Housing the Homeless:

The Effect of Homeless Housing Programs on Future Homelessness and Socioeconomic Outcomes

Elior Cohen

UCLA

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Skid Row
CITY LIMIT
POP Too Many
ELEV 2008

Homelessness: Facts and Figures

- Homelessness: highly prevalent and growing in US Cities
  - 550,000 homeless on a given night; 1.5 million homeless in a year (HUD, 2019)
  - Homeless rates increased by 20% in past decade
    - Approximately 500 homeless individuals per 100,000 residents
    - Similar to incarceration rate (Bureau of Justice Statistics, 2019)
- **Humanitarian Crisis:** Associated with multiple negative outcomes (crime, employment, health)
- **Public Finance Crisis:** Heavy administrative and financial burden on government agencies
  - Average cost of direct public services estimated at $80,000 per homeless person per year (Flaming et al., 2015)

Housing Assistance for the Homeless

- Popular treatment approach: **Housing First**
- Funding for housing programs almost doubled in past decade
  - $18 billion nationally in 2019 (USICH, 2020; Johnson and Levin, 2018)
  - **Continuum of programs** - emergency shelters (most basic $\sim$ 50%) to supportive housing (most intensive $\sim$ 5%)
  - **Assignment into Programs** - based on level of needs

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  - **Assignment into Programs** - based on level of needs
- Scant evidence on effectiveness (Evans et al., 2019; National Academies of Sciences, 2018; O'flaherty, 2019)
  - Lack of data
  - Non-random assignment to housing programs
  - Challenges in conducting RCTs

▸ Housing Programs - Types

This Paper - New Data on Homelessness and Innovative Design

- **Research Question:**
  - **What happens to the homeless when they receive housing assistance?**
    - **Short-Run: Do they manage to stay there?**
    - **Long-Run: Do they manage to avoid returning to homelessness?**
    - **Economic and social outcomes (crime, health, employment, social benefits)**

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- **Setting and Data:**
  - Los Angeles County (2nd largest homeless population in US)
  - Universe of homeless cases handled by homeless service providers (2016-2017)
  - Administrative records of multiple public agencies

  $\rightarrow$ **Novel, comprehensive, and detailed longitudinal data on homelessness**

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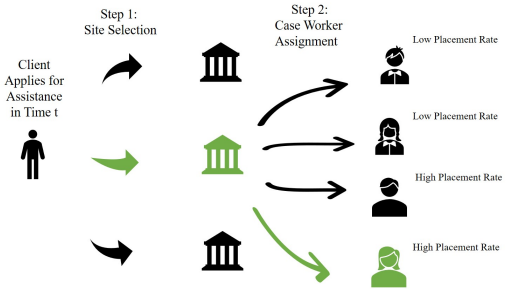
    $\rightarrow$ **Novel, comprehensive, and detailed longitudinal data on homelessness**
- **Identification Strategy:**
  - **Instrumental Variables Design:** As-good-as-random assignment of cases to case workers who differ in propensity to place individuals in housing programs

Research Design - Random Assignment to Case Workers



- Case Worker Housing Placement Rate:

$$Z_{j(i)} = \frac{\sum_{k \neq i} H_{jk}}{N_j - 1} \tag{1}$$

H_{jk} = Housing assistance indicator for individual k assigned to case worker j

N_j = Number of cases handled by case worker j in 2016-2017

▸ Placement Rate - Distribution

IV Model

1. Estimate the effect of housing assistance on subsequent homelessness and a wide array of outcomes using the following model:

$$Y_{it} = \beta_t H_i + \delta_{sm} + X_i^{'} \theta_t + \varepsilon_{it} \tag{2}$$

Y_{it} = dependent variable of interest measured at month t after intake
H_i = Individual i is enrolled in a housing program in the 18 months after intake
δ_{sm} = service-site by month of intake fixed effects
X_i = vector of individual-level characteristics

2. First Stage Equation:

$$H_i = \gamma Z_{j(i)} + \gamma_{sm} + X_i^{'} \pi + \eta_i \tag{3}$$

$Z_{j(i)}$ = case worker j's housing placement rate assigned to case i
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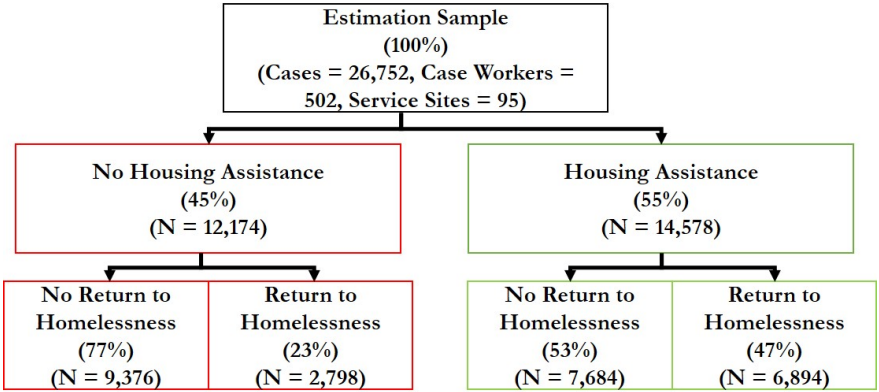
Estimation Sample, Treatment, and Recidivism

Figure 1: Housing Assistance Treatment and Recidivism to Homelessness - Estimation Sample



Notes: Estimation sample consists of 26,752 homeless cases in 2016-2017 that were as-good-as-randomly assigned to case workers. Housing assistance treatment is defined as enrolling in any housing assistance programs within 18 months from intake date. Recidivism into homelessness is defined as seeking assistance from the homeless support system as least once in the 18 months after intake.

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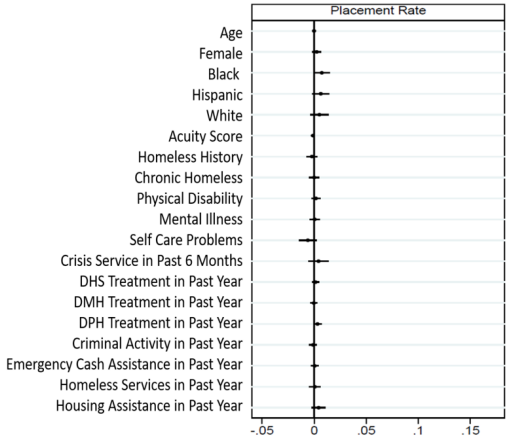
Figure 2: Testing for Random Assignment of Cases to Case Workers



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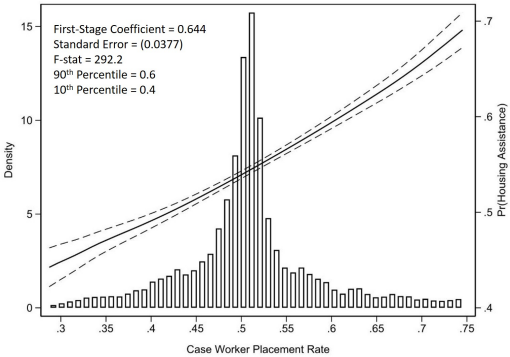
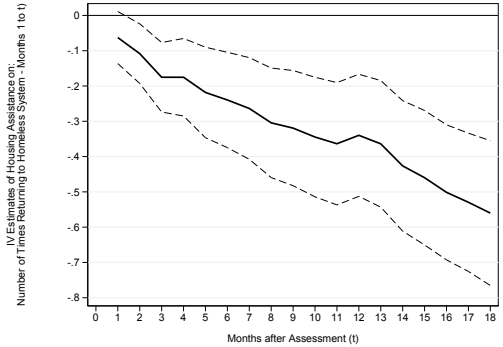
▸ Table ▸ First Stage

Housing Assistance Reduces and Prevents Future Homelessness

Figure 3: The Effect of Housing Assistance on Returning to the Homeless Support System



(a) First-Stage: Pr(Receiving Housing Assistance)



(b) IV Estimates: Number of Returns to Homeless System

Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017. Returns to the homeless support system include a new enrollment in a street outreach program or a new acuity assessment. Panel (a) shows first-stage estimates for ever receiving housing assistance as a function of case worker housing placement rate. Panel (b) shows IV estimates for the number of returns to the homeless support system between month 1 to t after assessment. Dashed lines show 90% confidence intervals.

Additional Results - Future Homelessness

- *"Incapacitation"* vs. *Post-Treatment Effect* ▸ Post-Treatment Effect
- **Heterogeneous Treatment Effects:**
  - **Case Characteristics:**
    1. High-acuity individuals (observed characteristics) ▸ Results
    2. Marginal Treatment Effects (unobserved characteristics) ▸ MTE
  - **Program Characteristics:**
    1. Temporary vs. Permanent Housing Programs ▸ PH vs. TH
    2. Duration of assistance (intensive margin) ▸ Extensive vs. Intensive Margin

Main Results

1. **Future Returns to Homeless System:**
   - **Housing assistance reduces and prevents future returns to the homeless support system**
     - ⋆ Without controlling for selection (OLS): estimates suggest housing assistance increases homelessness
     - ⋆ Driven by programs that provide long-term housing solutions
2. **Additional Economic and Social Outcomes:**
   - Housing assistance $\rightarrow \uparrow$ employment, $\uparrow$ health, $\downarrow$ criminal activity
3. **Cost-Benefit Analysis:**
   - Average cost of housing assistance \$10,000; Average savings to public agencies: \$8,000 (first 18-months alone)
   - Potential for larger benefits: (i) longer-time horizon; (ii) indirect benefits

Concluding Remarks

- **Future Returns to Homelessness:**
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- **Additional Outcomes and Cost-Effectiveness:**
  - Suggestive evidence of: improved health, reduced crime, increased employment
  - Large share of housing costs are offset in the short-run
    - ⋆ Benefits likely to be larger: reduced street homelessness, longer time off the streets

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  - Large share of housing costs are offset in the short-run
    - ⋆ Benefits likely to be larger: reduced street homelessness, longer time off the streets
- **Bottom Line: more housing combined with better targeting is needed to make housing assistance effective**

Comments and questions: eliorc@ucla.edu

Full paper available on: eliorcohen.com

Thank You!

Outline

1. Introduction
2. Background
3. Data
4. Empirical Strategy
5. Results
6. Additional Results - Recidivism to Homelessness

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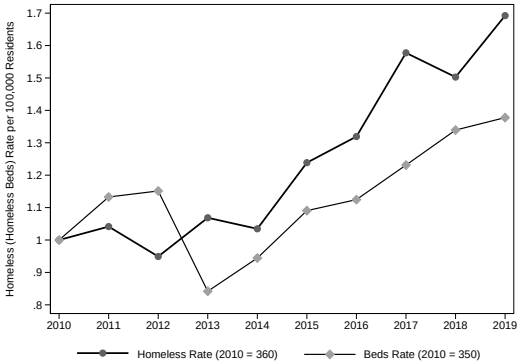
Housing Supply Does Not Keep Up with Homelessness in LA County

Figure 4: Homeless and Homeless Beds Rates in Los Angeles County



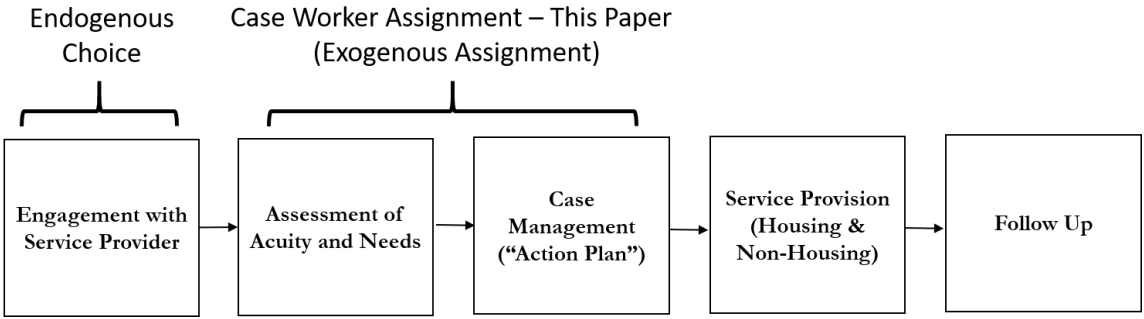
Notes: Los Angeles County includes all of Los Angeles County, excluding the cities of Glendale, Long Beach, and Pasadena. CoC population is defined as the average estimates from the 2013-2017 ACS. Both lines are standardized to 1 at 2010.

Source: Byrne et al. (2013), US Department of Housing and Urban Development (HUD) Point-in-Time (PIT).

▸ Homeless Population - Characteristics

Homelessness Assistance Process in LA County

Figure 5: Typical Service Process for Homeless in LA County



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   - All new homeless cases (2016-2017)
   - Client demographics (age, gender, race)
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   - Enrollment and exit date (when relevant)
3. **Enterprise Linkages Project (ELP)**
   - Department of Health Services (DHS), Department of Mental Health (DMH), Department of Social Services (DPSS), Department of Public Health (DPH), Probation, and Sheriff
   - **Economic and Social Outcomes:** Health care utilization (Emergency and Outpatient), Mental Health, Crime, Employment and Income, Social Benefits

Defining Treatment, Recidivism, and Additional Outcomes

Housing assistance treatment: any housing assistance received by 18-months after intake

- Bundle all housing assistance types (explore program heterogeneity later)
- Treatments are not mutually exclusive (explore intensive margin later)

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- **New Intake**
- **New Street Outreach Enrollment**

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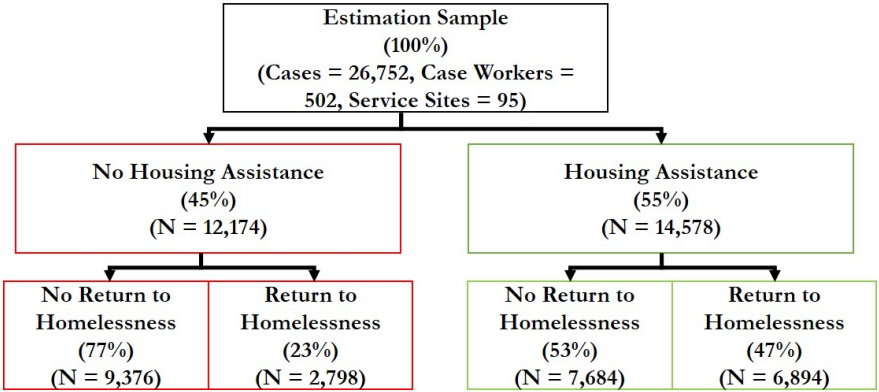
Recidivism into homelessness: any of the following observed by t-months after intake:

- **New Intake**
- **New Street Outreach Enrollment**
- **Main Outcomes:** any of the following observed by t-months after intake:
  - Emergency department visits, mental health treatments, jail days, crimes committed, any employment, non-zero income

▸ Time to Treatment CDF ▸ Days in Housing Programs CDF ▸ Multiple Treatments

Estimation Sample, Treatment, and Recidivism

Figure 6: Housing Assistance Treatment and Recidivism to Homelessness - Estimation Sample



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▸ Sample Construction ▸ Treatment Distribution ▸ Recidivism Patterns ▸ Summary Statistics ▸ Alternative Measures ▸ Recidivism Measure

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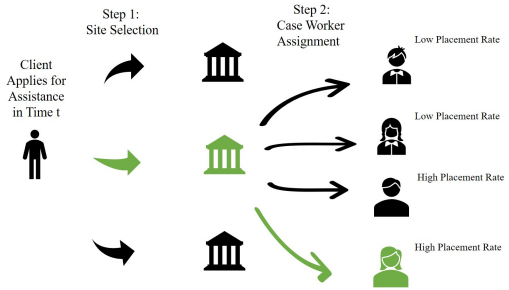

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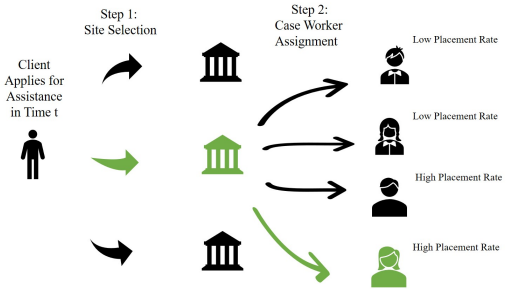

- Case Worker Housing Placement Rate:

$$Z_{j(i)} = \frac{\sum_{k \neq i} H_{jk}}{N_j - 1} \tag{4}$$

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N_j = Number of cases handled by case worker j in 2016-2017

▸ Placement Rate - Distribution

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$$Y_{it} = \beta_t H_i + \delta_{sm} + X_i^{'} \theta_t + \varepsilon_{it} \tag{5}$$

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2. First Stage Equation:

$$H_i = \gamma Z_{j(i)} + \gamma_{sm} + X_i^{'} \pi + \eta_i \tag{6}$$

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IV Model - Assumptions

$$Y_{it} = \beta_t H_i + \delta_{sm} + X_i^{'}\theta_t + \varepsilon_{it} \tag{7}$$

$$H_i = \gamma Z_{j(i)} + \gamma_{sm} + X_i^{'}\pi + \eta_i \tag{8}$$

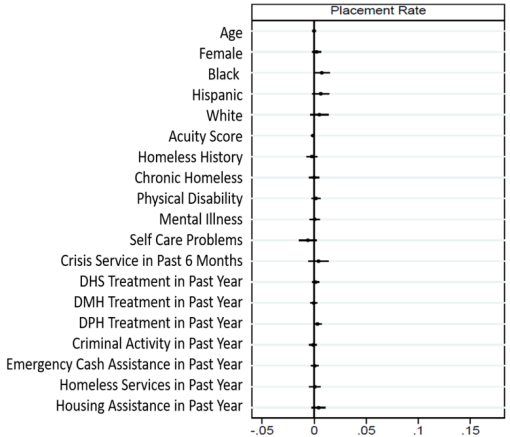
- IV estimator (β_t) = Local Average Treatment Effect (LATE) of Compliers
- Compliers = individuals who could have received a different housing assistance treatment had their case been assigned to a different case worker
- **Assumptions required to be satisfied by instrument:**
  - **Exogeneity (Random Assignment):** $\{Y_i(H_i, Z_i), H_i(Z_i)\} \perp\!\!\!\perp Z_i$
  - **Relevance (First-Stage):** $E[H_i(Z) - H_i(Z')] \neq 0$ for any $Z \neq Z'$
  - **Exclusion:** $Y_i(H_i, Z_i) = Y_i(H_i)$ for all Z_i
  - **Monotonicity:** $H_i(Z) - H_i(Z') \geq 0$ for any $Z \geq Z'$

▸ Who are the Compliers?

