

The Right to Counsel at Scale

Patrick Power, Shomik Ghosh and Markus Schwedeler

Do Not Cite — Active Work in Progress — Do Not Cite
Most Recent Version

October 13, 2023

Abstract

Our paper assesses the impact of the Right to Counsel on housing stability. The Right to Counsel is a policy which ensures that low-income tenants facing eviction have access to free legal representation. Exploiting the recent zip code level adoption of this policy across the state of Connecticut, we provide empirical estimates regarding whether legal representation improves legal & housing outcomes for those currently housed and whether the policy adversely effects those who are currently unhoused. Regression analysis for the intention-to-treat and IV estimates are performed using linear models, fine-tuned large language models and cluster regularized neural networks. Additionally, we provide insight about the type of tenants most likely to respond to the policy as well as how lawyers can alter their aims to improve the downstream outcomes of their clients.

Keywords: Evictions

1 Introduction

There is a silent tension in a formal eviction move out that is cut only by the sequence of questions racing through one’s mind. The most pressing, of course, being where will the tenants end up that evening. And the most incomprehensible – how did things get to this point in the first place.

As jarring as an eviction can feel, though, they are a regular part of the business in low-income housing markets (figure 1a).¹ Tenants fall behind rent. A landlord or property manager files for an eviction. And the tenant, often without a lawyer (figure 1b), typically loses their case (figure 1c). Each year, this process results in more than one million evictions across the U.S. with the greatest likelihood falling on children ([Graetz et al. \[2023\]](#)).

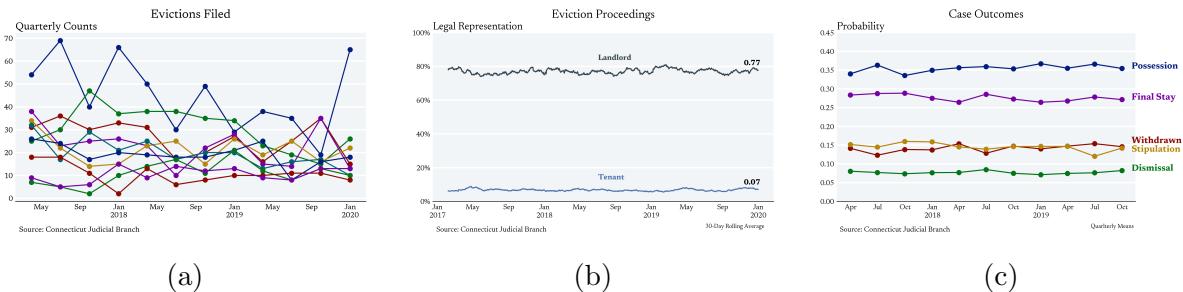


Figure 1: (a) Quarterly Counts of Evictions Filed by top ten filers in the State of Connecticut (b) Representation Rate in Eviction Cases in Connecticut (c) time series of eviction case outcomes

Since 2017, a growing number of cities and states have provided low-income tenants facing eviction with a lawyer (figure 2 – adoption of the Right to Counsel). Given the well documented costs associated with eviction ([Collinson et al. \[2022\]](#)), the numerous factors which contribute to its occurrence ([Desmond \[2016\]](#)) and the typical manner in which a case evolves ([Nelson \[2022\]](#)), the hope is that lawyer may be able to intervene in such a way so as to diminish the adverse effects of an eviction.

To date, though, there is little empirical work on the impact of this policy both on those facing eviction and as well as on those seeking housing.²³ Prior empirical work, [Seron et al.](#)

¹ “Evictions are a regular part of the business.” – quote attributed by to Sharena Tarver in [Desmond \[2016\]](#)

²[Evans et al. \[2019\]](#): “There is some rigorous evidence that providing legal assistance helps the tenant receiving services (Seron et al. 2001; Greiner et al. 2013). However, such an intervention may hurt other tenants if housing supply contracts because universal legal representation reduces the profitability of renting a unit. While theoretically plausible, such market-level effects have been investigated little in the empirical literature.”

³[O’Flaherty \[2019\]](#): Whether anti-eviction programs reduce or increase homelessness, then, is an open question, and one which individual-level studies cannot resolve. The comparison that must be made is between housing markets with anti-eviction programs and housing markets without them, and then only after landlords and tenants have had enough time to adjust to the new rules. Of course, the housing markets for this comparison should be chosen as-if randomly, and so doing the right study will be hard. But it is worth doing.”

Implementation of the Right to Counsel in Eviction Proceedings

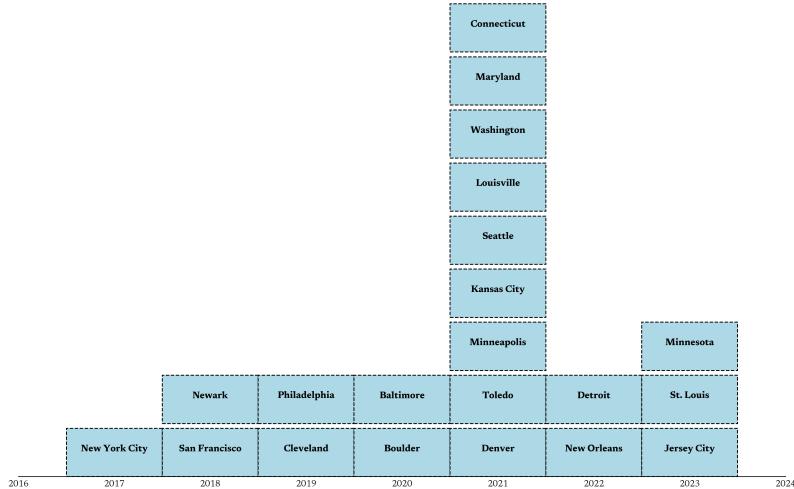


Figure 2: Adopting the Right to Counsel

[2001], Greiner et al. [2012], Cassidy and Currie [2022], focuses on housing court related outcomes – whether having a lawyer decreases the likelihood of a Judgement of Possession. Recent Macroeconomic work on the topic, Abramson [2021], provides a coherent framework for thinking about potential mechanisms involved. But no work to date can speak to whether a lawyer is more likely to keep the tenant housed in the current unit.⁴ Or measure the extent to which landlords pass the costs of this policy onto those currently without housing.

We address this gap in the literature by exploiting the recent zip code level implementation of the Right to Counsel across the state of Connecticut. Importantly for our aim, the zip codes which adopted the policy in the first phase, January 2022, were not exclusively those with the highest level of evictions fillings (figure 3). Controlling for individuals level details of the case, we therefore exploit this quasi-exogenous rollout to examine the effects of the Right to Counsel both on those facing eviction and those seeking housing.



Figure 3: Highlighting the overlap between treated and control zip codes, each dot corresponds to a zip code where either the Right to Counsel went into effect on January 31, 2022 (Treated) or it did not (Control). The x-axis shows the average number of eviction filings over the years 2017, 2018, and 2019.

⁴Tenant Preservation

Contributions

We exploit the underlying text that makes up an eviction case. Using [OpenAI's LLM API](#), we extract a rich set of details from each case file: monthly rental price, type of lease, length of lease, landlords reason(s) for filing, and tenant's stated defense. These textual features (a) provide us with a better understanding of the rental market that is most affected by evictions (b) strengthen our identification strategy by providing us with a richer set of controls and (c) allows to understand what types of tenants are most responsive to the policy. In addition to extracting numerical representations from each case, we also estimate intention-to-treat and IV parameters by fine-tuning large language completion models directly on the text which provides us with a novel robustness check.

We assess the impact of legal representation on housing stability. As previous literature has pointed out, legal outcomes are a noisy predictor of whether tenants remain housed in their current unit. Following an unsatisfactory legal ruling, landlords may re-file or remove tenants from their units informally.⁵ Using consumer reference data which tracks individuals' addresses overtime, we measure whether lawyers are able to preserve the original tenancy.

We examine whether having a lawyer decreases the likelihood that a tenant enters an emergency shelter. Prior work has illustrated that emergency shelter usage is a low probability event for those people experiencing housing instability ([Evans et al. \[2016\]](#), [Phillips and Sullivan \[2023\]](#)). Measuring the impact of a lawyer on emergency shelter usage, though, allows us to understand whether lawyers are meaningfully assisting tenants who face the greatest level of housing insecurity.

We consider the potential negative impact of the Right to Counsel on those currently without housing. Specifically, we explore the extent to which the housing search process becomes more costly for low-income households following the implementation of this policy. Describing the potential unintended consequences of the policy, [Abramson \[2021\]](#) writes, “Low income households, who are priced out of the rental market, are intuitively the main losers.” Using data from HMIS on families and individuals who are currently homeless but don’t face significant barriers to rehousing, we estimate whether the **search length** and the **total voucher cost** (which we proxy for a price of housing) increases in response to the Right to Counsel. Voucher costs have the advantage over a listed rental prices in that they capture both increases in the monthly rental prices and the security deposit.

Finally, we assess whether tenant outcomes could be improved if lawyers pushed more for formal agreements sanctioned by the court rather than the informal agreements that occur following either a Dismissal or a Withdraw. Exploiting the systematic variation across lawyers in their tendency to achieve certain case outcomes, we adopt an instrumental variable

⁵[Greiner et al. \[2012\]](#) - “In at least one treated-group case of which we are aware, the following chain of events occurred: The landlord served a facially defective notice to quit. After a GBLS staff attorney moved to dismiss, the landlord agreed voluntarily to dismiss the case. For our purposes, this agreement meant that the occupant retained possession at the end of the piece of litigation that entered our study, so we coded this case accordingly, and that was the end of the matter as far as this case’s contribution to the District Court Study. We happen to know in this case that the landlord did as one would expect, meaning that the landlord served a corrected notice to quit on the occupant, then filed another lawsuit.”

strategy to estimate this effect. We posit aprioir that that a formal agreement is more effective as tenants likely have more bargaining power in the presence of their attorney.

Preview of Results

For many of our results, we report estimates using Ordinary Least Squares, Fine-Tuned Large Language Model, and Zip Code Regularized Neural Networks.⁶ Across these models, we find the following:

1. The Right to Counsel increases the legal representation of tenants between 9-12 percentage points.
2. A lawyer reduces the likelihood of a Judgement of Possession, while increasing the likelihood of a Withdraw and Stipulation agreement.
3. A lawyer decreases the probability that we observe the tenant moving to a new address by more than 15 percentage points, decreases the poverty rate of a tenant's census tract by more than 2 percentage points, but has no effect on the probability that a tenant enters a homeless shelter.
4. Preliminary estimates suggest that individuals without significant barriers to housing see total first month rental costs increase by more than \$100.
5. Lawyers who push for a court approved agreement between tenant and landlord (as opposed to a dismissal or withdraw of the case) decrease the likelihood the we observe the tenant moving to a new address by roughly 20 percentage points.

