The Effect of Targeted Subsidies on the Location Choice of Housing Voucher Recipients:

"Horizontal Scaling" of Small-Area Fair Market Rents

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Housing Voucher Program

- The Housing Voucher Program (Section 8)
  - The largest low-income housing subsidy program in the U.S.
  - The U.S. Department of Housing and Urban Development (HUD) spends + $18B annually, for more + 5M households.
- Program Design
  - Eligibility: Household income below 50% of the MSA's area median income.
  - Contribution: Voucher recipients contribute 30% of their income to rent.
  - Subsidy: The program subsidizes the remaining rent up to a **location-specific subsidy payment standard.**
  - Public Housing Authorities (PHAs) are local sub-agencies responsible for implementing the program.
- Issue: Many subsidized families (70% with children) live in high-poverty neighborhoods (Pollakowski et al., 2022; Ellen, O'Regan, and Harwood, 2023).
  - Residential environments are crucial for families' well-being, especially for children (Chetty, Hendren, and Katz, 2016; Chyn and Katz, 2021).

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SAFMR: Changes in Subsidy Payment Standard

Before: Fair Market Rent (FMR)

- Subsity is paid up to the 40th percentile of metro-wide rent (FMR)
- Fixed total rental budget within metro areas
  - Max monthly rental budget for a 2-bd unit in Chicago Metro FMR (2017): $1,232
- Issue: Trade-off for location choices of voucher recipients
  - Better housing quality vs. better neighborhood quality within Metro

Small Area Fair Market Rent (SAFMR)

- Varying subsidies by ZIP codes: ↑ high-rent, ↓ low-rent areas ▸ Examples
  - Max monthly rental budget for 2-bedroom unit in Chicago can be $680 to $1,630
- Voucher recipients still contribute 30% of their income to rent.
- Goal: To encourage voucher recipients to move to lower poverty (better) neighborhoods (supposedly) without increasing overall program costs (i.e., cost neutrality).

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Experimental (2011-2012) Period

- 2011: Dallas metro area
  - Collinson and Ganong (2018): Existing voucher holders moved to neighborhoods with lower poverty rates and better amenities with SAFMR

'Horizontal Scaling' Period (2018 April-)

- Federal Mandate: HUD mandated SAFMRs in PHAs in 24 Metro areas (2018)
  - Selected based on 4 pre-mandate criteria with arbitrary thresholds
- 'Horizontal Scaling': SAFMRs were initially piloted in a few areas, and after evaluating the outcomes, HUD expanded the program to other regions.
- Expanding SAFMR mandate to 41 Metro areas (January 2025 onwards)

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Research Question

We investigate whether the successful outcomes in poverty reduction in the initial SAFMR experiment in the Dallas metropolitan area (Collinson and Ganong, 2018)—are "horizontally" scalable across different settings and subgroups (List, 2022).

- We use HUD administrative data on housing voucher holders.
- We highlight the importance of understanding the mobility constraints faced by certain populations as a key factor for policy effectiveness:
  - New voucher recipients vs. existing voucher recipients.
  - Heterogeneity by race: differences between white recipients and minorities.
- We explore heterogeneity across 15 metro areas:
  - Investigating factors that explain variation in effectiveness across MSAs.

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Preview of Findings

- The SAFMR's benefits are most pronounced for movers, but existing voucher holders face mobility barriers.
  - New recipients (5%): often need to move to use voucher and 16% more likely to live in 10% poverty areas post-mandate (Ellen, O'Regan, and Strochak, 2024).
  - Existing recipients (95%): Move rates (˜ 9.6%) remained stable; movers relocated to even lower-poverty neighborhoods.
- Racial Disparities
  - White households were twice as likely to move to lower-poverty areas compared to African-American households.
  - Disparity persists despite African-American households moving more frequently and traveling farther.
  - Pre-SAFMR, White households already resided in lower-poverty neighborhoods, reinforcing racial segregation.
- Metro Area Heterogeneity
  - Tailoring SAFMR policies to each metropolitan area's characteristics could improve housing mobility and poverty reduction.

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15 SAFMR Mandated MSAs (2018) in Our Sample

	Voucher Count	Voucher Concent.	Unit Concent.	Vacancy Rate
HUD's Selection Benchmark (Using ACS)	$>$ 2,500	$>$ 1.55	$>$ 0.20	$>$ 4%
Metros in Mandatory Metro List from HUD				
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	32,631	1.7475	0.2555	7.54%
Washington-Arlington-Alexandria, DC-VA-MD	32,109	1.6647	0.3139	5.25%
Atlanta-Sandy Springs-Marietta, GA	28,697	1.6074	0.2291	11.06%
San Antonio-New Braunfels, TX	14,633	1.9562	0.2588	8.42%
Hartford-West Hartford-East Hartford, CT	12,831	1.5969	0.2149	7.07%
Sacramento-Arden-Arcade–Roseville, CA	12,672	1.5711	0.2837	6.55%
Bergen-Passaic, NJ	11,503	1.5759	0.2677	5.18%
Fort Lauderdale-Pompano-Deerfield Beach, FL	10,486	2.1603	0.2725	9.57%
Charlotte-Gastonia-Rock Hill, NC-SC	7,951	1.8373	0.2505	7.16%
Monmouth-Ocean, NJ	7,811	2.3203	0.3516	5.15%
West Palm Beach-Boca Raton-Delray Beach, FL	6,058	1.9970	0.4451	9.50%
Jacksonville, FL	5,872	1.9787	0.2395	10.40%
Jackson, MS	4,742	1.8480	0.3047	9.54%
Gary, IN	3,305	1.7369	0.2107	6.65%
North Port-Bradenton-Sarasota, FL	2,592	2.5878	0.2712	12.33%

- Remove 5 metros (Colorado Springs, Tampa, San Diego, Honolulu and Palm Bay) w/ lack of obs in our restricted data
- Remove 4 metros (Chicago (Cook County), Dallas and Fort Worth, Pittsburgh) and five demonstration PHAs (Laredo (not in our sample), Long Beach, Mamaroneck, Chattanooga (no obs), Cook County (Chicago)), with pre-existing voucher mobility programs

▸ In-Sample Mandatory Map ▸ In-Sample Comparison Map ▸ All Mandatory Map

Empirical Strategy

HUD Administrative data

- Universe of detailed records for voucher holders location/ and characteristics records (2015-2019)

Identification Strategies

1. **Select Comparison MSAs**
   - Mandatory MSAs were selected in April 2018 based on four observable criteria.
   - Comparison MSAs: 15 comparison MSAs that closely resemble the mandatory MSAs by relaxing the threshold criteria. ▸ Comparison Selection Table
2. **Actual SAFMR Adoption at the Household Level**
   - Within the mandated MSAs, public housing authorities (PHAs) had discretion to choose the timing of SAFMR adoption.

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Empirical Specification

For household i, PHA p, county c, year t:

$$Y_{i,p,c,t} = \alpha + \beta \mathbb{I}(\text{PayStand=SAFMR})_{i,p,c,t} + \lambda \mathbf{X}'_{i,t} + \delta_c + \gamma_i + \zeta_t + \epsilon_{i,p,c,t}$$

- $Y_{i,p,c,t}$: Census-tract level poverty rate
- $\mathbb{I}(\text{PayStand=SAFMR})_{i,p,m,t} = 1$: if households use SAFMRs as their payment standard.
- Year-Month (ζ_t), County (δ_c), Household (γ_i) Fixed Effects, or household control variables ($X'_{i,t}$) included
- Standard errors are clustered at county-PHA-contract start time (year-month)
- **Identifying Assumption**: At the household level, the timing of SAFMR adoption by a PHA is orthogonal to the timing of a new (or renewal) contract.
- Instrumental Variable: 1-month lagged SAFMR compliance rate of the PHA administering their voucher.

Effect on Poverty Exposure

Dependent Variable	Poverty Rate			
	(1)	(2)	(3)	(4)
Group	**First***		**Existing****	
(Estimation)	(OLS)	(2SLS)	(OLS)	(2SLS)
SAFMR Payment Standard	-0.6972***	-0.7438***	-0.1664***	-0.1627***
	(0.2637)	(0.2711)	(0.0191)	(0.0191)
Average Dep Var (2017)	24.1052	24.1052	22.8734	22.8734
N	109,055	109,055	2,340,366	2,340,366

- **First***: Voucher holders who appear in the dataset for the first time
- **Existing****: Voucher holders who appear in the dataset more than once
  - 9.6% of existing voucher recipients moved addresses during 2017.
  - Conditional on moving, the poverty reduction effect is calculated as -1.73 ($= -0.1664/0.096$).
- Takeaway: The SAFMR's benefits are most pronounced for movers, but existing voucher holders face mobility barriers.

▸ Event Study (First) ▸ Event Study (Existing)

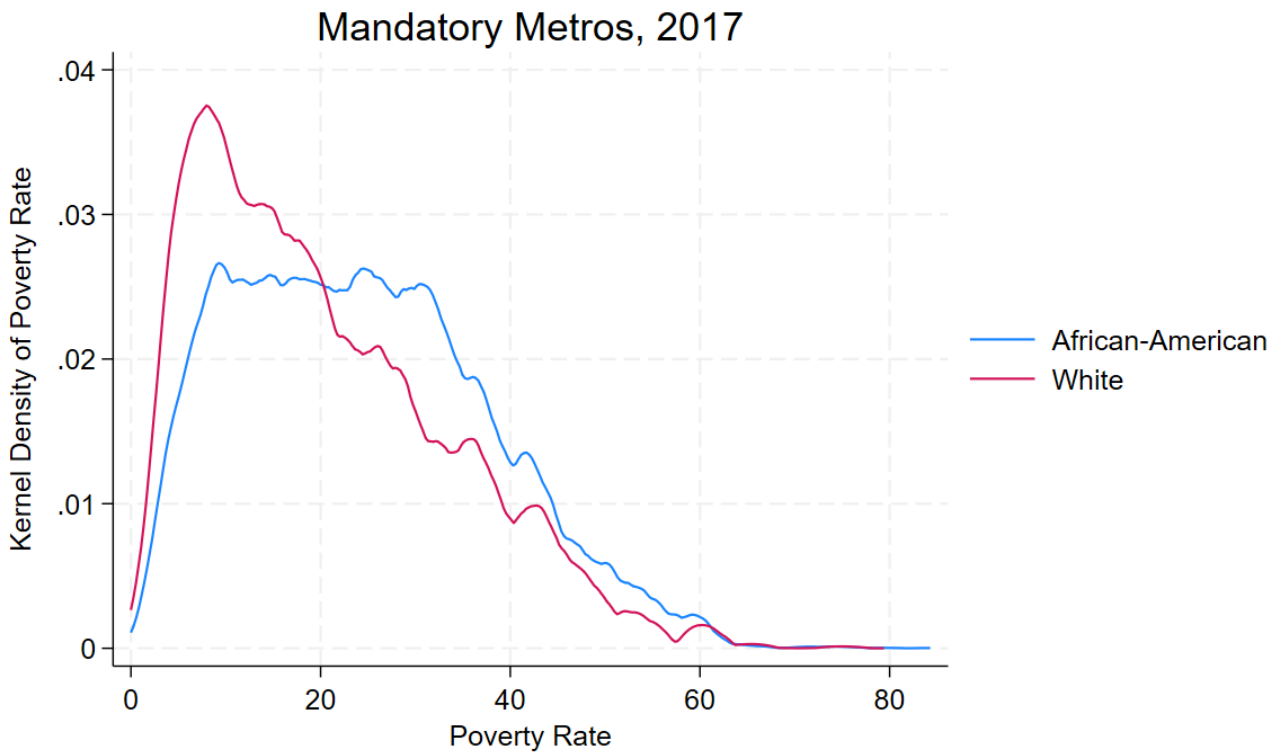
Effect on Existing Voucher Holders' Move Rates