Assumption 1: Instrument Exogeneity

Verifying Random Assignment to Case Workers

Figure 7: Testing for Random Assignment of Cases to Case Workers



Notes: Figures show estimates for estimation sample of individuals assessed in 2016-2017. All estimations include controls for site x month of assessment FEs. The omitted category for race is missing/multiple/other race. Standard errors are two-way clustered at the case worker and client level. 95% confidence intervals are displayed.

▸ Table ▸ First Stage

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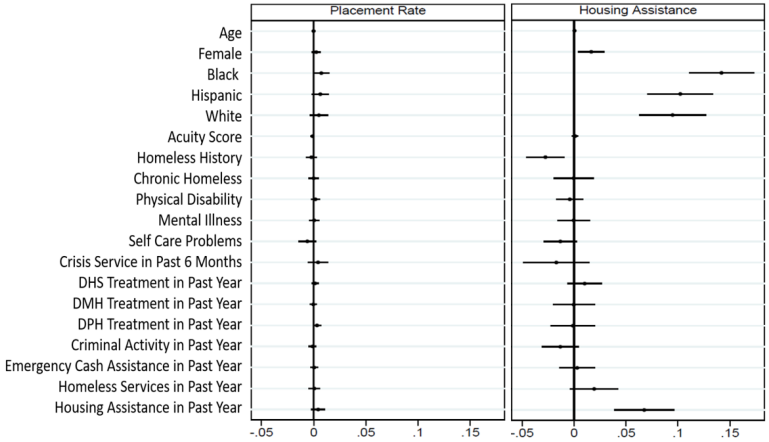
Figure 6: Testing for Random Assignment of Cases to Case Workers



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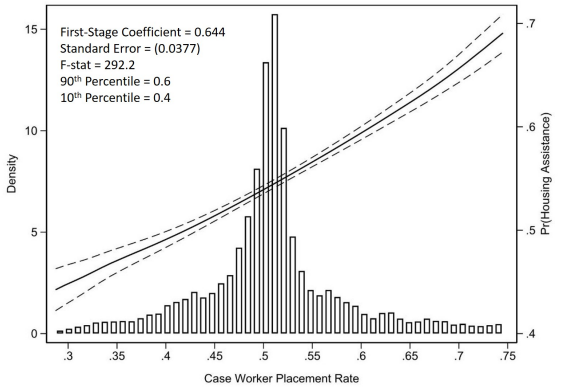
Assumption 2: First Stage

Case Worker Assignment is a Good Predictor for Housing Assistance

Figure 8: First Stage Graph of Housing Assistance on Case Worker Placement Rate



Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017. Probability of housing assistance is plotted on the right y-axis against leave-out mean case worker placement rate of the assigned case worker shown along the x-axis. The plotted values are mean-standardized residuals from regressions on site x assessment month fixed effects and all variables listed in Figure 6. The solid line shows a local linear regression of housing assistance on case worker placement rate. Dashed lines show 95% confidence intervals. The histogram shows the density of case worker placement rates along the left y-axis (top and bottom 2% excluded).

▸ What Drives The Variation? ▸ Validation Exercise ▸ Reduced Form

Assumptions 3 & 4: Exclusion & Monotonicity

(Instrument Impact via Housing Assistance Channel)

IV Validity: Exclusion and Monotonicity

- **Exclusion:** Case worker housing placement rate affects outcomes only through housing assistance
  - Main challenge: Multi-dimensional nature of case worker's work (i.e., housing and non-housing assistance)
  - Concern: Z affects Y because it is correlated with propensity of case workers in other dimensions
    - ⋆ Control for propensity in non-housing assistance services in 1st & 2nd stages ▸ Exclusion Test ▸ Housing vs. Other Programs ▸ Frandsen et al. (2019)

- **Monotonicity:** Individuals receiving housing assistance from a case worker with low placement rate would also receive it from a case worker with a high housing placement rate (and vice-versa for not receiving assistance)
  - Two tests for monotonicity: first stage estimates ▸ Monotonicity Tests
    - ⋆ Strong and positive across subsamples
    - ⋆ Strong when using placement rate in other case types

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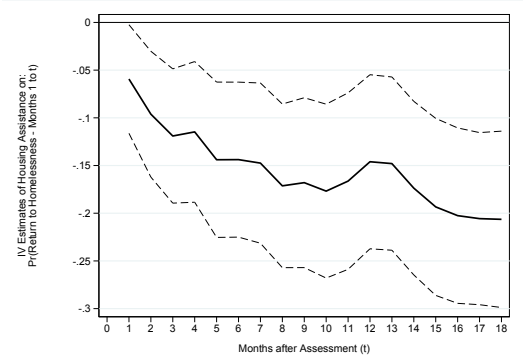
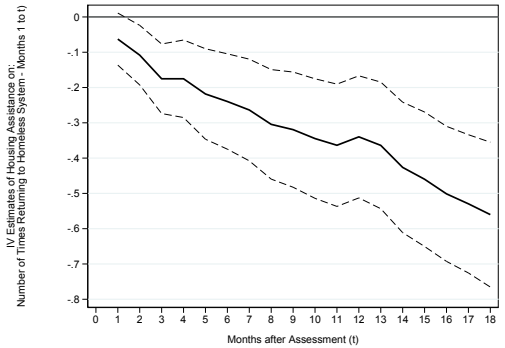
Recidivism to Homelessness

Housing Assistance Reduces and Prevents Recidivism to Homelessness

Figure 9: The Effect of Housing Assistance on Returning to the Homeless Support System



(a) IV Estimates: Pr(Ever Returning)



(b) IV Estimates: Number of Returns

Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017. Returns to the homeless support system include a new enrollment in a street outreach program or a new acuity assessment. Panel (a) shows IV estimates for ever returning to the homeless support system between month 1 to t after assessment. Panel (b) shows IV estimates for the number of returns to the homeless support system between month 1 to t after assessment. Dashed lines show 90% confidence intervals.

▸ First-Time Homeless ▸ Potential Outcomes

Recidivism - OLS vs. IV Differences Driven by Selection on Unobservables

Table 1: The Effect of Housing Assistance on Recidivism to Homelessness

Dependent Variable:	**Pr(Ever Returned to Homeless System)**				
Specification:	OLS	OLS	OLS	RF	IV
Controls:	No	Yes	Yes	Yes	Yes
Complier Weights:	No	No	Yes	No	No
	(1)	(2)	(3)	(4)	(5)
Housing Assistance	0.243***	0.270***	0.274***		-0.206***
	(0.0150)	(0.0130)	(0.0132)		(0.0564)
Housing Placement Rate				-0.133***	
				(0.0336)	
Dependent Mean	0.36	0.36	0.36	0.36	0.36
Complier Mean if No Housing Assistance	0.38	0.38	0.38	0.38	0.38
Number of Assessments	26,752	26,752	26,752	26,752	26,752

Notes: Controls refer to the list of controls listed in Figure 6 and site x month of intake FEs. Outcome is defined as returning to seek assistance from the homeless support system at least once in the 18 months after intake. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

▸ Complier Weights ▸ Full Table

Economic and Social Outcomes

Housing Assistance Stabilizes Physical and Mental Health

Table 2: The Effect of Housing Assistance on Health Outcomes - Main Findings

Dependent Variable:	**Health Outcomes (1-18 Months After Intake)**		
	Any Emegency Department Visit	**Any Mental Health Treatment**	**Any Substance Abuse Treatment**
	(1)	(2)	(3)
2SLS: Housing Assistance	-0.0541*	-0.0460**	-0.134
All Controls	(0.0302)	(0.0218)	(0.0878)
Dependent Mean	0.06	0.03	0.04
Number of Cases	11,339	15,510	5,314

Notes: All specifications include service site x month of assessment FEs and all the controls listed in Table 1. All outcomes are measured between 1-18 months after intake date. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

▸ Subsamples ▸ DHS ▸ DMH ▸ DPH

Housing Assistance Reduces Involvement in Criminal Activity

Table 3: The Effect of Housing Assistance on Crime Outcomes - Main Findings

	Criminal Activity (1-18 Months After Intake)		
Dependent Variable:	**Jail Bookings**	**Crimes**	**Any Probation**
	(1)	(2)	(3)
2SLS: Housing Assistance	-1.507**	-0.389**	-0.0363
All Controls	(0.621)	(0.182)	(0.0261)
Dependent Mean	1.05	0.31	0.033
Number of Assessments	15,510	15,510	15,510

Notes: All specifications include service site x month of assessment FEs and all the controls listed in Table 1. All outcomes are measured between 1-18 months after intake date. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

▸ Subsamples ▸ Crime

Housing Assistance Increases Financial Stability

Table 4: The Effect of Housing Assistance on Financial Outcomes - Main Findings

	Employment and Income (Any Report)		
Dependent Variable:	**Any Income**	**Employed**	**Social Benefits**
	(1)	(2)	(3)
2SLS: Housing Assistance	0.264***	0.242***	0.0923
All Controls	(0.0609)	(0.0724)	(0.0646)
Dependent Mean	0.76	0.14	0.67
Number of Assessments	23,054	23,387	23,054

Notes: All specifications include service site x month of assessment FEs and all the controls listed in Table 1. All outcomes are measured between 1-18 months after intake date. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

▸ Subsamples ▸ Income & Employment ▸ Benefits

Cost-Benefit Analysis

Benefits of Housing Assistance Offset Large Share of Housing Costs

Table 5: The Costs and Benefits of Housing Assistance for the Homeless

	Costs	**Benefits (Savings) of Public Agencies Expenditures**				
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable (Months 1-18 After Assessment):	Days Spent in Housing Programs	Overall	Future Returns to Homelessness	Health	Law Enforcement	Employment
IV: Housing Assistance	10,366***	-8,044***	-2,102***	-2,796*	-1,724***	-1,146***
	(1,020)	(1,713)	(469.5)	(1,583)	(549.6)	(388.2)
Dependent mean	3,752	5,723	2,413	1,264	941	-138
Number of Assessments	26,752	10,305	26,752	11,339	15,510	23,054

Notes: Estimation sample and specification with all controls. Standard errors are two-way clustered at the case worker and individual level. Direct housing costs are set to **$**35 per day for temporary housing, **$**40 per day for rapid rehousing, and **$**50 per day for permanent supportive housing, according to the 2017 Los Angeles Housing Gap Analysis. Future returns costs are estimated based on an average housing cost of **$**4,000 per return, based on direct housing costs computed in (1). Health costs are the sum of DHS and DMH costs. Law enforcement are the costs of jail days and probation months. Cost estimates are taken as described in the text. Net transfers are computed as the total cash transfers, computed as the difference between total income and wage, and taxes received are set at 15% of wages. Overall costs are the sum of columns 3-6. All costs and benefits are estimated for an 18-month period. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

Outline

1. Introduction
2. Background
3. Data
4. Empirical Strategy
5. Results
6. Additional Results - Recidivism to Homelessness

Outline

7 Robustness
- Specification Checks
- Exclusion Restriction

8 Backup Slides

Specification Checks (1): Minimum Number of Cases

Table 6: Specification Checks - Minimum Number of Cases per Case Workers

		Cases Handled by Case Worker in Sample			
	Baseline	$\geq$ 10 Cases	$\geq$ 20 Cases	$\geq$ 30 Cases	$\geq$ 40 Cases
	(1)	(2)	(3)	(4)	(5)
Dependent Variable:		**A. Pr(Received Housing Assistance)**			
First Stage: Case Worker Housing Placement Rate	0.644***	0.609***	0.661***	0.664***	0.684***
	(0.0377)	(0.0351)	(0.0411)	(0.0508)	(0.0605)
Dependent Mean	0.5449	0.5419	0.5512	0.5559	0.5664
Dependent Variable:		**B. Pr(Returned to Homeless Support System)**			
Months 1-18 after Assessment					
RF: Case Worker Housing Placement Rate	-0.133***	-0.118***	-0.136***	-0.146***	-0.134***
	(0.0336)	(0.0308)	(0.0366)	(0.0447)	(0.0484)
IV: Housing Assistance	-0.206***	-0.194***	-0.206***	-0.220***	-0.196**
	(0.0564)	(0.0536)	(0.0599)	(0.0746)	(0.0805)
Dependent Mean	0.36	0.36	0.36	0.36	0.36
Dependent Variable:		**C. Number of Times Returning to Homeless Support System**			
Months 1-18 after Assessment					
RF: Case Worker Housing Placement Rate	-0.361***	-0.334***	-0.344***	-0.376***	-0.346***
	(0.0712)	(0.0655)	(0.0771)	(0.0916)	(0.0943)
IV: Housing Assistance	-0.560***	-0.549***	-0.521***	-0.565***	-0.506***
	(0.125)	(0.120)	(0.131)	(0.161)	(0.168)
Dependent Mean	0.64	0.64	0.64	0.65	0.65
Number of Assessments	26,752	28,309	25,386	23,340	20,873

Notes: All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

Specification Checks (2): Fixed Effects Selection

Table 7: Specification Checks - Fixed Effects Selection

		Fixed Effects Selection			
	Baseline	Site x Quarter	Site x Year	Provider x Month	SPA x Month
	(1)	(2)	(3)	(4)	(5)
Dependent Variable:		**A. Pr(Received Housing Assistance)**			
First Stage: Case Worker Housing Placement Rate	0.644***	0.593***	0.571***	0.647***	0.577***
	(0.0377)	(0.0414)	(0.0467)	(0.0477)	(0.0910)
Dependent Mean	0.5449	0.5356	0.5328	0.5323	0.5297
Dependent Variable:		**B. Pr(Returned to Homeless Support System)**			
Months 1-18 after Assessment					
RF: Case Worker Housing Placement Rate	-0.133***	-0.130***	-0.130***	-0.124***	-0.123**
	(0.0336)	(0.0320)	(0.0344)	(0.0342)	(0.0486)
IV: Housing Assistance	-0.206***	-0.219***	-0.227***	-0.192***	-0.213**
	(0.0564)	(0.0580)	(0.0630)	(0.0568)	(0.106)
Dependent Mean	0.36	0.36	0.36	0.36	0.36
Dependent Variable:		**C. Number of Times Returning to Homeless Support System**			
Months 1-18 after Assessment					
RF: Case Worker Housing Placement Rate	-0.361***	-0.326***	-0.322***	-0.352***	-0.327***
	(0.0712)	(0.0674)	(0.0725)	(0.0735)	(0.0933)
IV: Housing Assistance	-0.560***	-0.549***	-0.564***	-0.544***	-0.567***
	(0.125)	(0.126)	(0.135)	(0.127)	(0.217)
Dependent Mean	0.64	0.64	0.63	0.63	0.63
Number of Assessments	26,752	29,422	30,343	28,788	30,393