Summary: Exploiting the first phase of the Connecticut's roll out of the Right to Counsel, we find that lawyers improve housing court outcomes for tenants facing eviction which importantly translates into improved housing stability. We emphasize though, that as with any empirical work, put perhaps even more so given our specific context, that these are limited results and should be interpreted cautiously.

2 Background

Rental Market

The vast majority of eviction filings correspond to month-to-month leases. These include both leases that start as a month-to-month, as well as those which begin with a one year contract and then continue on a month-to-month bases.⁷ For example, it's typical to see

⁶Controls for the zip code level adoption of the policy

⁷A Landlord's guide to Summary Process (Eviction) states, "Be sure to indicate in the Complaint whether you and the defendant had an oral or written week-to-week, month-to-month, or year-to-year lease."

descriptions of the lease such as “On or about [DATE], Plaintiff, Defendant [NAME1], and Defendant [NAME2] entered into a written one-year lease for the Premises (“Lease”). After expiration, the Lease renewed automatically for successive terms of one month.”

Lease agreements last from as little as one month to several years. We measure the end of the lease agreements as the date when the landlord files for an eviction against the tenant. About 25% of leases last less than 6 months, 50% less than 13, and 75% less than 27. It’s worth pointing out that about 7% last less than the initial month of the lease.

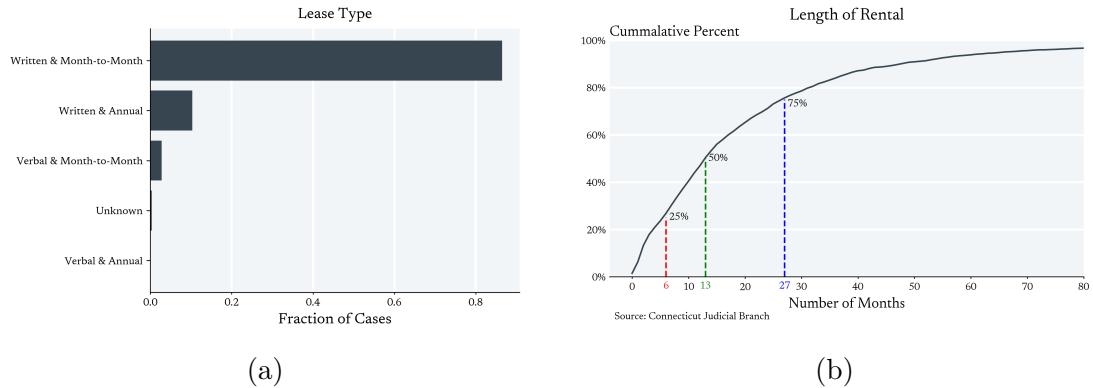


Figure 4: (a) Bar graph of the Types of Leases. (b) Cumulative Distribution Function of the Length of the Lease.

There is a relatively large dispersion in the monthly rental price of a unit. The interquartile range is \$500 with the 25th percentile starting at \$800 and the 75th topping out at \$1300.

Eviction filings are most frequent in higher poverty locations. We plot the empirical CDF of the poverty rates using the 5-year ACS first with respect to a uniform distribution over census tracts and then by the distribution generated by the addresses associated with each eviction filing. We formally describe the differences between these lines in section 11.1.

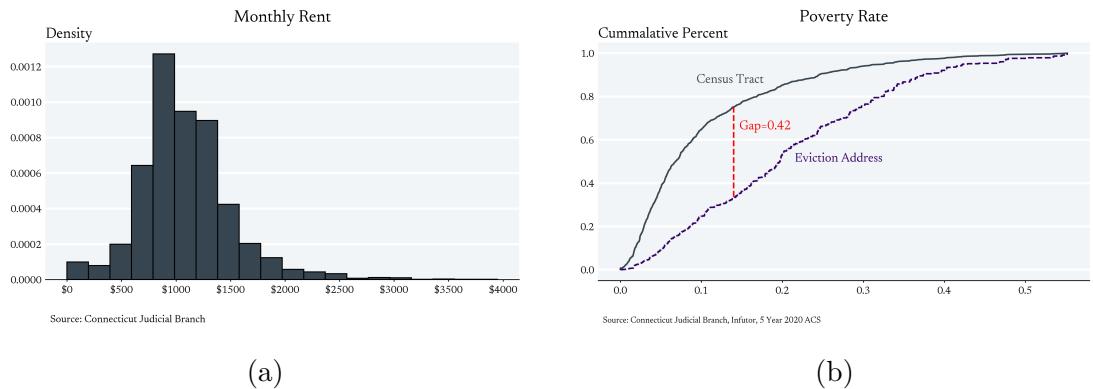


Figure 5: (a) Histogram of Monthly Rental Price(b) Cumulative Distribution Function of Poverty Rate.

Eviction Process

The Eviction process begins with the **Notice to Quit**. Usually served by a State Marshal, the Notice to Quit explains to the tenants that they are in violation of their lease and must move out within three days.⁸ The most common reason given, figure 6a, is that the tenants have failed to pay their rent. It's worth pointing out, though, that Landlords are not obliged to file an Eviction case immediately upon a failure to pay rent. Indeed, as mentioned in [Desmond \[2016\]](#), there is money to be made in working with tenants who fall behind for various reasons. And empirically, figure 6b, illustrates that landlords tend to provide tenants with some time before filing an eviction.⁹

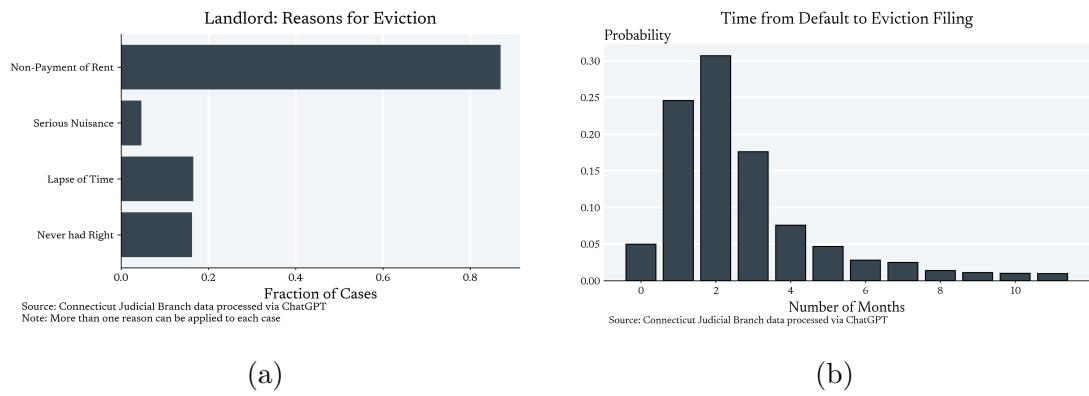


Figure 6: (a) Bar graph of Landlords' reasons for filing an eviction case. (b) Bar graph of the elapsed time between when the tenant fell behind on rent and when the landlord filed the eviction case

If the tenants fail to move out in response to the Notice, a landlord can then file a **Summons** and **Complaint**. The summons informs the tenant that they are “being sued for possession of the premises.”¹⁰ The Complaint expands upon the Notice to Quit by including details regarding the lease agreement – the date the tenants first occupied the unit, the nature of the lease, the date the tenants fell behind on their rent – as well as details concerning the reasons for the eviction filing which can range from the rather mundane, such as a complaint about the tenants’ pet, to the extremely severe, such as a physical altercation which resulted in a fatality.

At this point, the tenants must file an **Appearance** and **Answer**. In the Answer, the tenant indicates whether they agree with the landlord’s Complaint and provides additional “facts” for why they should not be evicted. Only about 15% of Answers include these additional facts. As figure 9 highlights, the most common stated defenses concern procedural, financial or health issues.

Cases can ultimately be settled in several different ways. For a more detailed descrip-

⁸[A Landlord’s Guide to Summary Process \(Eviction\)](#)

⁹Evictions in the private rental market compared to public housing – In the 21,000 eviction filings in Public Housing Units that [Leung et al. \[2023\]](#) focuses on, nearly half experienced repeated filings

¹⁰[A Landlord’s Guide to Summary Process \(Eviction\)](#)

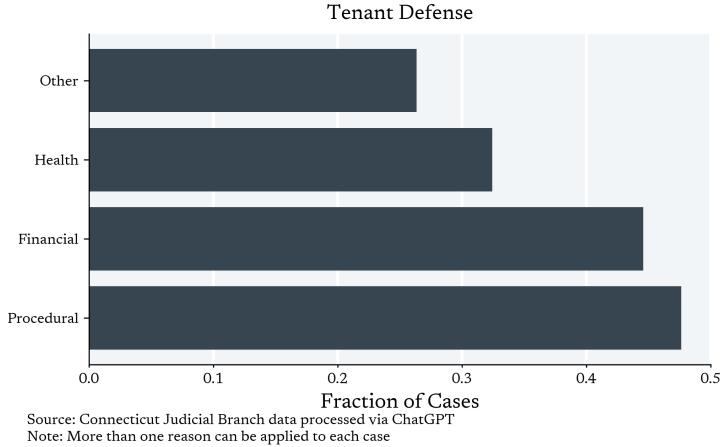


Figure 7: Self-Reported Special Defense

tion, we recommend the work by Kyle Nelson who covers the court process in greater depth. For our purposes, we classify cases outcomes into five categories: Judgement of Possession in favor of the landlord, a Dismissal of the case, a Withdraw of the case, a Final Stay by Stipulation and a Stipulation Agreement. A Final Stay by Stipulation ultimately gives the landlord possession of the unit but provides the tenants with additional time before they must vacate. A Stipulation Agreement corresponds to a case where the tenant and landlord have agreed to a plan that if adhered to (such as catching up on back rent) will allow the tenant to remain in the unit. Figure 1c plot the time series average of these case outcomes prior to the Pandemic.

Implementation

Signed into law in June of 2021, the Right to Counsel went into effect on January 31, 2022, as rental relief services in response to Covid-19 were coming to an end, well after the expiration of the CDC's eviction moratorium for nonpayment of rent (August 26, 2021).

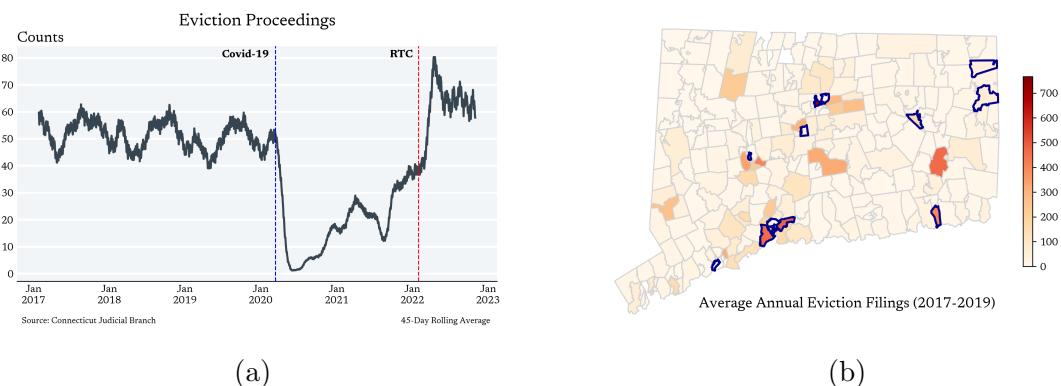


Figure 8: (a) Eviction Filings Within Connecticut (b) Average eviction filing counts by zip code (2017-2019). A blue outline indicates that the Right to Counsel was implemented in that zip code.

