi)\left(\frac{d}{\varepsilon} + \frac{\eta}{1-\eta}\frac{k}{\mu(\theta)}\right). \tag{22}$$

The last term $\eta/(1-\eta)\cdot k/\mu(\theta)$ in (22) corresponds to the landlord's surplus $\pi^G_O - \pi_V$. Intuitively, landlords are indifferent between starting eviction and just keeping the tenant if the present discounted value of missed rent for the marginal tenant $y^R R$ equals the expected additional eviction costs d/ε and landlord's surplus from matching, using the effective discount rate $r+\sigma+\delta+\phi$. If the tenant misses more than this amount of rent y^R, the landlord optimally chooses to initiate eviction proceedings.

Substituting the value functions derived earlier into the Nash sharing (11) gives the Rent (RR) condition

$$\textbf{RR:}\quad R = \frac{\eta(z-\rho)+(1-\eta)\left[r\xi+\frac{\sigma(1-G(y^R))d}{r+\sigma+\delta+\phi+\varepsilon}\right]}{1-\sigma\bar{y}}, \tag{23}$$

where $\bar{y}$ is given by (20).

Finally, free entry of landlords $\pi_O^G = \xi$ gives the Landlord Entry (LE) condition

$$\textbf{LE:} \quad \frac{r\xi + c(\mathcal{V})}{\lambda(\theta)} = \frac{\eta}{1-\eta}\frac{k}{\mu(\theta)}, \tag{24}$$

which, as before, captures that landlords enter until the expected search and user costs are covered by the expected surplus from matching. Once the equilibrium market tightness is determined, the LE condition gives the measure of vacancies $\mathcal{V}$.[17] The measure of rental seekers $\mathcal{R}$ follows readily from $\theta = \mathcal{R}/\mathcal{V}$ and the equilibrium $\mathcal{V}$.

An equilibrium is a tuple $\{\theta, y^R, R, \mathcal{V}, \mathcal{R}\}$ that satisfies: (i) the RE condition (21); (ii) the EE condition (22); (iii) the RR condition (23); (iv) the LE condition (24); and (v) $\theta = \mathcal{R}/\mathcal{V}$. Substituting the rents RR from (23) into the EE eviction condition (22) gives an eviction condition that depends on $\{\theta, y^R\}$ alone. As we show in the appendix, after substituting rents the resulting eviction condition describes another upward-sloping relationship in $\{\theta, y^R\}$. Intuitively, an increase in market tightness raises the match surplus, so landlords are willing to keep match longer, i.e. y^R increases. This raises the possibility of multiple equilibria. In the proposition below we show that there is either a unique equilibrium or two equilibria at most. Under certain parameter restrictions, we can guarantee that the equilibrium is unique. As we report in our quantitative exercise in section 5.6, the condition for uniqueness is always satisfied for a wide range of parameter values, so the equilibrium is unique under any reasonable parameter combination.

Proposition 1. *Assume* $(1-\eta)[(z-\rho-r\xi)+r\xi/\eta]/(r+\sigma/2+\delta+\phi) > (1-\eta)(z-r\xi-\rho)/(r+\delta)$. *Then the equilibrium exists and is unique.*

Figure 4 depicts the RE condition and the EE condition after substituting rents from the RR condition, as well as the equilibrium market tightness θ and eviction threshold y^R, see (31) and (32) in section 5.5 below for the exact expressions. The appendix provides the precise

[17] Without entry of landlords, the measure of vacancies would be determined by a law of motion similar to the Beveridge Curve and unemployment in labor search models. The endogenous free entry of landlords in our model gives rise to an upward-sloping Beveridge Curve in the rental market (Gabrovski and Ortego-Marti, 2019, 2021), consistent with recent empirical evidence for rental markets (Badarinza et al., 2023).

details, but we sketch the proof in what follows. Let $\bar{\theta}$ denote the market tightness that satisfies the RE condition when y^R equals 1, i.e. when landlords never evict. Similarly, let $\tilde{\theta}$ satisfy EC condition with $y^R = 1$. The values $\bar{\theta}$ and $\tilde{\theta}$ correspond to the intercepts of RE and EE curves with the $y^R = 1$ line. The proof in the appendix shows that both the RE and EE conditions are upward-sloping and with no change in curvature. It is straightforward that in that case if $\bar{\theta} < \tilde{\theta}$ then there is a unique intercept of RE and EE. By contrast, if one or the two curves have too much curvature, then it would be possible that $\bar{\theta} \geq \tilde{\theta}$, in which case there are two intercepts and equilibria. The condition $(1-\eta)[(z-\rho-r\xi)+r\xi/\eta]/(r+\sigma/2+\delta+\phi) > (1-\eta)(z-r\xi-\rho)/(r+\delta)$ is equivalent to $\bar{\theta} < \tilde{\theta}$, and ensures a unique intercept and, therefore, equilibrium.

Finally, we use the law of motions for quantities to solve for the equilibrium distributions. Consider the stock of occupied properties. Let L_O denote the total number of occupied properties, regardless of eviction status, and let L_O^E denote the number of occupied properties that are under eviction. In the steady state, the flows in and out of the stock L_O must be equal to guarantee a stationary distribution, which gives the following flow equation

$$\lambda(\theta)\mathcal{V} = \delta L_O + \varepsilon L_O^E. \tag{25}$$

The left-hand side corresponds to the flow into the occupied properties stock, and is equal to the number of rental vacancies that find a tenant (and thus become occupied). The right-hand side are the flows out of L_O. All occupied properties leave the stock L_O at a rate δ, while occupied properties with a tenant that is being evicted become vacant at an additional rate ε.

Similarly, consider the stock of occupied properties with eviction proceedings L_O^E. In the steady-state, the following flow equation holds

$$(L_O - L_O^E)\sigma(1 - G(y^R)) = (\delta + \varepsilon + \phi + \sigma G(y^R))L_O^E. \tag{26}$$

The left-hand side corresponds to the flow into the stock of occupied properties under eviction. An occupied property that is not under eviction joins the stock L_O^E when it receives a σ shock and the new inability to pay y is higher than y^R, which occurs with probability $1 - G(y^R)$. The right-hand side is the flow out of L_O^E. An occupied property with eviction proceedings leaves the stock L_O^E either when there is a separation shock δ, an eviction shock ε, a ϕ shock so that the tenant becomes good, or there is a new draw at a rate σ and the new y is lower than y^R, so the landlord no longer wants to evict.

Let $p \equiv L_O^E/L_O$ denote the fraction of occupied properties with eviction proceedings. The above flow equations imply that

$$\lambda(\theta)\mathcal{V} = (\delta + p\varepsilon)L_O, \tag{27}$$

$$L_O^E = \frac{\sigma(1 - G(y^R))}{\delta + \varepsilon + \phi + \sigma} L_O, \tag{28}$$

$$p = \frac{\sigma(1 - G(y^R))}{\delta + \varepsilon + \phi + \sigma}. \tag{29}$$

Finally, let $v = \mathcal{V}/(\mathcal{V} + L_O)$ denote the vacancy rate, in the steady state the equilibrium vacancy rate is given by

$$v = \frac{\delta + p\varepsilon}{\delta + p\varepsilon + \lambda(\theta)} \tag{30}$$

Intuitively, the vacancy rate is increasing in the fraction of occupied properties under eviction p, since those become vacant at a higher rate, and decreasing in market tightness as this raises $\lambda(\theta)$ and, therefore, landlords find tenants more quickly.

5.5 The effects of an increase in eviction costs

Our main interest is in the comparative static responses to changes in d, the cost of eviction. An increase in d makes it more costly for landlords to evict tenants. Therefore, an increase in d captures through the lens of our model an improvement in tenant protection rights. For ease of exposition, we focus on changes in d, but it is straightforward to see from the equilibrium conditions that a drop in ε has an equivalent effect, where the drop in ε implies that landlords take longer to evict tenants.

Consider the RE and EE conditions (21) and (22), and substitute rents from (23) into the EE condition. The equilibrium θ and y^R are then determined by the RE and the modified EE conditions

$$\textbf{RE:} \quad \frac{k}{\mu(\theta)} = (1-\eta)\frac{z-\rho-r\xi-\frac{\sigma(1-G(y^R)d}{r+\sigma+\delta+\phi+\varepsilon}}{r+\delta+\frac{\sigma\varepsilon(1-G(y^R))}{r+\sigma+\delta+\phi+\varepsilon}}, \tag{31}$$

$$\textbf{EE:} \quad y^R \cdot \frac{\eta(z-\rho)+(1-\eta)\left(r\xi+\frac{\sigma(1-G(y^R))d}{r+\sigma+\delta+\phi+\varepsilon}\right)}{(r+\sigma+\delta+\phi)(1-\sigma\bar{y})} = \left(\frac{d}{\varepsilon}+\frac{\eta}{1-\eta}\frac{k}{\mu(\theta)}\right). \tag{32}$$

Figure 4 depicts the equilibrium. An increase in d shifts the EE curve upward, which raises both y^R and θ. Intuitively, given θ an increase in d makes eviction more costly, so landlords accept worse matches with higher y tenants, i.e. landlords raise y^R. The RE curve rotates left, but it is important to note that the intercept of the RE with $y^R = 1$ remains unchanged, i.e. the rotation in RE is anchored at $\bar{\theta}$. This readily follows from the fact that $\bar{\theta}$ is defined as the market tightness that satisfies the RE condition with $y^R = 1$, and is given by $(1-\eta)(z-r\xi-\rho)/(r+\delta) = k/\mu(\bar{\theta})$, which is clearly independent of d. The rotation in the RE curve lowers y^R and θ, potentially leading to an ambiguous overall effect of an increase in d. However, as we prove in the appendix, it is straightforward to see that as long as the equilibrium y^R is not excessively low, the shift in the EE curve dominates, and that overall an increase in eviction costs d raises both y^R and θ. Intuitively, because the rotation in RE is anchored at $\bar{\theta}$, this implies that the change in y^R and θ is smaller as y^R increases, and tends to zero as y^R tends to 1 and θ to $\bar{\theta}$. The formal proof rearranges the RE and the modified EE conditions to express $k/\mu(\theta)$ as a function of y^R for each condition and shows that overall, the effect of the EE condition dominates if y^R is high enough. Quantitatively, we show in section 5.6 that this condition is robustly satisfied for any reasonable calibration.