Notes: All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

Specification Checks (3): Treatment Timing Definition

Table 8: Specification Checks - Treatment Timing Definition

		Treatment Definition: Received Housing Assistance Within:			
	Baseline	1 Month	3 Months	6 Months	12 Months
	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	**A. Pr(Received Housing Assistance)**				
First Stage: Case Worker Housing Placement Rate	0.644***	0.859***	0.788***	0.735***	0.682***
	(0.0377)	(0.0264)	(0.0298)	(0.0317)	(0.0345)
Dependent Mean	0.5449	0.3615	0.4160	0.4601	0.5157
Dependent Variable:	**B. Pr(Returned to Homeless Support System)**				
Months 1-18 after Assessment					
RF: Case Worker Housing Placement Rate	-0.133***	-0.0992***	-0.104***	-0.120***	-0.130***
	(0.0336)	(0.0288)	(0.0299)	(0.0311)	(0.0327)
IV: Housing Assistance	-0.206***	-0.116***	-0.133***	-0.164***	-0.190***
	(0.0564)	(0.0349)	(0.0393)	(0.0443)	(0.0507)
Dependent Mean	0.36	0.36	0.36	0.36	0.36
Dependent Variable:	**C. Number of Times Returning to Homeless Support System**				
Months 1-18 after Assessment					
RF: Case Worker Housing Placement Rate	-0.361***	-0.215***	-0.241***	-0.293***	-0.353***
	(0.0712)	(0.0610)	(0.0621)	(0.0656)	(0.0693)
IV: Housing Assistance	-0.560***	-0.250***	-0.306***	-0.398***	-0.518***
	(0.125)	(0.0748)	(0.0831)	(0.0957)	(0.112)
Dependent Mean	0.64	0.64	0.64	0.64	0.64
Number of Assessments	26,752	26,752	26,752	26,752	26,752

Notes: All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

Specification Checks (4): Instrument Definition

Table 9: Specification Checks - Instrument Definition

		Instrument Definition:			
	Baseline	Winsorized Instrument	Split Sample	with Veteran Cases	Residualized Placement Rate
	(1)	(2)	(3)	(4)	(5)
Dependent Variable:		**A. Pr(Received Housing Assistance)**			
First Stage: Case Worker Housing Placement Rate	0.644***	0.666***	0.613***	0.657***	0.713***
	-0.0377	(0.0419)	(0.0461)	(0.0377)	(0.0435)
Dependent Mean	0.5449	0.5449	0.5504	0.5449	0.5449
Dependent Variable:		**B. Pr(Returned to Homeless Support System)**			
Months 1-18 after Assessment					
RF: Case Worker Housing Placement Rate	-0.133***	-0.141***	-0.100**	-0.129***	-0.150***
	(0.0336)	(0.0359)	(0.0410)	(0.0342)	(0.0389)
IV: Housing Assistance	-0.206***	-0.212***	-0.164**	-0.196***	-0.211***
	(0.0564)	(0.0582)	(0.0671)	(0.0557)	(0.0592)
Dependent Mean	0.36	0.36	0.36	0.36	0.36
Dependent Variable:		**C. Number of Times Returning to Homeless Support System**			
Months 1-18 after Assessment					
RF: Case Worker Housing Placement Rate	-0.361***	-0.384***	-0.304***	-0.357***	-0.409***
	(0.0712)	(0.0760)	(0.0799)	(0.0726)	(0.0821)
IV: Housing Assistance	-0.560***	-0.577***	-0.497***	-0.543***	-0.574***
	(0.125)	(0.130)	(0.138)	(0.124)	(0.132)
Dependent Mean	0.64	0.64	0.64	0.64	0.64
Number of Assessments	26,752	26,752	13,394	26,752	26,752

Notes: All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

Threats to Exclusion Restriction

Table 10: IV Model with Three Treatment Options 'Housing Assistance', 'Non-Housing Services', and 'No Treatment'.

	First Stages		Reduced Form		IV	
	(1)	(2)	(3)	(4)	(5)	(6)
	Outcome: **Pr(Housing Assistance)**	Outcome: **Pr(Non-Housing Assistance)**	Months 1-18 after Assessment **Pr(Returned to Homeless Support System)**	Months 1-18 after Assessment **Number of returns**	Months 1-18 after Assessment **Pr(Returned to Homeless Support System)**	Months 1-18 after Assessment **Number of returns**
A. Baseline Specification						
Instrument:					Outcome:	
Housing Placement Rate	0.644***		-0.133***	-0.361***	Housing Assistance -0.206***	-0.560***
	(0.0377)		(0.0336)	(0.0712)	(0.0564)	(0.125)
F-stat (Instrument)	292.22					
Dependent Mean	0.5449		0.3623	0.6432	0.3623	0.6432
B. Specification with Three Treatment Options						
Instruments:					Outcomes:	
Housing Placement Rate	0.641***	-0.0715**	-0.131***	-0.356***	Housing Assistance -0.199***	-0.546***
	(0.0369)	(0.0279)	(0.0330)	(0.0705)	(0.0559)	(0.126)
Non-Housing Services Placement Rate	-0.0775***	0.671***	0.0476	0.105*	Non-Housing Services 0.0479	0.0931
	(0.0267)	(0.0419)	(0.0291)	(0.0582)	(0.0456)	(0.0962)
SW F-stat (Instrument)	258.85	243.4				
Dependent Mean	0.5449	0.3426	0.3623	0.6432	0.3623	0.6432
Number of Assessments	26,752	26,752	26,752	26,752	26,752	26,752

Notes: All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

Housing Programs for the Homeless

1. **Emergency Shelter (ES):** A program that offers temporary shelter (lodging) for the homeless in general or for specific populations of the homeless.
2. **Transitional Housing (TH):** A program that provides temporary lodging and is designed to facilitate the movement of homeless individuals and families into permanent housing within a specified period of time, but no longer than 24 months.
3. **Safe Haven (SH):** A program that offers supportive housing that (1) serves hard to reach homeless persons with severe mental illness who came from the streets and have been unwilling or unable to participate in supportive services; (2) provides 24-hour residence for eligible persons for an unspecified period; (3) has an overnight capacity limited to 25 or fewer persons; and (4) provides low demand services and referrals for the residents.
4. **Rapid Re-Housing (RRH):** A program that provides housing relocation and stabilization services and short- and/or medium-term rental assistance as necessary to help a homeless individual or family move as quickly as possible into permanent housing and achieve stability in that housing.
5. **Permanent Supportive Housing (PSH):** A program that offers permanent housing and supportive services to assist homeless persons with a disability to live independently.
6. **Other Permanent Housing (OPH):** A program that either 1) offers permanent housing and supportive services to assist homeless persons to live independently, but does not limit eligibility to individuations with disabilities, or 2) offers permanent housing for persons who are homeless, but does not make supportive services available as part of the project.

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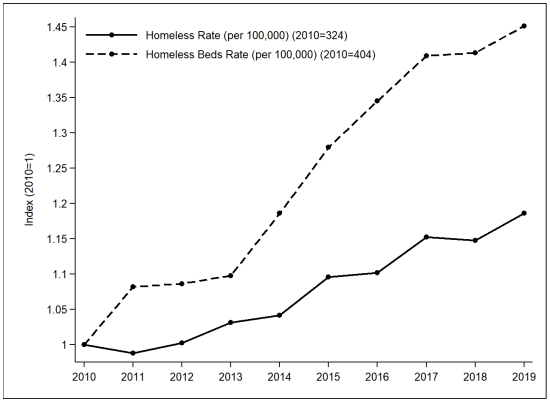
Expansion of Beds Failed to Stop Increase in Homelessness

Figure 1.1: Homeless Rates and Homeless Beds Rate in Large US Cities, 2010-2019



Notes: Solid line presents the homeless rates (per 100,000 residents) for the 30 largest cities in the US per 100,000 residents. Population is defined as the average estimates from the 2013-2017 ACS. The dashed line presents the homeless beds rate (per 100,000 residents). Both measures are standardized to 1 at 2010.

Source: Byrne et al. (2013), US Department of Housing and Urban Development (HUD) Point-in-Time (PIT), United States Interagency Council on Homelessness (USICH).

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Who is Experiencing Homelessness in LA County?

Table 1.1: Individuals Experiencing Homelessness Are More Likely to Come from Disadvantaged Populations

	Homeless Population		General Population
	Los Angeles County	Rest of US	USA
	(1)	(2)	(3)
Overall Population	56,257	505,927	-
Homeless Rate (per 100,000)	608	164	-
Shelter Type:			
Sheltered	**0.25**	0.68	-
Unsheltered	0.75	0.32	-
Gender:			
Females	0.31	0.40	0.51
Males	0.67	0.60	0.49
Race/Ethnicity:			
Black	**0.43**	0.40	0.13
Hispanic	**0.36**	0.20	0.09
White	0.10	0.28	0.73
Other Race/Ethnicity	0.11	0.12	0.06
Household Type:			
Families	**0.15**	0.32	0.43
Anyone Else	0.85	0.68	0.57
By Age:			
Under 18 Years Old	0.09	0.20	0.229
18-24 Years Old	0.06	0.08	0.01
$>$ 24 Years Old	0.85	0.72	0.76
Special Populations (18+ Years Old):			
Chronically Homeless	**0.28**	0.18	-
Veterans	0.06	0.07	0.06
Severely Mentally Ill*	0.27	0.20	0.03
Chronic Substance Abuse*	0.16	0.16	0.06
HIV Positive*	0.02	0.07	0.003

Notes: Columns 1-2 show different demographic characteristics of individuals experiencing homelessness. Column 1 considers Los Angeles County's homeless population, while column 2 considers the homeless population in the rest of the US. Column 3 shows the same demographics for the general US population.

Source: Byrne et al. (2013), US Department of Housing and Urban Development (HUD) Point-in-Time (PIT), Evans et al. (2019).

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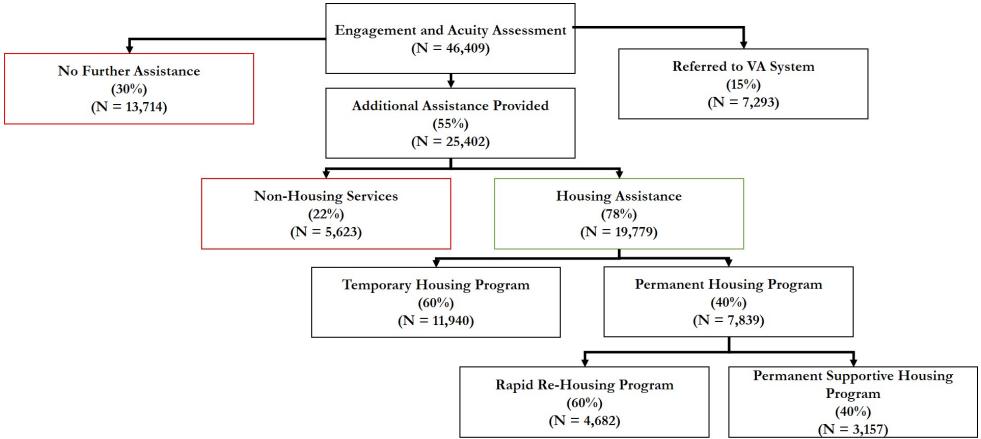
Constructing the Instrument and Estimation Samples

- **Reminder:** This study uses a case worker random-assignment design which requires:
  - Case worker's housing placement propensity
  - Consider only cases that were as-good-as-randomly assigned
- **Instrument Sample** (to construct case worker housing placement propensity):
  - Focus on cases: Conducted in 2016-2017; Single adults age 25-65; Non-veteran
  - 39,116 Cases handled by 2,580 case workers in 316 service sites
  - Each case worker handles on average 60 cases in the instrument sample
- **Estimation Sample** (to consider only as-good-as-randomly assigned cases):
  - Keep sites with at least 2 case workers working in the same month
  - Keep case workers with at least 15 cases handled in 2016-2017
  - **26,752 cases handled by 502 case workers in 95 service sites**

Sample Selection - Steps | Back

CES Process and Best Treatment Distribution

Figure 1.2: Best Treatment Received - Instrument Sample

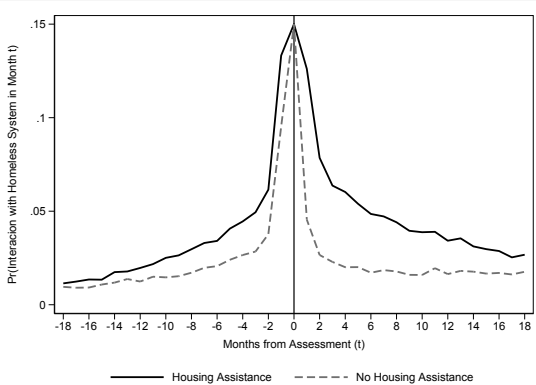


Notes: Sample consists of assessments conducted in 2016-2017. Treatments received within 18-months from assessment are not mutually exclusive and best treatment received is presented for simplicity.

First Treatment Received | Back

Housing Assistance is Positively Correlated with Recidivism

Figure 1.3: Recidivism into Homelessness before and after Month of Assessment



Notes: Instrument sample consisting of 39,106 non-veteran single adult cases assessed in 2016-2017. Cases are categorized in two groups, either receiving housing assistance within 18-months from assessment date as shown in the solid black or those who did not receive housing assistance within this period as shown in the dashed grey line. Recidivism into homelessness is defined as enrolling in a street outreach program or being assessed by a case worker at least once in each month. Month 0 outcome is winsorized to .15 for ease of interpretation (both groups have a probability of 1 by definition).

▸ Recidivism - Alternative Definitions ▸ Treatment - Alternative Definitions ▸ Residuals Figure ▸ Back

Constructing the Instrument Sample

Table 1.2: Sample Restrictions

	Sample Sizes (Remaining after each restriction):			
	Number of Assess-ments	Number of Clients	Number of Case Workers	Number of Sites
	(1)	(1)	(2)	(3)
All Cases:	87,351	67,171	-	-
Keep all assessments conducted in 2016-2017	55,366	42,655	-	-
Keep individuals age 25-65	48,595	37,241	-	-
Drop cases with missing case worker, organization, and site information	47,157	36,620	3,028	350
Remove duplicates or multiple same-day assessments	46,411	36,511	3,020	348
Keep all non-veteran cases **(Instrument Sample)**	39,116	30,794	2,580	316
Keep case workers with more than 15 non-veteran assessments	31,629	25,556	524	112
Keep sites with at least 2 case workers in a given month **(Estimation Sample)**	26,752	22,011	502	95

Notes: The initial sample consists of all assessments processed in Los Angeles County's Coordinated Entry System between 01/16–12/17 for single adults age 25-65.

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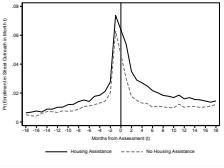
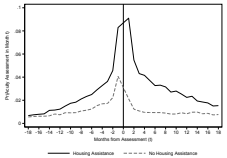
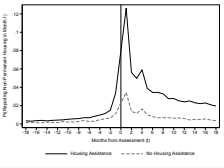
Figure 1.4: Alternative Definitions of Recidivism



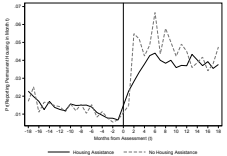
(a) Enrollment in a Street Outreach Program



(b) New Acuity Assessment



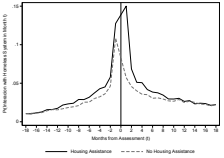
(c) Reported No Housing Solution



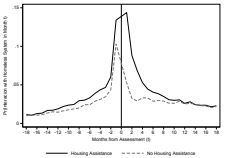
(b) Reported a Permanent Housing Solution

Notes: Instrument sample consisting of 39,119 non-veteran single adult cases assessed in 2016-2017. Cases are categorized in two groups, either receiving housing assistance within 18-months from assessment date as shown in the solid black or those who did not receive housing assistance within this period as shown in the dashed grey line.