Because the expected demand for legal services under the Right to Counsel exceed the level of legal support, state representatives rolled the policy out in phases. In the first phase, the policy was implemented across a subset of the zip codes which accounted for 30% of evictions and 20% percent of the renter population pre-pandemic. Individuals and families within these zip codes who made 80% or less than the area median income were eligible. Importantly for our purposes, there was substantial overlap in the average number of evictions across the “treated” and “control” zip codes (figure 3).

Beginning on October 1, 2021, landlords were to notify individuals of the existence of this policy when serving tenants with a Notice to Quit. From conversations with State Marshals, we learned that even if a landlord forgot to attach the document the State Marshall office would often do so. In addition, courts were expected to inform tenants of the policy when and if tenants appeared in court.¹¹

Controlling only for the court house, month, and whether the plaintiff has a lawyer, we observe meaningful difference between treated and control groups prior to the Pandemic. Table 1 reports Intention-to-Treat and LATE results on tenant outcomes prior to the pandemic.¹² This gap motivates us to include case specific features, when available, in our empirical analysis.

Model	ITT Est	ITT SE	LATE Est	LATE SE	N	Params
Case Length	-5.025	0.477	-38.654	3.67	43384	24
Appearance	0.012	0.004	0.092	0.0326	43384	24
Possession	-0.005	0.004	-0.041	0.0314	43384	24
Dismissal	-0.013	0.002	-0.098	0.0124	43384	24
Withdraw	-0.008	0.002	-0.065	0.0128	43384	24
Final-Stay	-0.010	0.003	-0.080	0.0224	43384	24
Non-Final-Stay	0.037	0.003	0.284	0.0219	43384	24

Table 1: Placebo Results (Prior to the Pandemic)

3 Data

Judicial Data

The data for this section consists of (1) tabular data provided to us by the Connecticut Judicial Branch and (2) publicly available case files on the Connecticut Judicial Branch website. As figure 9 illustrates, we construct case level features by processing the case files with a computer vision model that can extract handwritten text and a large language

¹¹Reference

¹²The LATE estimates reported here are the intention-to-treat estimates scaled by the first stage results that we estimate during the first phase of the policy.

model ([gpt-3.5-turbo](#)) which can perform a number of **prompt based tasks**.¹³ For example, to determine the monthly rent of the unit, we prompt the language model with the case text and a question about monthly rent. The model then returns the monthly rent as its answer/completion to the prompt. We note that while this approach allows us to collect a rich set of variables for our analysis, it also introduces measurement error ([Liu et al. \[2023\]](#)). We are currently in the process of assessing the frequency of these errors. All code will be made available via our [GitHub Repository](#).

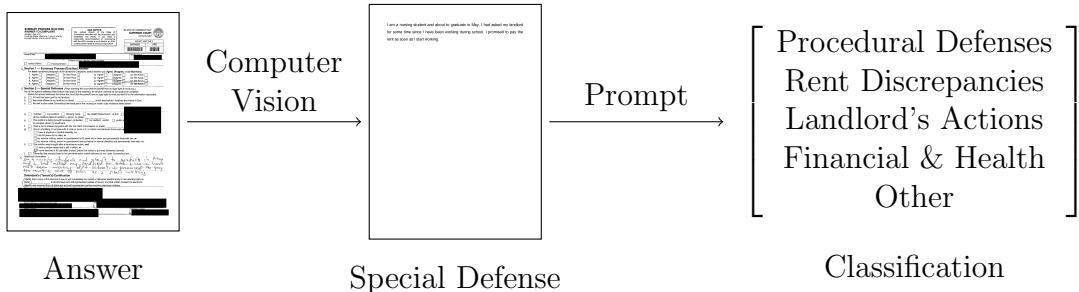


Figure 9: The Answer is only redacted because we are sharing this paper publicly. In our own analysis, we do not redact the Answer. To extract the handwritten defense by the Tenant we use Microsoft’s Computer Vision v3.2 GA Read API.

Consumer Reference Data

We want to know whether tenants remain housed in their unit following an eviction filing. To do so, we make use of Infutor’s consumer identity management system¹⁴ which provides us with a tenant’s most recent address as of September 2023. Comparing this address to the one listed in the eviction case we can identify which tenants move. Based on previous papers that have made use of Infutor’s data ([Collinson et al. \[2022\]](#)), and our own tabulation, it seems likely that Infutor under counts the number of moves. As figure 10b illustrates, less than 20% of tenants who receive a Judgement of Possession have an observed move.

Homeless Management Information System

Emergency Shelters

In addition to examining whether a tenant moves, we also consider whether they enter an emergency shelter within the state of Connecticut. The Connecticut Coalition to End Homelessness together with Nutmeg Consulting provided us with the names, dates, and previous zip code associated with each individual who entered an emergency shelter between

¹³As [Liu et al.](#) writes, “These models perform downstream tasks primarily via prompting: all relevant task specification and data to process is formatted as a textual context, and the model returns a generated text completion.”

¹⁴We use Infutor’s CRM Freshlink Premium system

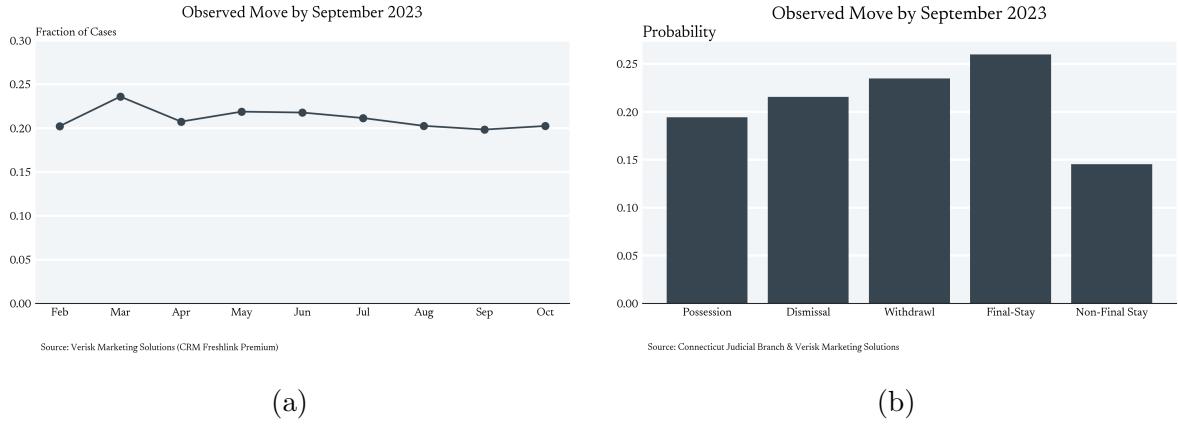


Figure 10: Infutor: (a) Probability of Observed Move by September 2023 by File Date (b) Probability of an Observed Move by September 2023 by Case Outcome

January 1, 2017 and July 31, 2023. We match across the emergency shelter and housing court datasets based on name, zip code, and date.

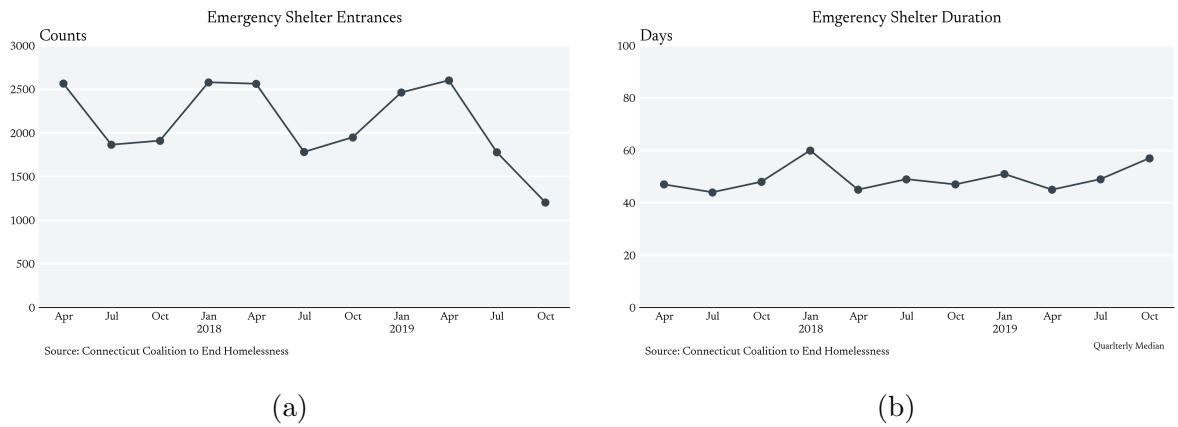


Figure 11: Emergency Shelter

Rapid Rehousing

To explore the potential unintended consequences of the Right to Counsel, we use data on Rapid Rehousing Programs within the State of Connecticut.¹⁵ Rapid Rehousing programs provide time-limited stipends and case management services to individuals experiencing homelessness who do not face significant barriers to housing. In this way, the program acts like a “trampoline”¹⁶ by assisting families to regain housing.

While distinct from an independent housing search, the key outcomes of interest that we observe in the Rapid Rehousing data – Search Length and Voucher Amount – are reasonable

¹⁵We are grateful to Rose Kelly from the Connecticut Coalition to End Homelessness who made this possible. Working with us over the course of two years, Rose was instrumental in helping us identify the key variables of interest and ensuring that the data was high quality.

¹⁶CCEH

Variable	Mean
Chronic Homeless (Verified)	0.00
Developmental Disability	0.10
Health Insurance	0.94
Household Size	1.97
Entry Family Total Income	831.96
Latest Family Total Income	948.01
Mental Health Disorder	0.48
Physical Disability	0.18
Substance Use Disorder	0.21
Veteran Status	0.00

Table 2: Rapid Reshoring Data

proxies. First, Rapid Rehousing programs “serve people experiencing homelessness with no preconditions such as employment, income, absence of criminal record, or sobriety.”¹⁷ In this way, as [Evans et al. \[2019\]](#) notes, Rapid Rehousing is a Housing First initiative. Second, programs target individuals who don’t face significant barriers to rehousing. Individuals who are chronically homeless receive Permanent Supportive Housing instead. Third, the lease agreement households sign come with “the same rights and responsibilities as a typical lease holder.”¹⁸ Fourth, it’s emphasized that clients treat the housing identification process like a regular housing search.¹⁹

We assign treatment to individuals and families based on their previous address. As figure [27](#) illustrates, the vast majority of clients who enter a rapid rehousing programs more than once do so exclusively from either zip codes that implement the Right to Counsel in the first phase (treated) or zip codes that do not (control). Therefore, while an imperfect measure of who is likely to be affected by the Right to Counsel, we again believe that our treatment assignment provides a reasonable approximation.