Finally, the rise in both the eviction threshold y^R and market tightness θ captures that an increase in eviction costs makes evictions less frequent (the eviction rate is lower) and raises the number of rent-seekers relative to the number of vacancies for rent ($\theta = \mathcal{R}/\mathcal{V}$ equals the ratio of the two). Using the RR condition (23) shows that both effects raise rents R. From (30), the increase in y^R and θ lowers p the fraction of tenants facing eviction and raises $\lambda(\theta)$, both of which lowers the vacancy rate v. Overall, an increase in eviction costs lowers evictions but worsens affordability due to a rise in the demand for rentals relative to supply, the rise in rents and the drop in the vacancy rate.

5.6 Quantitative results

In this section, we calibrate the model to illustrate our theoretical mechanism quantitatively and the effect of stronger tenant protections, as captured by an increase in eviction costs of d. The numerical exercise rules out multiple equilibria quantitatively and shows that market tightness and the eviction threshold both robustly rise in response to higher eviction costs. Although we report the results for a specific calibration, it is important to stress that the quantitative results are qualitatively unchanged and robust for a vast range of reasonable values. Quantitatively, eviction costs affect the rental market mostly through the eviction threshold y^R, whereas the effect on the rents R, the vacancy rate v and market tightness θ are relatively smaller. Table 9 summarizes the calibration strategy.

We calibrate the model at the monthly frequency. The interest rate r is consistent with an annual discount factor of 0.953, a standard value in the macroeconomics literature. We assume a Cobb-Douglas matching function, which implies that the matching rates are $\mu(\theta) = m_0\theta^{-\alpha}$ and $\lambda(\theta) = m_0\theta^{1-\alpha}$, where m_0 is matching efficiency and $0 < \alpha < 1$. Given the lack of evidence on the parameters of the matching function in the rental market, we follow the evidence in the housing market and assume similar values for the rental market. In the housing market the elasticity α is around 0.16 (Genesove and Han, 2012), so we adopt the same value in the rental market. In addition, Genesove and Han (2012) find that in the housing market time-to-sell equals time-to-buy, so similarly we assume that time-to-house $1/\mu(\theta)$ equals time-to-rent $1/\lambda(\theta)$. This implies a steady-state market tightness equal to

1 and gives the value for the matching efficiency m_0. Han et al. (2022) find that it takes landlords about a month to find a tenant for their properties using data from Toronto. For the US, Gabriel and Nothaft (2001) find that the average vacancy duration is around 1.5-2 months, which is the value also used by Halket and di Custoza (2015). Given this evidence, we calibrate a time-to-rent equal to one month, but results barely change when we use a larger value of 2 months.

As is common in the search and matching literature, we assume a Hosios-Mortensen-Pissarides condition and impose $\eta = \alpha$. The rate δ determines tenants tenure in a rental property. Han et al. (2022) find that tenants stay 3 years in their property using data from Toronto. For the US, Kumar (2024) uses a value for tenure of 2 years to match vacancy rates, ans similarly Redfin reports that the average tenant moves every 2 years.[18] Therefore, we choose a value for δ consistent with tenants staying in their rental property for an average 2 years, but it is important to note that results do not change significantly when we assume 3 years instead—results are available upon request.

The time it takes to evict a tenant varies significantly across states, so we choose an intermediate value of 4 months. Eviction times range from 2 months to 8 months, so we provide results later in the section for these two alternative values. The parameter σ captures a shock to tenants' ability to pay full rent, such as an income or health shock. We calibrate σ to be equal to 0.01, similar to the values used in the labor search literature to calibrate wage shocks (Hornstein et al., 2011).[19] For symmetry, we assume $\phi = \sigma$, i.e. tenants become good at the same rate as they become bad. The remaining parameters are normalizations that only affect the overall level of prices and the size of the market.

We begin by using our calibration to compute the equilibrium in the steady state with no eviction costs, i.e. with d equal to 0. We then compute the effect of implementing eviction costs equal to 0.1, which amounts to expected eviction costs of around 5% of the PDV of

[18] Redfin statistics can be found at https://www.redfin.com/news/homeowner-tenure-2022/.

[19] In our framework this parameter also captures other shocks that would make tenants unable to pay a fraction of the rent (for example a health shock), but results are amplified if we assume larger values so this is not an issue.

rents. Figure 5 depicts the effect on the equilibrium market tightness θ and eviction threshold y^R, where for ease of exposition the effect on θ is captured through $k/\mu(\theta)$ using (31) and (32). It is clear graphically that the increase in eviction costs d yields a significantly larger shift in the EE condition. Although not visible in the figure, the RE curve shifts but the shift is barely noticeable. This is consistent with our theoretical result in the previous section, where we showed that as long as the equilibrium eviction threshold is large enough the shift in the RE curve is negligible and tends to 0. Overall, the shift in EE dominates and both y^R and θ increase. Quantitatively, the increase in y^R is significantly larger. The eviction threshold y^R increases by 15.6%, a significant drop in the eviction rate. By contrast, market tightness increases by around 8.3%, capturing a larger relative demand for rentals. Rents increase by about 1% and the vacancy rate drops by about 7.6%. These quantitative results suggest that eviction costs have a relatively larger positive effect on the eviction rate than a negative effect on affordability.

As a robustness check, we report results for alternative values of the eviction length. Although results vary depending on this calibration target, results are overall robust to alternative calibration of the eviction rate ε. Assuming that eviction takes 8 months instead of our baseline calibration of 4 months, the eviction threshold y^R increases instead by 30.7%, market tightness increases by around 14.7%, rents increase by about 1.2% and the vacancy rate drops by 12.7%. When the eviction length is 2 months, the eviction threshold y^R increases instead by 7.9%, market tightness increases by around 4.4%, rents increase by about 0.6% and the vacancy rate drops by about 4.2%.

Finally, we report the effect of an increase in eviction costs on the number of households and rental properties. From the flow equations used to derive (30) it is straightforward that the total number of rental properties $L = L_O + \mathcal{V} = \mathcal{V}(\lambda(\theta) + \delta + p\varepsilon)/(\delta + p\varepsilon)$. Let $T = \mathcal{H} + \mathcal{R}$ denote the total number of households participating in the rental market, where $\mathcal{H}$ is the total number of housed tenants. Following the same steps as for landlords, the flow equations for households yield that $T = \mathcal{R}(\mu(\theta) + \delta + p\varepsilon)/(\delta + p\varepsilon)$.[20] In our baseline calibration with an eviction length of 4 months, an increase in eviction costs leads to an increase of 16.5% in the total number of households, and an increase of 16.1% in the rental stock, both consistent with our empirical results. When the eviction length is 2 months, the increase is 8.7% and 8.5% respectively. For the upper bound eviction length of 8 months the respective numbers are 30.1% and 29.4%. This corresponds neatly with the results in the empirical results,which demonstrated that lower eviction costs increases rents, but also increases both the number of households and the number of housing units by a slightly smaller amount, just as in the simulations.

This underscores the importance of the theoretical model particular feature of allowing endogenous entry of both tenants and landlords. One might have thought that more tenant-friendly legal environments might generate the withdrawal of housing from those markets. This does not happen. The rise in rents partially compensates landlords for the increase in costs and induces entry. While this entry does not completely absorb the new demand for housing in tenant-friendly environments (so that the vacancy rate does fall, and homeless rate does rise) this entry does mitigate more drastic outcomes. Our theory model demonstrates that under plausible parameters, supply respond to the new demand, even though eviction is more costly.

6 Conclusion

Strict landlord regulation, often championed by advocates of tenant rights, is proposed as a means to prevent evictions and address the significant social and economic costs associated with the eviction crisis.

This study provides both theoretical and empirical analyses that shed light on the impact of landlord-tenant laws on eviction and rent affordability. Our paper offers three major

[20]Specifically, let $\mathcal{H}^E$ denote the number of housed tenants under eviction. Then, $\mathcal{H}^E = \sigma(1 - G(y^R))\mathcal{H}/(\delta + \varepsilon + \phi + \delta)$, which implies that the fraction of housed tenants under eviction is $\mathcal{H}^E/\mathcal{H} = p$. Using that $\sigma(1 - G(y^R))\mathcal{H} = (\delta + \varepsilon + \phi + \sigma)\mathcal{H}^E$ in the steady state equilibrium gives the results above.

contributions to the literature on affordable rent. First, we construct a novel state-level index to proxy for the level of tenant protections. Second, utilizing the newly available eviction data and TRI, we empirically estimate the correlation between landlord-tenant laws, evictions, and several other housing affordability outcomes. Third, we provide a theoretical framework with search and matching frictions, endogenous entry of tenants and landlords, bargaining over rents and an endogenous eviction rate to rationalize the relationship between tenant rights, eviction rates, and rent prices.

Overall, our findings highlight an important trade-off between tenant protections and rent affordability: imposing strict landlord regulations may protect tenants from potential hardships associated with eviction but at the cost of lower housing affordability and vacancy, and increased homelessness. Importantly, though, both the empirical and theoretical models find that increased supply mitigates some of these outcomes. This has important implications for landlord-tenant regulations that should be of great interest to policymakers.