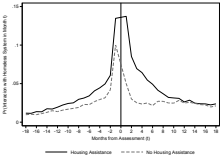
Figure 1.5: Alternative Definitions of Treatment



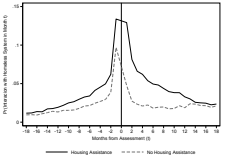
(a) Up to 1 Month After Assessment



(b) Up to 3 Months After Assessment



(c) Up to 6 Months After Assessment

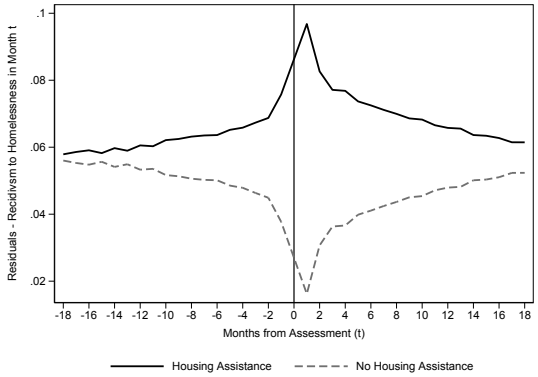


(b) Up to 12 Months After Assessment

Notes: Instrument sample consisting of 39,119 non-veteran single adult cases assessed in 2016-2017. Cases are categorized in two groups, either receiving housing assistance within 1,3,6, and 12-months from assessment date as shown in the solid black or those who did not receive housing assistance within this period as shown in the dashed grey line.

Housing Assistance is Positively Correlated with Recidivism

Figure 1.6: Recidivism into Homelessness before and after Month of Assessment



Notes: Instrument sample consisting of 39,106 non-veteran single adult cases assessed in 2016-2017. Cases are categorized in two groups, either receiving housing assistance within 18-months from assessment date as shown in the solid black or those who did not receive housing assistance within this period as shown in the dashed grey line. Residuals are obtained from a regression of case-month recidivism on case, month from intake, month, and individual fixed effects.

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Table 1.3: Summary Statistics by Sample Type

	Estimation Sample	Instrument Sample	Excluded Sample
	(1)	(2)	(3)
Demographics:			
Age	45.12	45.24	45.50
	(11.23)	(11.22)	(11.20)
Female	0.342	0.359	0.396
	(0.474)	(0.480)	(0.489)
Black	0.509	0.484	0.429
	(0.500)	(0.500)	(0.495)
Hispanic	0.231	0.237	0.250
	(0.421)	(0.425)	(0.433)
White	0.195	0.209	0.238
	(0.396)	(0.406)	(0.426)
Acuity Assessment:			
Acuity Score (0-18)	7.267	7.511	8.040
	(3.710)	(3.711)	(3.660)
Homeless History	0.717	0.735	0.775
	(0.450)	(0.441)	(0.418)
Chronic Homeless	0.613	0.640	0.698
	(0.487)	(0.480)	(0.459)
Physical Disability	0.697	0.721	0.773
	(0.459)	(0.448)	(0.419)
Mental Disability	0.576	0.606	0.669
	(0.494)	(0.489)	(0.470)
Self Care Problems	0.291	0.293	0.297
	(0.454)	(0.455)	(0.457)
Used Crisis Service in Past 6 Months	0.0425	0.0445	0.0486
	(0.202)	(0.206)	(0.215)
Past Health, Criminal, Housing History:			
Any DHS Treatment in Past 12 Months	0.172	0.172	0.172
	(0.378)	(0.378)	(0.378)
Any DMH Treatment in Past 12 Months	0.116	0.116	0.116
	(0.321)	(0.320)	(0.320)
Any Substance Abuse Treatment in Past 12 Months	0.0846	0.0841	0.0831
	(0.278)	(0.278)	(0.276)
Involvement with Law Enforcement Agencies in Past 12 Months	0.137	0.136	0.134
	(0.343)	(0.343)	(0.341)
Received Emergency Cash Assistance in Past 12 Months	0.192	0.191	0.190
	(0.394)	(0.393)	(0.392)
Any Interaction with Homeless Support System in Past 12 Months	0.351	0.347	0.340
	(0.477)	(0.476)	(0.474)
Any Housing Assistance Recieved in Past 12 Months	0.282	0.276	0.263
	(0.450)	(0.447)	(0.440)
Number of Clients	22,011	30,794	11,346
Number of Cases	26,752	39,116	12,364

Notes: Column 1 shows sample means for estimation sample of individuals assessed between 01/16-12/17. Column 2 shows sample mean for the full sample of assessment, column 3 shows sample means of all excluded cases.

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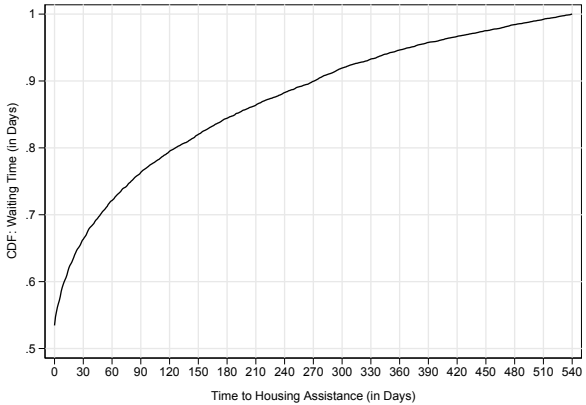
The CDF of Housing Assistance Days Until Housing Assistance Started

Figure 1.7: Time to Housing Assistance - CDF



Notes: Sample consists of 10,427 cases processed between 01/16-12/17 which resulted in housing assistance.

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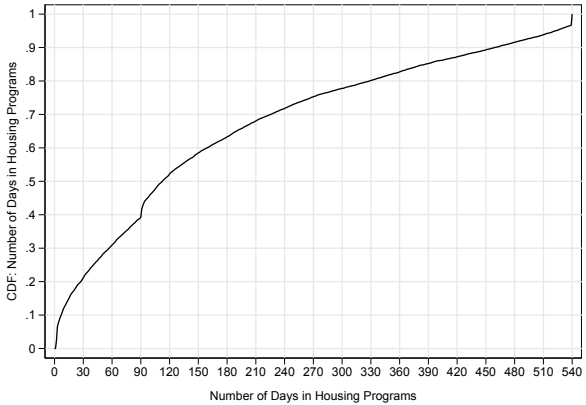
The CDF of Housing Assistance Days Received

Figure 1.8: Days in Housing Programs - CDF



Notes: Sample consists of 10,427 cases processed between 01/16-12/17 which resulted in housing assistance.

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Treatments Distribution by Sample

Table 1.4: Treatment Received - Homeless Support System

	Instrument Sample		Estimation Sample	
	Number of Cases	Percent of Cases	Number of Cases	Percent of Cases
	(1)	(2)	(3)	(4)
1. Permanent Supportive Housing (PSH):	3,157	100%	1,962	100%
Permanent Supportive Housing (PSH) Only	1,031	33%	564	29%
with Non-Housing Services (NH)	561	18%	370	19%
with Temporary Housing (TH)	594	19%	370	19%
with Temporary Housing (TH) and Non-Housing Services (NH)	598	19%	429	22%
with Rapid Re-Housing (RRH)	106	3%	76	4%
with Rapid Re-Housing (RRH) and Temporary Housing (TH)	81	3%	38	2%
with Rapid Re-Housing (RRH) and Non-Housing Services (NH)	73	2%	56	3%
with Rapid Re-Housing (RRH), Temporary Housing (TH), and Non-Housing Services (NH)	113	4%	59	3%
2. Rapid Re-Housing (RRH):	4,682	100%	3,204	100%
Rapid Re-Housing (RRH) Only	2,186	47%	1,522	48%
with Temporary Housing (TH)	960	21%	554	17%
with Non-Housing Services (NH)	689	15%	567	18%
with Temporary Housing (TH) and Non-Housing Services (NH)	847	18%	561	18%
3. Temporary Housing (TH):	11,940	100%	9,412	100%
Temporary Housing (TH) Only	7,981	67%	6,321	67%
with Non-Housing Services (NH)	3,959	33%	3,091	33%
4. Non-Housing Services (NH):	5,623	100%	4,031	100%
5. No Treatment Received	13,714	100%	8,143	100%
Total Cases	39,116	100%	26,752	100%

Notes: The initial sample consists of all assessments processed in Los Angeles County's Coordinated Entry System between 01/16–12/17 for single adults age 25-65. Covers all treatments received within 18-months from assessment date.

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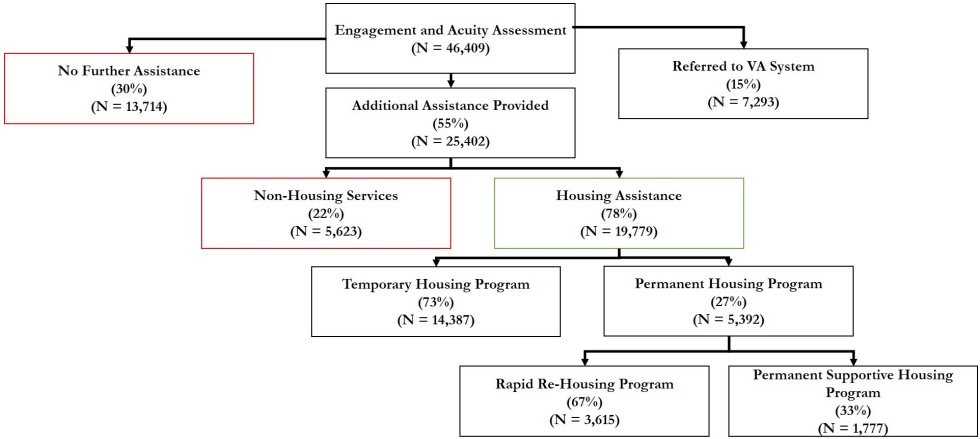
CES Process and First Treatment Distribution

Figure 1.9: First Treatment Received - Instrument Sample



Notes: Sample consists of assessments conducted between 01/16-12/17. Treatments received are not mutually exclusive and first treatment received is presented for simplicity.

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Constructing the Estimation Sample

Table 1.5: Sample Restrictions

	Sample Sizes (Remaining after each restriction):			
	Number of Assess-ments	Number of Clients	Number of Case Workers	Number of Sites
	(1)	(1)	(2)	(3)
All Cases:	87,351	67,171	-	-
Keep all assessments conducted in 2016-2017	55,366	42,655	-	-
Keep individuals age 25-65	48,595	37,241	-	-
Drop cases with missing case worker, organization, and site information	47,157	36,620	3,028	350
Remove duplicates or multiple same-day assessments	46,411	36,511	3,020	348
Keep all non-veteran cases **(Instrument Sample)**	39,116	30,794	2,580	316
Keep case workers with more than 15 non-veteran assessments	31,629	25,556	524	112
Keep sites with at least 2 case workers in a given month **(Estimation Sample)**	26,752	22,011	502	95

Notes: The initial sample consists of all assessments processed in Los Angeles County's Coordinated Entry System between 01/16–12/17 for single adults age 25-65.

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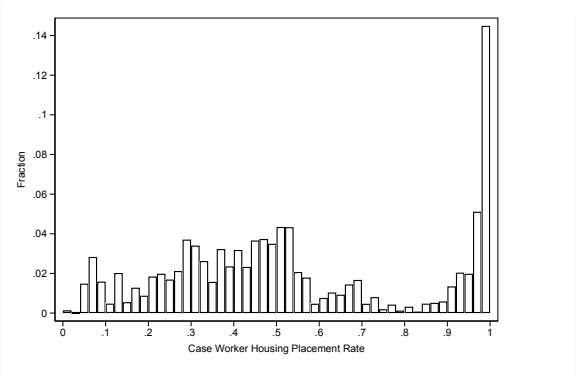
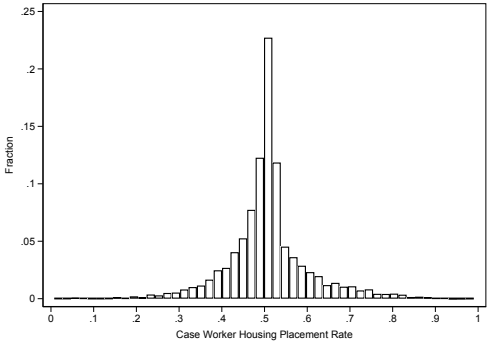
Case Worker Housing Placement Rates - Distribution

Figure 1.10: Case Worker Housing Placement Rates - Raw and Adjusted



(a) Raw



(b) Adjusted for Site and Time

Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017. The plotted values in figure (a) are raw placement rates and in figure (b) are mean-standardized residuals from regressions on site x assessment month fixed effects and all variables listed in Table 1.
Raw placement rate: mean = .544, standard error = .297, median = .487
Adjusted Placement Rate: mean = .508, standard error = .099, median = .508

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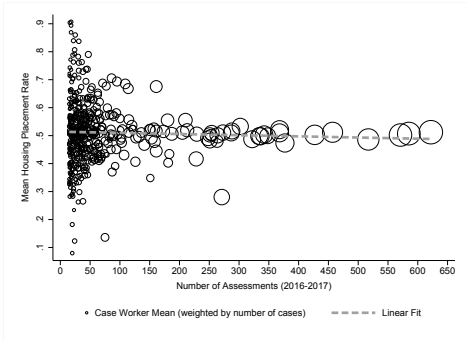
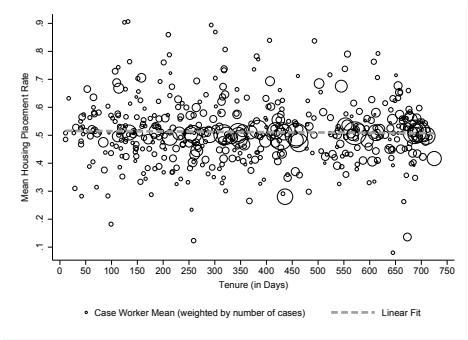
Case Worker - Placement Rate and Characteristics

Figure 1.11: Case Worker Housing Placement Rate vs. Number of Assessments and Tenure



(a) Number of Assessments



(b) Tenure

Notes: Panel (a) plots case worker housing placement rate against the total number of assessments conducted by each case worker. Panel (b) plots case worker housing placement rate against the tenure (in days) of each case worker. There are 502 unique case workers, and on average, each case worker has handled a total of 60 assessments. Housing placement rates are standardized by subtracting off service site by month of assessment means and individual level covariates. Dot size is proportional to the number of cases the case worker has in the estimation sample, which is slightly smaller than the overall number of cases.

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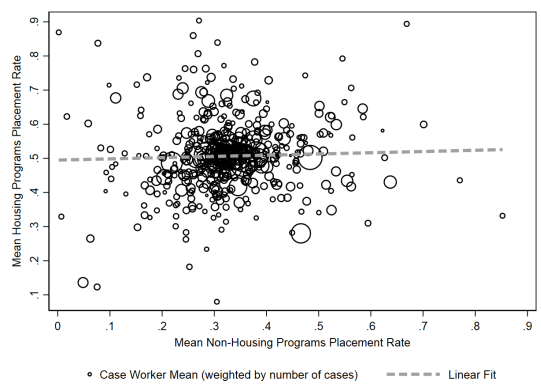
Housing vs. Non-Housing Program Placement Propensities

Figure 1.12: Case Worker Housing Placement Rate vs. Non-Housing Programs Placement Rate



Notes: Figure plots case worker housing placement rate against non-housing programs placement rate by each case worker. There are 502 unique case workers, and on average, each case worker has handled a total of 60 assessments. Placement rates are standardized by subtracting off service site by month of assessment means and individual level covariates. Dot size is proportional to the number of cases the case worker has in the estimation sample, which is slightly smaller than the overall number of cases.