Table: SAFMR Effects on Move Rate

Dependent Variable	Moving Address When Renewing Subsidy (0,1)		
	(1)	(2)	(3)
Dependent Variable	Overall	Initially Located in Lower Poverty Poverty$<$20%	Initially Located in Higher Poverty Poverty$\geq$20%
SAFMR Payment Standard	-0.0009	-0.0055***	0.0026
	(0.0014)	(0.0017)	(0.0018)
Average Dependent Variable (2017)	0.0957	0.0961	0.0954
N	2,340,366	869,738	1,269,652

- Overall, there is no change in the probability of moving.
- Encouraging more movement among this group is a crucial aspect of improving policy effectiveness.
  - Sources of mobility barriers: myopic decision-making, strong social ties in current neighborhoods, and high search costs.. (Bergman, Chan, and Kapor, 2020)

Distribution of Location Characteristics by Race



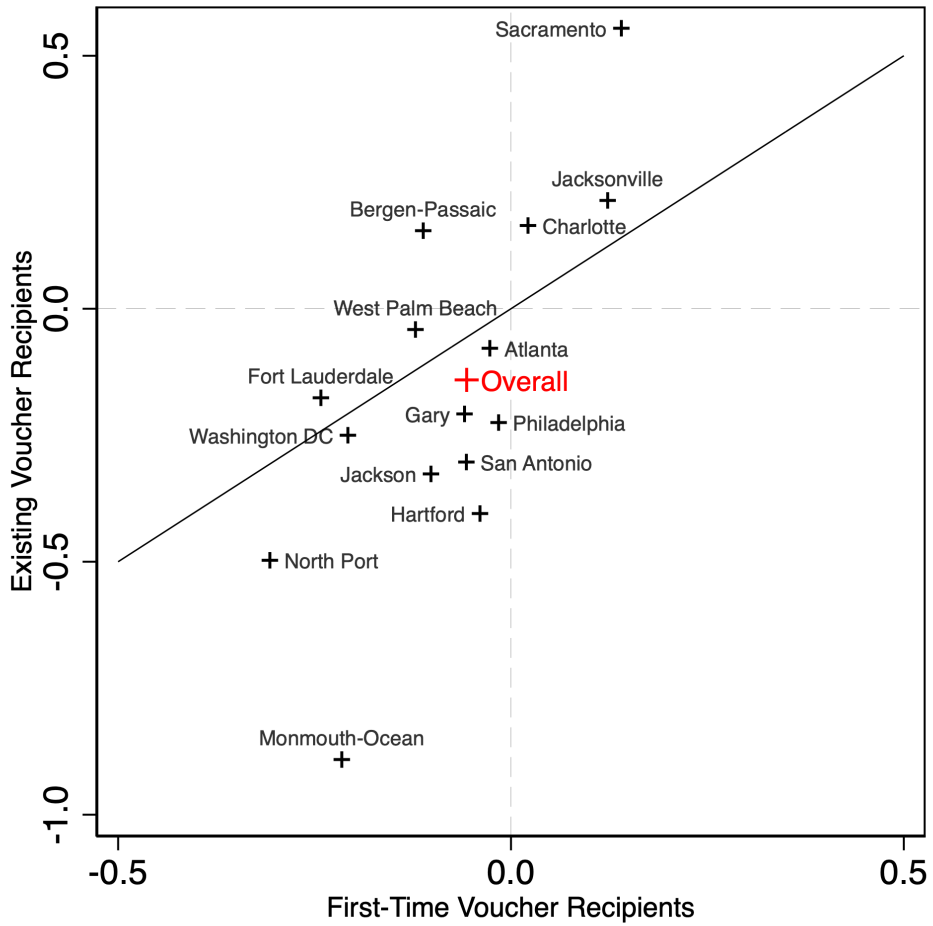
- Prior to SAFMR implementation, White households were already more likely to reside in lower-poverty locations than African American households.

Effects by Race (Existing Households)

Table: SAFMR Effects by Race

Y=Poverty Rate Sample	(1) Overall	(2) African-American	(3) Non-Hispanic White
SAFMR Payment Standard	-0.1664*** (0.0191)	-0.0980*** (0.0237)	-0.2418*** (0.0360)
Average Dep Var (2017) *N*	22.87 2,340,366	24.18 1,338,764	17.18 481,337

- SAFMR may have inadvertently reinforced racial disparities in poverty exposure.
- African American households tend to move more frequently than White households, suggesting that African American voucher holders face higher search costs and reduced unit availability.
- Having children does not predict such racial differences in mobility patterns.



- Our overall aggregate standardized effect for existing recipients under the 2018 mandates was -0.1406, which is comparable to the 2011 Dallas metropolitan area's effect of -0.188 (Collinson and Ganong, 2018).

Correlation b/w MSAs' Characteristics and Policy Effectiveness

	Pre-SAFMR MSA Characteristics (Existing)	Correlation Coefficient	P-Value
(1)	Voucher Count	0.0300	0.9160
(2)	Voucher Concentration in Concentrated Low Income Areas	-0.5390**	0.0380
(3)	% All Units in SAFMR$\geq$110%FMR	-0.1500	0.5940
(4)	Rental Unit Vacancy Rate	-0.0030	0.9920

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Conclusion

- The effectiveness of the Housing Choice Voucher Program varies across:
  - New voucher holders vs. existing voucher holders
  - White vs. African-American households
  - Heterogeneity across Metropolitan Statistical Areas (MSAs)
- Addressing mobility challenges for existing voucher holders is crucial
  - Factors such as uncertainty, myopic decision-making, strong social ties in current neighborhoods, and high search costs hinder mobility (Bergman, Chan, and Kapor, 2020).
- Understanding search costs and units availability across racial groups is essential.
- Enhancing horizontal scaling efforts requires:
  - Tailoring policies to account for heterogeneity across MSAs.
  - Identifying and addressing institutional barriers within Public Housing Authorities (PHAs).

Thank You!

For questions or further discussion,

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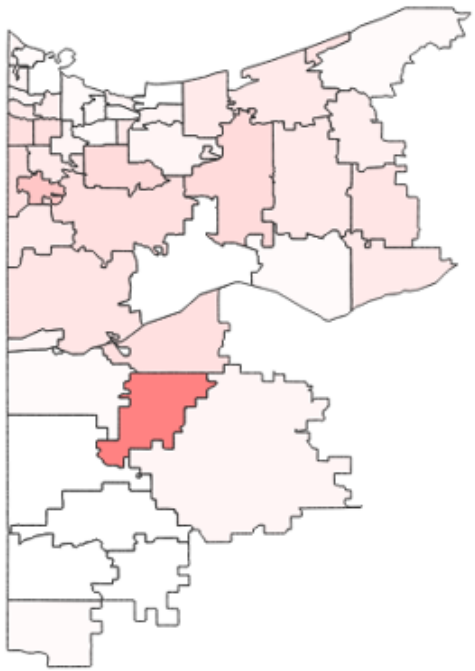
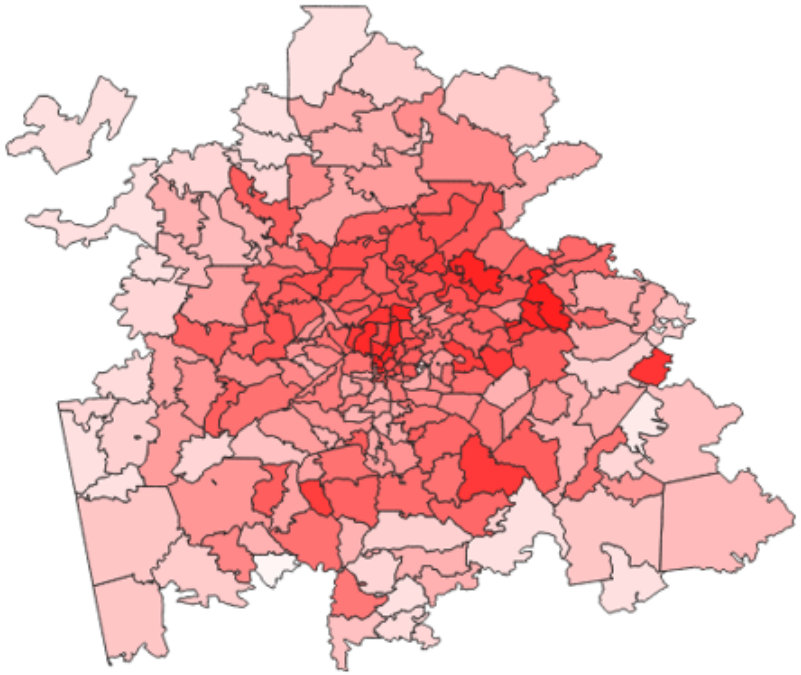
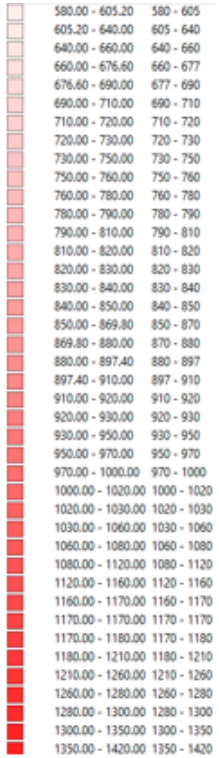
Distribution of SAFMR