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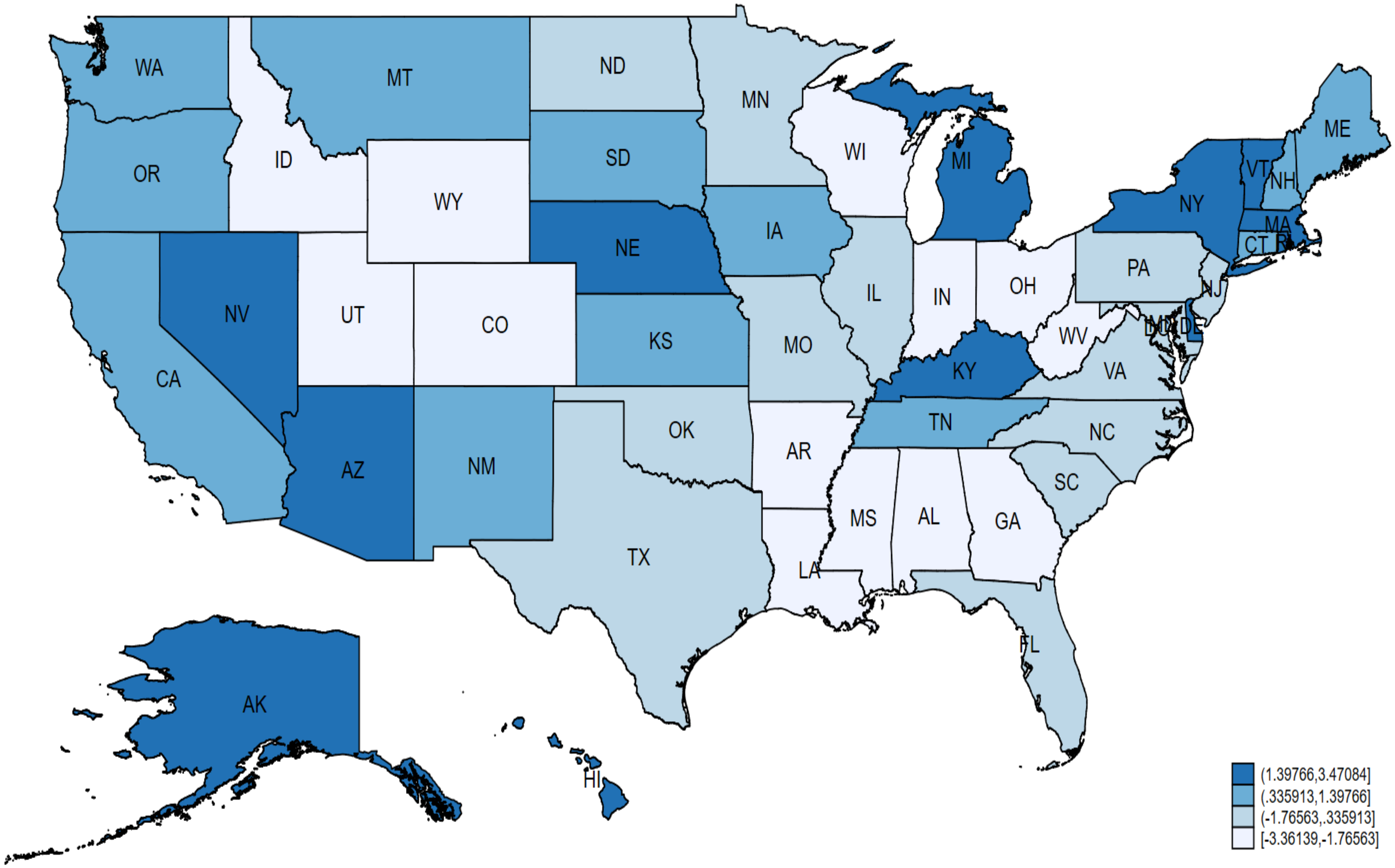
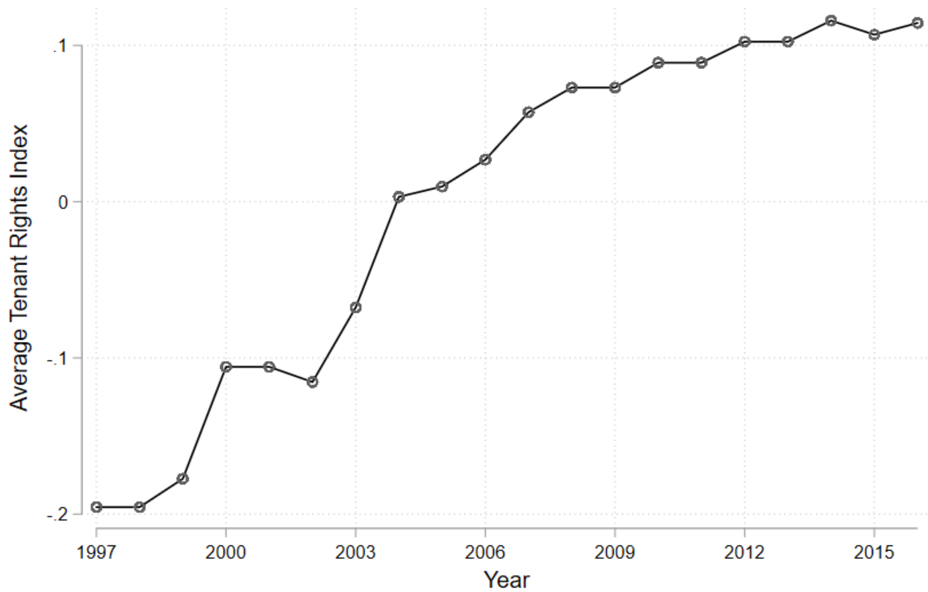
Figure 1: Tenant Rights Index by State



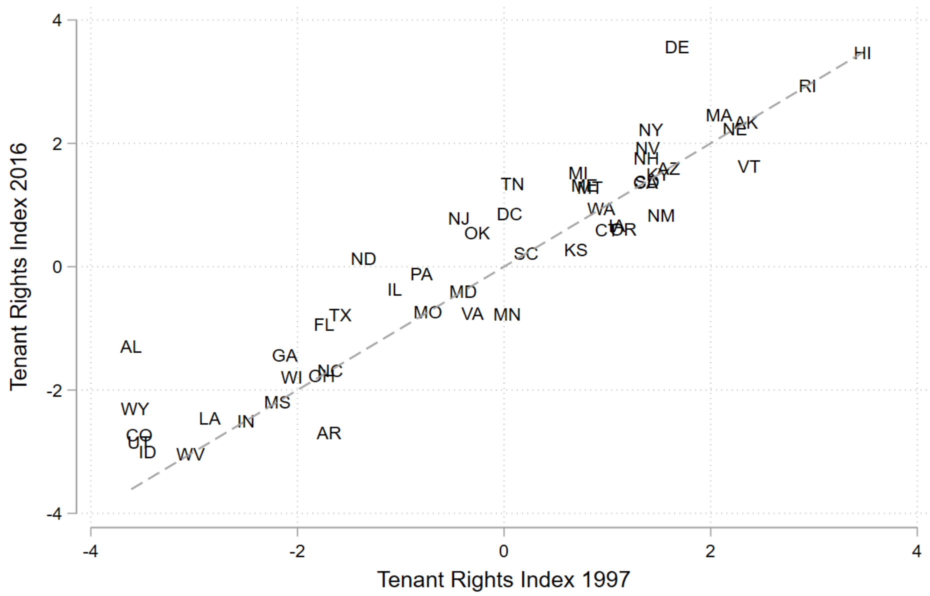
Notes: This figure features a map of the United States with color-coding to highlight the Tenant Rights Index value in each state. The data used in this map are shown in the first column of Table 2.

Figure 2: Tenant Rights Index 1997–2016

(a) Average Index

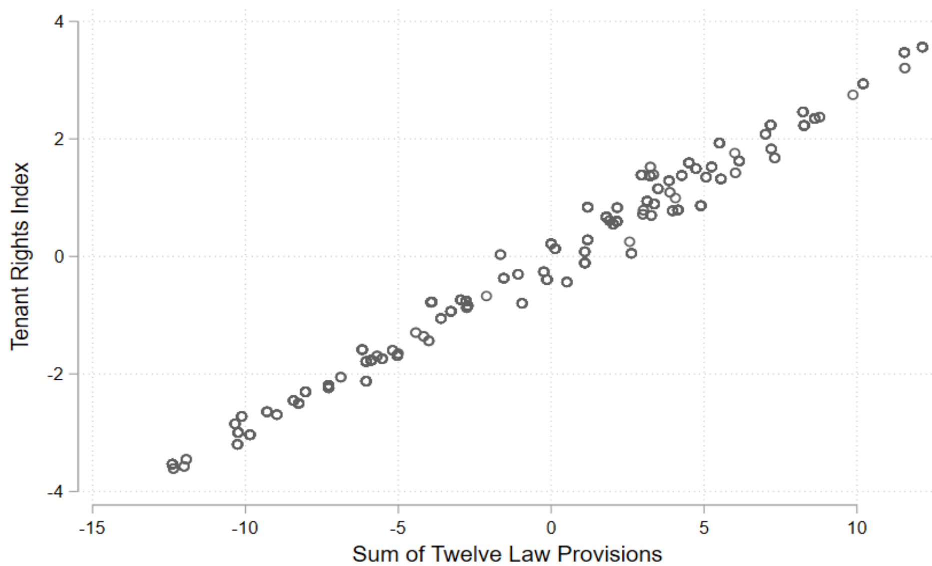


(b) Index by State



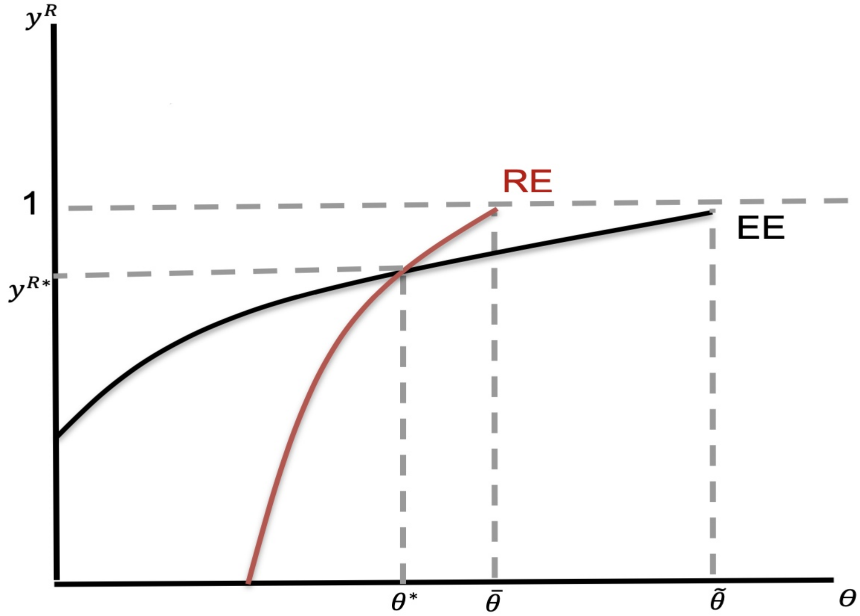
Notes: This figure shows the trend of average Tenant Rights Index by year during our sample period.