As a placebo exercise, we fit our regression model on heads of households who entered rapid rehousing programs prior to October 1, 2019. Controlling for the core set of variables mentioned above, table [3](#) captures relatively small effects. The search length estimate is less than 2 days and the rental amount is fewer than \$6. In the appendix (section [14](#)), we provide a balance check across the control variables.

¹⁷Reference

¹⁸It is imperative that any lease agreement provides the tenant with **the same rights and responsibilities as a typical lease holder** and that the financial terms of the lease are such that the household has a reasonable ability to assume rental costs once financial support ends (keeping in mind that in the majority of cases, even households with no income at move-in retain their housing)”

¹⁹CCEH : A Business Approach to Landlord Engagement

Outcome	Est	Std	%Δ	N	Params	Core
Search Length	1.8323	5.0240	4	379	85	✓
Voucher Amount	5.7022	113.4337	13	379	85	✓

Table 3: Placebo Effect on Legal Representation

4 Empirical Strategy

Notation

We adopt the following notation to explore the effects of lawyers on housing outcomes.

$$\begin{aligned}
 \text{Controls} &:= \text{Details of the case} & X_i \\
 \text{Instrument} &:= \text{Tenant Covered by the Right to Counsel} & Z_i \\
 \text{Treatment} &:= \text{Legal Aid Lawyer} & D_i \\
 \text{Outcome} &:= \begin{cases} \text{Judgment of Possession} \\ \text{Observed Move} \\ \text{Change in Poverty Rate} \\ \text{Emergency Shelter} \end{cases} & Y_i
 \end{aligned}$$

Identification Strategy

We exploit the cross-sectional variation of the Right to Counsel controlling for details of the case. More specifically, we assume that conditional on case level controls, the Right to Counsel can be thought of as good as randomly assigned.

$$\tilde{Y}_i \perp \text{Right to Counsel} | \text{Case Level Controls}$$

In order to interpret our results under the LATE framework, we need to clarify who the compliers are and what the exclusion restriction implies. In this context, the compliers are tenants who receive legal representation under the Right to Counsel but who wouldn't receive it otherwise. The exclusion restriction assumes that the effect of legal aid on downstream outcomes is only through the assistance of a lawyer. For example, if tenants responded to the Right to Counsel flier attached to the Notice to Quit by showing up at court but without a lawyer this would be a violation of the exclusion restriction and bias our estimates upwards.

Residualized Instrumental Variables

In addition to fitting linear models, we also fit the following nonlinear residualized model as a robustness check. We do so because (a) it's a nonlinear relaxation of linear IV, (b) it

allows us to incorporate text as control variables and (c) it is computationally attractive relative to a fully nonparametric model. We expand upon these points in the appendix (see section 13).

$$Y_i = \beta_1 (\mathbb{E}[D_i | X_i, Z_i] - \mathbb{E}[D_i | X_i]) + \varepsilon_i$$

Cluster Regularized Neural Networks

We fit zip code regularized neural networks for the following three reasons. First, [Cassidy and Currie \[2022\]](#) illustrate “The [RTC] had a much greater impact in some target zip codes than in others, likely due to heterogeneity in housing court personnel and legal services providers across boroughs.” This introduces additional variance into our estimator. Second because the Right to counsel is rolled at the zip code level, our instrument is collinear with zip code fixed effects. Therefore because we cannot exploit within zip code variation, we have to partial out the zip code effects which we do in a nonparametric manner via bi-level gradient descent as described in our accompanying paper “Regularizing the Forward Pass.”

5 Legal Results

5.1 Legal Representation

Our first empirical results concern whether the Right to Counsel increases the representation rate for tenants. A low takeup rate will increase the uncertainty surrounding our downstream results. This is true both in a literal sense as the size of the standard errors will increase but also from a conceptual stand point. If only a relatively small fraction of tenants receive legal representation under the policy, landlords’ might not respond and therefore our estimates won’t be informative about how landlords behave when the policy is adopted at scale.

We find that the Right to Counsel increases the likelihood that a tenant facing eviction has a legal representation by **9-13** percentage points.²⁰ The core set of controls include the month, courthouse, whether the Plaintiff has a lawyer, and the poverty rate associated with the tenant’s census tract. In some specification, we also control for the landlords reasons for filing the eviction case as well as the tenants stated defense.

In addition to the average treatment effects, we are interested in understanding which factors increase the likelihood that tenants’ receive legal aid. Adding an interacted term to the linear model, we see that the fraction female and the poverty rate associated with the household increase the probability that a tenant receives legal assistance whereas the monthly rental price (\$100) has a negative effect. Fitting linear models to subsets of the data formed by partitioning the data based upon the tenant’s stated defense, we find the

²⁰These estimates are inline with [Cassidy and Currie \[2022\]](#) who, focusing on the NYC roll-out, find first stage results of 12 percentage points

Model	Est	Std	%Δ	N	Params	Core	Tenant	Landlord
Linear (1)	0.1146	0.0042	482	14245	21	✓		
Linear (2)	0.1146	0.0042	483	14245	24	✓		✓
Linear (3)	0.1146	0.0042	482	14245	24	✓	✓	
Linear (4)	0.1146	0.0042	483	14245	27	✓	✓	✓
FT-LLM	0.0978	0.0021	339	4795	350 M			✓
RFP-NN	0.1273	0.0006	442	9178	2016	✓	✓	✓

Table 4: Effect on Legal Representation

Financial and Health reasons are strong predictors of take-up.

Variable	Est	Std	N	Params	Core	Tenant	Landlord
Fraction Female	0.0239	0.0109	9178	30	✓	✓	✓
Poverty Rate	0.1002	0.0456	9178	30	✓	✓	✓
Monthly Rent	-0.0104	0.0129	3667	30	✓	✓	✓
Procedural	0.0408	0.0228	121	2	✓	✓	✓
Financial	0.0636	0.0243	111	2	✓	✓	✓
Health	0.1377	0.0434	85	2	✓	✓	✓

Table 5: Effect on Legal Representation

5.2 Legal Outcomes

We are interested in the effect of legal representation on case outcomes. We classify cases outcomes into five categories: Possession, Dismissal, Non-Final Stay, and Final-Stay stipulation agreements. Using an instrumental variable strategy (Right to Counsel as the instrument), we can identify the effect of legal representation across these set of outcomes for compliers – those who only have legal representation under the Right to Counsel.

We find that a lawyer decreases the likelihood of a Judgement of Possession and increases the likelihood of a Withdraw or a Non-Final Stay Stipulation Agreement. From the perspective of a policy advocates for the Right to Counsel, the effect on Possession and Stipulation agreements are positive results. They indicate that lawyers help tenants come to a resolution with their landlords.

6 Housing Stability

Observed Move

We examine whether legal aid increases the likelihood of remaining housed. We do so by matching housing court data to consumer reference data provided by Verisk Marketing

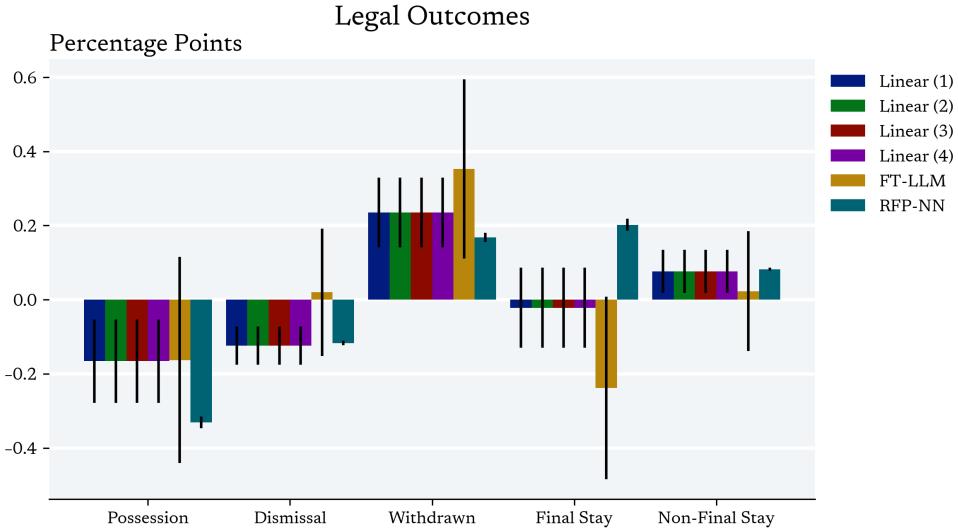


Figure 12: The Effects of a Lawyer on Case Outcomes

Solutions. We classify a tenant as moving if the most recent address as of August 2023 is different from the address at which the eviction was filed against. As figure 13 illustrates, the probability of an observed move is roughly the same across eviction cases which originated from February through October of 2022.

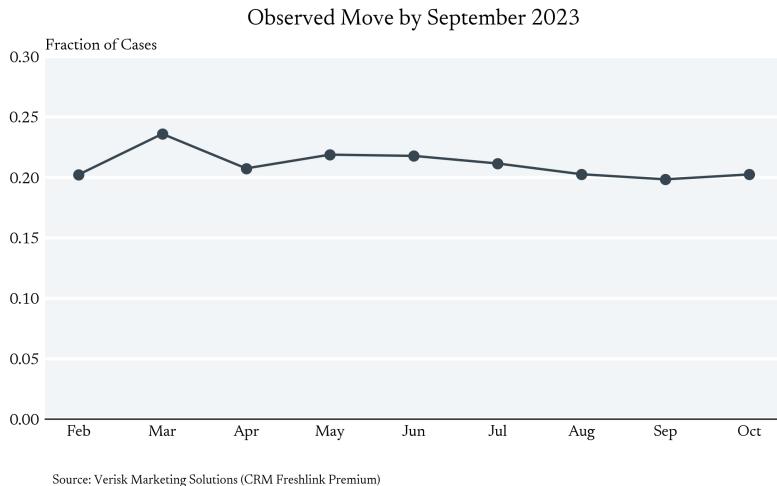


Figure 13: The Probability of an Observed Move

We find that a lawyer decreases the likelihood of an observed move by roughly **20** percentage points. The regularized neural network produces an estimate slightly below this number while the linear model results are slightly above.