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Verifying Random Assignment to Case Workers (2)

Table 1.6: First Stage Estimates of Housing Assistance on Case Worker Placement Rate

	(1)	(2)	(3)	(4)
Controls:	Site X Time FEs	Add Demographics	Add Acuity Measures	Add History of Interaction with Public Agencies
Dependent Variable:		**Pr(Received Housing Assistance)**		
Case Worker Housing Placement Rate	0.661***	0.652***	0.652***	0.644***
	(0.0381)	(0.0380)	(0.0382)	(0.0377)
F-stat. (Instrument)	300.13	294.89	291.38	292.22
Dependent mean	0.545	0.545	0.545	0.545
R-Squared	0.378	0.384	0.384	0.389
Number of Assessments	26,752	26,752	26,752	26,752

Notes: Columns 1-4 show first stage estimates of different specifications on the estimation sample of assessments in 2016-2017. Column 1 includes site-month of assessment fixed effects. Column 2 adds the individual demographics listed in Table 1. Column 3 adds acuity assessment outcomes described in Table 1. Column 4 adds lagged outcomes variables described in Table 1. Standard errors are two-way clustered at the case worker and client level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

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What Causes Case Workers to Differ in Housing Placement Propensity?

- No relationship between observed case worker characteristics and instrument:
  - Number of assessments/tenure ▸ Figure
  - Gender and Race (including interaction with client characteristics)
- Based on interviews with many service providers, hard to measure **soft skills** are key:
  - Ability to build trust and motivate clients
  - Good networking skills
  - Ability to manage resources available to solve the problem
- Causal interpretation is valid regardless why case workers differ from each other

▸ Case Worker Characteristics ▸ Back

Case Worker Characteristics

Table 1.7: Case Worker Characteristics

	Mean	Standard Deviation	Median	Min	Max
	(1)	(2)	(3)	(4)	(5)
Tenure:					
Number of Assessments	64	87	35	15	680
Number of Assessments (non-veteran)	60	81	34	15	622
Tenure Days (Number of Days Between First and Last Assessment)	370	202	351	11	725
Demographics:					
Female Sounding First Name	0.62	0.49	1	0	1
Hispanic Sounding Last Name	0.36	0.48	0	0	1
Housing Placements:					
Share of Cases with Any Housing Assistance	0.48	0.27	0.45	0	1
Share of Cases with Permanent Housing Assistance	0.23	0.20	0.18	0	1
Share of Cases with Supportive Housing Assistance	0.09	0.10	0.067	0	0.70
Share of Cases with Rapid Re Housing Assistance	0.15	0.19	0.09	0	1
Share of Cases with Temporary Housing Assistance	0.32	0.28	0.25	0	1
Mean Housing Placement Rate (Instrument)	0.51	0.12	0.26	0.51	0.92
Number of Case Workers	502	502	502	502	502

Notes: Sample of case workers from the estimation sample of individuals assessed between 01/16-06/17. The 502 case workers are affiliated with 95 service sites, the average number of case workers in a site being 15, the median is 3.

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Verifying Random Assignment to Case Workers (1)

Table 1.8: Testing for Random Assignment of Criminal Cases to Judges

	Dependent Variables:				Explanatory Variables:	
	Pr(Received Housing Assistance)		Case Worker Housing Placement Rate		Mean	Standard Deviation
	(1)	(2)	(3)	(4)	(5)	(6)
	Coefficient Estimate	Standard Error	Coefficient Estimate	Standard Error		
Demographics:						
Age	0.000507*	(0.000273)	0.000	(0.000)	45.12	(11.23)
Female	0.0166**	(0.00654)	0.00246	(0.00212)	0.342	(0.474)
Black	0.142***	(0.0159)	0.00735*	(0.00401)	0.509	(0.500)
Hispanic	0.102***	(0.0161)	0.00638	(0.00417)	0.231	(0.421)
White	0.0949***	(0.0163)	0.00501	(0.00445)	0.195	(0.396)
Acuity Assessment:						
Acuity Score (0-17)	0.00116	(0.00149)	-0.00110	(0.000893)	7.267	(3.710)
Homeless History	-0.0275***	(0.00937)	-0.00212	(0.00262)	0.717	(0.450)
Chronic Homeless	-0.000266	(0.00968)	0.000	(0.00240)	0.613	(0.487)
Physical Disability	-0.00404	(0.00657)	0.00170	(0.00210)	0.697	(0.459)
Mental Disability	-0.000262	(0.00789)	0.000480	(0.00251)	0.576	(0.494)
Self Care Problems	-0.0131	(0.00805)	-0.00603	(0.00440)	0.291	(0.454)
Used Crisis Service in Past 6 Months	-0.0170	(0.0162)	0.00421	(0.00481)	0.0425	(0.202)
Past Health, Criminal, Housing History:						
Any DHS Treatment in Past 12 Months	0.0102	(0.00848)	0.00135	(0.00160)	0.172	(0.378)
Any DMH Treatment in Past 12 Months	-0.000210	(0.0103)	-0.000301	(0.00179)	0.116	(0.321)
Any Substance Abuse Treatment in Past 12 Months	-0.00106	(0.0108)	0.00322	(0.00206)	0.0846	(0.278)
Involvement with Law Enforcement Agencies in Past 12 Months	-0.0132	(0.00916)	-0.00106	(0.00188)	0.137	(0.343)
Received Emergency Cash Assistance in Past 12 Months	0.00306	(0.00864)	0.000453	(0.00176)	0.192	(0.394)
Any Interaction with Homeless Support System in Past 12 Months	0.0194	(0.0118)	0.000653	(0.00267)	0.351	(0.477)
Any Housing Assistance Recieved in Past 12 Months	0.0676***	(0.0148)	0.00433	(0.00336)	0.282	(0.450)
F-statistic for joint test	9.174		1.117			
p-value	0.000		0.329			
Number of Cases	26,752				26,752	

Notes: Columns 1-4 show estimates for estimation sample of individuals assessed in 2016-2017. All estimations include controls for site x month of assessment FEs. Reported F-statistic refers to a joint test of the null hypothesis for all variables. The omitted category for race is missing/multiple/other race. Standard errors are two-way clustered at the case worker and client level. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

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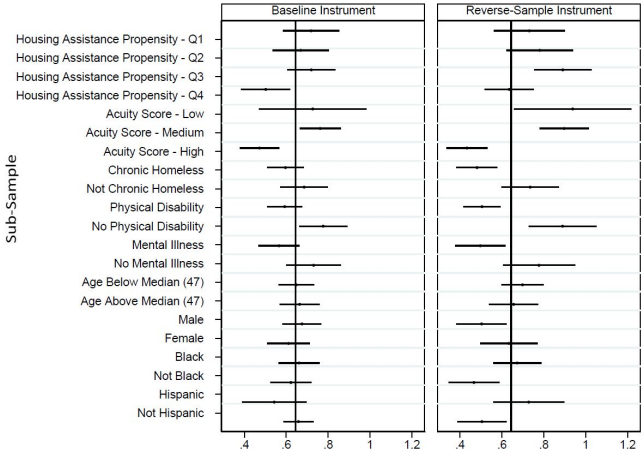
Monotonicity Tests

Figure 1.13: Tests for the Monotonicity Assumption



Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017.The plotted coefficients are from regressions of site x assessment month fixed effects and all variables listed in Table 1 on housing assistance receipt. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

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Exclusion Restriction Test (1)

Table 1.9: Controlling for Case Worker Propensity in Non-Housing Assistance Margin

	First Stage	Reduced Form		IV	
	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	**Pr(Received Housing Assistance)**	**Pr(Returned to Homeless System)**	**No. of times returned to Homeless System**	**Pr(Returned to Homeless System)**	**No. of times returned to Homeless System**
A. Baseline Specification					
	0.644***	-0.133***	-0.361***	-0.206***	-0.560***
	(0.0377)	(0.0336)	(0.0712)	(0.0564)	(0.125)
F-stat (Instrument)	292.22				
B. Controls for Non-Housing Services Placement Rate					
	0.641***	-0.131***	-0.356***	-0.204***	-0.556***
	(0.0369)	(0.0330)	(0.0705)	(0.0560)	(0.125)
F-stat (Instrument)	301.79				
Number of Assessments	26,752	26,752	26,752	26,752	26,752

Notes: Sample includes individuals who were assessed by a case workers in 2016-2017. All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

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Describing the Compliers, Always, and Never Takers

Table 1.10: Summary Statistics by Complier Type

	Baseline Sample	Compliers (27%)	Always Takers (26%)	Never Takers (47%)
	(1)	(2)	(3)	(4)
Demographics:				
Age Above Median (47)	0.50	0.52	0.49	0.57
	(0.01)	(0.02)	(0.03)	(0.05)
Female	0.34	0.32	0.44	0.37
	(0.01)	(0.02)	(0.03)	(0.04)
Black	0.51	0.52	0.56	0.37
	(0.01)	(0.03)	(0.03)	(0.04)
Hispanic	0.23	0.19	0.18	0.26
	(0.01)	(0.03)	(0.03)	(0.04)
White	0.20	0.20	0.21	0.22
	(0.01)	(0.02)	(0.02)	(0.04)
Acuity Assessment:				
Homeless History	0.72	0.71	0.78	0.86
	(0.01)	(0.02)	(0.03)	(0.04)
Chronic Homeless	0.61	0.57	0.68	0.82
	(0.01)	(0.02)	(0.03)	(0.04)
Physical Disability	0.70	0.64	0.71	0.91
	(0.01)	(0.02)	(0.03)	(0.02)
Mental Disability	0.58	0.51	0.65	0.79
	(0.01)	(0.02)	(0.03)	(0.04)
Self Care Problems	0.29	0.20	0.32	0.34
	(0.01)	(0.03)	(0.04)	(0.04)
Past Health, Criminal, Housing History:				
Any DHS Treatment in Past 12 Months	0.17	0.17	0.14	0.14
	(0.003)	(0.02)	(0.02)	(0.03)
Any DMH Treatment in Past 12 Months	0.12	0.10	0.09	0.14
	(0.002)	(0.02)	(0.02)	(0.03)
Any Substance Abuse Treatment in Past 12 Months	0.08	0.08	0.09	0.07
	(0.002)	(0.02)	(0.02)	(0.02)
Involvement with Law Enforcement Agencies in Past 12 Months	0.14	0.13	0.14	0.18
	(0.002)	(0.02)	(0.02)	(0.04)
Received Emergency Cash Assistance in Past 12 Months	0.19	0.16	0.18	0.18
	(0.002)	(0.02)	(0.02)	(0.03)
Any Interaction with Homeless Support System in Past 12 Months	0.35	0.27	0.42	0.45
	(0.01)	(0.02)	(0.03)	(0.05)
Any Housing Assistance Recieved in Past 12 Months	0.28	0.23	0.34	0.27
	(0.01)	(0.02)	(0.03)	(0.04)

Notes: The table shows summary statistics for compliers, always takers, and never takers of housing assistance within our estimation sample. Standard errors are computed using 100 clsutered bootstrap replications.

▸ Complier Stats - Derivation ▸ Back

Recidivism Results - OLS vs. IV

Table 1.11: The Effect of Housing Assistance on Recidivism to Homelessness

Dependent Variable:	**Pr(Ever Returned to Homeless System)**			**Number of Returns**
	Months 1-9 after Assessment (1)	Months 10-18 after Assessment (2)	Months 1-18 after Assessment (3)	Months 1-18 after Assessment (4)
OLS: Housing Assistance	0.228***	0.0867***	0.243***	0.524***
No Controls	(0.0124)	(0.00902)	(0.0150)	(0.0322)
OLS: Housing Assistance	0.245***	0.106***	0.270***	0.563***
All Controls	(0.0120)	(0.00892)	(0.0130)	(0.0383)
OLS: Housing Assistance	0.248***	0.106***	0.274***	0.566***
Complier Re-weighted	(0.0122)	(0.00895)	(0.0132)	(0.0388)
RF: Housing Placement Rate	-0.108***	-0.131***	-0.133***	-0.361***
All Controls	(0.0325)	(0.0266)	(0.0336)	(0.0712)
2SLS: Housing Assistance	-0.168***	-0.204***	-0.206***	-0.560***
All Controls	(0.0543)	(0.0441)	(0.0564)	(0.125)
Dependent Mean	0.28	0.18	0.36	0.64
Complier Mean if No Housing Assistance	0.35	0.18	0.38	0.72
Number of Assessments	26,752	26,752	26,752	26,752

Notes: All specifications include site x month of assessment FEs and all the controls listed in Figure 4. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

▸ Complier Weights ▸ Back

Table 1.12: Characterization of Compliers

	Low Acuity	High Acuity
	(1)	(2)
1. Sub-sample: Housing Assistance Propensity - 1st quartile (lowest)		
Population Share	0.088	0.148
Complier Share	0.442	0.215
Complier Conditional Population Share	0.142	0.116
Complier Relative Likelihood	1.620	0.787
Number of Cases	2,351	3,957
2. Sub-sample: Housing Assistance Propensity - 2nd quartile		
Population Share	0.121	0.126
Complier Share	0.307	0.251
Complier Conditional Population Share	0.137	0.116
Complier Relative Likelihood	1.126	0.919
Number of Cases	3,246	3,383
3. Sub-sample: Housing Assistance Propensity - 3rd quartile		
Population Share	0.136	0.124
Complier Share	0.292	0.297
Complier Conditional Population Share	0.146	0.134
Complier Relative Likelihood	1.071	1.087
Number of Cases	3,643	3,310
4. Sub-sample: Housing Assistance Propensity - 4th quartile (highest)		
Population Share	0.119	0.138
Complier Share	0.263	0.194
Complier Conditional Population Share	0.114	0.098
Complier Relative Likelihood	0.963	0.710
Number of Cases	3,176	3,686

Notes: Estimation sample of assessments processed in 2016-2017. We split the sample into eight mutually exclusive and collectively exhaustive subgroup based on acuity score (below and above 7) and quartiles of the predicted probability of housing assistance which is estimated based on all variables listed in Table 1. We estimate the first stage equation separately for each subgroup, which allows us to calculate the proportion of compliers by subgroup. For each subgroup, we report the population share (row 1), the complier share (row 2), and the probability of being in a subgroup conditional on being a complier (row 3). Finally, we also report the complier relative likelihood (row 4), which is the ratio of group-specific complier share to the overall complier share estimated to be 0.27 for the full estimation sample.

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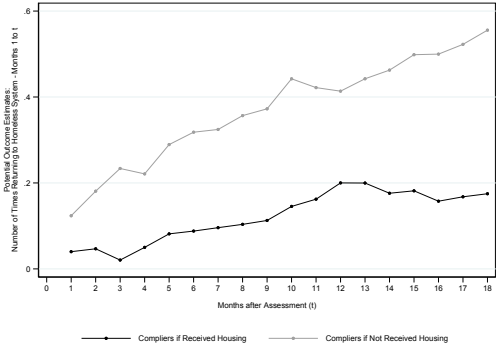
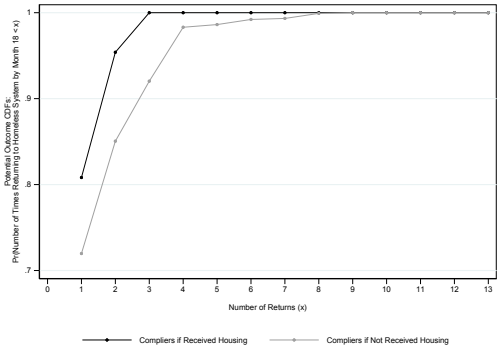
Potential Outcomes: Number of Returns

Figure 1.14: The Effect of Housing Assistance on Number of Returns to the Homeless System



(a) Number of Returns - Months 1 to t



(b) CDF: Number of Returns by Month 18

Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017. Panel (a) shows potential number of returns to the homeless system between month 1 and month t after assessment by housing assistance treatment. Panel (b) shows the CDFs of the potential number of returns to the homeless support system by 18 months after assessment by housing assistance treatment.