Figure 3: Tenant Rights Index and Sum of Twelve Statutes



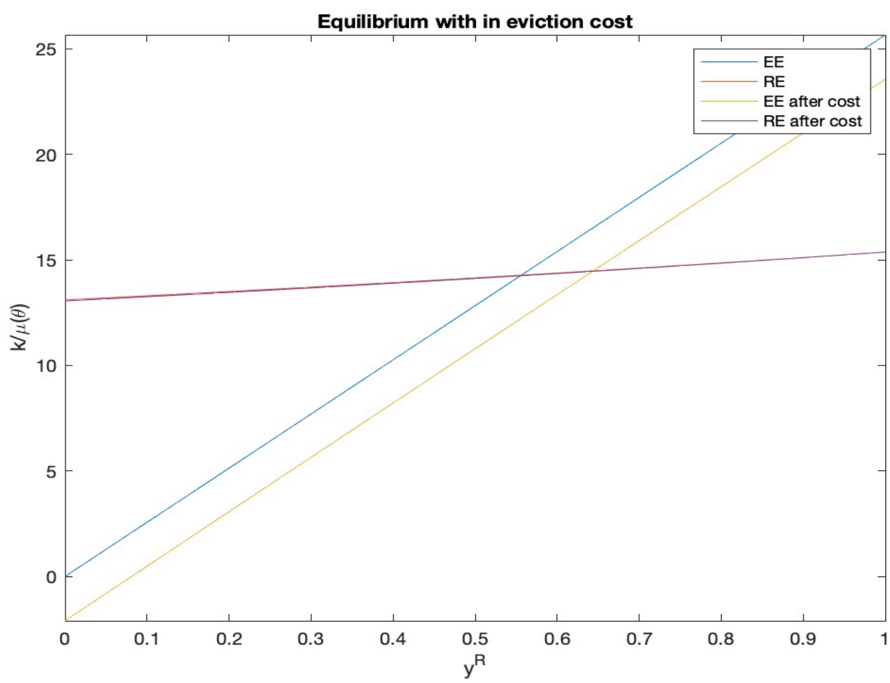
Notes: We follow the approach of Gyourko et al. (2008) to construct an alternative index by summing all twelve statutes and comparing it with our Tenant Rights Index. This figure plots the values of the Tenant Rights Index against the sum of the twelve law provisions used to construct the index. The correlation between them is 0.99. This similarity gives us confidence in the effectiveness of our index in reflecting the overall level of tenant protection in each state.

Figure 4: Equilibrium market tightness and eviction threshold



Note: Figure 4 depicts the equilibrium under the assumption in proposition 1, which guarantees a unique equilibrium. The RE curve corresponds to the renter entry condition (21) and the EE condition to the eviction condition (22).

Figure 5: Effect of an increase in eviction costs



Note: Figure 5 depicts the effect of an increase in eviction costs d on the equilibrium market tightness θ and eviction threshold y^R.

Table 1: Definition of Landlord-Tenant Law Provisions and Index Construction

Statute name	Definition	Code
Rent Increase Notice	Minimum notice to increase rent for a month-to-month tenancy	1 = 15 days or less or no statute, 2 = 16 to 30 days, 3 = more than 30 days
Rent Control Preemption	Whether state laws explicitly pre-empt local governments to control rent	0 = Yes, 1 = No
Rent Withholding	Tenant has the option to withhold rent for failure to provide essential services	0 = No, 1 = Yes
Repair and Deduct	Tenant is allowed to repair and deduct costs from rent	0 = No, 1 = Yes
Regular Termination	Minimum notice to change terms or terminate a month-to-month tenancy	1 = 15 days or less or no statute, 2 = 16 to 30 days, 3 = more than 30 days
Nonpayment Termination	Termination notice required for nonpayment of rent	0 = 3 days or less, 1 = 4 to 7 days, 2 = 8 to 15 days, 3 = more than 15 days
Lease Violation Termination	Termination notice required for lease violation	0 = 3 days or less or no statute, 1 = 4 to 7 days, 2 = 8 to 15 days, 3 = more than 15 days
Self-help Eviction	Amount tenant can sue landlord for self-help eviction	1= actual damage or no statute, 2 = 1.5 to 2 times actual damage, 3 = more than 2 times actual damage
Right to Stay	Whether tenant has the right to stay after illegal eviction	0 = No, 1 = Yes
Maximum deposit	Maximum security deposit for an unfurnished apartment on a one year lease	1 = more than 2 months' rent, 2 = 1.5 to 2 months' rent, 3 = 1 month's rent or less or no statute
Deposit Interest	Whether landlord must keep security deposits in an interest-bearing account	0 = No, 1 = Yes
Deposit Return	Deadline for returning security deposit when no deductions are imposed by landlord	1 = more than 35 days or no statute, 2 = 16 to 35 days, 3 = 15 days or less

Notes: This table provides the definition of the twelve law provisions regarding landlord-tenant relationships used to construct our Tenant Rights Index.

Table 2: Average Tenant Rights Index by States (1997-2016)

State	Tenant Rights Index	Max Deposit	Deposit Interest	Deposit Return	Regular Termination	Rent Increase Notice	Withhold Rent	Repair Deduct	Nonpayment Termination	Lease Violation Termination	Self-help Eviction	Right to Stay	Rent Control Preemption
Alabama	-2.17	0.29	-0.84	-1.09	-0.84	-0.8	-0.65	-1.26	0.3	0.51	-0.87	-1.1	-0.75
Alaska	2.35	0.29	1.19	1.62	0.24	0.78	0.6	0.79	0.09	0.51	0.26	0.91	1.33
Arizona	1.59	0.29	-0.84	1.62	0.24	0.78	0.6	0.79	0.09	0.51	0.26	0.91	-0.75
Arkansas	-2.27	0.29	-0.84	-0.5	0.24	-0.57	-1.67	-1.26	-0.96	0.51	-0.87	-1.1	-0.75
California	1.37	0.29	-0.84	-0.07	0.24	0.78	0.6	0.79	-0.96	-1.23	1.38	0.91	1.33
Colorado	-3.25	-0.93	-0.84	-0.07	-1.92	-0.8	-0.88	-1.26	-0.96	-1.23	-0.87	-1.1	-0.75
Connecticut	0.64	0.29	1.19	-0.07	-1.92	-0.8	0.6	0.79	1.19	0.64	0.26	0.91	-0.75
Delaware	3.2	1.52	1.19	0.35	2.39	2.36	-0.08	0.79	0.09	-0.36	1.04	0.61	1.33
District of Columbia	0.58	1.52	1.19	-1.77	0.24	-0.8	-0.2	-1.26	2.18	1.38	1.38	-1.1	1.33
Florida	-1.22	-0.93	1.19	1.62	-1.92	-0.8	0.6	-1.26	-0.96	-0.36	0.59	-1.1	-0.75
Georgia	-2.02	-0.93	1.19	-0.07	2.39	-0.8	-1.67	-0.95	-0.96	-1.23	-0.87	-1.1	-0.75
Hawaii	3.47	1.52	-0.84	1.62	2.39	2.36	0.6	0.79	0.09	0.51	0.26	0.91	1.33
Idaho	-3.06	-0.93	-0.84	-0.33	0.24	-0.8	-1.67	-1.26	-0.96	-1.23	-0.87	-1.1	-0.75
Illinois	-0.68	-0.93	-0.84	-0.07	0.24	0.78	0.6	-0.13	0.09	0.51	-0.87	-1.1	-0.75
Indiana	-2.5	-0.93	-0.84	-1.77	0.24	0.78	-1.67	-1.26	1.14	-1.23	-0.87	-1.1	-0.75
Iowa	0.72	0.29	1.19	-0.07	0.24	0.78	0.6	0.79	-0.96	-0.36	-0.87	0.91	-0.54
Kansas	0.39	1.52	-0.84	-0.07	0.24	-0.8	0.6	-1.26	1.14	1.38	-0.87	0.91	-0.23
Kentucky	1.5	-0.93	1.19	-0.07	0.24	0.78	0.6	0.79	0.09	0.51	1.38	0.91	-0.75
Louisiana	-2.55	-0.93	-0.84	-0.07	-1.92	-0.8	-1.67	0.79	0.04	-0.75	-0.87	-1.1	-0.75
Maine	1.13	0.29	1.19	-0.07	0.24	1.81	0.6	0.79	1.14	-0.36	-0.87	-1.1	1.33
Maryland	-0.39	0.29	1.19	-1.77	0.24	0.78	0.6	-1.26	-0.96	1.38	-0.87	-1.1	1.33
Massachusetts	2.37	1.22	1.19	-0.07	0.24	0.78	0.6	0.79	1.14	0.51	1.38	0.91	-0.75
Michigan	1.4	0.29	1.19	-0.07	0.24	-0.8	0.6	0.79	0.09	1.38	1.04	0.91	-0.75
Minnesota	-0.65	-0.93	-0.84	-0.07	0.24	-0.8	0.6	0.79	-0.96	-1.23	-0.53	0.91	-0.75
Mississippi	-2.19	-0.93	-0.84	-1.77	0.24	-0.8	-1.67	0.79	-0.96	1.38	-0.87	-1.1	-0.75
Missouri	-0.74	0.29	-0.84	-0.07	0.24	-0.8	0.6	0.79	-0.96	0.51	-0.87	-1.1	-0.75
Montana	1.17	-0.93	-0.84	1.2	0.24	-0.8	0.6	0.79	-0.96	0.51	1.38	0.91	1.33
Nebraska	2.24	1.52	-0.84	1.62	0.24	-0.8	0.6	0.79	-0.96	1.38	1.38	0.91	1.33
Nevada	1.88	-0.93	-0.84	-0.07	0.02	2.36	0.6	0.79	0.09	-0.36	1.38	0.91	1.33