Gary, IN



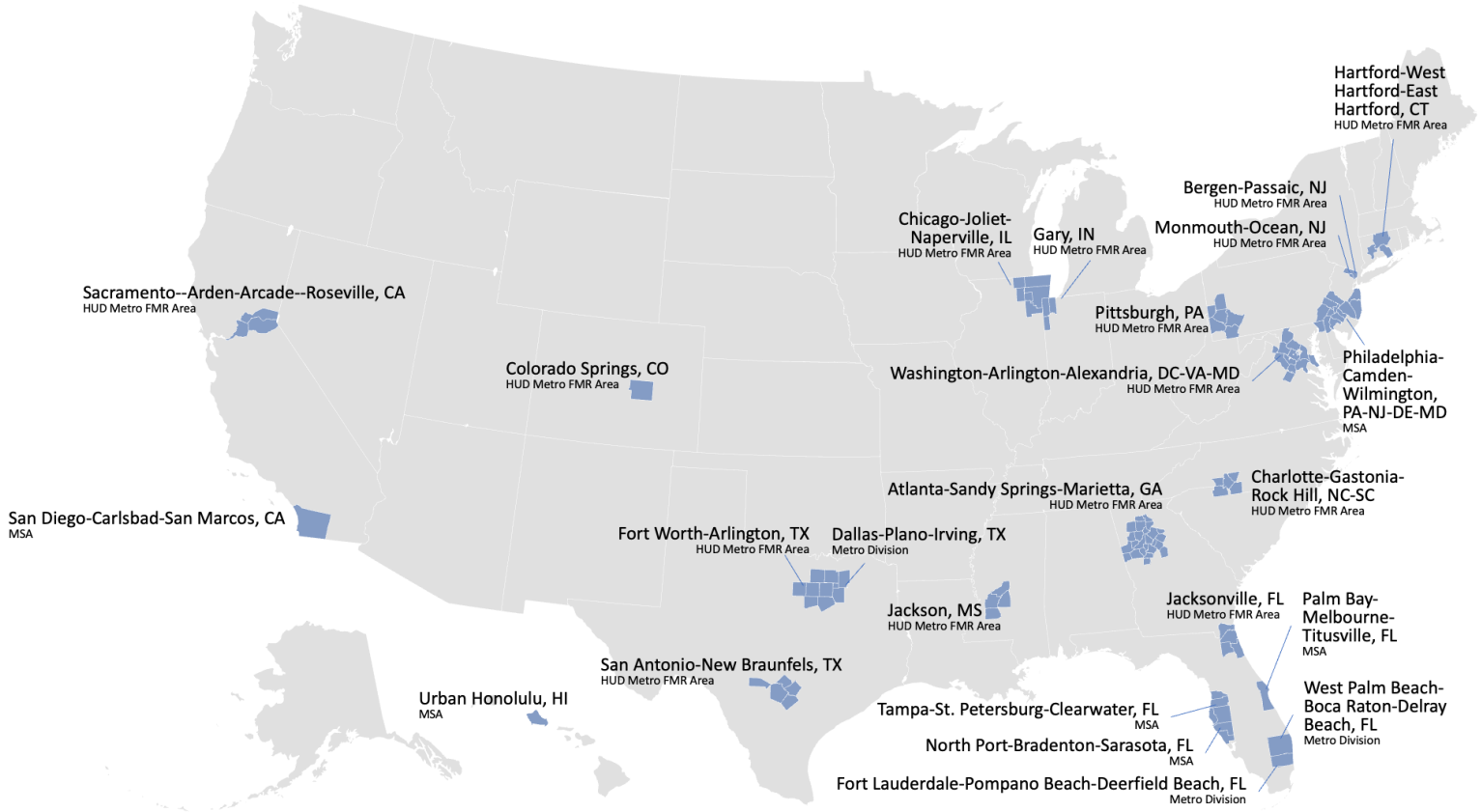
Atlanta, GA



- Darker red – higher payment standards (i.e., SAFMR)

▸ Back

24 Mandatory Metros



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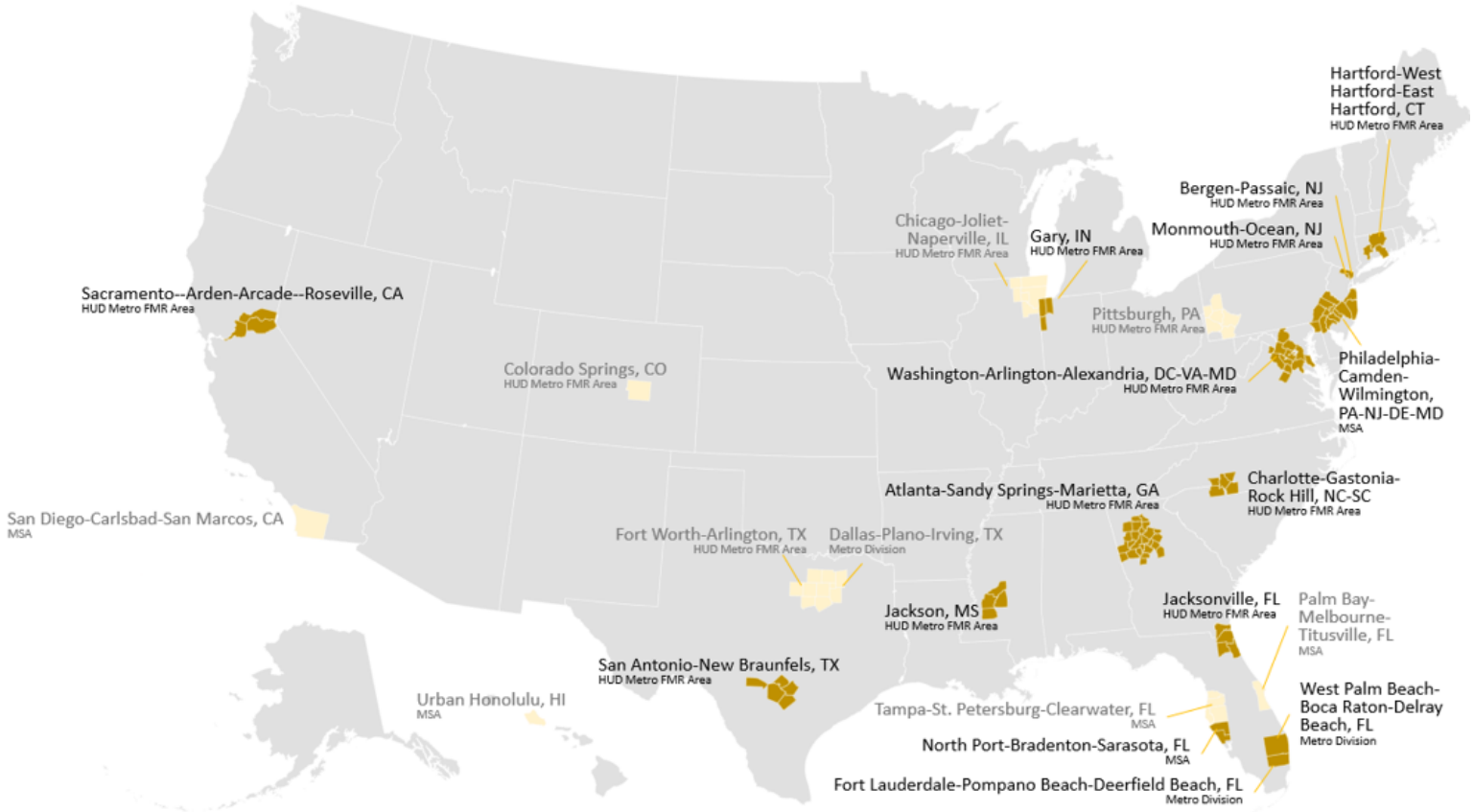
15 Mandatory Metros in Our Sample



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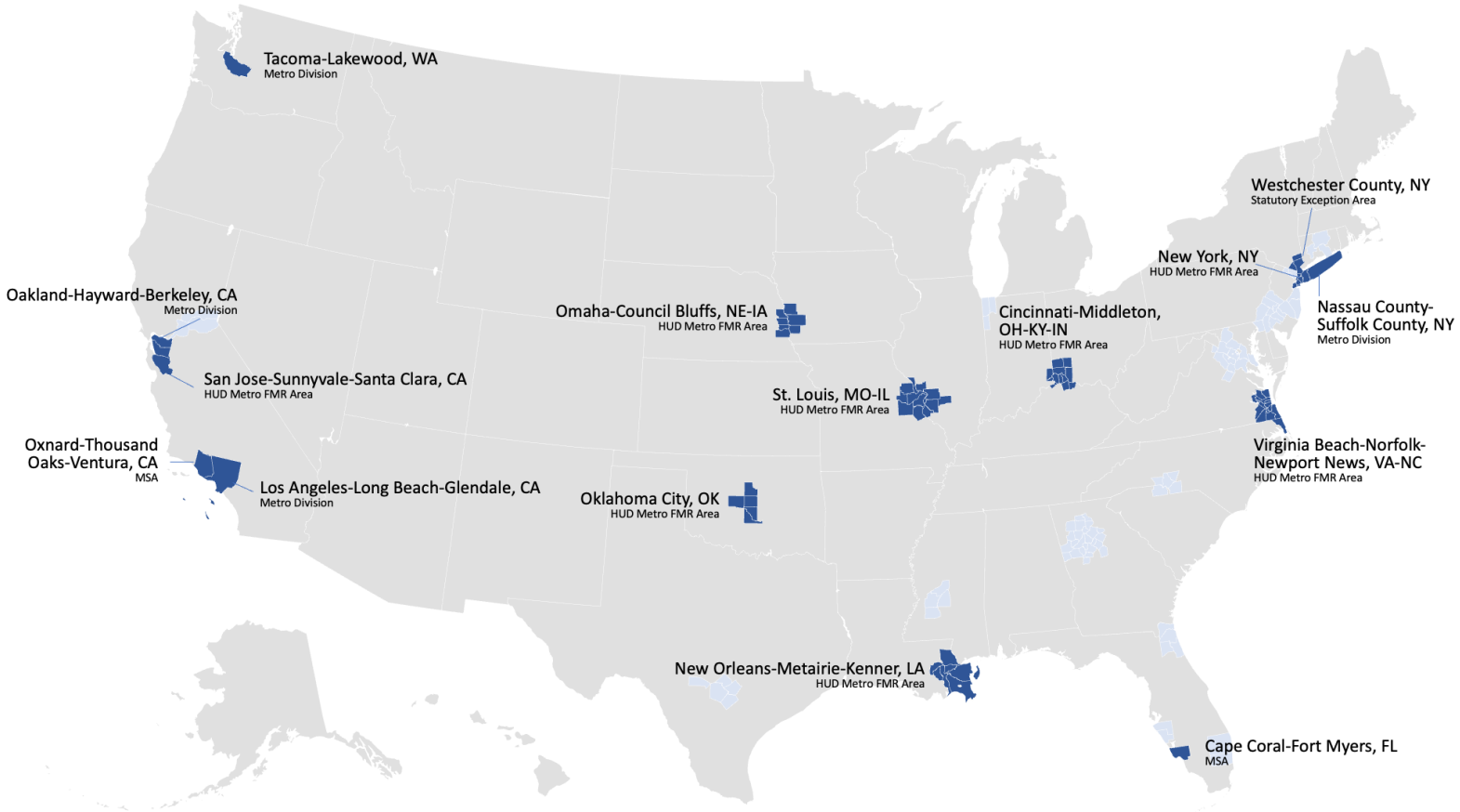

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Data

1. Administrative data (U.S. Dep of Housing and Urban Development)
    - Universe of detailed records for voucher holders location records (2015-2019)
    - Households and family demographics, income, address, voucher payment standards, gross rents, family rent contribution.
2. American Community Survey (ACS)
    - 2009-2013 5-Year Estimates; Same data as HUD using to select the mandatory metro areas in 2018.