Model	Est	Std	\bar{Y}	N	Params	Core	Tenant	Landlord
Linear (1)	-0.174	0.040	0.22	13288	21	✓		
Linear (2)	-0.172	0.040	0.22	13288	24	✓		✓
Linear (3)	-0.173	0.040	0.22	13288	24	✓	✓	
Linear (4)	-0.171	0.040	0.22	13288	27	✓	✓	✓
FT-LLM	-0.190	0.129	0.21	4739	350 M			✓
RFP-NN	-0.1795	0.0117	0.22	9178	2016	✓	✓	✓

Table 6: Local Effect of Legal Representation on Moving

Poverty Rate

We explore the effect a lawyer has on the poverty rate of the tenant’s surrounding neighborhood. In this context, the poverty rate can only change if the tenant moves. However conditioning on those tenants who move would bias the analysis as the decision to move is directly influenced by a lawyer. We therefore fit a series of regression models where we restrict the underlying sample to those tenants with a predicted probability of moving greater than some value. Using the addresses provided by Verisk Marketing Solutions, we generate tenant specific probabilities of moving by fitting a logistic regression model to the control group.

We find that a lawyer decreases the poverty rate of the tenant’s surrounding census tract. As figure 14, the effect size generally tends to get larger as we restrict the underlying sample to those tenants with the greatest predicted probability of moving. We allow the threshold value (shown along the x-axis) to range from one standard deviation below the mean probability of moving to one standard deviation above.

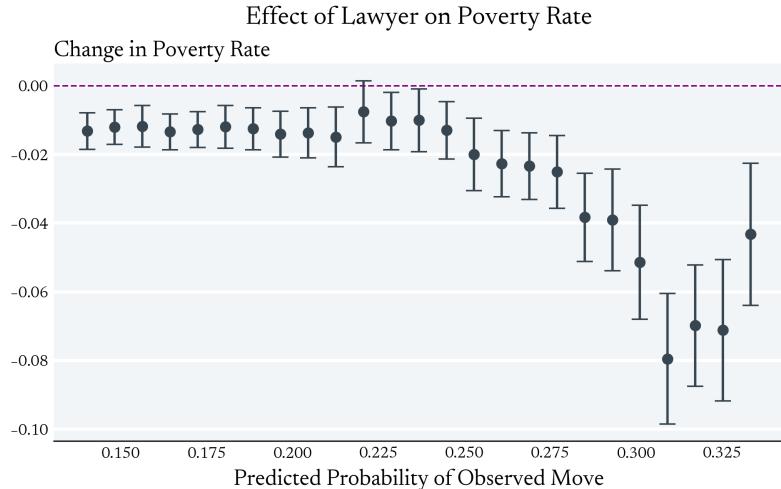


Figure 14: The Effect of a Lawyer on the Poverty Rate across subsets of the sample corresponding to tenants who have a greater predicted probability of moving.

Emergency Shelter

As a final measure on housing stability, we consider whether a lawyer decreases the likelihood that a tenant enters an emergency shelter. As [Evans et al. \[2019\]](#) notes, “Evictions are thought to represent a gateway into homelessness for many.” We match housing court records to emergency shelter records based on zip code, date of the eviction filing and entry into an emergency shelter and name.

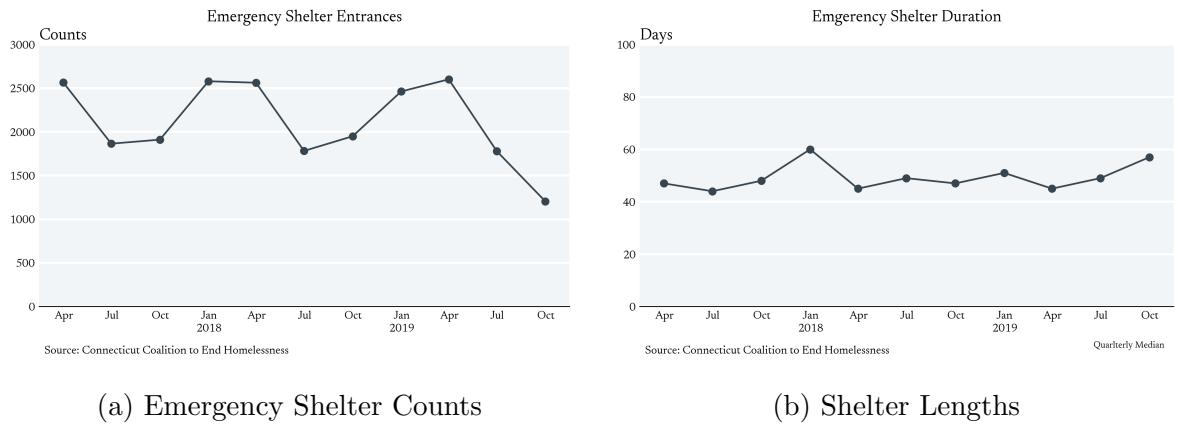


Figure 15: Emergency Shelters

We find that a legal aid lawyer has no effect on the probability of entering a homeless shelter.²¹ There are a couple of possible explanations for why we find a null result. For one, we might not have allowed for sufficient amount of time to pass between when a tenant is evicted and our collection of the Homeless Information Management Data (July 2023). This doesn’t seem likely as [Evans et al. \[2016\]](#) considers transitions into shelters within 6 months which is well within our time frame. Two, it may be that given that homelessness is a low probability event to begin with, our identification strategy is not suitable. Three, it may be that individuals that are likely to end up homeless are the most challenging cases to intervene in. We leave this as an open question.

Model	Est	Std	\bar{Y}	N	Params	Core	Tenant	Landlord
Linear (1)	0.002	0.018	0.02	13645	21	✓		
Linear (2)	0.001	0.018	0.02	13645	24	✓		✓
Linear (3)	0.001	0.018	0.02	13645	24	✓	✓	
Linear (4)	0.001	0.018	0.02	13645	27	✓	✓	✓
FT-LLM	-0.087	0.026	0.03	4734	350 M			✓
RFP-NN	-0.0717	0.0012	0.020	9178	2016	✓	✓	✓

Table 7: Local Effect of Legal Representation on Becoming Homeless

²¹There are additional outcomes that would be worth exploring such as the effects on child welfare and income assistance as considered in [Rolston et al. \[2013\]](#)

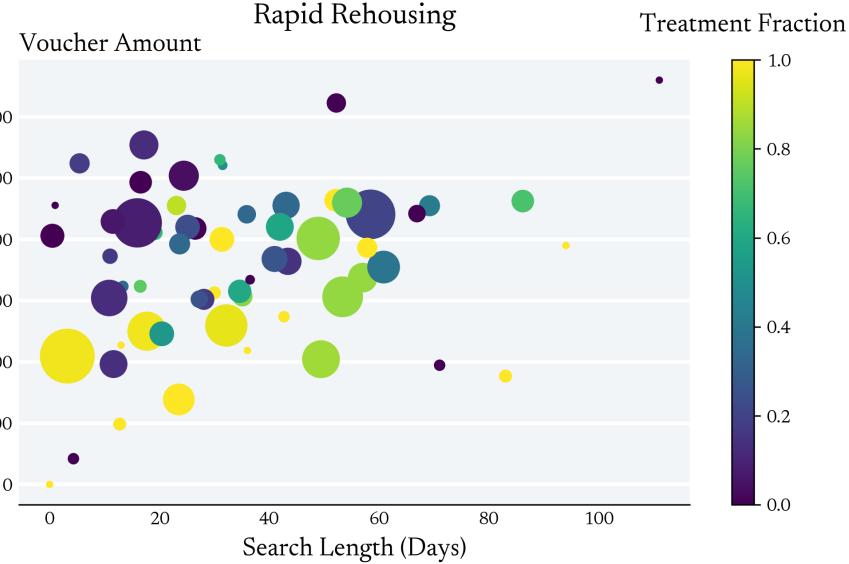


Figure 16: Mean Voucher Amount and Search Length by Rapid Rehousing Provider

7 Potential Unintended Consequences

Prior research has long speculated that the provision of free legal aid to households facing eviction might adversely effect those who are currently experiencing homelessness. As Gunn [1995] writes, “By increasing landlords’ costs of doing business, legal services attorneys may enrich their clients at the expense of all other similarly situated poor tenants.” To date though, there is no empirical work that explores this potential adverse effect.²² We provide preliminary results by measuring whether the search length and total first-month voucher costs of clients in Rapid Rehousing Programs increase following the implementation of the Right to Counsel.

Our estimation strategy parallels our regression analysis with housing court data. We control for the Rapid Rehousing program (like we previously controlled for housing court) because as figure 16 illustrates, there is tremendous variation across programs in terms of average outcomes. We keep only heads of households who entered programs after October 1, 2021 to account for the potential anticipation effects of the policy. We include as controls a rich set of individual specific features such as Year & Month, Age, Domestic Violence, White, VI Score, Household Size, Drug Use, Prior Living Situation, Income, English, Physical Disability, Male.

Our estimates, while noisy, indicate that the costs of securing housing increases in response to the policy. The search length lengthens by roughly 5 days and the total first month costs jumps by more than \$100. This monetary numbers captures the joint effect on the monthly rent as well as the security deposit. An assessment that only considers the

²²Evans et al. [2019] writes, “By definition, market-level interventions affect all properties in a jurisdiction and are thus more difficult to evaluate. To our knowledge, there is no rigorous experimental or quasi-experimental work examining how these policies affect homelessness.”

listed rental prices of a unit might understate the effect.

Outcome	Est	Std	%Δ	N	Params	Core
Search Length	5.6111	3.4303	26	412	70	✓
Voucher Amount	126.5639	99.0089	591	412	70	✓

Table 8: Effect on Legal Representation

8 Policy Improvement

“The authors posit that these different results may be the result of assertive strategies adopted in Boston, versus a non-confrontational approach on the North Shore. More work is needed in this area, particularly regarding legal tactics and the underlying housing market.” - [Evans et al. \[2019\]](#)

We are interested in exploring how the implementation of the Right to Counsel can be improved. We focus on the question of whether lawyers should push more for a formal court approved agreement between tenant and landlord versus a dismissal or withdraw if their aim is to keep the tenant housed in their current unit. To estimate the relative effectiveness, we adopt an instrumental variable strategy based on the variation across lawyers in their tendency to achieve certain outcomes.

In an ideal setup, we would take two cases which are similar in nature and assign different legal aid lawyers to each case, one which tended to reach formal agreements with the landlord and the other less so. We could then attribute any difference between the tenant’s housing outcomes to the different strategies employed by the lawyers assuming that they don’t assist tenants in any other way.²³ Doing so, we could understand the relative effectiveness of a formal agreement.

We attempt to mimic this ideal setup via an instrumental variables approach where we construct the regressor of interest by taking the predicted difference between a model trained on both the case and the lawyer inputs, and a model trained only on the case.²⁴ As Figure 17 highlights, there is tremendous variation across lawyers in their tendency to achieve certain outcomes. Figure 17 plots the distribution across case outcomes in counterfactual worlds where there is only one legal aid lawyer. We have 26 legal aid lawyers in the data set which produces these 26 separate graphs.

We don’t want our identification to come from cases which have low probability of both a Dismissal or an Agreement. In the second equation that we fit as part of our partially

²³Exclusion restriction

²⁴We estimate these two conditional expectation functions by training a neural network via bi-level gradient descent where the clustering is done with respect to the lawyer.