Table 2: Tenant Rights Index by States (1997-2016) (Continue)

State	Tenant Rights Index	Max Deposit	Deposit Interest	Deposit Return	Regular Termination	Rent Increase Notice	Withhold Rent	Repair Deduct	Nonpayment Termination	Lease Violation Termination	Self-help Eviction	Right to Stay	Rent Control Preemption
New Hampshire	1.4	1.52	1.19	-0.07	0.24	0.78	0.6	-1.26	0.09	-0.27	1.38	0.91	-0.75
New Jersey	0.34	0.29	1.19	-0.07	0.24	0.15	0.6	0.08	2.18	-1.23	-0.87	-1.1	1.33
New Mexico	0.91	1.52	-0.84	-0.07	0.24	0.78	0.6	-1.05	-0.96	-0.36	1.38	0.91	-0.75
New York	2.15	1.52	1.19	1.62	0.24	0.78	0.6	0.79	1.14	-1.23	1.15	-1.1	1.33
North Carolina	-1.52	0.29	1.19	-0.07	-1.92	-0.8	-1.22	-1.26	1.14	-1.23	-0.87	0.91	-0.75
North Dakota	-0.06	1.52	1.19	-0.07	0.24	0.78	-1.67	0.59	-0.96	-1.23	1.04	-1.1	-0.75
Ohio	-1.77	-0.93	-0.84	-0.07	0.24	-0.8	0.6	-1.26	-0.96	-1.23	-0.87	-1.1	1.33
Oklahoma	0.31	-0.93	1.19	-0.07	0.24	-0.8	-0.08	0.79	0.09	0.51	0.26	0.91	-0.75
Oregon	0.8	-0.93	-0.84	-0.07	0.24	-0.25	0.6	0.79	1.14	1.38	0.26	0.91	-0.75
Pennsylvania	-0.35	0.29	1.19	-0.07	-1.92	-0.8	0.6	0.08	1.14	0.51	-0.87	-1.1	1.33
Rhode Island	2.94	1.52	-0.84	-0.07	0.24	0.78	0.6	0.79	2.18	1.38	1.38	0.91	1.33
South Carolina	0.22	-0.93	-0.84	-0.07	0.24	-0.8	0.6	0.79	0.09	0.51	0.26	0.91	-0.75
South Dakota	1.39	1.52	-0.84	1.62	0.24	0.78	0.6	0.79	-0.96	-1.23	0.26	0.91	-0.75
Tennessee	0.76	-0.93	1.19	-1.35	0.24	-0.8	-0.08	0.79	1.14	1.38	1.38	0.91	-0.75
Texas	-1.22	-0.93	-0.84	-0.07	0.24	-0.8	-1.67	0.79	-0.96	-1.23	0.14	0.91	-0.75
Utah	-3.36	-0.93	-0.84	-0.07	-1.92	-0.8	-1.67	-0.74	-0.96	-1.23	-0.87	-1.1	-0.75
Vermont	1.79	-0.93	-0.84	1.62	0.24	1.02	0.6	0.79	1.56	1.38	-0.87	0.91	1.33
Virginia	-0.65	0.29	-0.84	-1.35	0.24	-0.8	0.6	-1.26	0.09	1.38	-0.87	0.91	-0.75
Washington	0.94	-0.93	1.19	1.62	0.24	0.78	0.6	0.79	-0.96	0.51	-0.87	0.91	-0.75
West Virginia	-3.03	-0.93	-0.84	-1.77	0.24	-0.8	-1.67	-1.26	-0.96	-1.23	-0.87	-1.1	1.33
Wisconsin	-1.79	-0.93	-0.84	-0.33	0.24	-0.8	0.6	-1.26	0.09	-0.06	-0.87	-1.1	-0.75
Wyoming	-2.49	-0.93	-0.84	-0.33	-1.92	-0.8	0.26	-1.26	-0.96	-1.23	-0.87	-1.1	1.33

Notes: This table reports the individual scores for the twelve legal provisions as well as the final Tenant Rights Index in each state, averaged over 1997–2016. Refer to Table for details on the score calculation for the twelve provisions. The Tenant Rights Index is the first component from the PCA analysis of the twelve provisions. All are standardized to have a mean of zero and a standard deviation of one.

Table 3: Law Provisions: Correlation Matrix

	Max Deposit	Deposit Interest	Deposit Return	Regular Termination	Rent Increase Notice	Withhold Rent	Repair Deduct	Nonpayment Termination	Lease Violation Termination	Self-help Eviction	Right to Stay	Rent Control Preemption
Maximum Deposit	1.000											
Deposit Interest	0.235	1.000										
Deposit Return	0.189	0.040	1.000									
Regular Termination	0.273	0.026	0.082	1.000								
Rent Increase Notice	0.361	0.163	0.292	0.444	1.000							
Rent Withholding	0.273	0.133	0.38	0.128	0.286	1.000						
Repair and Deduct	0.065	0.121	0.403	0.224	0.346	0.275	1.000					
Nonpayment Termination	0.256	0.286	-0.089	-0.03	0.162	0.219	0.112	1.000				
Lease Violation Termination	0.168	0.053	-0.054	0.151	-0.029	0.366	0.209	0.341	1.000			
Self-help Eviction	0.397	0.223	0.210	0.215	0.288	0.293	0.369	0.140	0.186	1.000		
Right to Stay	0.208	0.031	0.344	0.238	0.253	0.427	0.476	0.118	0.332	0.491	1.000	
Rent Control Preemption	0.234	0.045	0.143	0.169	0.335	0.281	0.097	0.220	0.032	0.153	-0.067	1.000

Notes: This table reports the correlation matrix of the twelve variables included in the construction our Tenant Rights Index. The correlation between different variables are low because each of them represents a unique legal aspect of tenant rights.

Table 4: Principal Component Analysis

Statute	Factor Loadings	Correlation with Tenant Rights Index
Maximum Deposit	0.31	0.57
Deposit Interest	0.17	0.31
Deposit Return	0.27	0.50
Regular Termination	0.25	0.46
Rent Increase Notice	0.34	0.63
Rent Withholding	0.36	0.66
Repair and Deduct	0.33	0.62
Nonpayment Termination	0.20	0.36
Lease Violation Termination	0.22	0.41
Self-help Eviction	0.36	0.66
Right to Stay	0.36	0.67
Rent Control Preemption	0.20	0.37

Notes: This table reports loading factors of the twelve statutes used to construct the Tenant Rights Index and their correlations with the index.

Table 5: Descriptive Statistics

Variables	(1) N	(2) Mean	(3) Std. Dev.	(4) Min	(5) Max
	City Level Data				
Population ('000)	6,532	197.09	446.30	55.41	8550.41
Density (persons/square miles)	6,532	4201.96	3928.19	156.21	54026.60
Median Household Income ('000)	6,532	53.93	19.11	18.01	151.37
Share of Minority Population (%)	6,365	33.79	17.65	3.02	96.86
Median Number of Rooms	6,532	4.20	0.43	1.30	8.20
Median Property Age (years)	6,532	36.13	14.13	4.00	77.00
Median Property Tax	6,532	2637.77	1508.93	181.00	10000.00
Homeownership Rate (%)	6,532	56.83	12.26	16.55	96.71
Rent Burden (gross rent as % of income)	6,532	22.67	4.66	11.00	63.62
Unemployment Rate (%)	6,482	7.59	3.91	1.04	50.63
Median Gross Rent ($)	6,532	983.56	296.52	466.00	3042.00
Gross Rent - 30th Percentile ($)	2,954	795.40	250.44	330.00	2160.00
Number of Households ('000)	6,438	73.47	165.09	12.54	3,148.07
Number of Housing Units ('000)	6,532	81.42	181.77	13.85	3,463.87
Vacancy rate (%)	2,785	9.96	4.19	1.10	33.14
Eviction filing rate (%)	5,296	6.62	7.12	0.00	62.13
Eviction rate (%)	5,296	3.10	2.56	0.00	20.98
	State Level Data				
Tenant Rights Index	612	0.08	1.82	-3.53	3.56
Land Regulation Index	612	5.99	10.00	0.00	78.00
Tourism Industry - GDP Output ('000)	612	8.97	10.73	0.85	68.03
Share of Homeless Population (%)	500	0.17	0.09	0.05	0.55

Notes: This table reports the summary statistics of variables used in the empirical tests.