Descriptive Statistics

Table: SAFMR-Mandatory Metropolitan Areas in 2017

Mean	(1) First-Time Recipients (2017)	(2) Existing Recipients (2017)	(3) Difference
Dependent Variables			
Census Tract Poverty Rate	24.11	22.87	1.23
$<$20% Poverty Tract	0.4379	0.4691	-0.0313
$<$10% Poverty Tract	0.1954	0.1991	-0.0037
Move Addresses When Renew Subsidy	-	0.0957	-
Voucher Recipients Demographics			
Black	0.6182	0.6682	-0.0500
Asian	0.0100	0.0195	-0.0095
Other Race	0.0144	0.0099	0.0045
Hispanic	0.1738	0.1534	0.0204
Female	0.7032	0.8448	-0.1416
Children Present	0.4743	0.5814	-0.1071
Household Member w/ Disabilities	0.2755	0.2467	0.0288
Age$\leq$30 (Baseline)	0.2281	0.1835	0.0446
Age 30-40	0.2420	0.2745	-0.0325
Age 40-50	0.1377	0.2147	-0.0770
Age 50-60	0.1998	0.1860	0.0138
Age 60-70	0.1300	0.0902	0.0398
Age$>$70	0.0625	0.0510	0.0114
One Household Member (including head, baseline)	0.4168	0.2946	0.1221
Two Household Members	0.2062	0.2169	-0.0108
Three Household Members	0.1458	0.1870	-0.0412
More than Three Household Members	0.2312	0.3014	-0.0702
N	6,116	164,253	

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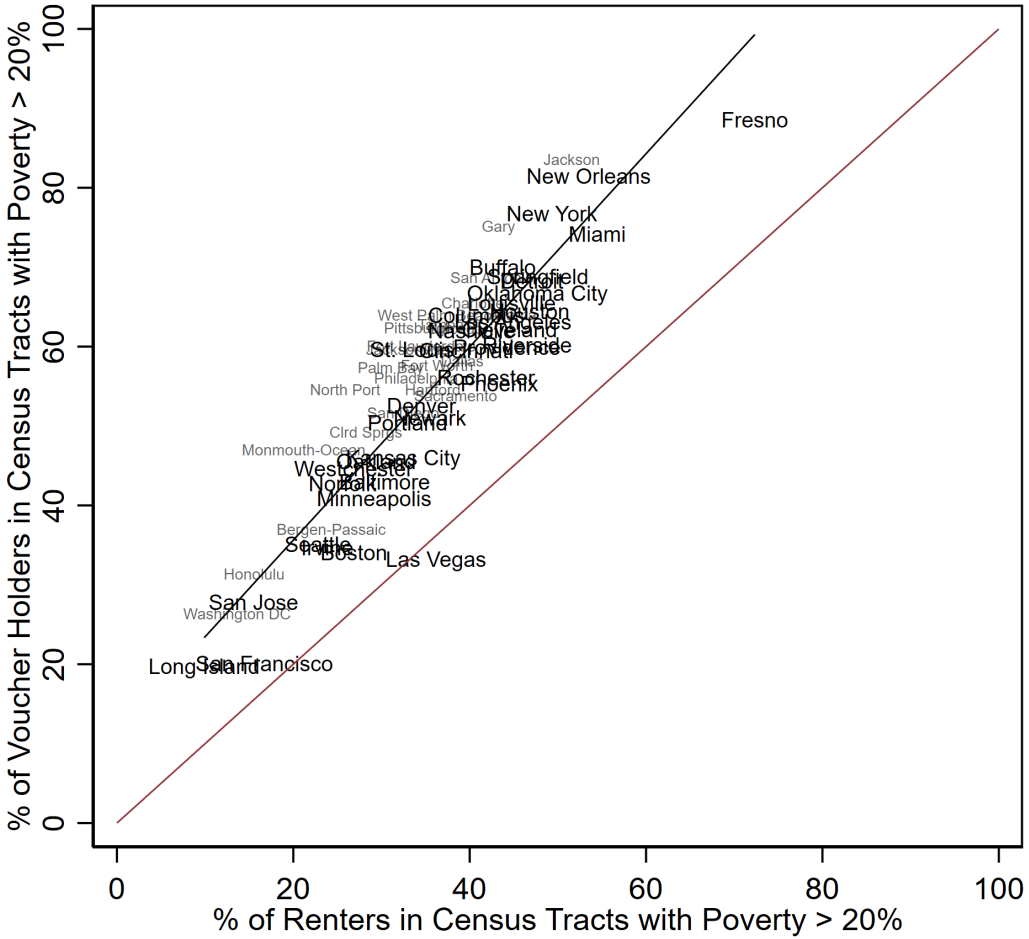
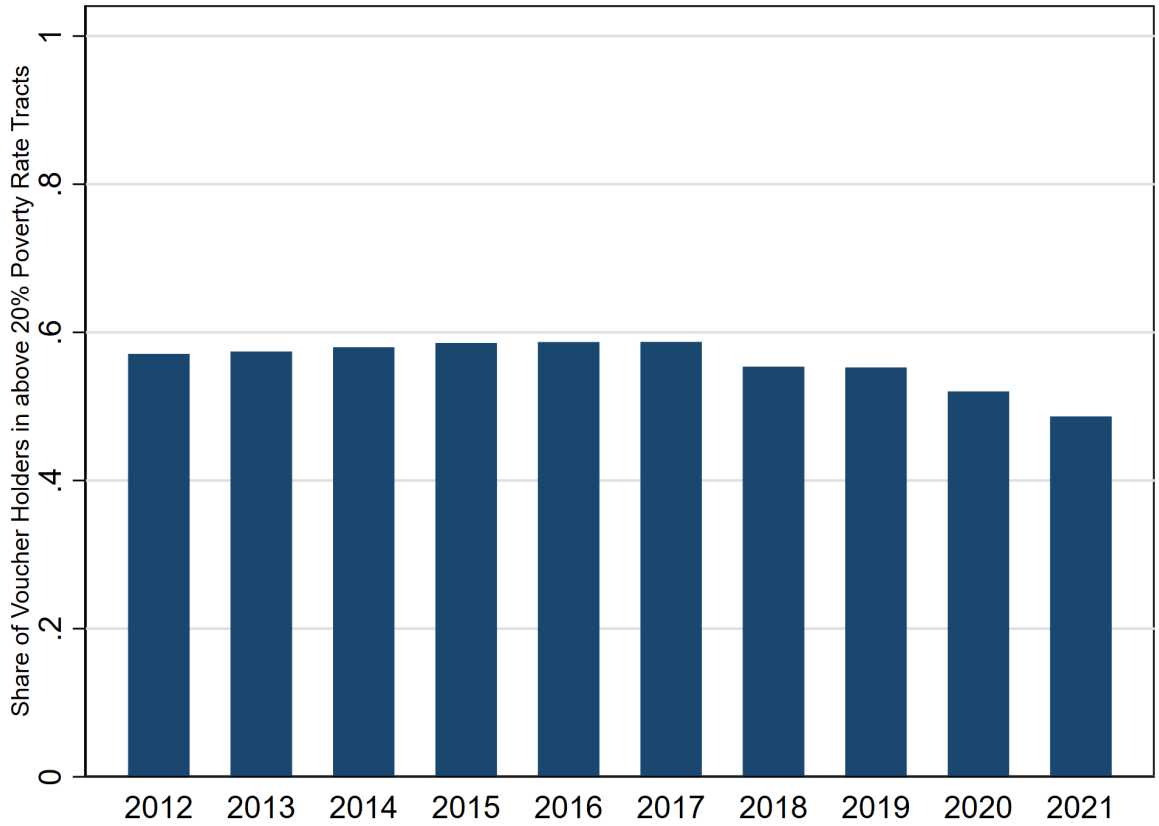
Mean	(1) First-Time Recipients (2017)	(2) Existing Recipients (2017)	(3) Difference
Adjusted Monthly Income	1,097	1,223	-126
Gross Rent Amount	1,153	1,217	-64
Total Subsidy Amount	829	840	-11
Tenant Payment Amount	324	377	-53
N	6,116	164,253	

Voucher Holders Reside in High Poverty Areas



- X: (%) of all renters in high poverty area (poverty rate $>$ 20%) (2013 ACS)
- Y: (%) of voucher holders in high poverty area)

Voucher Holders Reside in High Poverty Areas (annual)



- Y: (%) of voucher holders in poverty $\geq$ 20% tract by year)

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Fact 1 (a). Subsidies Structure Changed with SAFMR

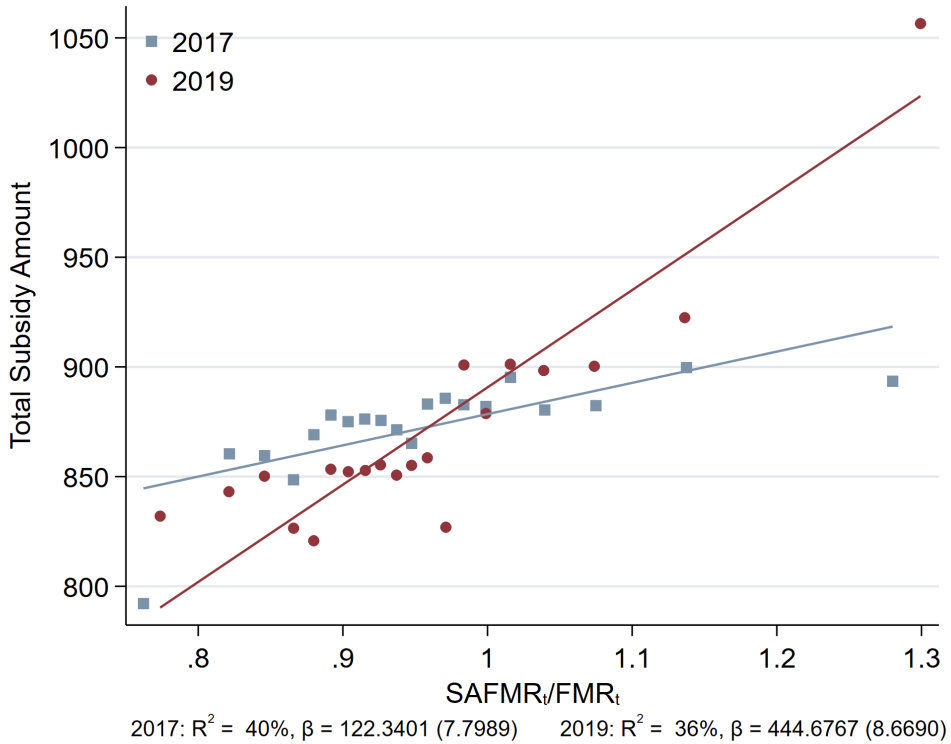


Figure: Housing Assistance Payment and Neighborhood Quality

Note: The plot utilizes restricted data from 2017 and 2019, focusing solely on voucher recipient households that currently reside in the 15 mandatory metros. Each dot on the plot represents the mean value for one of the 20 quantiles of the ZIP code-level SAFMR/FMR distribution. ▸ Comparison Metros