▸ Potential Outcomes - Derivation ▸ Back

Better Understanding LATE - Compliers

I follow Imbens and Rubin (1997) and Dahl et al. (2014) in decomposing IV estimates into average potential outcomes if the compliers would have received housing assistance and if they would not by doing the following:

1. Regress case worker housing placement rate on site X month of assessment FEs and all individual controls
2. Using the residualized placement rate, I define the highest propensity case workers as those in the 97.5th percentile and above of the distribution ($h_{97.5}$), and the lowest propensity case workers as those in 2nd and below percentile of the distribution (h_5)
3. I then run the first-stage regression on the entire sample, and define the share of always takers, never takers, and compliers in the following way:
   - Share of always takers $= \beta_0 + \beta_{cw} \times h_5 = 27\%$
   - Share of never takers $= 1 - \beta_0 - \beta_{cw} \times h_{95} = 47\%$
   - Share of compliers $= \beta_{cw} \times (h_{95} - h_5) = 26\%$
4. To estimate complier characteristics, for binary characteristic x_i, we have:

$$\frac{Pr(x_i = 1|complier)}{Pr(x_i = 1)} = \frac{Pr(complier|x_i = 1)}{Pr(complier)} = \frac{E(H_i|Z_i = z_h, x_i = 1) - E(H_i|Z_i = z_l, x_i = 1)}{E(H_i|Z_i = z_h) - E(H_i|Z_i = z_l)} \tag{9}$$

   The numerator can be recovered by estimating the first stage coefficient for subsample $x_i = 1$ and multiplying by $z_h - zl$, and the denominator is constructed similarly using the full sample.
5. To estimated potential outcomes, I use the following derivation of the potential outcomes framework:

$$E(Y_{0i}|complier) = \left(\frac{p_c + p_n}{p_c}\right) E(Y_i|H_i = 0, Z_i = z_l) - \left(\frac{p_n}{p_c}\right) E(Y_i|H_i = 0, Z_i = z_h) \tag{10}$$

6. I estimate the expected values by regressing Y_i on z_i for the sample of non-treated cases

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Quarterly Estimates

Table 1.13: Quarterly Estimates of the Effect of Housing Assistance on Recidivism

Time Period (Months after Assessment):	Months 1-3 (1)	Months 4-6 (2)	Months 7-9 (3)	Months 10-12 (4)	Months 13-15 (5)	Months 16-18 (6)
Dependent Variable:	**A. Pr(Ever Returned to Homeless System)**					
OLS: Housing Assistance	0.160***	0.106***	0.0924***	0.0742***	0.0586***	0.0479***
	(0.0104)	(0.00700)	(0.00668)	(0.00674)	(0.00593)	(0.00587)
RF: Housing Placement Rate	-0.0767***	-0.0567**	-0.0760***	-0.0522**	-0.0935***	-0.0958***
	(0.0268)	(0.0222)	(0.0235)	(0.0205)	(0.0187)	(0.0211)
2SLS: Housing Assistance	-0.119***	-0.0881**	-0.118***	-0.0810**	-0.145***	-0.149***
	(0.0429)	(0.0360)	(0.0394)	(0.0324)	(0.0314)	(0.0353)
Dependent Mean	0.17	0.13	0.12	0.11	0.10	0.10
Complier Dependent Mean if No Housing	0.23	0.13	0.17	0.14	0.12	0.10
Number of Assessments	26,752	26,752	26,752	26,752	26,752	26,752

Notes: All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

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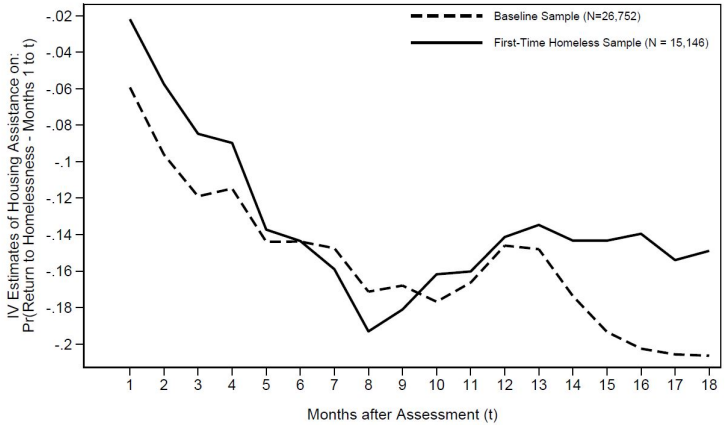
Recidivism Results: First Time Homeless

Figure 1.15: The Effect of Housing Assistance on Recidivism - First Time Homeless



Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017. First-time homeless sample consisting of 15,146 assessments for individuals with no homeless services history processed in 2016-2017.

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Marginal Treatment Effects

We follow Bhuller et al. (2019) in estimating marginal treatment effects (MTEs):

1. We model the observed outcome as:
$$Y = H \times Y(1) + (1 - H) \times Y(0) \tag{11}$$
where H is an indicator for receiving housing assistance and $Y(1)$, $Y(0)$ are the potential outcomes
2. The choice of treatment by a case worker is given by
$$H = 1[v(X, Z) - U] \tag{12}$$
v is an unknown function
U is an unobserved continuous variable
Z is the case worker placement rate
3. Normalize the distribution of $U|X = x$ to be uniformly distributed over $[0, 1]$ for every X
4. This implies that $v(X, Z)$ is equal to the propensity score
$$p(X, Z) = P[H = 1|X = x, Z = z] \tag{13}$$
5. The MTE is defined as $E[Y(1) - Y(0)|U = u, X = x]$
6. U captures unobserved characteristics of the individual which influence a case worker's choice
   - Individuals with low values of U are more likely to take treatment regardless of the case worker, and vice versa
7. If we assume separability between observed and unobserved heterogeneity in treatment effects, we can point identify the MTE over the support of $p(X, Z)$

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Table 1.14: Summary Measures of Treatment Effects Based on the 2SLS and the MTE

A. Treatment Parameters Based on the 2SLS	**LATE - Estimation Sample** (1)	**LATE - Common Support Sample** (2)
Pr(Returned to Homeless Support System)	-0.206***	-0.144***
	(0.0564)	(0.0482)
Number of Assessments	26,752	26,484

B. Treatment Parameters Based on the MTE for the Common Support Sample	**Average Treatment Effect on the Treated (ATT)** (1)	**Average Treatment Effect(ATE)** (2)	**Average Treatment Effect on the Untreated (ATUT)** (3)
1. Linear Specification			
Pr(Returned to Homeless Support System)	-0.1771*	-0.130**	-0.073
	(0.0977)	(0.0637)	(0.0956)
2. Global Quadratic Polynomial			
Pr(Returned to Homeless Support System)	-0.178*	-0.131*	-0.074
	(0.1002)	(0.0688)	(0.1005)
3. Global Cubic Polynomial			
Pr(Returned to Homeless Support System)	-0.185**	-0.132***	-0.069
	(0.0816)	(0.05)	(0.0707)
4. Global Quartic Polynomial			
Pr(Returned to Homeless Support System)	-0.215**	-0.163**	-0.100
	(0.1016)	(0.0691)	(0.1006)
Number of Cases	26,484	26,484	26,484

Notes: Full sample of assessments of homeless acuity processed between 01/16-12/17 and trimmed sample with common support. The rescaled treatment parameters are weighted averages (for the treated (ATT), for all (ATE), and for the untreated (ATUT)) over the MTE curves over the area with common support (weights sum to 1) Standard errors are constructed based on 50 non-parametric bootstrap replications. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

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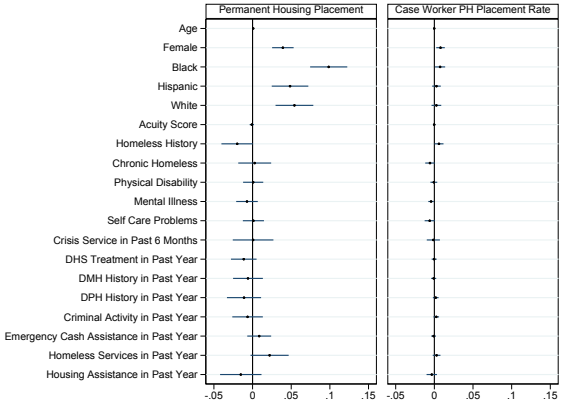
Balancing Tests: Permanent Housing

Figure 1.16: Balancing Tests: Case Worker Permanent Housing Placement Rate



Notes: Figures show estimates for estimation sample of individuals assessed in 2016-2017. All estimations include controls for site x month of assessment FEs. The omitted category for race is missing/multiple/other race. Standard errors are two-way clustered at the case worker and client level. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

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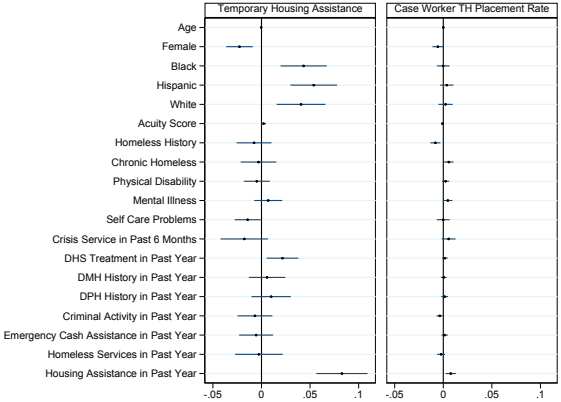
Balancing Tests: Temporary Housing

Figure 1.17: Balancing Tests: Case Worker Temporary Housing Placement Rate



Notes: Figures show estimates for estimation sample of individuals assessed in 2016-2017. All estimations include controls for site x month of assessment FEs. The omitted category for race is missing/multiple/other race. Standard errors are two-way clustered at the case worker and client level. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

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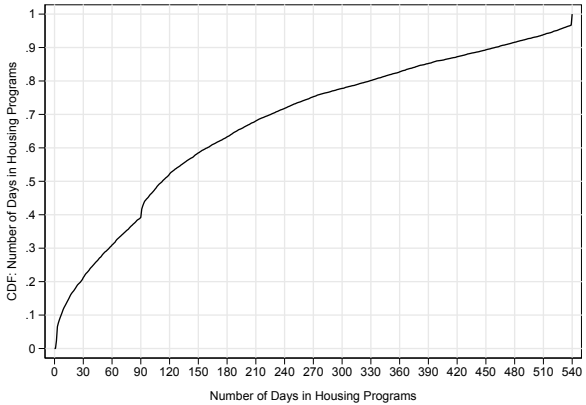
The CDF of Housing Assistance Days Received

Figure 1.18: Days in Housing Programs - CDF



Notes: Sample consists of 10,427 cases processed between 01/16-12/17 which resulted in housing assistance.

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Time in Housing Programs

Table 1.15: The Effect of Housing Assistance on Time in Housing Programs

	(1)	(2)	(3)
Dependent Variable:	Actual Days of Housing Assistance	Waiting Time (in Days)	Days passed from Assessment Date Until Housing Assistance Ended
RF: Case Worker Housing Placement Rate	164.9***	-53.53***	111.3***
	(14.12)	(8.753)	(16.43)
IV: Housing Assistance	256.0***	-83.11***	172.9***
	(23.69)	(14.05)	(26.05)
Dependent mean	95	38	132
Number of Assessments	26,752	26,752	26,752

Notes: Estimation sample of assessments processed in 2016-2017. Controls include all controls listed in Table 1, including site x month of assessment fixed effects. Days passed from assessment date until housing assisatnce has ended includes the waiting period from assessment date until housing assistance has started. Cases that did not receive housing assistance are assigned zero days for all outcomes. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

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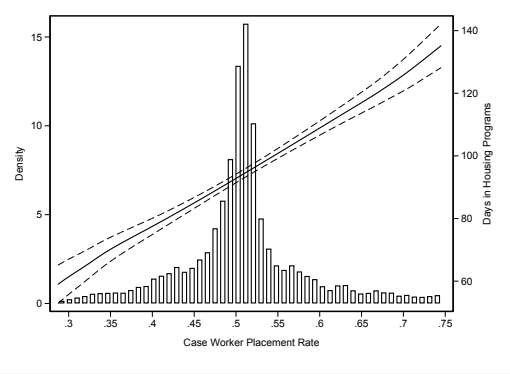
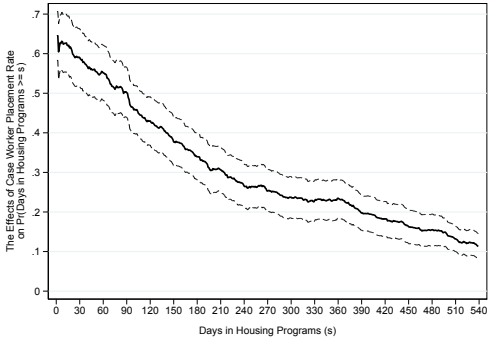
Housing Duration and Case Worker Placement Rate

Figure 1.19: Housing Assistance Duration and Case Worker Placement Rate



(a) IV Estimates: Ever Return - Months 1 to t



(b) Case Worker Placement Rate on Pr(Duration $\geq s$)

Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017. Days in housing programs is plotted on the right y-axis against leave-out mean case worker housing placement rate (plot a) of the assigned case worker shown along the x-axis. The plotted values are mean-standardized residuals from regressions on service site x month of assessment fixed effects and all variables listed in Table 1. The solid line shows a local linear regression of days in housing programs on case worker placement rate. The histograms in plot a shows the density of case worker placement rate along the left y-axis (top and bottom 2% excluded). Plot b shows the estimates of case worker housing placement rate on Pr(Days in Housing Programs $\geq t$). Dashed lines show 90% confidence intervals.

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The Effect of Duration on Recidivism

Table 1.16: The Effect of Number of Days in Housing Programs on Recidivism

Dependent Variable:	**Pr(Ever Returned to Homeless System)**			**Number of Times Returning to Homeless System**
Time Period (Months After Assessment):	Months 1-9	Months 10-18	Months 1-18	Months 1-18
	(1)	(2)	(3)	(4)
OLS: Days in Housing Programs (in 250s)	0.159***	0.0435***	0.154***	0.343***
All Controls	(0.00852)	(0.00680)	(0.00889)	(0.0273)
RF: Housing Placement Rate	-0.108***	-0.131***	-0.133***	-0.361***
All Controls	(0.0325)	(0.0266)	(0.0336)	(0.0712)
2SLS: Days in Housing Programs (in 250s)	-0.203***	-0.199***	-0.202***	-0.547***
All Controls	(0.0679)	(0.0419)	(0.0506)	(0.112)
Dependent Mean	0.28	0.18	0.36	0.64
Number of Assessments	26,752	26,752	26,752	26,752

Notes: Estimation sample of all assessments in 2016-2017. The estimates show the effect of an increase in duration of housing assistance by 250 days. All specifications include service site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

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First Stage & Recidivism Results by Subsample

Table 1.17: First Stage and Recidivism Estimates by Subsample

Sample:	(1) Baseline	(2) DHS	(3) DPH	(4) DMH, Sheriff, Probation and General Relief	(5) Employment, SSI and SSDI Sample	(6) Income	(7) Food Stamps
I. Balancing Tests							
F-statistic for joint test of covariates	1.12	0.99	1.24	1.46	1.07	1.07	1.15
p-value	0.33	0.47	0.23	0.09	0.37	0.37	0.29
II. First Stage: Pr(Received Housing Assistance)							
Housing Placement Rate	0.644***	0.598***	0.541***	0.633***	0.627***	0.613***	0.592***
	(0.0377)	(0.0440)	(0.0803)	(0.0381)	(0.0382)	(0.0398)	(0.0407)
F-stat. (Instrument)	292.22	184.88	45.35	275.82	268.92	237.42	211.76
Dependent mean	0.545	0.575	0.543	0.578	0.623	0.630	0.643
Number of Assessments	26,752	11,339	5,314	15,510	23,387	23,054	18,773
III. 2SLS: Pr(Return to Homeless Support System - Months 1 to 18)							
Housing Assistance	-0.206***	-0.242***	-0.242	-0.230***	-0.323***	-0.325***	-0.317***
	(0.0564)	(0.0831)	(0.148)	(0.0646)	(0.0639)	(0.0664)	(0.0691)
Dependent mean	0.362	0.440	0.458	0.418	0.405	0.402	0.424
Number of Assessments	26,752	11,339	5,314	15,510	23,387	23,054	18,773

Notes: Columns 1-7 show the main results on recidivism into homelessness Table 4 for the different sub-samples used in the analysis. All specifications include service site x month of assessment fixed effects. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