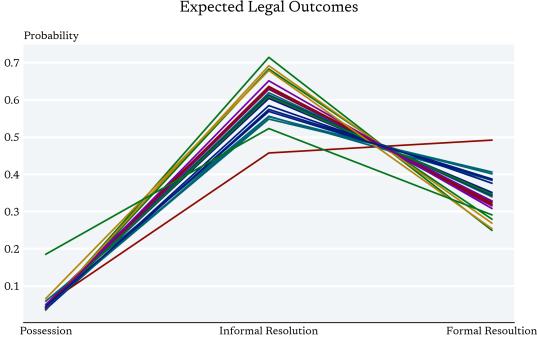


Figure 17: Counterfactual Expected Case Outcomes

linear instrumental variable approach,

$$\begin{aligned}\tilde{S}_i &= \mathbb{E}[\text{Dismissal}|\text{case, lawyer}] - \mathbb{E}[\text{Dismissal}|\text{case}] \\ Y_i &= \beta\tilde{S}_i + \varepsilon_i\end{aligned}$$

we therefore restrict our sample to those cases with a predicted probabilities of both outcomes of at least ‘x’ percent, where ‘y’ corresponds to the y-axis in figure 18. Meaningful for us, we observe that as the quality of the sample improves, that is as the set of cases is further refined to those which might likely result in either a dismissal or a stipulation, we see the effects associated with these strategies widen with a formal agreement being the more successful of the two approaches. **Caveats:** We want to emphasize though that these estimates should be interpreted very cautiously. They are sensitive to the moving data that we match to as well as the hyperparameters we used to train the neural network.

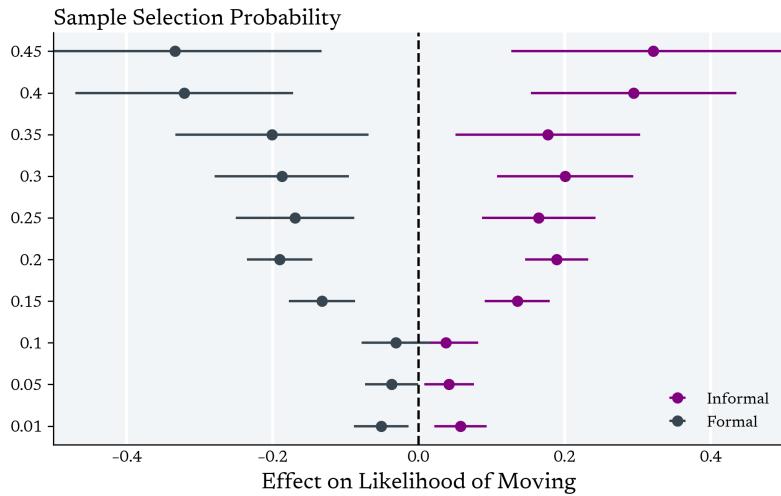


Figure 18: IV Estimates on the Effect of a Dismissal and a Stipulation Agreement on the Likelihood of an Observed Move.

9 Conclusion

Exploiting the ongoing implementation of the Right to Counsel across the state of Connecticut, we provide empirical evidence which suggests that having legal representation in an eviction case improves housing court outcomes. Importantly this appears to translate into improved housing stability as tenants with legal representation are less likely to have an observed move following an eviction filing. We note, though, that the costs of the policy appear to be transferred onto those currently without housing who see increased search lengths and higher first month rental prices in response to the policy. As with any empirical work, but perhaps even more so given our context, these results should be interpreted cautiously.

References

- Boaz Abramson. The welfare effects of eviction and homelessness policies. 2021.
- Michael T Cassidy and Janet Currie. The effects of legal representation on tenant outcomes in housing court: Evidence from new york city’s universal access program. Technical report, National Bureau of Economic Research, 2022.
- Robert Collinson, John Eric Humphries, Nicholas S Mader, Davin K Reed, Daniel I Tannenbaum, and Winnie van Dijk. Eviction and poverty in american cities. Technical report, National Bureau of Economic Research, 2022.
- Matthew Desmond. *Evicted: Poverty and profit in the American city*. Crown, 2016.
- William N Evans, James X Sullivan, and Melanie Wallskog. The impact of homelessness prevention programs on homelessness. *Science*, 353(6300):694–699, 2016.
- William N Evans, David C Philips, and Krista J Ruffini. Reducing and preventing homelessness: A review of the evidence and charting a research agenda. 2019.
- Nick Graetz, Carl Gershenson, Peter Hepburn, Sonya R Porter, Danielle H Sandler, and Matthew Desmond. A comprehensive demographic profile of the us evicted population. *Proceedings of the National Academy of Sciences*, 120(41):e2305860120, 2023.
- D James Greiner, Cassandra Wolos Pattanayak, and Jonathan Hennessy. The limits of unbundled legal assistance: a randomized study in a massachusetts district court and prospects for the future. *Harv. L. rev.*, 126:901, 2012.
- Steven Gunn. Eviction defense for poor tenants: Costly compassion or justice served. *Yale L. & Pol'y Rev.*, 13:385, 1995.
- Lillian Leung, Peter Hepburn, James Hendrickson, and Matthew Desmond. No safe harbor: Eviction filing in public housing. *Social Service Review*, 97(3):000–000, 2023.
- Stephanie Lin, Jacob Hilton, and Owain Evans. Teaching models to express their uncertainty in words. *arXiv preprint arXiv:2205.14334*, 2022.

Kyle Robert Nelson. *Litigating the Housing Crisis: Legal Assistance and the Institutional Life of Eviction in Los Angeles*. University of California, Los Angeles, 2022.

Brendan O’Flaherty. Homelessness research: A guide for economists (and friends). *Journal of Housing Economics*, 44:1–25, 2019.

David C Phillips and James X Sullivan. Do homelessness prevention programs prevent homelessness? evidence from a randomized controlled trial. *The Review of Economics and Statistics*, pages 1–30, 2023.

Howard Rolston, Judy Geyer, Gretchen Locke, Stephen Metraux, and Dan Treglia. Evaluation of the homebase community prevention program. *Report, Abt Associates, Inc., Bethesda, MD*, 2013.

Carroll Seron, Martin Frankel, Gregg Van Ryzin, and Jean Kovath. The impact of legal counsel on outcomes for poor tenants in new york city’s housing court: results of a randomized experiment. *Law and Society Review*, pages 419–434, 2001.

10 Appendix

11 Appendix: Background

11.1 Poverty Rate

In figure 4, we plot two empirical cumulative distribution functions. The difference of the two CDFs correspond to a difference in the underlying probability space. For the poverty rate associated with the census tract, the sample space (Ω) is the set of all census tracts in Connecticut. Letting X denote the random variable which maps each census tract to its corresponding poverty rate, we are therefore plotting the CDF associated with $\mathbb{P} \circ X^{-1}$.

$$(\Omega, \mathcal{F}, \mathbb{P}), \quad X :: \Omega \rightarrow [0, 1]$$

It’s not yet 8:30 a.m., and the four men milling around an oversized moving truck are anxious to get started. A few cars back out of their places, and a dog is let out across the street. No one seems to mind the tenants in the central unit, their front lawn disappearing underneath a heap of furniture and clothes as they make repeated trips to the basement. Several minutes pass before the State Marshall walks through the doorway to ask for the keys. There’s no squabble. No one asks for more time. It’s eerily similar to a “Pens Down” command at the end of an exam period, except instead of turning over a paper, they’re turning over their half emptied apartment. As the tenants turn their attention towards clearing the front lawn, the four men from

the moving company set to work inside: taping up boxes and hauling the remaining items out to the truck. The back of a t-shirt reads, *If You Don't Pay ... You Can't Stay.*

- From Shadowing a State Marshall

Standard Errors

Standard Errors for linear models are constructed via two-step bootstrapping. First, 80% of the housing courts are sampled without replacement according the their empirical probabilities. Then 80% of the observations within the subsampled housing courts are sampled. The model is fit to this final subsample. Standard Errors for the Large Language Model are constructed via two-step bootstrapping. First, 80% of the housing courts are sampled without replacement according the their empirical probabilities. Then 80% of the estimated individuals level treatment effects within the subsampeld housing courts are sampled. We take the mean of this final subsample.

Take Up Rate

Model	Est	Std	% Δ	N	Params	Core	Tenant	Landlord
Linear (1)	0.1134	0.0056	477	5020	20	✓		
Linear (2)	0.1133	0.0056	477	5020	23	✓		✓
Linear (3)	0.1132	0.0056	477	5020	24	✓	✓	
Linear (4)	0.1131	0.0056	476	5020	27	✓	✓	✓
FT-LLM	0.0875	0.0006	368	5020	350 M			✓
RFP-NN	0.1184	0.0006	536	9178	2016	✓	✓	✓

Table 9: Effect on Legal Representation

Model	Possession	Dismissal	Withdrawn	Final Stay	Non-Final Stay	Core	Tenant	Landlord
Linear (1)	-0.166 (0.056)	-0.124 (0.026)	0.235 (0.047)	-0.022 (0.054)	0.076 (0.029)	✓		
Linear (2)	-0.166 (0.056)	-0.124 (0.026)	0.235 (0.047)	-0.022 (0.054)	0.076 (0.029)	✓		✓
Linear (3)	-0.166 (0.056)	-0.124 (0.026)	0.235 (0.047)	-0.022 (0.054)	0.076 (0.029)	✓	✓	
Linear (4)	-0.166 (0.056)	-0.124 (0.026)	0.235 (0.047)	-0.022 (0.054)	0.076 (0.029)	✓	✓	✓
FT-LLM	-0.163 (0.139)	0.020 (0.086)	0.353 (0.121)	-0.238 (0.123)	0.023 (0.081)			✓
RFP-NN	-0.331 (0.008)	-0.117 (0.003)	0.168 (0.006)	0.202 (0.008)	0.082 (0.002)	✓	✓	✓

Table 10: Effect on Legal Outcomes

Model	Possession	Dismissal	Withdrawn	Final Stay	Stipulation	Core	Tenant	Landlord
Linear (1)	-0.256 (0.086)	-0.116 (0.027)	0.100 (0.061)	0.121 (0.057)	0.160 (0.027)	✓		
Linear (2)	-0.262 (0.085)	-0.117 (0.028)	0.099 (0.061)	0.136 (0.057)	0.154 (0.027)	✓		✓
Linear (3)	-0.247 (0.083)	-0.118 (0.027)	0.100 (0.060)	0.115 (0.055)	0.160 (0.027)	✓	✓	
Linear (4)	-0.253 (0.082)	-0.119 (0.028)	0.099 (0.061)	0.129 (0.055)	0.154 (0.027)	✓	✓	✓
FT-LLM	-0.282 (0.076)	0.023 (0.035)	0.138 (0.067)	0.089 (0.082)	0.032 (0.046)			✓
RFP-NN	-0.204 (0.008)	-0.151 (0.004)	0.060 (0.009)	0.230 (0.012)	0.072 (0.002)	✓	✓	✓