Fact 2 (a). VHs' Financial Incentives Changed with SAFMR

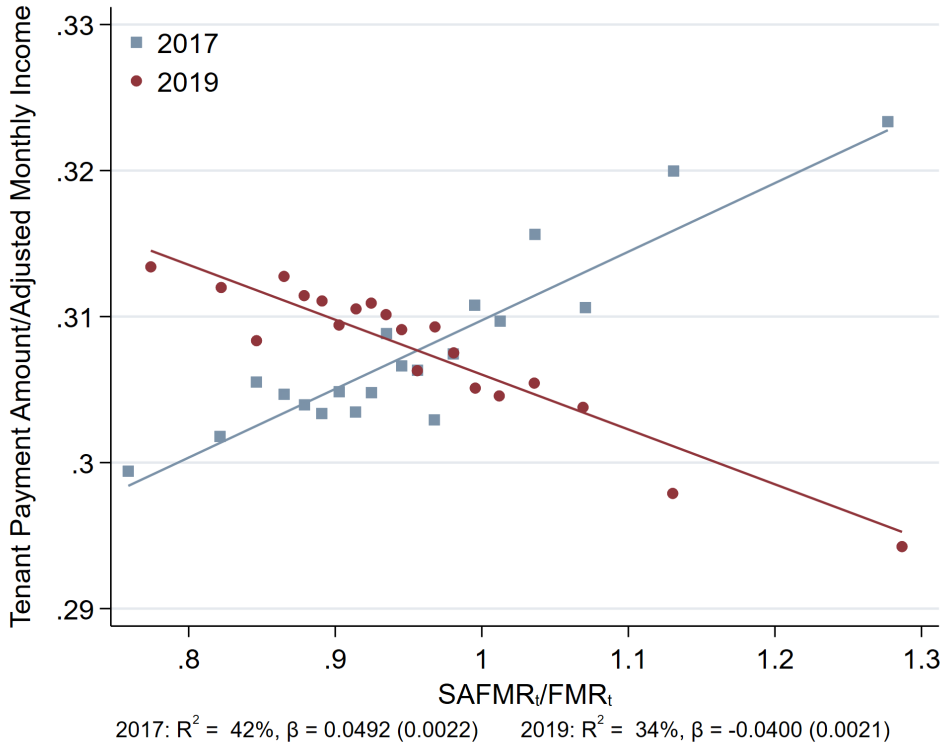


Figure: Family Contribution and Neighborhood Quality

Note: The plot utilizes restricted data from 2017 and 2019, focusing solely on voucher recipient households that currently reside in the 15 mandatory metros. Each dot on the plot represents the mean value for one of the 20 quantiles of the ZIP code-level SAFMR/FMR distribution. ▸ Comparison Metros

Fact 1 (b). Subsidies Structure in Comparison Metros

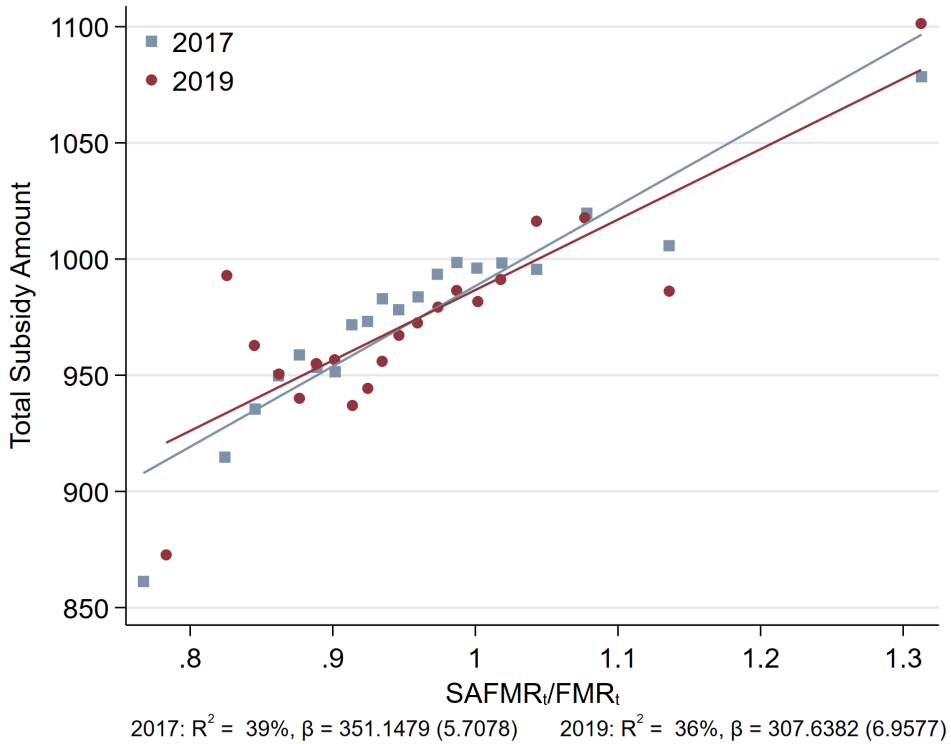


Figure: Housing Assistance Payment and Neighborhood Quality

Note: The plot utilizes restricted data from 2017 and 2019, focusing solely on voucher recipient households that currently reside in the 15 mandatory metros. Each dot on the plot represents the mean value for one of the 20 quantiles of the ZIP code-level SAFMR/FMR distribution. ▸ Back

Fact 2 (b). VHs' Financial Incentives in Comparison Metros

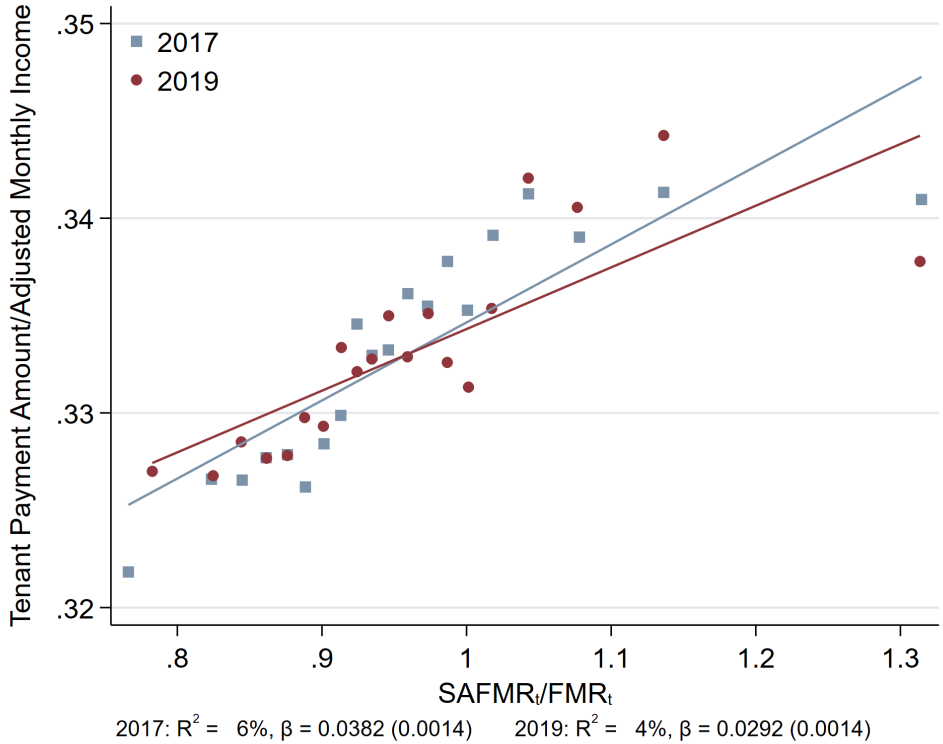


Figure: Family Contribution and Neighborhood Quality

Note: The plot utilizes restricted data from 2017 and 2019, focusing solely on voucher recipient households that currently reside in the 15 mandatory metros. Each dot on the plot represents the mean value for one of the 20 quantiles of the ZIP code-level SAFMR/FMR distribution. ▸ Back

Selection of Comparison MSAs

	Voucher Count	Voucher Concent.	Unit Concent.	Vacancy Rate
HUD's Selection Benchmark	$>$ 2,500	$>$ 1.55	$>$ 0.20	$>$ 4%
Panel A. Voucher Count: 2,000 $\rightarrow$ 2,500				
Cape Coral-Fort Myers, FL	2,138	1.9397	0.2464	14.70%
Panel B. Voucher Concentration: 1.5 $\rightarrow$ 1.55				
Los Angeles-Long Beach-Glendale, CA	81,404	1.5447	0.2738	4.43%
Cincinnati-Middleton, OH-KY-IN	17,502	1.5454	0.2193	9.23%
Westchester County, NY Statutory Exception Area	10,322	1.5288	0.3332	6.02%
Panel C. % Units in SAFMR $\geq$ 110%: 0.18 $\rightarrow$ 0.20				
New Orleans-Metairie-Kenner, LA	23,316	1.7180	0.1910	10.09%
St. Louis, MO-IL	18,297	1.7523	0.1982	7.06%
Oklahoma City, OK	11,228	1.6280	0.1906	7.48%
Omaha-Council Bluffs, NE-IA	6,391	1.6208	0.1958	7.51%
Panel D. Rental Unit Vacancy Rate to 3% $\rightarrow$ 4%				
New York, NY HUD Metro FMR Area	119,362	1.7047	0.2092	3.78%
San Jose-Sunnyvale-Santa Clara, CA	14,307	2.1365	0.2104	3.10%
Oxnard-Thousand Oaks-Ventura, CA	5,612	1.5826	0.3682	3.78%
Panel E. Metros Meet HUD's Standard				
Oakland-Hayward-Berkeley, CA	28,355	1.5523	0.2800	4.61%
Virginia Beach-Norfolk-Newport News, VA-NC	12,291	1.6972	0.2799	7.15%
Nassau County-Suffolk County, NY	11,593	1.9035	0.4834	4.73%
Tacoma-Lakewood, WA Metro Division	5,341	1.5524	0.3367	5.81%

▸ Back

Regression with Comparison MSAs

For household i living in county c in year t,

$$Y_{i,p,m,t} = \alpha + \beta \text{Mandatory}_m \times \text{Post}_t + \lambda \mathbf{X}'_{it} + \delta_c + \zeta_t + \epsilon_{i,p,m,t}$$

- $Y_{i,p,m,t}$: Various household-level outcomes (e.g., 2010 tract-level poverty rate)
- $\text{Mandatory}_m = 1$: if voucher holders are in the mandatory metropolitan areas
  - 15 mandatory metros: 301,820 households (N=1.44 millions).
  - 15 comparison metros: 534,702 households (N=2.67 millions).
- $\text{Post}_t = 1$: if effective date (t) is after March 31st, 2018.
  - Sample periods: 2014-2020 (Pre: 2014-2017, Post: 2018-2020)
- $\mathbf{X}_{i,t}$: household head-level control variables
  - e.g., race, gender, age, presence of children or disabled members
- δ_c: time-invariant county-level factors (nested in metropolitan m).
- ζ_t: Calendar year-contract month fixed effects.
- Standard errors are clustered at the county-PHA-year-month level.