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DHS Results

Table 1.18: The Effect of Housing Assistance on Department of Health Services

Dependent Variable :	Any Treatment (1)	Inpatient (2)	Outpatient (3)	Emergency (4)
A. Ever Received (1-18 Months after Assessment):				
OLS: Housing Assistance	0.00249	0.00268	0.00707	0.00159
All Controls	(0.00739)	(0.00310)	(0.00529)	(0.00619)
RF: Housing Placement Rate	-0.0367*	0.0242**	-0.0285	-0.0323*
All Controls	(0.0220)	(0.0120)	(0.0207)	(0.0178)
2SLS: Housing Assistance	-0.0613*	0.0405*	-0.0476	-0.0541*
All Controls	(0.0370)	(0.0206)	(0.0347)	(0.0302)
Dependent Mean	0.10	0.02	0.05	0.06
Number of Assessments	11,339	11,339	11,339	11,339
B. Number of Days/Episodes (1-18 Months after Assessment):				
OLS: Housing Assistance	0.0195	0.0672	0.0268	-0.0124
All Controls	(0.0729)	(0.0862)	(0.0629)	(0.0237)
RF: Housing Placement Rate	-0.0417	0.573*	-0.0202	-0.0817
All Controls	(0.230)	(0.329)	(0.188)	(0.0851)
2SLS: Housing Assistance	-0.0697	0.958*	-0.0338	-0.137
All Controls	(0.384)	(0.562)	(0.314)	(0.143)
Dependent Mean	0.50	0.27	0.33	0.14
Number of Assessments	11,339	11,339	11,339	11,339

Notes: All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

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DMH Results

Table 1.19: The Effect of Housing Assistance on Mental Health Services

Dependent Variable:	Any Treatment (1)	Inpatient/Residential (2)	Outpatient (3)
A. Ever Received (1-18 Months after Assessment):			
OLS: Housing Assistance	-0.00539	-0.00339*	-0.00463
All Controls	(0.00380)	(0.00200)	(0.00367)
RF: Housing Placement Rate	-0.0292**	-0.00471	-0.0212
All Controls	(0.0136)	(0.00717)	(0.0131)
2SLS: Housing Assistance	-0.0460**	-0.00744	-0.0334
All Controls	(0.0218)	(0.0114)	(0.0208)
Dependent Mean	0.03	0.01	0.028
Complier Mean if No Housing Assistance	0.07	0.00	0.06
Number of Assessments	15,510	15,510	15,510
B. Number of Days/Episodes (1-18 Months after Assessment):			
OLS: Housing Assistance	-0.0211	-0.103	-0.0173
All Controls	(0.130)	(0.523)	(0.129)
RF: Housing Placement Rate	-0.809	-2.005*	-0.788
All Controls	(0.502)	(1.112)	(0.501)
2SLS: Housing Assistance	-1.278	-3.165*	-1.244
All Controls	(0.809)	(1.803)	(0.806)
Dependent Mean	0.38	1.14	0.36
Complier Mean if No Housing Assistance	1.75	3.55	1.73
Number of Assessments	15,510	15,510	15,510

Notes: All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

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DPH Results

Table 1.20: The Effect of Housing Assistance on Substance Abuse Treatments

Dependent Variable:	Any Treatment (1)	Detox (2)	Residential (3)	Outpatient (4)
A. Ever Received (1-18 Months after Assessment):				
OLS: Housing Assistance	0.00388	0.00330	0.00154	-0.000366
All Controls	(0.00388)	(0.00212)	(0.00305)	(0.00283)
RF: Housing Placement Rate	-0.00363	0.00460	-0.00569	-0.0152
All Controls	(0.0171)	(0.0108)	(0.0142)	(0.00999)
2SLS: Housing Assistance	-0.00671	0.00851	-0.0105	-0.0282
All Controls	(0.0316)	(0.0200)	(0.0264)	(0.0191)
Dependent Mean	0.01	0.00	0.007	0.01
Complier Dependent Mean if No Housing Assistance	0.01	0.00	0.03	0.03
Number of Assessments	5,314	5,314	5,314	5,314
B. Number of Days/Episodes:				
OLS: Housing Assistance	0.00753	0.722	1.387	-0.00316
All Controls	(0.0116)	(0.448)	(1.054)	(0.00696)
RF: Housing Placement Rate	-0.0723	0.480	0.143	-0.0568**
All Controls	(0.0473)	(2.780)	(5.274)	(0.0222)
2SLS: Housing Assistance	-0.134	0.887	0.265	-0.105**
All Controls	(0.0878)	(5.154)	(9.755)	(0.0423)
Dependent Mean	0.04	0.53	2.07	0.01
Complier Dependent Mean if No Housing Assistance	0.12	0.53	10.68	0.08
Number of Assessments	5,314	5,314	5,314	5,314

Notes: All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

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Crime Results

Table 1.21: The Effect of Housing Assistance on Criminal Activity

Dependent Variable :	Jail Bookings (1)	Jail Days (2)	At least One Crime (3)	Number of Crimes (4)	Probation Service (5)	Probation Days (6)
OLS: Housing Assistance	0.217*	1.429*	0.00749	0.0332	0.00329	0.0475
All Controls	(0.111)	(0.789)	(0.00509)	(0.0348)	(0.00362)	(0.143)
RF: Housing Placement Rate	-0.955**	-8.457***	-0.0501***	-0.247**	-0.0230	-0.351
All Controls	(0.389)	(2.503)	(0.0164)	(0.115)	(0.0166)	(0.702)
2SLS: Housing Assistance	-1.507**	-13.35***	-0.0790***	-0.389**	-0.0363	-0.555
All Controls	(0.621)	(4.001)	(0.0260)	(0.182)	(0.0261)	(1.109)
Dependent Mean	1.05	6.45	0.07	0.31	0.033	1.17
Complier Dependent Mean if No Housing Assistance	1.09	10.70	0.10	0.22	0.08	1.67
Number of Assessments	15,510	15,510	15,510	15,510	15,510	15,510

Notes: All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

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Income and Employment Results

Table 1.22: The Effect of Housing Assistance on Income, Employment and Social Benefits

Sample:	**Income**		**Employment and Wages**		**Social Benefits**	
Dependent Variable:	Any Income	Monthly Income	Employed	Monthly Wage	Any Benefits	Monthly Benefits
	(1)	(2)	(3)	(4)	(3)	(4)
OLS: Housing Assistance	0.146***	202.2***	0.0834***	134.7***	0.130***	88.36***
All Controls	(0.0109)	(14.36)	(0.00794)	(14.14)	(0.0107)	(9.436)
RF: Housing Placement Rate	0.162***	271.4***	0.152***	269.3***	0.0566	17.40
All Controls	(0.0366)	(89.07)	(0.0447)	(83.19)	(0.0397)	(35.51)
2SLS: Housing Assistance	0.264***	442.5***	0.242***	429.4***	0.0923	28.36
All Controls	(0.0609)	(148.4)	(0.0724)	(135.3)	(0.0646)	(57.83)
Dependent Mean	0.76	586	0.14	196	0.67	399
Complier Dependent Mean if No Housing Assistance	0.49	390	0.05	69	0.44	323
Number of Assessments	23,054	23,054	23,387	23,387	23,054	23,054

Notes: All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

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Social Benefits Results

Table 1.23: The Effect of Housing Assistance on Social Benefits Take Up

Social Benefit Type:	**General Relief**	**SSI**	**SSDI**	**Food Stamps**
	(1)	(2)	(3)	(4)
OLS: Housing Assistance	0.00257	0.0646***	0.0376***	0.104***
All Controls	(0.00630)	(0.00815)	(0.00584)	(0.0133)
RF: Housing Placement Rate	-0.0178	0.0365	0.0104	0.0180
All Controls	(0.0197)	(0.0310)	(0.0215)	(0.0366)
2SLS: Housing Assistance	-0.0280	0.0582	0.0165	0.0304
All Controls	(0.0313)	(0.0497)	(0.0344)	(0.0617)
Dependent Mean	0.10	0.26	0.09	0.56
Complier Dependent Mean if No Housing Assistance	0.08	0.20	0.09	0.45
Number of Assessments	15,510	23,387	23,387	18,773

Notes: All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

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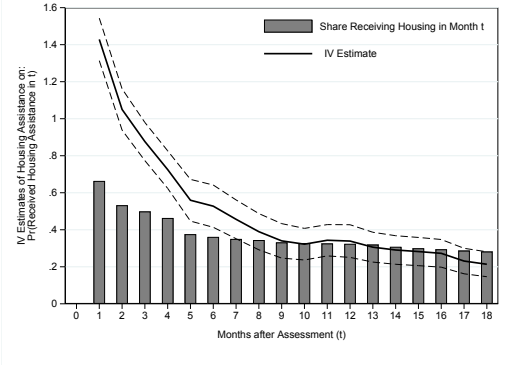
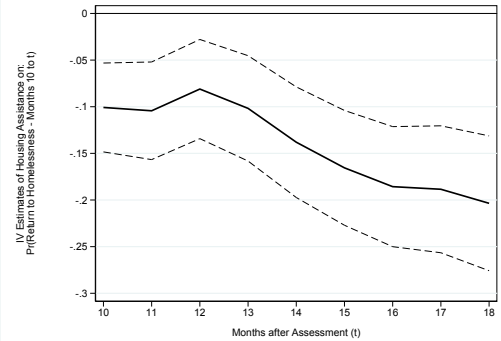
Effects Not Driven by Incapacitation Effect

Figure 1.20: Post-Treatment Effect on Returning to Homeless Support System



(a) IV Estimates: Pr(Receiving Housing Assistance - Month t)



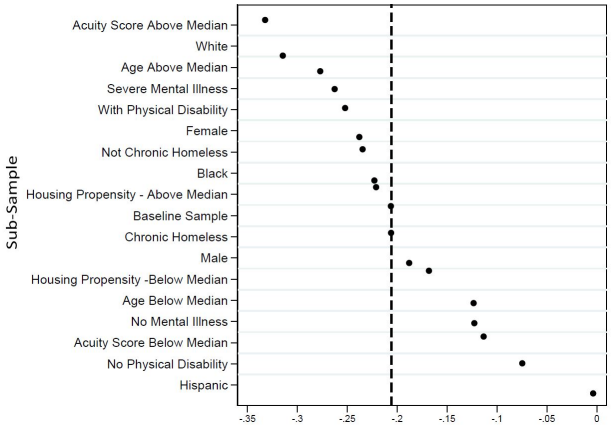
(b) IV Estimates: Pr(Returned to Homeless Support System - Months *10* to t)

Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017. In panel (a), any active enrollment in a housing program is considered. In panel (b), returns to the homeless support system include a new enrollment in a street outreach program or a new acuity assessment. Dashed lines show 90% confidence intervals.

▸ Quarterly Estimates ▸ Back

Heterogeneous Effects (1): Sub-Samples

Figure 1.21: The Effect of Housing Assistance on Recidivism - Subsamples



Notes: IV estimates of housing assistance treatment on recidivism to homeless support system by 18-months from assessment. Each point represents the IV estimate by sub-sample. Dashed line represents the baseline IV estimate of -.206. All coefficients are statistically significant from zero except for: hispanics, no mental illness, and no physical disability. Sample sizes range from 5,034 (Whites) to 18,634 (With Physical Disability). Estimation sample consists of 26,75 cases.

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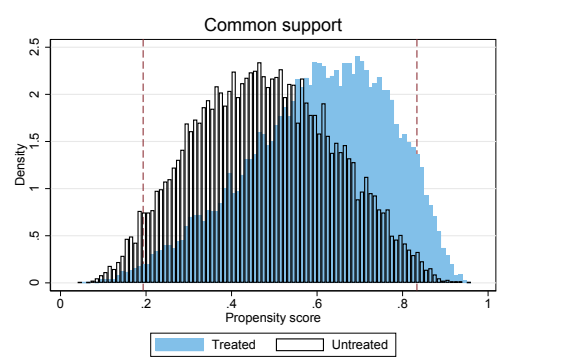
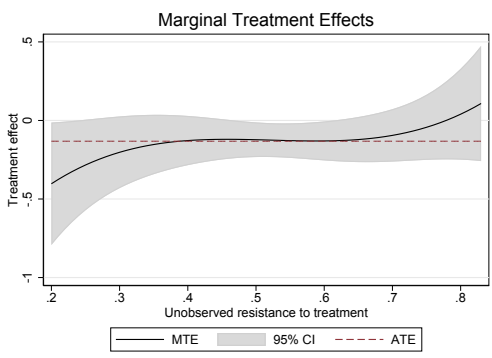
Heterogeneous Effects (2): Marginal Treatment Effects

Figure 1.22: The Effect of Housing Assistance on Recidivism – Marginal Treatment Effects



(a) Common Support



(b) MTE Estimates - Pr(Returned to Homeless Support System - Months 1 to 18)

Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017. The MTE estimates plotted are based on a local instrumental variables (IV) approach using a global cubic polynomial specification for the 1% trimmed sample with common support. Standard errors are based on 100 bootstrap replications.

▸ ATE, ATT, ATUT ▸ Theory ▸ Back

Heterogeneous Treatment Effects - Program Characteristics

Heterogeneous Effects (3): Permanent vs. Temporary Housing

Table 1.24: IV Model Interacted with Sub-Sample Indicators for Permanent or Temporary Housing Assistance Propensity.

	First Stages		Reduced Form		IV
	(1)	(2)	(3)		(4)
Outcome:	**Pr(Permanent Housing Placement)**	**Pr(Temporary Housing Placement)**	**Pr(Returned to Homeless Support System)**		**Pr(Returned to Homeless Support System)**
Instruments:				**Explanatory Variables:**	
PH Placement Rate	0.697***	-0.0338	-0.217***	Permanent Housing	-0.313***
	(0.0382)	(0.0313)	(0.0370)		(0.0547)
TH Placement Rate	0.0119	0.605***	-0.0178	Temporary Housing	-0.0232
	(0.0244)	(0.0595)	(0.0380)		(0.0643)
SW F-stat (Instrument)	432.13	113.43			
Dependent Mean	0.1931	0.3518	0.3623		0.3623
Number of Assessments	26,752	26,752	26,752		26,752

Notes: All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

▸ Balancing Test - PH ▸ Balancing Test - TH ▸ Back

Heterogeneous Effects (4): Intensive vs. Extensive Margin

Table 1.25: IV Model with Three Treatment Options 'Housing Assistance', 'Duration of Housing Asistance (in Days)', and 'Non-Housing Treatment or No Treatment'.

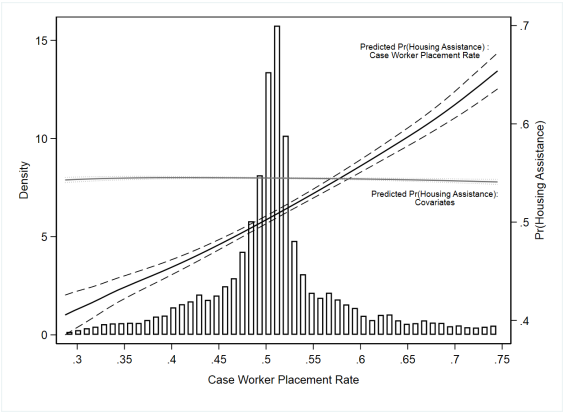
	First Stages		Reduced Form		IV
	(1)	(2)	(3)		(4)
Outcome:	**Pr(Housing Assistance)**	**Days in Housing Programs (in 250s)**	**Pr(Returned to Homeless Support System)**		**Pr(Returned to Homeless Support System)**
Instruments:				**Explanatory Variables:**	
Housing Placement Rate	0.574***	0.209***	-0.0456	Housing Assistance	-0.00962
	(0.0594)	(0.0614)	(0.0502)		(0.127)
Housing Assistance Duration Rate	0.0739**	0.473***	-0.0915**	Housing Days (in 250s)	-0.192*
	(0.0352)	(0.0671)	(0.0432)		(0.112)
Dependent Mean	0.5449	0.3787	0.3623		0.3623
Number of Assessments	26,752	26,752	26,752		26,752

Notes: All specifications include site x month of assessment FEs and all the controls listed in Table 1. Standard errors are two-way clustered at the case worker and individual level. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

▸ CDF - Duration ▸ Time in Housing Programs ▸ IV & Duration ▸ Duration Table ▸ Back

Fitted Values Are Not Explained by Instrument

Figure 1.23: First Stage and Predicted Probability of Housing Assistance Receipt Graphs on Case Worker Placement Rate



Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017. Probability of housing assistance is plotted on the right y-axis against leave-out mean case worker placement rate of the assigned case worker shown along the x-axis. The plotted values are mean-standardized residuals from regressions on site x assessment month fixed effects and all variables listed in Figure 6. The solid line shows a local linear regression of housing assistance on case worker placement rate. Dashed lines show 95% confidence intervals. The histogram shows the density of case worker placement rates along the left y-axis (top and bottom 2% excluded).