Table 11: Effect on Legal Outcomes

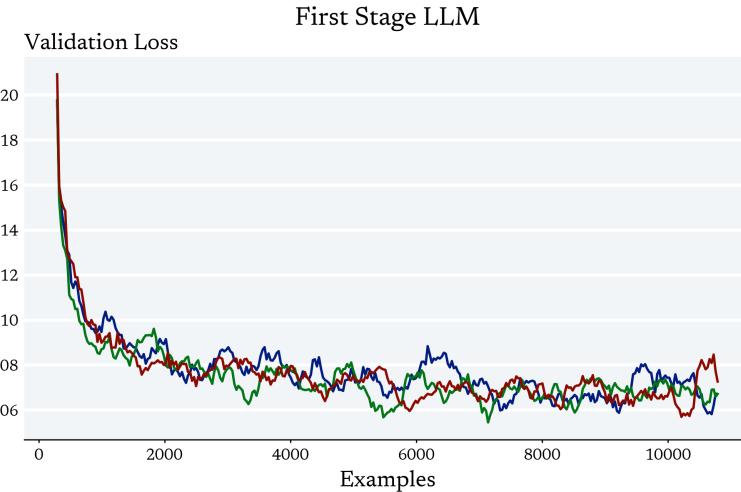


Figure 19: Training Loss of Fine-Tuned First Stage Model

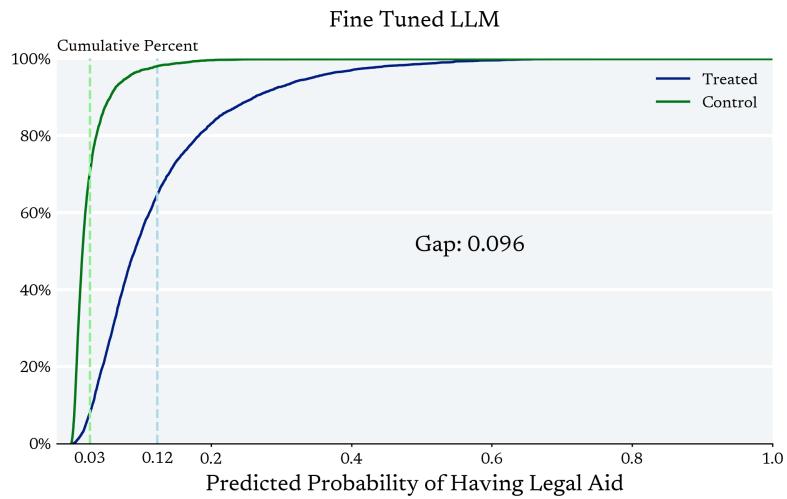


Figure 20: Textual First Stage

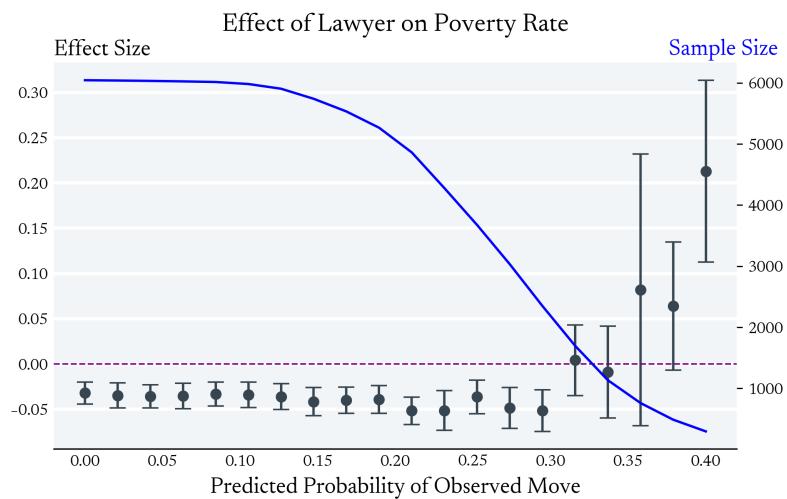


Figure 21: Caption

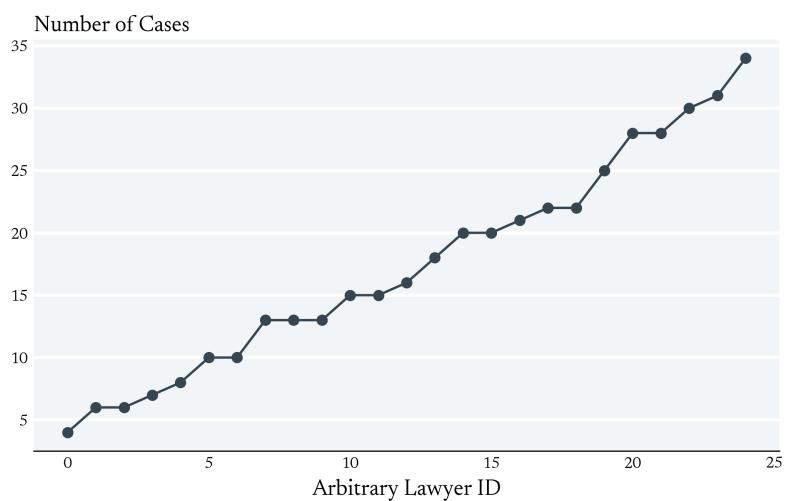


Figure 22: Number of Cases by Legal Aid Lawyer

Service Type	Amount
Signing Bonus Not Shared Housing	1980.0
Rental/Security Deposit	1300.0
Lease Payment	1247.5
Emergency Housing Assistance	1246.0
Shared Housing Signing Bonus	725.0
Rental Assistance	720.0
Motel/Hotel Costs	530.0
Extended Shallow Subsidy - Rental Assistance	525.0
General Housing Stability Assistance	494.24
Moving Costs	283.155
Utility Deposit	270.0
Home Repair	86.095
Utility Assistance	81.85
Application Fees	50.0
Financial assistance for rent	30.0
Financial assistance for Moving On (e.g., security deposit, moving expenses)	30.0
Housing Referral	30.0
Housing Services: Planning of housing	30.0
Housing referral/placement	30.0
Continuation of Services	30.0
Subsidized housing application assistance	22.5
Emergency financial assistance	22.5
Non-financial assistance for Moving On (e.g., housing navigation, transition support)	22.5
Direct provision of other public benefits - Legal services - eviction protection	1.0
Apartment fees	0.0
Motel/Hotel Vouchers	0.0
Landlord and Tenant Assistance / Mediation	0.0
Housing services	0.0
Housing Placement	0.0
Housing Assistance	0.0
Financial Services	0.0
Extended Shallow Subsidy	0.0
Housing Search and Info	0.0

Table 12: Median Service Total by Service Type

Legal Outcomes

Fine-Tuning Laguage Model

Downstream Effects

Policy Improvements

12 Model

We write down a model to clarify the potential adverse effects of the Right to Counsel.

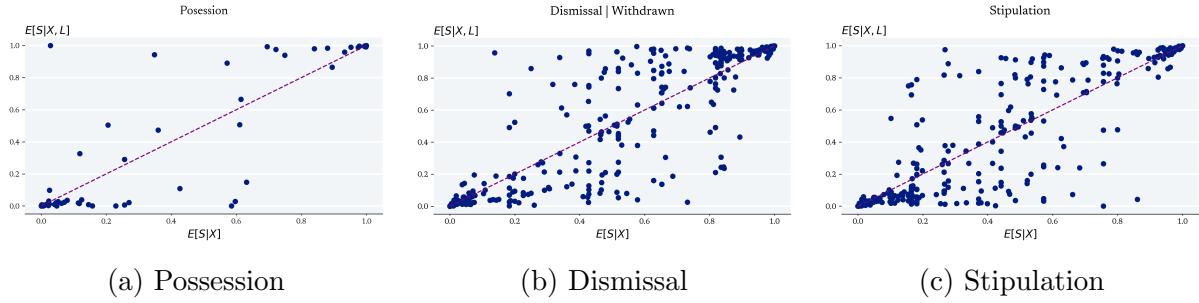


Figure 23: IV Diagnostics for Policy Improvement

12.1 Tenants

From the tenant's perspective, having access to a lawyer is a form of social insurance. And as such, the issue of moral hazard comes into play. If a tenant knows that a lawyer can help them dismiss their eviction case, they may be more likely to "short" their landlord on the monthly rent.²⁵

To keep things simple, we model this potential issue as a single period optimization problem. Maximizing their expected utility, the tenant spends part of their income on consumption, c , and the rest on housing, $h = I - c$. Housing expenditure together with the rental price, the Right to Counsel status and the state of the world, ω , determine if the tenant is evicted.²⁶

Evicted :: Rent → RTC → HousingExpenditure → Ω → {0, 1}

If the tenant is evicted, they receive the value of the outside option. If they aren't, then they receive the monthly rental amount which can be greater than the amount they paid to their landlord.

MonetaryValue :: Rent → Outside Option → {0, 1} → HousingDollars

$$\text{MonetaryValue}(r, \bar{q}, x) = \begin{cases} \bar{q}, & \text{if } x = 1, \\ r, & \text{if } x = 0. \end{cases}$$

Utility :: Income → HousingDollars → Utils

²⁵Desmond [2016] notes how tenants may short their landlords in the summer in order to keep steady with the utility bill and then do the reverse in the winter, responding to policy that utility companies won't disconnect families during the winter.