Instrumental Variable Strategy

For household i residing in PHA p, metro m in year t (2014-2020),

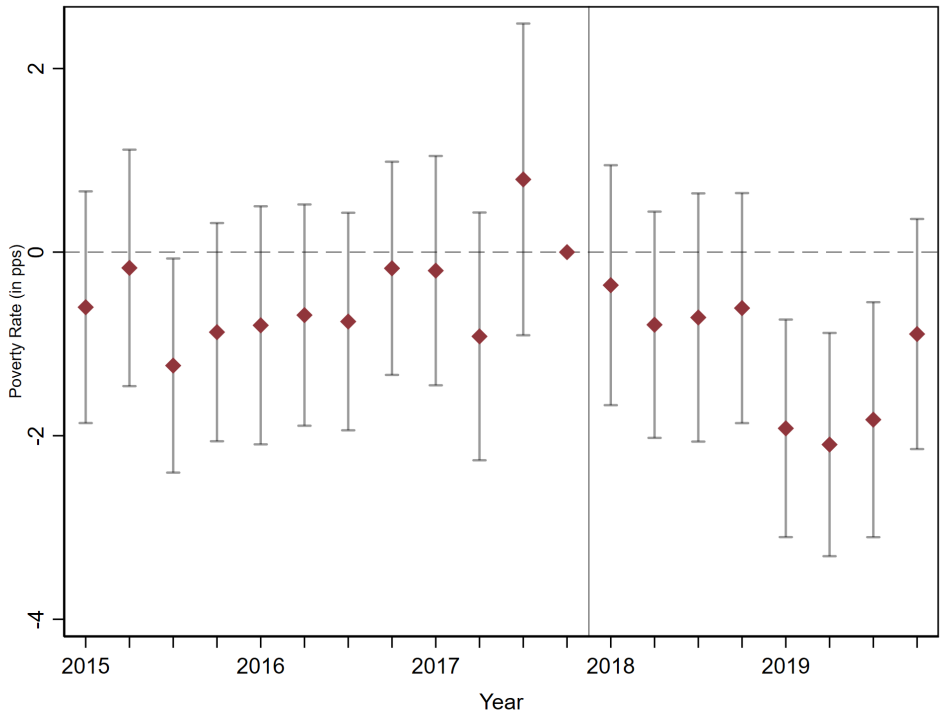
$$\mathbb{I}(\text{EFMR=SAFMR})_{i,p,m,t} = \alpha + \gamma \text{Adoption Rate}_{-i,p,m,t} + \lambda \mathbf{X}'_{i,t} + \delta_c + \zeta_t + \epsilon_{i,p,m,t}$$

$$Y_{i,p,m,t} = \alpha + \beta \widehat{\mathbb{I}(\text{EFMR=SAFMR})}_{i,p,m,t} + \lambda \mathbf{X}'_{i,t} + \delta_c + \zeta_t + \epsilon_{i,m,t}$$

- **Endogenous Variable** ($\mathbb{I}(\text{EFMR=SAFMR})_{i,p,m,t}$) equals one if households use SAFMRs as their effective Fair Market Rent (EFMR)
- **Instrumental Variable** ($\text{Adoption Rate}_{-i,p,m,t}$) indicates the SAFMR adoption rate of peers who are in the same PHA and metropolitan areas, at month-year t
- $Y_{i,p,m,t}$ represents the variables of interest (e.g., poverty rate), $\widehat{\mathbb{I}(\text{EFMR=SAFMR})}_{i,t}$ denotes the predicted values from the first stage
- $\mathbf{X}'_{i,t}$, δ_c, and ζ_t represent household-level control variables, county fixed effects, and year-month fixed effects, respectively

▸ Back: Result

New Voucher Recipients: Effect on Poverty Exposure

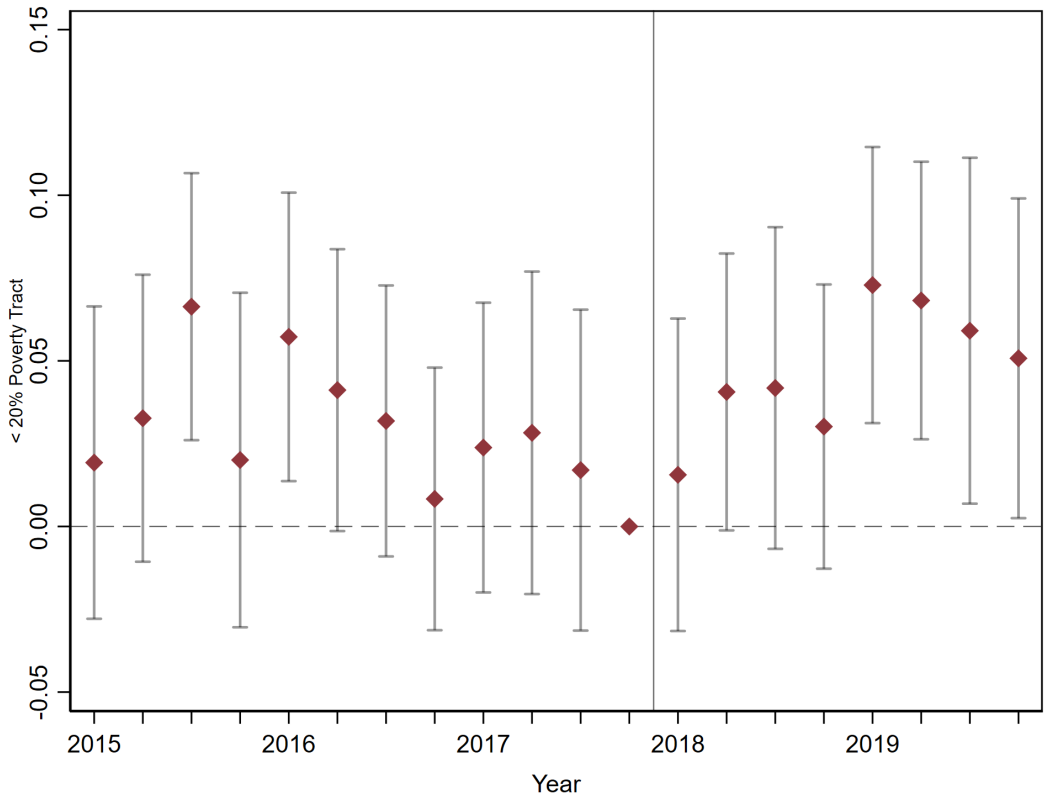


- Y = Poverty Rate
- β_t coefficients for all $t \in \{2015Q1, \ldots, 2019Q4\}$

$$Y_{i,m,t} = \sum_t \beta_t \times \text{Mandatory}_m \times \text{Post}_t + \gamma \mathbf{X}'_{i,t} + \delta_c + \zeta_t + \epsilon_{i,m,t}$$

▸ Back

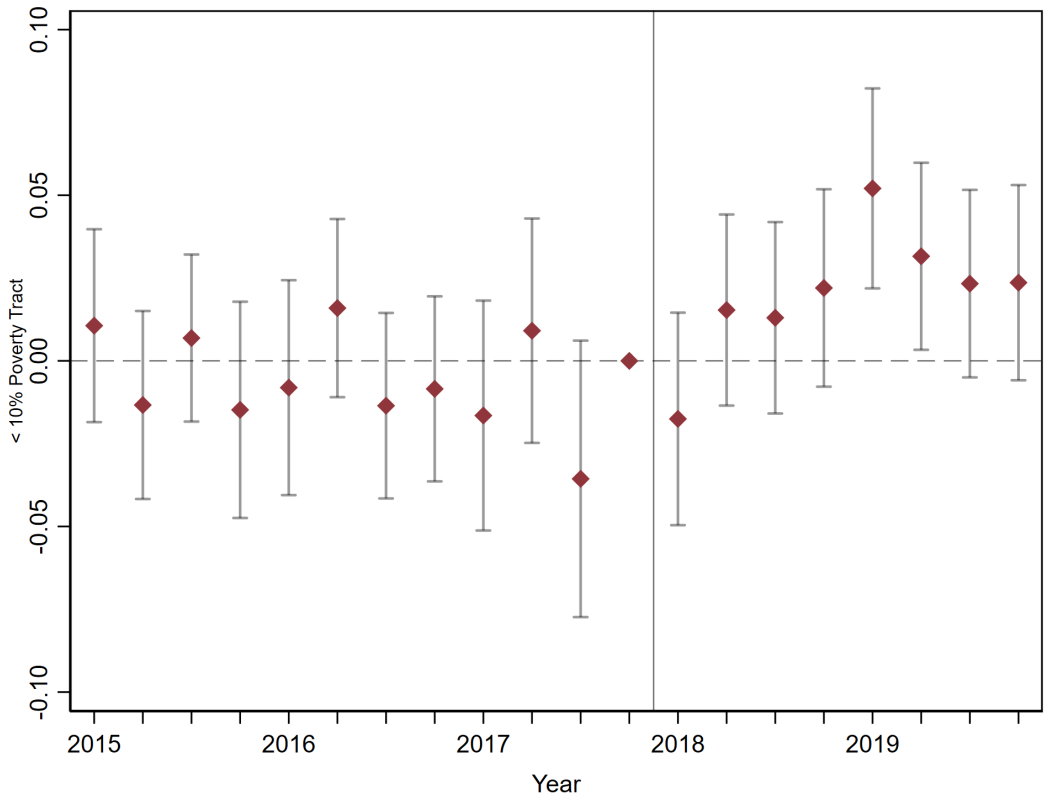
Event Study: New Voucher Holders in below 20% Poverty



- Y = If in $<$20% Poverty Rate Census Tract
- Mandatory vs. Comparison MSAs
- β_t coefficients for all $t \in \{2015Q1, \ldots, 2019Q4\}$

$$Y_{i,m,t} = \sum \beta_t \times \text{Mandatory}_m \times \text{Post}_t + \gamma \mathbf{X}'_{i,t} + \delta_c + \zeta_t + \epsilon_{i,m,t}$$