Table 6: Tenant Rights Index and Rent Affordability

Dependent Variable:	(1) Median Rent	(2) Median Rent	(3) Median Rent	(4) 30th Percentile Rent
Tenant Rights Index	0.060***	0.058***	0.056***	0.054***
	(0.009)	(0.008)	(0.008)	(0.014)
Population	0.001	0.001	-0.001	-0.010
	(0.005)	(0.005)	(0.006)	(0.018)
Population Density	0.004*	0.004*	0.009***	0.016***
	(0.002)	(0.002)	(0.002)	(0.005)
Median Income	0.559***	0.547***	0.550***	0.587***
	(0.022)	(0.023)	(0.023)	(0.055)
Median Number of Rooms	0.103***	0.101***	0.108***	0.117***
	(0.008)	(0.008)	(0.008)	(0.021)
Share of Houses Built after 2010	0.075*	0.056	0.035	-0.091
	(0.041)	(0.042)	(0.041)	(0.119)
Property Tax	0.136***	0.137***	0.136***	0.160***
	(0.014)	(0.014)	(0.014)	(0.029)
Homeownership Rate	-0.004***	-0.004***	-0.004***	-0.005***
	(0.000)	(0.000)	(0.000)	(0.001)
Land Regulation Index		-0.001***	-0.001***	-0.001**
		(0.000)	(0.000)	(0.000)
Tourism		0.004***	0.004***	0.002*
		(0.000)	(0.001)	(0.001)
State FE	Yes	Yes	Yes	Yes
Include rent control cities	Yes	Yes	No	Yes
Observations	6,532	6,532	6,079	1,937
Adj R2	0.882	0.884	0.885	0.845

Notes: This table reports our OLS estimation results of Equation 1 in Section 3. The dependent variables are rent measures. Standard errors are calculated at the city level. Clustered standard errors are shown in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Table 7: Housing Supply, Vacancy, and Homeless Rate

VARIABLES	(1) Households	(2) Housing units	(3) Vacancy Rate	(4) Homeless Rate	(5) Households	(6) Housing units	(7) Vacancy Rate	(8) Homeless Rate
Tenant Rights Index	0.038	0.036	-1.568***	0.018***	0.039	0.037	-1.551***	0.015**
	(0.025)	(0.025)	(0.471)	(0.006)	(0.025)	(0.026)	(0.478)	(0.006)
Median Income	-0.007***	-0.008***	-0.004	3.463**	-0.009***	-0.010***	0.002	4.294**
	(0.003)	(0.002)	(0.014)	(1.614)	(0.002)	(0.002)	(0.015)	(1.734)
Unemployment rate	-0.008	-0.005	0.154***	0.008**	-0.006	-0.003**	0.150***	0.009***
	(0.006)	(0.006)	(0.055)	(0.003)	(0.006)	(0.007)	(0.057)	(0.003)
Median Property Tax	0.028	0.030	-0.158	-0.027**	0.069*	0.075	-0.205	-0.030*
	(0.041)	(0.041)	(0.151)	(0.013)	(0.038)	(0.038)	(0.186)	(0.015)
Share of Minority Population	0.008***	0.008***	0.007	0.000	0.007***	0.007***	0.008	0.000
	(0.002)	(0.002)	(0.008)	(0.001)	(0.002)	(0.002)	(0.009)	(0.001)
Land Regulation Index	0.001*	0.001*	0.052***	0.003*	0.001	0.000	0.050**	0.004**
	(0.001)	(0.001)	(0.017)	(0.001)	(0.001)	(0.001)	(0.020)	(0.002)
Tourism	0.000	0.000	-0.216***	0.002	0.002	0.002	-0.254***	0.001
	(0.003)	(0.003)	(0.034)	(0.001)	(0.003)	(0.003)	(0.039)	(0.001)
State FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Include rent control cities	Yes	Yes	Yes	Yes	No	No	No	No
Observations	6,292	6,368	2,761	500	5,843	5,917	2,525	460
Adj R2	0.150	0.170	0.283	0.405	0.181	0.205	0.267	0.398

Notes: This table reports our OLS estimation results of Equation 1 in Section 3. The dependent variables are logged number of households , logged number of housing units, vacancy rate (%), and homeless rate (%). Standard errors are calculated at the city level. Clustered standard errors are shown in parentheses. (*** p<0.01, ** p<0.05, * p<0.1)

Table 8: Tenant Rights Index and Eviction

Dependent Variable:	(1) Eviction Rate	(2) Eviction Rate	(3) Eviction Filing Rate	(4) Eviction Filing Rate
Tenant Rights Index	-0.376**	-0.384**	0.322	0.298
	(0.169)	(0.172)	(0.377)	(0.382)
Rent Burden	0.044*	0.053**	-0.004	0.001
	(0.023)	(0.025)	(0.052)	(0.052)
Share of Minority Population	0.039***	0.044***	0.109***	0.107***
	(0.005)	(0.005)	(0.014)	(0.014)
Population density	-0.074**	-0.157***	-0.208***	-0.306***
	(0.037)	(0.027)	(0.048)	(0.062)
Homeownership Rate	0.007	0.003	-0.018	-0.021
	(0.007)	(0.008)	(0.018)	(0.019)
State FE	Yes	Yes	Yes	Yes
Include rent control cities	Yes	No	Yes	No
Observations	5,296	4,958	5,389	5,051
Adj R2	0.463	0.466	0.633	0.614

Notes: This table reports our OLS estimation results of Equation 1 in Section 3. The dependent variables are eviction rate (%) and eviction filling rate (%). Standard errors are calculated at the city level except for the homeless regressions, in which standard errors are clustered at the state level. Clustered standard errors are shown in parentheses. (*** p<0.01, ** p<0.05, * p<0.1)

Table 9: Calibration

Parameter	Value	Source/target
Interest rate r	0.0041	Annual discount factor 0.953
Elasticity matching rate α	0.16	Genesove and Han (2012)
Market tightness θ	1	Time-to-rent equals time-to-house Genesove and Han (2012), Han et al. (2022)
Matching efficiency m_0	1	Vacancy duration 1 month Gabriel and Nothaft (2001), Han et al. (2022)
Separation rate δ	0.0417	Tenants tenure 2 years Han et al. (2022), Redfin data
Bargaining power η	0.16	Hosios-Mortensen-Pissarides condition $\eta = \alpha$
Shock rate, σ	0.01	Hornstein et al. (2011)
Shock rate, ϕ	0.01	Symmetry, $\phi = \sigma$
Congestion cost elasticity γ	1.2	Gabrovski and Ortego-Marti (2019)

Notes: This table reports our calibration targets.

Tenant Rights, Eviction, and Rent Affordability

Supplementary Appendix

This appendix supplements Coulson, Le, Ortego-Marti and Shen (2024).

A.1 Index Appendix

A.1.1 Descriptive Statistics of TRI

Table A.1 presents additional state-level Tenant Rights Index (TRI) between 2007 and 2016. These numbers are used to create figures in our manuscript.

A.1.2 TRI and and State Characteristics

We also investigate the potential correlation between state-level tenant protections and local demographic and regulatory characteristics.

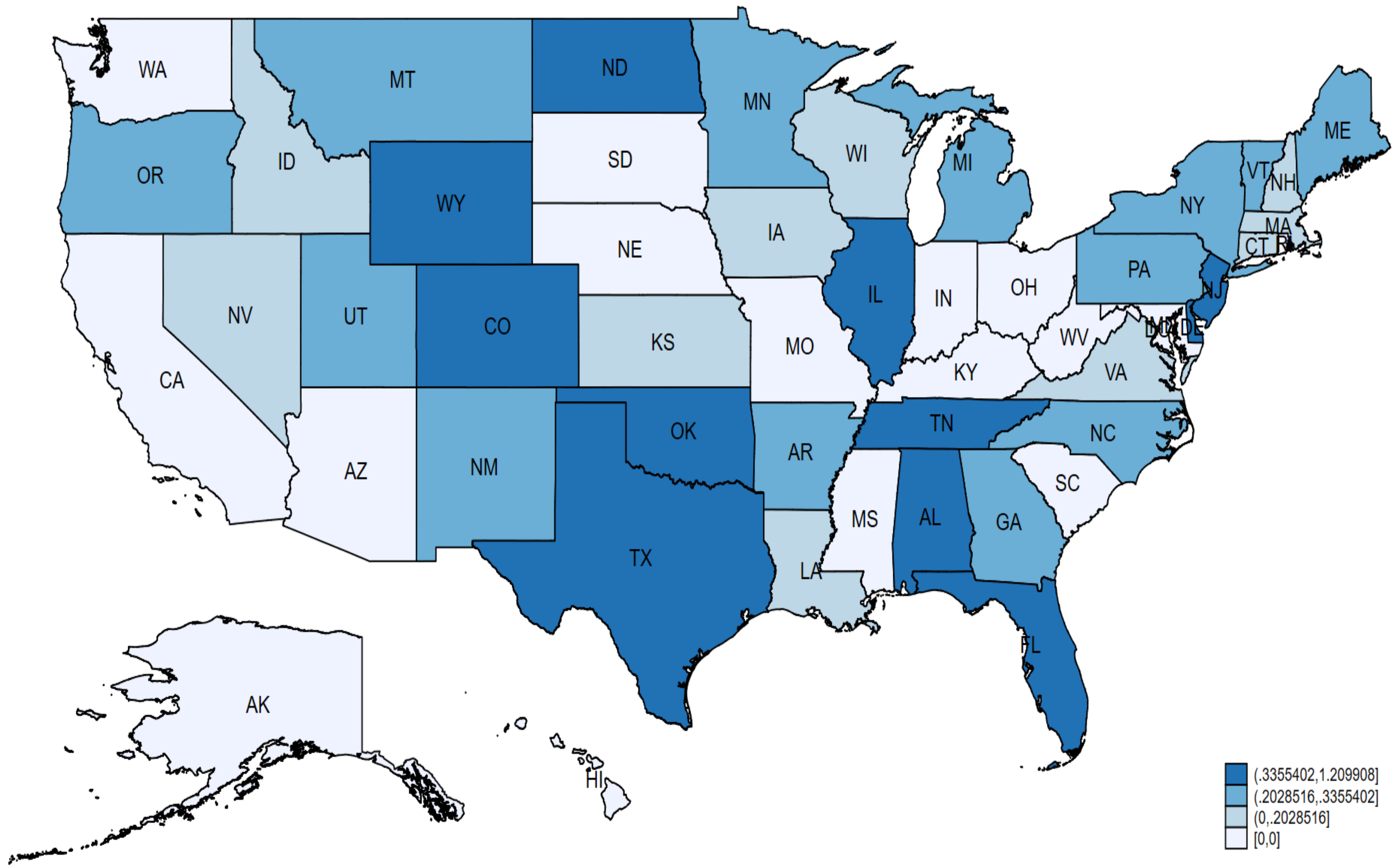
Table A.2 presents the regression results, where the dependent variable is the Tenant Rights Index (TRI). A higher TRI value indicates greater tenant rights protection. The analysis reveals that TRI is positively and statistically significantly correlated with the local population and the local preference for the Democratic party. However, correlations between TRI and local household income, local house value, percentage of non-white population, and land regulation are positive but not statistically significant. Similarly, TRI is negatively correlated with the local poverty rate, but this correlation is not statistically significant.