²⁶All random variables in this section are defined with respect to the underlying probability space $(\Omega, \mathcal{F}, \mathbb{P})$

By partially evaluating these functions on the exogenous variables (Monthly Rent, Outside Option, and Right to Counsel), we can compose them to express the quality of the tenant's housing as a function of their housing expenditure and state of the world.

$$\begin{aligned}\text{Quality}_{I,r,\bar{q},\text{rtc}} &:: \text{Housing Expenditure} \rightarrow \Omega \rightarrow \text{Utils} \\ \text{Quality}_{I,r,\bar{q},\text{rtc}} &:= \text{Utility}_I \circ \text{MonetaryValue}_{r,\bar{q}} \circ \text{Evicted}_{r,\text{rtc}}\end{aligned}$$

Introducing a utility function which maps income and housing quality into utils, we can define the tenant's objective function by integrating over all states of the world.

$$\begin{aligned}V_{r,I,\bar{q},\text{RTC},h} &:= \int_{\Omega} \text{Quality}_{I,r,\bar{q},\text{rtc},h} d\mathbb{P} \\ h^*(r, I, \bar{q}, \text{RTC}) &:= \underset{h \in [0, I]}{\operatorname{argmax}} V_{r,I,\bar{q},\text{RTC}}(h)\end{aligned}$$

Moral Hazard arises if under the Right to Counsel, tenants find it optimal to decrease their housing expenditure. We provide a python notebook which simulates this result.

$$\text{Moral Hazard} \iff h^*(r, I, \bar{q}, \text{True}) < h^*(r, I, \bar{q}, \text{False})$$

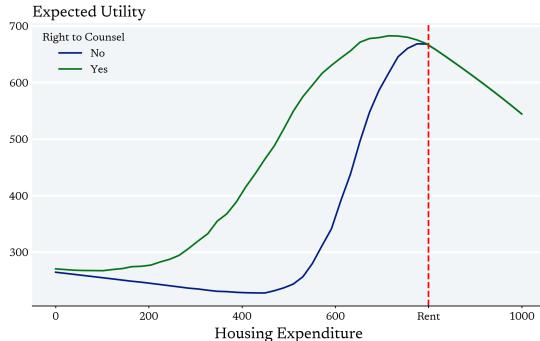


Figure 24: Tenant's Objective Function

12.2 The Landlord

We write down a model of the landlord's behavior to illustrate the potential adverse effects of the Right to Counsel. We start by defining the probabilistic relationship between the credit type of a tenant and the likelihood of default.

$$\text{Default} :: \text{Credit Type} \rightarrow \Omega \rightarrow \{0, 1\}$$

We then define the landlord's payment function which takes into account the monthly rent, the status of the Right to Counsel and the tenant's default status.

$$\text{Payment} :: \text{Rent} \rightarrow \text{RTC} \rightarrow \{0, 1\} \rightarrow \mathcal{R}$$

We can then define revenue as a function of the rent, the Right to Counsel, the tenant's credit type, and the state of the world.

$$\text{Revenue} :: \text{Rent} \rightarrow \text{RTC} \rightarrow \text{Credit Type} \rightarrow \Omega \rightarrow \mathcal{R}$$

$$\text{Revenue}_{\text{rent}, \text{rtc}} := \text{Payment}_{\text{rent}, \text{RTC}} \circ \text{Default}$$

If we want to allow for heterogeneity across landlord types to capture that some landlords are more risk averse than others, we would need to only compose the payment function with a utility function. Since we can get the same point across without doing so, we omit this detail. Finally, we wrap up the model by writing down the landlord's objective function which is simply the integral of the Revenue function partially evaluated on the exogenous variables over the product of the states of the world and the tenants credit types that are above the minimum acceptable level (the landlord's choice variable).

$$V_{\text{rent}, \text{RTC}}(\text{min_ctype}) = \int_{\Omega} \int_{\text{min_ctype}} \text{Revenue}_{\text{rent}, \text{rtc}} d\lambda_{\text{min_ctype}} d\mathbb{P}$$

By placing specifying specific functional relationships, which we do in this [Colab notebook](#), we can generate the following figures which importantly demonstrate how in response to the Right to Counsel, the minimum acceptable Credit Type can increase, thereby echoing [Abramson \[2021\]](#) about how the costs of the policy may be pushed onto those who are unable to secure housing.

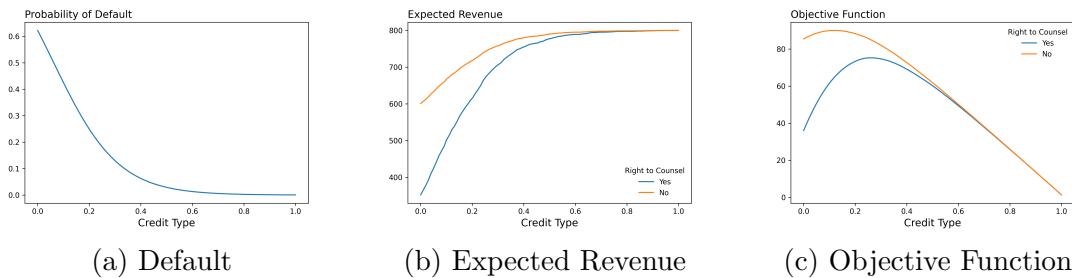


Figure 25: Model of Landlord Behavior

13 Appendix: Residualized IV

13.1 Linear Relaxation

Let's start by writing down the regression model which corresponds to linear instrumental variables.

$$Y_i = \beta_0 + \beta_1 \hat{D}_i + \beta_2 X_i + \varepsilon_i, \quad \hat{D}_i = \hat{\gamma}_1 X_i + \hat{\gamma}_z Z_i$$

Under the Frish Waugh Lovell Theorem, the two β_1 's are equivalent where \bar{D}_i is the predicted value of regression \hat{D}_i on X_i .

$$Y_i = \beta_1 (\hat{D}_i - \bar{D}_i) + \eta_i,$$

We arrive at our preferred nonlinear residualized model by simply replacing the linear models which form the residualized term with their nonlinear counterparts.

$$Y_i = \beta_1 (\mathbb{E}[D_i | X_i, Z_i] - \mathbb{E}[D_i | X_i]) + \varepsilon_i$$

13.2 Fine-tuned Large Language Models

There are many applied microeconomics contexts - think health care, education and housing - where the underlying data is text. Data analysis in these areas have traditionally proceeded by hand selecting numerical representations of the data and performing regression analysis on these representations. Recent developments in natural language processing, though, have opened up a more flexible²⁷ avenue of empirical research whereby the regression analysis is performed "directly" on the underlying text.

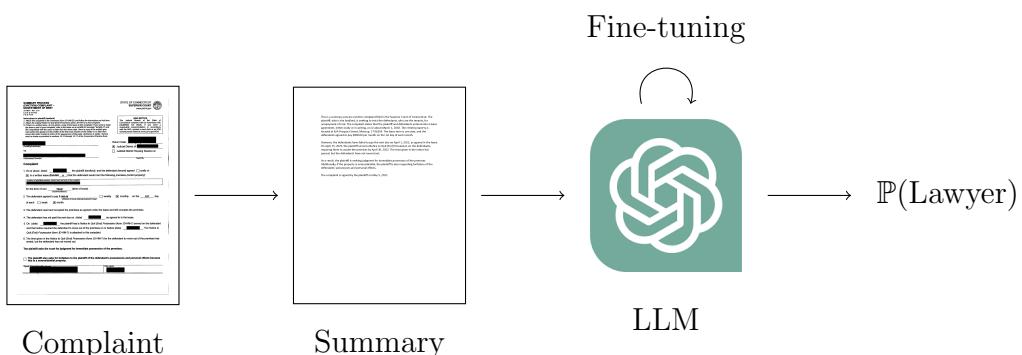


Figure 26: Pipeline

²⁷An interesting avenue is [Lin et al. \[2022\]](#) on verbalized probability

To do so in our context, we start by concatenating a textual indicator for the Right to Counsel Policy with a summary of the landlords complaint. Here, the summarized complaint acts as the control variable. With the concatenated text as the prompt, we fine tune the model across cases so that the model learns to predict a single token (Yes/No) for whether the tenant in the case has a lawyer. We can then estimate the effect of the Right to Counsel on legal aid by averaging the log probs associated with the token ‘Yes’ over the empirical distribution of complaints.

Formally, we can express this entire process as the following optimization problem, where we “learn” the parameters of the completions model which maximize the conditional probabilities of the observed legal status. These large completions model are usually only fine-tuned for 2-4 epochs which we capture via a regularization function, $R(\cdot, \cdot)$.

$$\underset{\theta}{\text{maximize}} \prod_i \mathbb{P}_{\theta}(\text{Lawyer}_i | \text{Treatment}_i, \text{Complaint}) - R(\theta_{\text{init}}, \theta)$$

The average effect on legal representation is then computed by integrating the probabilities generated via the fine-tuned completions model over the empirical distributions of complaints.

$$\hat{\beta} = \int \left(\mathbb{P}_{\theta}(\text{Lawyer} | \text{Treated}, \text{Complaint}_i) - \mathbb{P}_{\theta}(\text{Lawyer} | \text{Control}, \text{Complaint}_i) \right) d\mathbb{P}_{\text{Complaints}}$$

13.3 Computationally Attractive

This approach is computationally attractive because it requires only fine tuning two large language models regardless of the number of outcomes that we consider.

$$Y_i = \beta_1 (\mathbb{E}[D_i | X_i, Z_i] - \mathbb{E}[D_i | X_i]) + \varepsilon_i$$

In practice, instead of estimating $\mathbb{E}[D_i | X_i]$ directly, we estimate $\mathbb{E}[D_i | X_i, Z_i]$ and $\mathbb{P}(Z_i | X_i)$ and use the following relationship to construct $\mathbb{E}[D_i | X_i]$

$$\mathbb{E}[D_i | X_i] = \mathbb{E}[D_i | X_i, Z_i = 1] \mathbb{P}(Z_i = 1 | X_i) + \mathbb{E}[D_i | X_i, Z_i = 0] \mathbb{P}(Z_i = 0 | X_i)$$

14 Appendix: Rapid Rehousing

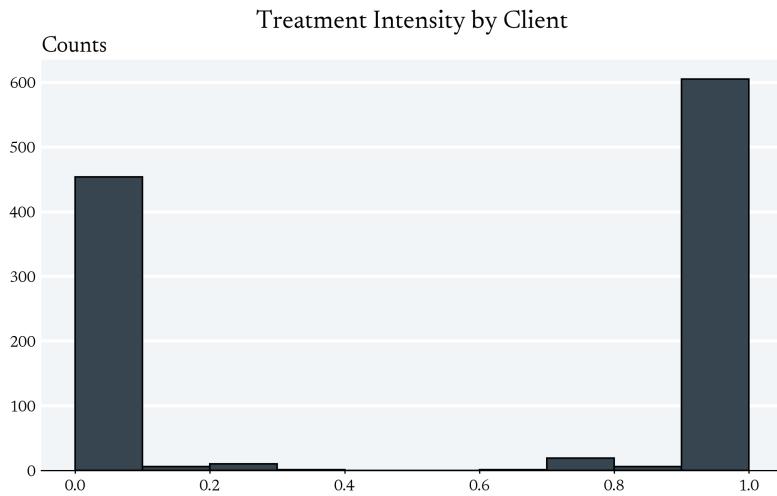


Figure 27: Softmax Weighted Average of Fraction of Observations in a Treated Zip Code for Individuals with Multiple Rapid Rehousing Stints

Variable	Treated	Control	Difference
Age	36.87 (0.900)	33.89 (0.975)	2.98 (1.327)
Household Size	2.45 (0.110)	2.41 (0.128)	0.04 (0.169)
Domestic Violence	0.31 (0.031)	0.40 (0.039)	-0.09 (0.050)
VI-Score	6.42 (0.143)	7.17 (0.201)	-0.75 (0.247)
Drug Use	0.22 (0.028)	0.21 (0.033)	0.01 (0.043)
Entry Family Total Income	834 (48.0)	611 (47.0)	223.000 (67.2)
English	0.86 (0.024)	0.96 (0.015)	-0.10 (0.028)
Physical Disability	0.19 (0.027)	0.17 (0.030)	0.02 (0.040)
Male	0.28 (0.031)	0.30 (0.037)	-0.02 (0.048)
White	0.37 (0.033)	0.48 (0.040)	-0.11 (0.051)

Rapid Rehousing Data Provided by Connecticut Coalition to End Homelessness

Table 13: Rapid Rehousing Balance Table