Event Study: New Voucher Holders in below 10% Poverty



- Y = If in $<$10% Poverty Rate Census Tract
- Mandatory vs. Comparison MSAs
- β_t coefficients for all $t \in \{2015Q1, \ldots, 2019Q4\}$

$$Y_{i,m,t} = \sum \beta_t \times \text{Mandatory}_m \times \text{Post}_t + \gamma \mathbf{X}'_{i,t} + \delta_c + \zeta_t + \epsilon_{i,m,t}$$

New Voucher Recipients: Effect on Poverty Exposure

Dependent Variable	Poverty Rate		<20% Poverty		<10% Poverty	
Variable	(1) OLS	(2) 2SLS	(3) OLS	(4) 2SLS	(5) OLS	(6) 2SLS
SAFMR Payment Standard	-0.6972***	-0.7438***	0.0210**	0.0213**	0.0311***	0.0312***
	(0.2637)	(0.2711)	(0.0099)	(0.0102)	(0.0059)	(0.0061)
FEs	Year-Month, County	Year-Month, County	Year-Month, County	Year-Month, County	Year-Month, County	Year-Month, County
Controls	Y	Y	Y	Y	Y	Y
Average Dep Var (2017)	24.1052	24.1052	0.4379	0.4379	0.1954	0.1954
N	109,055	109,055	109,055	109,055	109,055	109,055

Notes: Standard errors are clustered at county-PHA-contract start time (year-month) and presented in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

$$Y_{i,p,m,t} = \alpha + \beta \mathbb{I}(\text{PayStand=SAFMR})_{i,p,m,t} + \lambda \mathbf{X}'_{i,t} + \delta_c + \zeta_t + \epsilon_{i,p,m,t}$$

- $\mathbb{I}(\text{PayStand=SAFMR})_{i,p,m,t}$: indicator variable that equals one if households use SAFMRs as their payment standard.
- IV: 1-month lagged SAFMR compliance rate of the PHA administering their voucher.

▸ Event Study

Existing Voucher Recipients: Effect on Poverty Exposure

Dependent Variable	Poverty Rate	<20% Poverty	<10% Poverty
	(1)	(2)	(3)
SAFMR Payment Stand.	-0.1627***	0.0078***	0.0053***
	(0.0191)	(0.0008)	(0.0005)
FEs	Year-Month	Year-Month	Year-Month
	County	County	County
	Households	Households	Households
Average Dependent Variable (2017)	22.8734	0.4691	0.1991
N	2,340,366	2,340,366	2,340,366

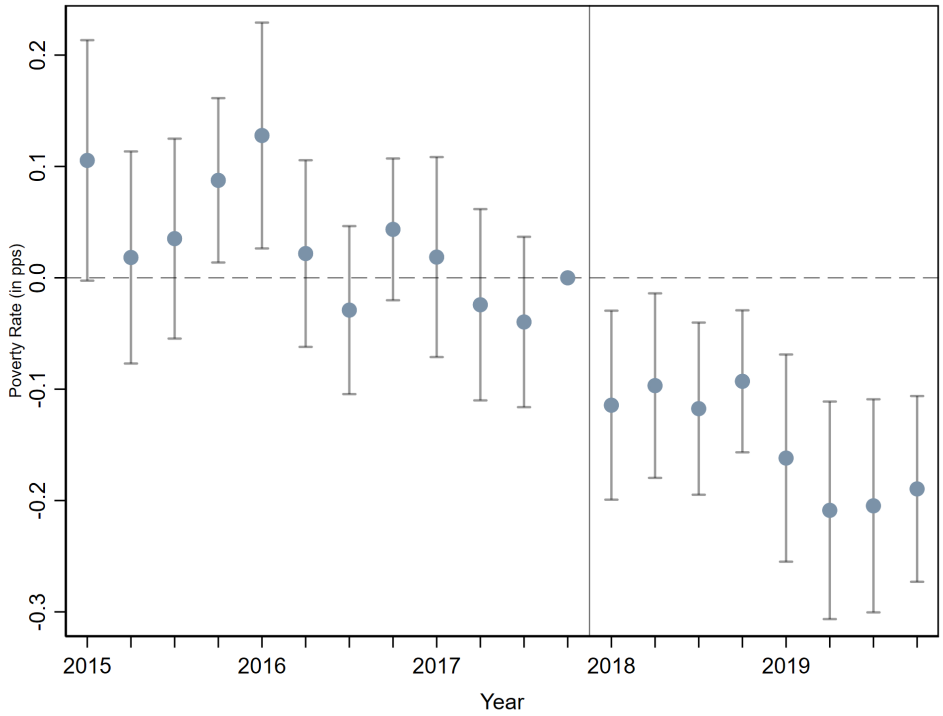
Notes: Standard errors are clustered at county-PHA-contract start time (year-month) and presented in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

$$Y_{i,p,m,t} = \alpha + \beta \mathbb{I}(\text{PayStand=SAFMR})_{i,p,m,t} + \lambda_i + \delta_c + \zeta_t + \epsilon_{i,p,m,t}$$

- $\mathbb{I}(\text{PayStand=SAFMR})_{i,p,m,t}$ is the indicator variable that equals one if households use SAFMRs as their payment standard.
- IV: Current month SAFMR compliance rate of the PHA administering their voucher excluding the voucher holder *i*.

▸ Event Study

Existing Voucher Recipients: Effect on Poverty Exposure

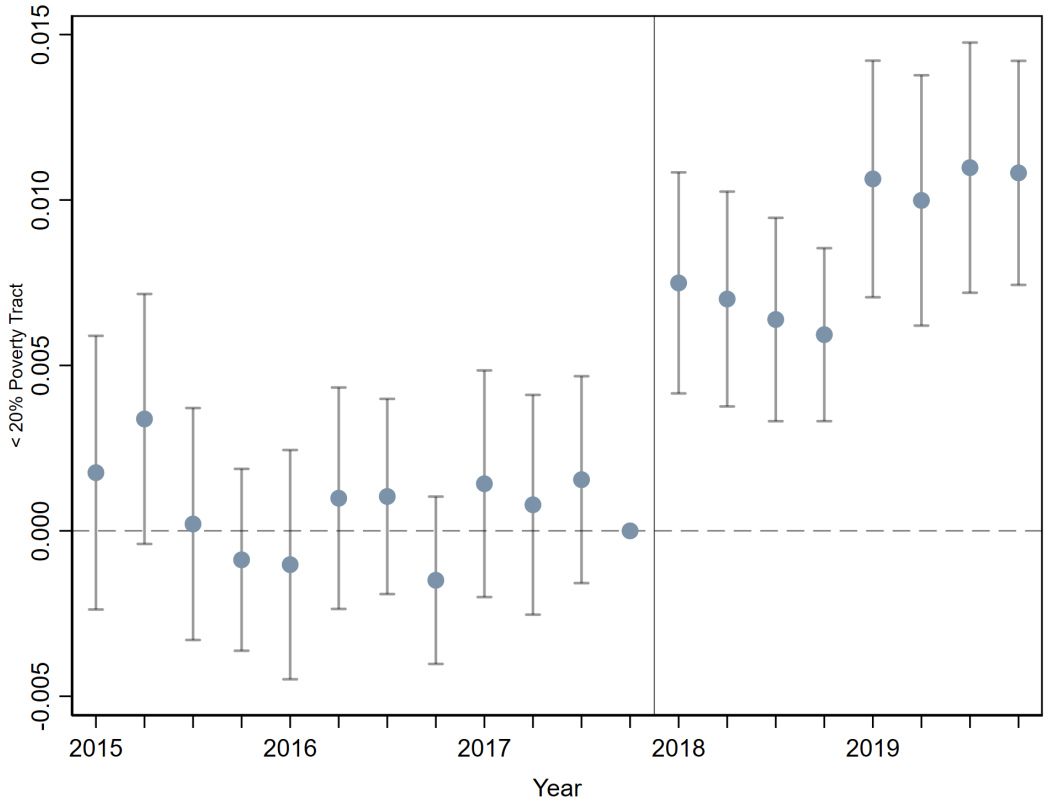


- Y = Poverty Rate
- β_t coefficients for all $t \in \{2015Q1, \ldots, 2019Q4\}$

$$Y_{i,m,t} = \sum_t \beta_t \times \text{Mandatory}_m \times \text{Post}_t + \lambda_i + \delta_c + \zeta_t + \epsilon_{i,m,t}$$

▸ Back

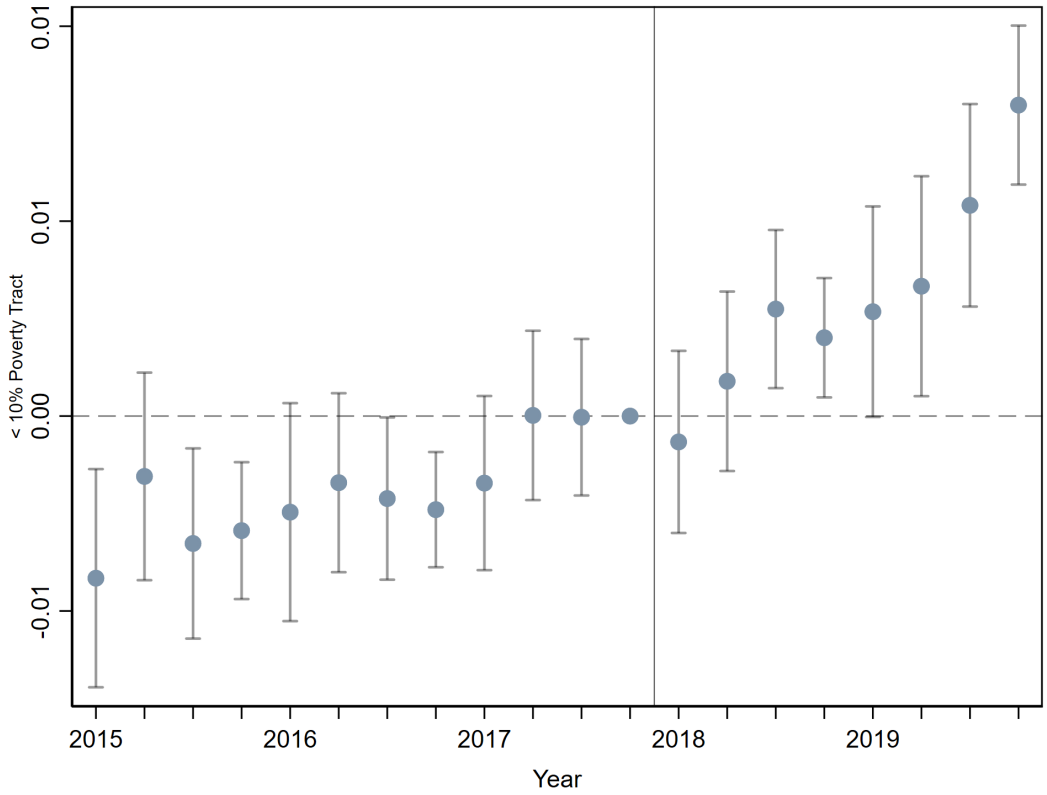
Event Study: Existing Voucher Holders in $<$ 20% Poverty