Table A.1: Summary Statistics of Tenant Rights Index by States (1997-2016)

State	Mean	St.Dev.	Min	Max	WRLURI (2008)
Utah	-3.36	0.30	-3.53	-2.85	-0.94
Colorado	-3.25	0.40	-3.53	-2.72	-1.07
Idaho	-3.06	0.17	-3.45	-2.99	0.58
West Virginia	-3.03	0.00	-3.03	-3.03	-0.86
Louisiana	-2.55	0.12	-2.85	-2.45	0.58
Indiana	-2.50	0.00	-2.50	-2.50	0.50
Wyoming	-2.49	0.46	-3.57	-2.30	0.38
Arkansas	-2.27	0.32	-2.69	-1.69	0.48
Mississippi	-2.19	0.00	-2.19	-2.19	0.00
Alabama	-2.17	1.21	-3.61	-0.84	0.40
Georgia	-2.02	0.25	-2.12	-1.44	-0.21
Wisconsin	-1.79	0.14	-2.05	-1.60	2.30
Ohio	-1.77	0.00	-1.77	-1.77	-0.63
North Carolina	-1.52	0.33	-1.68	-0.87	-0.19
Florida	-1.22	0.39	-1.74	-0.93	-1.02
Texas	-1.22	0.41	-1.58	-0.78	-0.99
Missouri	-0.74	0.00	-0.74	-0.74	-1.12
Illinois	-0.68	0.35	-1.06	-0.37	-0.59
Minnesota	-0.65	0.30	-0.77	0.03	-1.06
Virginia	-0.65	0.20	-0.76	-0.30	0.66
Maryland	-0.39	0.00	-0.39	-0.39	0.79
Pennsylvania	-0.35	0.34	-0.80	-0.11	1.57
North Dakota	-0.06	0.48	-1.36	0.13	0.02
South Carolina	0.22	0.00	0.22	0.22	0.08
Oklahoma	0.31	0.38	-0.26	0.55	-0.83
New Jersey	0.34	0.59	-0.43	0.79	-1.03
Kansas	0.39	0.19	0.28	0.70	-0.35
District of Columbia	0.58	0.40	0.05	0.87	-0.69
Connecticut	0.64	0.10	0.60	0.99	-0.46
Iowa	0.72	0.13	0.67	1.09	1.37
Tennessee	0.76	0.50	0.08	1.35	0.89
Oregon	0.80	0.27	0.61	1.15	-0.10
New Mexico	0.91	0.21	0.84	1.52	-0.02
Washington	0.94	0.00	0.94	0.94	-0.35
Maine	1.13	0.27	0.78	1.32	-0.55
Montana	1.17	0.20	0.83	1.29	-0.36
California	1.37	0.00	1.37	1.37	-0.70
South Dakota	1.39	0.00	1.39	1.39	0.08
Michigan	1.40	0.30	0.72	1.52	0.37
New Hampshire	1.40	0.09	1.38	1.76	1.52
Kentucky	1.50	0.00	1.50	1.50	-0.76
Arizona	1.59	0.00	1.59	1.59	-0.99
Vermont	1.79	0.27	1.63	2.37	-0.67
Nevada	1.88	0.17	1.39	1.93	-0.46
New York	2.15	0.25	1.42	2.23	-0.06
Nebraska	2.24	0.00	2.24	2.24	0.34
Alaska	2.35	0.00	2.35	2.35	-0.20
Massachusetts	2.37	0.17	2.08	2.46	0.74
Rhode Island	2.94	0.00	2.94	2.94	-0.92
Delaware	3.20	0.69	1.68	3.56	0.08
Hawaii	3.47	0.00	3.47	3.47	-0.45

Notes: This table reports the summary stats of the Tenant Rights Index and the WRLURI.

Figure A.1: Standard Deviation of Tenant Rights Index by State



Notes: This figure features a map of the United States with color-coding to highlight the standard deviation of the Tenant Rights Index for each state over 1997–2016.

Table A.2: Tenant Rights Index and State Characteristics

Dependent Variable:	Tenant Rights Index
Median Household Income	0.120
	(1.400)
Population	-0.668***
	(0.182)
Poverty rate	-0.003
	(0.086)
Median House Value	0.496
	(0.977)
Democratic Party Voting	0.078**
	(0.031)
Non–white population	0.014
	(0.017)
Land Regulation Index	0.192
	(0.322)
Observations	850
Adj R-squared	0.355

Notes: This table reports our estimation results from regressing the Tenant Rights Index against several state-level characteristics. Clustered standard errors are shown in parentheses. (*** p<0.01, ** p<0.05, * p<0.1)

A.1.3 Comparison between TRI and WRLURI

Figure A.2 presents a comparison between our Tenant Rights Index (TRI) and the Wharton Land Use Regulation Index (WRLURI) from Gyourko et al. (2008). Besides the subject differences, there are two notable distinctions between our TRI and the WRLURI regarding frequency and coverage. First, the WRLURI is computed at the "community level" (e.g., village, town, city), while the TRI is at the state level. Second, the WRLURI provides a snapshot of land use regulation at the community level as of 2008, whereas our study offers a dynamic panel of tenant rights spanning from 1997 to 2016.

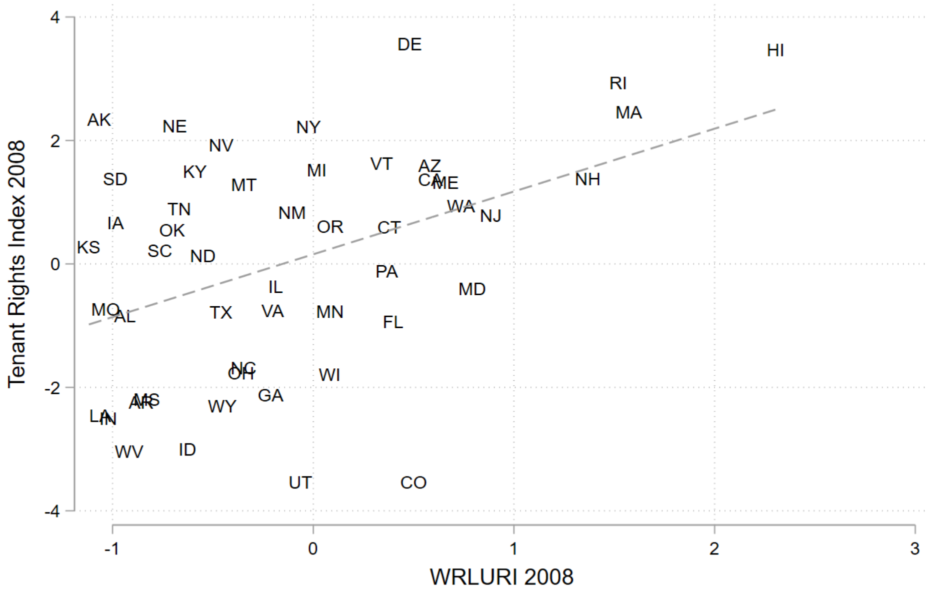
In Panel (a) of Figure A.2, we compare the state-level WRLURI with our TRI in 2008 to directly contrast the two indexes at that specific point in time. The correlation between the two indexes is 0.43. In Panel (b) of Figure A.2, we plot the TRI and the Land Regulation

Index we create from counting the number of legal cases that include the phrase "land use" in each state in each year, following the method described in Ganong and Shoag (2017) and the TRI. The correlation between the two indexes is 0.17.