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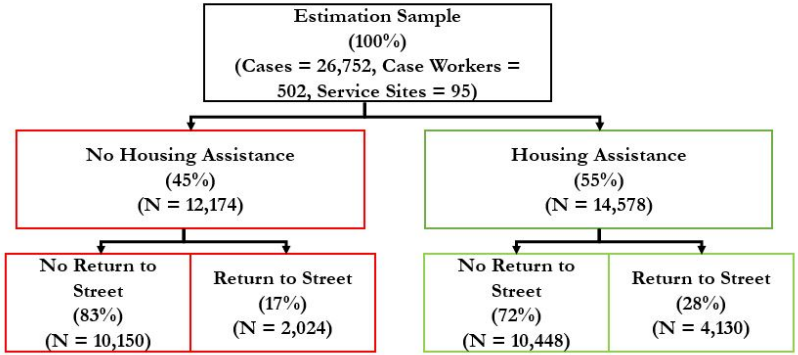
Estimation Sample, Treatment, and Recidivism - Return to Street

Figure 1.24: Housing Assistance Treatment and Recidivism to Homelessness - Estimation Sample



Notes: Estimation sample consists of 26,752 homeless cases in 2016-2017 that were as-good-as-randomly assigned to case workers. Housing assistance treatment is defined as enrolling in any housing assistance programs within 18 months from intake date.

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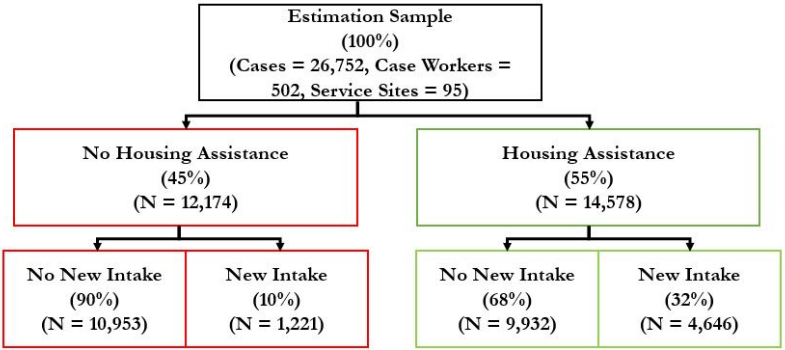
Estimation Sample, Treatment, and Recidivism - New Intake

Figure 1.25: Housing Assistance Treatment and Recidivism to Homelessness - Estimation Sample



Notes: Estimation sample consists of 26,752 homeless cases in 2016-2017 that were as-good-as-randomly assigned to case workers. Housing assistance treatment is defined as enrolling in any housing assistance programs within 18 months from intake date.

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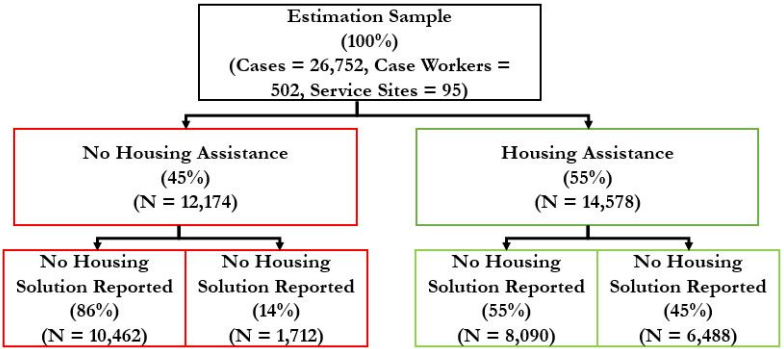
Estimation Sample, Treatment, and Recidivism - No Housing Solution

Figure 1.26: Housing Assistance Treatment and Recidivism to Homelessness - Estimation Sample



Notes: Estimation sample consists of 26,752 homeless cases in 2016-2017 that were as-good-as-randomly assigned to case workers. Housing assistance treatment is defined as enrolling in any housing assistance programs within 18 months from intake date.

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Test of Exclusion and Monotonicity Assumptions

- I follow Frandsen, Lefgren, and Leslie (2019) and perform the following test:
  1. Regress outcome Y_{it} on a flexible function of the case worker housing placement rate, $\phi(Z_{j(i)})$
  2. Testing the fit: regress the residuals from step 1, on case workers indicators and testing whether the coefficients are jointly zero
- I find that the p-value for the hypothesis that all coefficients are jointly zero is **0.395**
- **Implication:** Exclusion and Monotonicity assumptions are likely to hold, unobserved case worker characteristics besides housing placement propensity do not seem to play an important role in this context

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How to Think About the Recidivism Measure

- **Housing Assistance Recipients**
  1. Have a high likelihood of returning to homeless system
  2. Housing Assistance Increases Recidivism (welfare dependency)
  3. Housing Assistance provided is not sufficient in many cases to solve the homelessness problem
  4. Selection into housing programs: those more likely to receive housing assistance are also those more likely to become homeless again
- **No Housing Assistance:**
  1. Two options:
     - ⋆ Solve homelessness problem on their own or with case worker assistance (never-takers)
     - ⋆ Remain homeless
  2. If solve homelessness problem without housing assistance, implies that selection of participants into housing programs works
  3. Remain homeless and do not return to homeless system because they are discouraged by it - problem with selection of participants into housing programs

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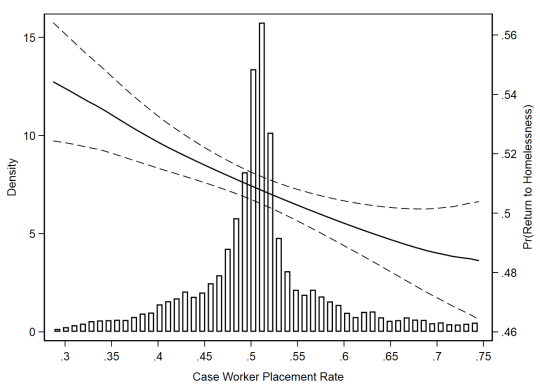
Reduced Form - Recidivism to Homelessness

Figure 1.27: Reduced Form Graph of Recidivism to Homelessness on Case Worker Placement Rate



Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017. Probability of returning to homelessness is plotted on the right y-axis against leave-out mean case worker placement rate of the assigned case worker shown along the x-axis. The plotted values are mean-standardized residuals from regressions on site x assessment month fixed effects and all variables listed in Figure 6. The solid line shows a local linear regression of recidivism to homelessness on case worker placement rate. Dashed lines show 95% confidence intervals. The histogram shows the density of case worker placement rates along the left y-axis (top and bottom 2% excluded).

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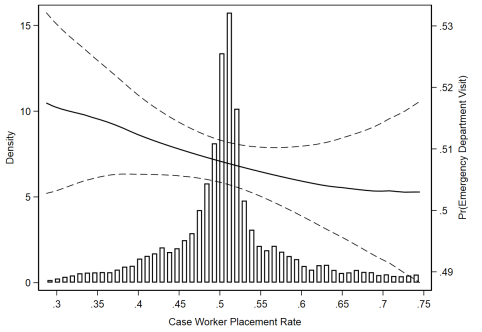
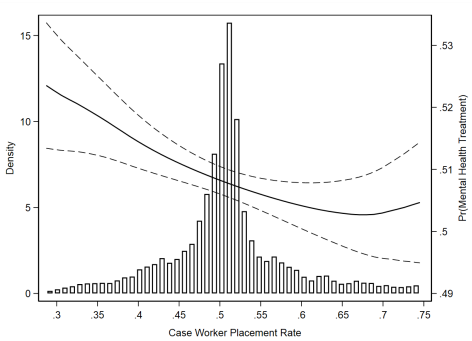
Reduced Form - Health Outcomes

Figure 1.28: Reduced Form Graph of Health Outcomes on Case Worker Placement Rate



(a) Pr(Emergency Department Visit)



(b) Pr(Mental Health Treatment)

Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017. Probability of having at least one emergency department visit (figure a) or one mental health treatment (figure b) in the 18 months after intake is plotted on the right y-axis against leave-out mean case worker placement rate of the assigned case worker shown along the x-axis, respectively. The plotted values are mean-standardized residuals from regressions on site x assessment month fixed effects and all variables listed in Figure 6. The solid line shows a local linear regression of the outcome on case worker placement rate. Dashed lines show 95% confidence intervals. The histogram shows the density of case worker placement rates along the left y-axis (top and bottom 2% excluded).

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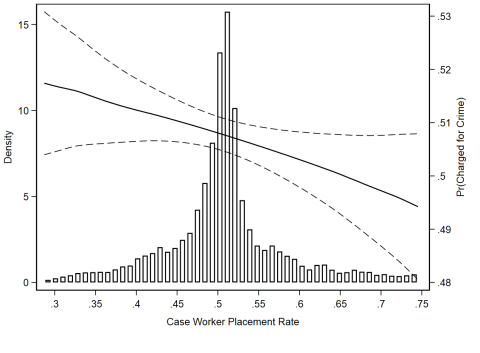
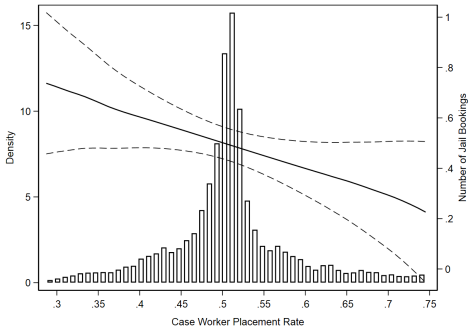
Reduced Form - Crime Outcomes

Figure 1.29: Reduced Form Graph of Crime Outcomes on Case Worker Placement Rate



(a) Pr(Being Charged for Crime)

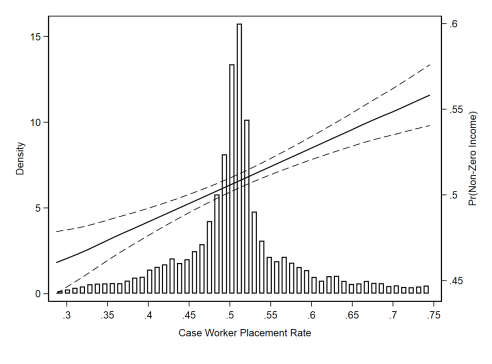


(b) Number of Jail Bookings

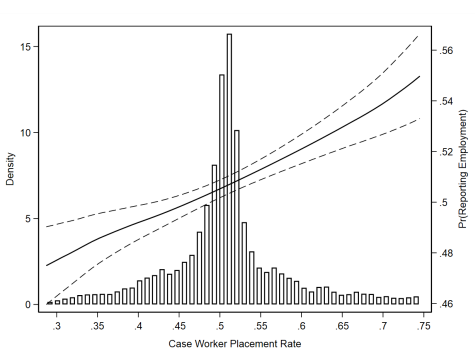
Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017. Probability of being charged for committing a crime at least once (figure a) and the number of jail bookings (figure b) in the 18 months after intake is plotted on the right y-axis against leave-out mean case worker placement rate of the assigned case worker shown along the x-axis, respectively. The plotted values are mean-standardized residuals from regressions on site x assessment month fixed effects and all variables listed in Figure 6. The solid line shows a local linear regression of the outcome on case worker placement rate. Dashed lines show 95% confidence intervals. The histogram shows the density of case worker placement rates along the left y-axis (top and bottom 2% excluded).

Reduced Form - Employment and Income Outcomes

Figure 1.30: Reduced Form Graph of Employment and Income Outcomes on Case Worker Placement Rate



(a) Pr(Reported Non-Zero Income)



(b) Pr(Reported Any Employment)

Notes: Estimation sample consisting of 26,752 assessments processed in 2016-2017. Probability of reporting non-zero income (figure a) and having any employment (figure b) at least once in the 18 months after intake is plotted on the right y-axis against leave-out mean case worker placement rate of the assigned case worker shown along the x-axis, respectively. The plotted values are mean-standardized residuals from regressions on site x assessment month fixed effects and all variables listed in Figure 6. The solid line shows a local linear regression of the outcome on case worker placement rate. Dashed lines show 95% confidence intervals. The histogram shows the density of case worker placement rates along the left y-axis (top and bottom 2% excluded).

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Compliers Do Not Differ in Demographics from Average Case

Table 1.26: Summary Statistics of Compliers - Demographics

	Baseline Sample (100%)	Compliers (27%)	Difference (2)-(1)
	(1)	(2)	(3)
Age Above Median (47)	0.50	0.52	0.02
	(0.01)	(0.02)	(0.02)
Female	0.34	0.32	-0.02
	(0.01)	(0.02)	(0.02)
Black	0.51	0.52	0.01
	(0.01)	(0.03)	(0.03)
Hispanic	0.23	0.19	-0.04
	(0.01)	(0.03)	(0.02)
White	0.20	0.20	0.01
	(0.01)	(0.02)	(0.02)
Number of Cases	26,752	26,752	26,752

Notes: The table shows summary statistics for the full sample of cases and for the compliers within the estimation sample. Column (3) shows the difference between the mean complier and the mean case in the sample. Standard errors are computed using 100 clsutered bootstrap replications. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$

▸ Complier Stats - Derivation ▸ Always- and Never-Takers ▸ Back

Compliers Have a Slightly Lower Level of Acuity and Needs

Table 1: Summary Statistics of Compliers - Acuity Measures

	Baseline Sample (100%)	Compliers (27%)	Difference (2)-(1)
	(1)	(2)	(3)
Homeless History	0.72	0.71	-0.01
	(0.01)	(0.02)	(0.02)
Chronic Homeless	0.61	0.57	-0.05**
	(0.01)	(0.02)	(0.02)
Physical Disability	0.70	0.64	-0.06***
	(0.01)	(0.02)	(0.02)
Mental Disability	0.58	0.51	-0.07***
	(0.01)	(0.02)	(0.02)
Self Care Problems	0.29	0.20	-0.09***
	(0.01)	(0.03)	(0.02)
Number of Cases	26,752	26,752	26,752

Notes: The table shows summary statistics for the full sample of cases and for the compliers within the estimation sample. Column (3) shows the difference between the mean complier and the mean case in the sample. Standard errors are computed using 100 clsutered bootstrap replications. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$

▸ Complier Stats - Derivation ▸ Always- and Never-Takers ▸ Back

Compliers are Less Likely to Interact with Homeless System in Past Year

Table 1: Summary Statistics of Compliers - Public Services History

	Baseline Sample (100%)	Compliers (27%)	Difference (2)-(1)
	(1)	(2)	(3)
Any DHS Treatment in Past 12 Months	0.17	0.17	0.00
	(0.003)	(0.02)	(0.02)
Any DMH Treatment in Past 12 Months	0.12	0.10	-0.02
	(0.002)	(0.02)	(0.02)
Any Substance Abuse Treatment in Past 12 Months	0.08	0.08	-0.01
	(0.002)	(0.02)	(0.02)
Involvement with Law Enforcement Agencies in Past 12 Months	0.14	0.13	-0.01
	(0.002)	(0.02)	(0.02)
Received Emergency Cash Assistance in Past 12 Months	0.19	0.16	-0.03**
	(0.002)	(0.02)	(0.01)
Any Interaction with Homeless Support System in Past 12 Months	0.35	0.27	-0.08***
	(0.01)	(0.02)	(0.02)
Any Housing Assistance Recieved in Past 12 Months	0.28	0.23	-0.05***
	(0.01)	(0.02)	(0.02)
Number of Cases	26,752	26,752	26,752

Notes: The table shows summary statistics for the full sample of cases and for the compliers within the estimation sample. Column (3) shows the difference between the mean complier and the mean case in the sample. Standard errors are computed using 100 clsutered bootstrap replications. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$

▸ Complier Stats - Derivation ▸ Always- and Never-Takers ▸ Back