- Y = If in $<$20% Poverty Rate Census Tract
- Mandatory vs. Comparison MSAs
- β_t coefficients for all $t \in \{2015Q1, \ldots, 2019Q4\}$

$$Y_{i,m,t} = \sum \beta_t \times \text{Mandatory}_m \times \text{Post}_t + \lambda_i + \delta_c + \zeta_t + \epsilon_{i,m,t}$$

Event Study: Existing Voucher Holders in $<$ 10% Poverty



- Y = If in $<$10% Poverty Rate Census Tract
- Mandatory vs. Comparison MSAs
- β_t coefficients for all $t \in \{2015Q1, \ldots, 2019Q4\}$

$$Y_{i,m,t} = \sum \beta_t \times \text{Mandatory}_m \times \text{Post}_t + \lambda_i + \delta_c + \zeta_t + \epsilon_{i,m,t}$$

First-Stage IV Regression

Panel A: First-Time Voucher Recipients

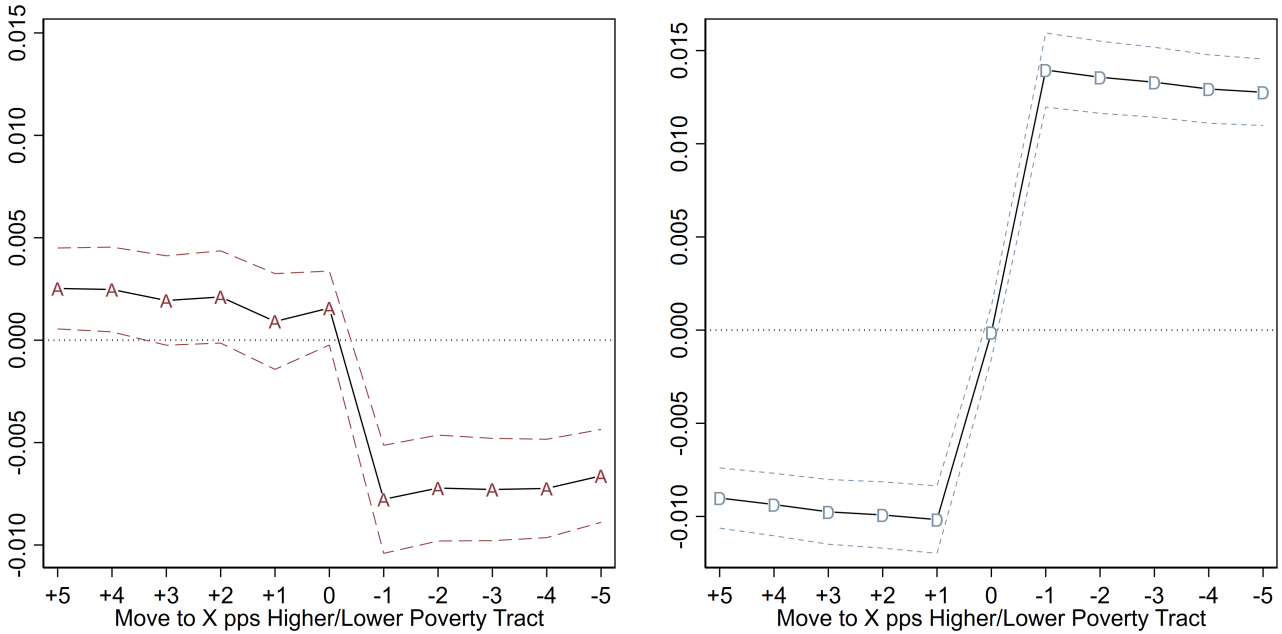
Dependent Variable	Poverty Rate	<20% Poverty	<10% Poverty
Variable	(1) 2SLS	(2) 2SLS	(3) 2SLS
1^{st} Stage: Adoption Rate$_{i,p,c,t-1}$	0.9807***	0.9807***	0.9807***
	(0.0038)	(0.0038)	(0.0038)
1^{st} Stage K-P Wald rk F statistic	66,857	66,857	66,857
N	109,055	109,055	109,055

Panel B: Existing Voucher Holders

Dependent Variable	Poverty Rate	<20% Poverty	<10% Poverty
Variable	(1) 2SLS	(2) 2SLS	(3) 2SLS
1^{st} Stage: Adoption Rate$_{-i,p,c,t}$	0.9859***	0.9859***	0.9859***
	(0.0004)	(0.0004)	(0.0004)
1^{st} Stage K-P Wald rk F statistic	6,994,639	6,994,639	6,994,639
N	2,340,366	2,340,366	2,340,366

Notes: Standard errors are clustered at county-PHA-contract start time (year-month) and presented in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

Intended Consequences

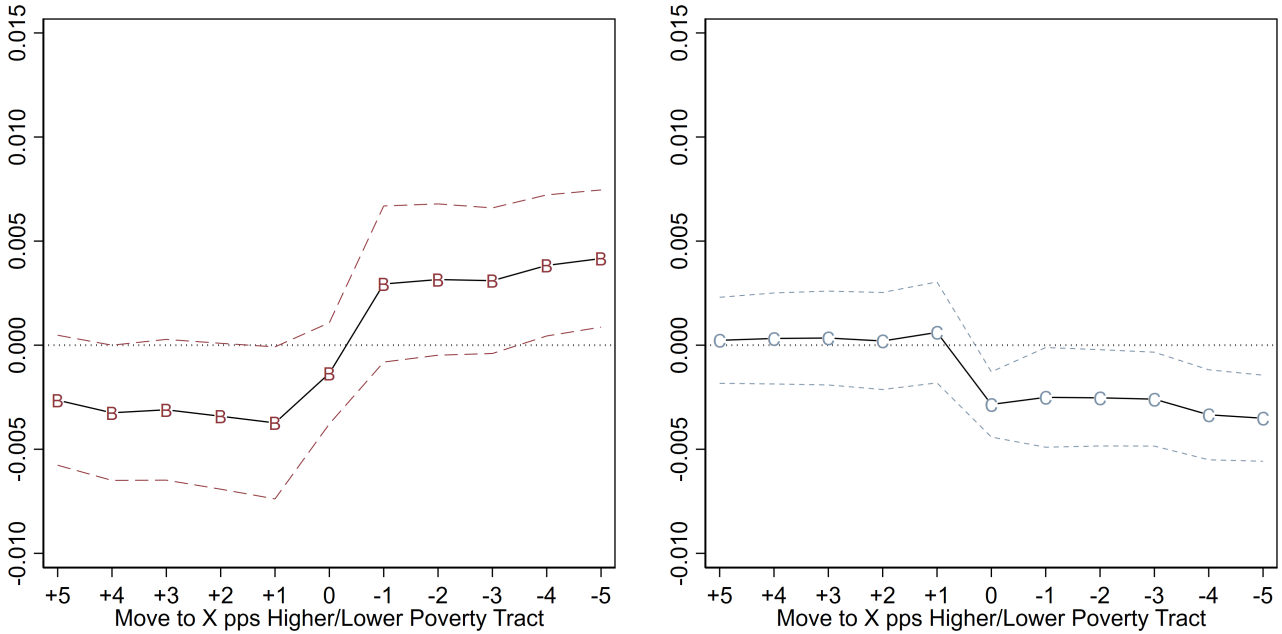


(a) Quad A: high rent, low pov. (b) Quad D: low rent, high pov.

Notes: X-axis: Prob(Move to X pps higher or lower poverty census tract), Y-axis: Regression Coefficients (with Standard Error)

- Before SAFMR in Quad A (Fig (e))
  - prob of moving to lower poverty area decreases after SAFMR
- Before SAFMR in Quad D (Fig (f)):

Unintended Consequences due to Imprecise Targeting



(c) Quad. B: high rent, high pov. (d) Quad. C: low rent, low pov.

Notes: X-axis: Prob(Move to X pps higher or lower poverty census tract), Y-axis: Regression Coefficients (with Standard Error)

- Before SAFMR, in Quad B (Fig (g)):
  - Prob of moving to lower poverty area decreases with SAFMR
  - Unintended consequences as they are stuck in high poverty area
- Before SAFMR, in Quad C (Fig (h)):

Heterogeneous Effects across Metropolitan Areas

SAFMR Mandatory Metropolitan Areas	First-Time		Existing		
	TOT	Standardized Effect	ITT	TOT	Standardized Effect
		(1)/SD			(4)/SD
	(1)	(2)	(3)	(4)	(5)
Atlanta-Sandy Springs-Marietta, GA HUD Metro FMR Area	-0.3342	-0.0269	-0.1138***	-0.9717	-0.0781***
Bergen-Passaic, NJ HUD Metro FMR Area	-1.3068	-0.1117	0.1031***	1.8055	0.1543***
Charlotte-Gastonia-Rock Hill, NC-SC HUD Metro FMR Area	0.2665	0.0217	0.1278*	2.0214	0.1645*
Fort Lauderdale-Pompano Beach-Deerfield Beach, FL Metro Division	-2.4270*	-0.2419*	-0.3598***	-1.7658	-0.1760***
Gary, IN HUD Metro FMR Area	-0.9651	-0.0591	-0.2852***	-3.3952	-0.2079***
Hartford-West Hartford-East Hartford, CT HUD Metro FMR Area	-0.5739	-0.0394	-0.5078***	-5.8930	-0.4047***
Jackson, MS HUD Metro FMR Area	-1.5538	-0.1018	-0.3751***	-4.9816	-0.3264***
Jacksonville, FL HUD Metro FMR Area	1.4163**	0.1231**	0.3945***	2.4629	0.2140***
Monmouth-Ocean, NJ HUD Metro FMR Area	-1.8420	-0.2153	-0.4832***	-7.6229	-0.8909***
North Port-Bradenton-Sarasota, FL MSA	-2.9266***	-0.3069***	-0.4323***	-4.7415	-0.4972***
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA	-0.2149	-0.0157	-0.1856***	-3.0767	-0.2249***
Sacramento–Arden-Arcade–Roseville, CA HUD Metro FMR Area	1.6130***	0.1405***	0.3200***	6.3639	0.5544***
San Antonio-New Braunfels, TX HUD Metro FMR Area	-0.7361	-0.0567	-0.4471***	-3.9303	-0.3030***
Washington-Arlington-Alexandria, DC-VA-MD HUD Metro FMR Area	-1.8329***	-0.2075***	-0.2235***	-2.2080	-0.2500***
West Palm Beach-Boca Raton-Delray Beach, FL Metro Division	-1.3556*	-0.1216*	-0.0437	-0.4579	-0.0411
Overall	-0.6972***	-0.0564	-0.1664***	-1.7388	-0.1406

Note: Standard errors are clustered at county-PHA-contract start time (year-month) and presented in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).