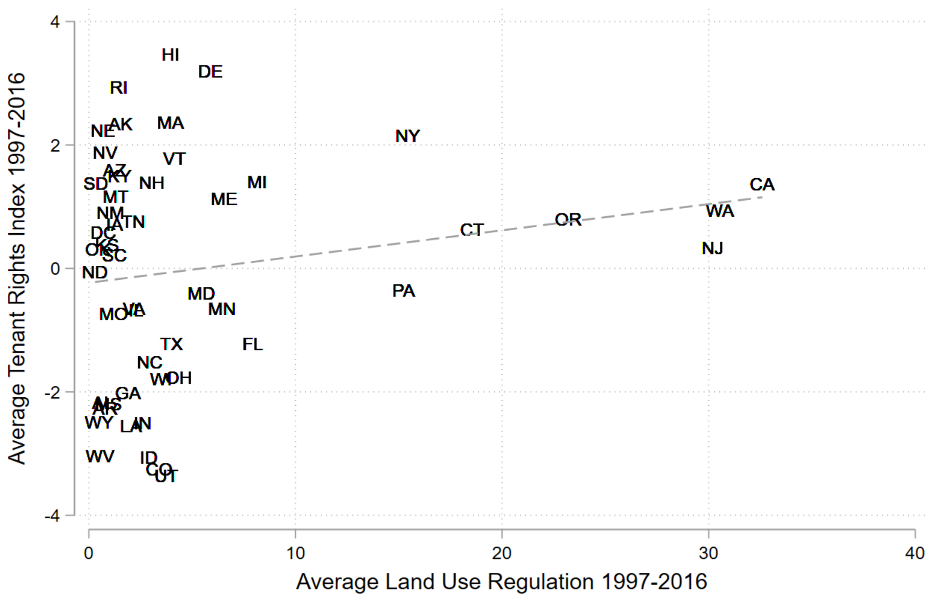
Overall, the positive correlations between the TRI and the two Land Regulation indices indicate that states with stringent land use regulations also tend to have robust landlord-tenant laws. However, the relatively low correlation also implies that land use regulation alone does not determine tenant rights regulations. The finding is intuitive because land use control is intended to regulate development, while landlord-tenant laws are intended to provide a legal framework for landlords. This distinction in purpose suggests that although there may be some correlation between the two regulatory frameworks, they serve distinct functions within the realm of housing-related policy.

Figure A.2: Tenant Rights Index and Land Use Regulation

(a) WRLURI



(b) Ganong and Shoag (2017)



Notes: In Panel (a), we compare the state-level WRLURI with our TRI in 2008 to directly contrast the two indexes at that specific point in time. The correlation between the two indexes is 0.43. In Panel (b), we plot the Land Regulation Index following the method described in Ganong and Shoag (2017) and the TRI. The correlation between the two indexes is 0.17.

A.2 Theoretical Appendix

Existence and uniqueness of equilibrium. Substitute the RR condition (23) into the EE condition (22) to obtain the following modified EE condition

$$y^R \cdot \frac{\eta(z-\rho)+(1-\eta)\left(r\xi+\frac{\sigma(1-G(y^R))d}{r+\sigma+\delta+\phi+\varepsilon}\right)}{(r+\sigma+\delta+\phi)(1-\sigma\bar{y})} = \left(\frac{d}{\varepsilon}+\frac{\eta}{1-\eta}\frac{k}{\mu(\theta)}\right), \tag{33}$$

where $\bar{y}$ is given by (20). Equations (21) and (33) determine the equilibrium y^R and θ. It is straightforward that the left-hand side of (21) is increasing in y^R and that the right-hand side is increasing in θ. Let $\text{LHS}|_{EE}$ denote the left-hand-side of (33). Differentiating it with respect to y^R gives

$$\frac{\partial \log \text{LHS}|_{EE}}{\partial y^R} = \frac{1}{y^R} + \frac{\eta\sigma}{r+\sigma+\delta+\phi+\varepsilon}d + \frac{\sigma\varepsilon}{r+\sigma+\delta+\phi}\frac{\eta}{1-\eta}\frac{k}{\mu(\theta)} > 0. \tag{34}$$

Given that the right-hand side of (33) is increasing in θ, the EE condition is upward-sloping. It is straightforward from (21) that the RE condition is upward-sloping. Therefore, both the RE and EE conditions (21) and (33) are upward-sloping in the (θ, y^R) space.

The RE curve intersects the x-axis at $\underline{\theta}$, where $\underline{\theta}$ satisfies the RE condition with $y^R = 0$ and satisfies

$$\frac{(1-\eta)\left(z-r\xi-\rho-\frac{\sigma d}{r+\sigma+\delta+\phi+\varepsilon}\right)}{r+\delta+\frac{\sigma\varepsilon}{r+\sigma+\delta+\phi+\varepsilon}} = \frac{k}{\mu(\underline{\theta})}. \tag{35}$$

The RE condition intersects the $y^R = 1$ line at $\bar{\theta}$, where as in the main text $\bar{\theta}$ satisfies

$$\frac{(1-\eta)(z-r\xi-\rho)}{r+\delta} = \frac{k}{\mu(\bar{\theta})}. \tag{36}$$

The EE curve intersects the y-axis at $\underline{y}$ that satisfies the EE condition with $\theta = 0$, and is given by

$$\underline{y} \cdot \frac{\eta(z-\rho)+(1-\eta)\left(r\xi+\frac{\sigma(1-G(\underline{y}))d}{r+\sigma+\delta+\phi+\varepsilon}\right)}{(r+\sigma+\delta+\phi)(1-\sigma\bar{y}_0)} = \frac{d}{\varepsilon} > 0, \tag{37}$$

where $\bar{y}_0 = \bar{y}|_{y^R=\underline{y}}$. The intercept with $y^R = 1$ happens at $\tilde{\theta}$, where $\tilde{\theta}$ satisfies the EE condition when $y^R = 1$, and is given by

$$\frac{1-\eta}{\eta}\left(\frac{\eta(z-\rho)+(1-\eta)r\xi}{r+\delta+\sigma/2+\phi} - \frac{d}{\varepsilon}\right) = \frac{k}{\mu(\tilde{\theta})}. \tag{38}$$

Given that there is no change in curvature in neither the RE and EE curves, and given their shape and properties, it is straightforward that a unique intersection between the RE and EE curves exists if and only $\bar{\theta} \leq \tilde{\theta}$. Using the above results, the condition $\bar{\theta} \leq \tilde{\theta}$ is equivalent to the assumption in proposition 1 that $(1-\eta)[(z-\rho-r\xi)+r\xi/\eta]/(r+\sigma/2+\delta+\phi) > (1-\eta)(z-r\xi-\rho)/(r+\delta)$. This proves proposition 1. When $\bar{\theta} > \tilde{\theta}$ either there are two equilibria (i.e. one or both curves have enough curvature to intersect twice) or there is a unique equilibrium with no evictions, i.e. $y^R = 1$ (this corresponds to no intercept with $y^R \in [0,1]$). In this latter case the equilibrium market tightness is derived using the RE condition with $y^R = 1$. The assumption in proposition 1 is satisfied for any reasonable calibration, as we discuss in section 5.6. There may be cases in which the equilibrium is the non-interesting $y^R = 1$ case with no evictions, but no calibration yielded multiple equilibria, essentially because the equilibrium condition are nearly linear and lack significant curvature.

Effect of an increase in d. Rearranging the modified condition EE gives

$$\textbf{EE:} \quad \frac{k}{\mu(\theta)} = \frac{1-\eta}{\eta}\left\{\frac{y^R\left[\eta(z-\rho)+(1-\eta)\left(r\xi+\frac{\sigma(1-G(y^R))d}{r+\sigma+\delta+\phi+\varepsilon}\right)\right]}{(r+\sigma+\delta+\phi)(1-\sigma\bar{y})} - \frac{d}{\varepsilon}\right\}, \tag{39}$$

$$\textbf{RE:} \quad \frac{k}{\mu(\theta)} = (1-\eta)\frac{z-\rho-r\xi-\frac{\sigma(1-G(y^R)d}{r+\sigma+\delta+\phi+\varepsilon}}{r+\delta+\frac{\sigma\varepsilon(1-G(y^R))}{r+\sigma+\delta+\phi+\varepsilon}}, \tag{40}$$

where for convenience the RE condition is also reproduced above. Consider now the RE condition. These modified expressions are equivalent to the equilibrium conditions depicted in figure 4, but instead expressed in the $(y^R, k/\mu(\theta))$ space. To identify whether the effect of an increase in d, it suffices to find the effect on $k/\mu(\theta)$ holding y^R fixed. This is equivalent to evaluating whether the shift in the EE curve dominates the shift in RE. This follows the same procedure used to prove that an increase in labor productivity raises market tightness in the DMP labor search model, see Pissarides (2000).

Consider the modified EE condition and differentiate it with respect to d, holding y^R constant. The size of the shift in the EE curve is given by

$$\frac{\partial(k/\mu(\theta))}{\partial d}|_{EE} = \frac{1-\eta}{\eta}\left(\frac{\frac{y^R(1-\eta)\sigma(1-G(y^R))}{r+\sigma+\delta+\phi+\varepsilon}}{(1-\sigma\bar{y})(r+\sigma+\delta+\phi)} - \frac{1}{\varepsilon}\right). \tag{41}$$

After replacing the expression for $\bar{y}$ it is straightforward to show that the above is negative and that the increase in d shifts the EE condition left. Specifically, use that $\bar{y} < (1/2)(1/(r+\delta+\sigma+\phi)$, which implies that

$$\frac{\frac{y^R(1-\eta)\sigma(1-G(y^R))}{r+\sigma+\delta+\phi+\varepsilon}}{(1-\sigma\bar{y})(r+\sigma+\delta+\phi)} < (1-\eta)\cdot\frac{\sigma/2}{r+\sigma/2+\delta+\phi}\cdot\frac{1}{r+\delta+\sigma+\phi+\varepsilon}. \tag{42}$$

The above expression is strictly lower than $1/\varepsilon$.

Similarly, differentiate the RE curve respect to d holding y^R fixed, which gives

$$\frac{d(k/\mu(\theta))}{dd}|_{RE} = -\frac{\frac{(1-\eta)\sigma(1-G(y^R))}{r+\sigma+\delta+\phi+\varepsilon}}{r+\delta+\frac{\varepsilon\sigma(1-G(y^R))}{r+\sigma+\delta+\phi+\varepsilon}}. \tag{43}$$

As we point out in 5.5, the above effect tends to 0 as y^R approaches 1. This implies that as long as the equilibrium y^R is high enough, the shift in the RE curve is negligible compared to the shift in the EE curve, so overall market tightness θ and the eviction threshold y^R both increase in response to an increase in eviction costs d. Quantitatively, this is always satisfied for any reasonable calibration—the shift in RE is always negligible.