SUBURBAN HOUSING AND URBAN AFFORDABILITY

EVIDENCE FROM RESIDENTIAL VACANCY CHAINS

Robert French and Valentine Gilbert

April 12, 2024

Joint Center for Housing Studies, Housing Research Seminar

RISING URBAN HOUSING COSTS

Steep increase in housing costs in U.S. cities 1990-2018 ▸ Figure

- 30% increase in real rents in metro areas
- 45% increase in real rents in 10% of tracts closest to city center

Rising costs driven by:

1. Rising demand to live in urban centers

   Couture et al. (2021); Su (2021); Couture and Handbury (2020)

2. Inelastic urban housing supply

   Howard and Liebersohn (2021); Baum-Snow and Han (2021); Glaeser and Gyourko (2003)

RISING SUBURBAN HOUSING SUPPLY

Supply of housing in low-density suburbs is elastic Figure

- < 50% of the housing stock in 1990
- > 80% of housing supply growth 1990-2018

Question: Can expanding suburban housing supply lower urban housing costs?

SUBJECT OF POLICY DEBATE

Supply Skeptics

- New market-rate housing won't lower costs for low- and middle-income households
- Assume housing submarkets are segmented

Market Urbanists

- Increasing aggregate supply will lower housing costs for all
- Assume high mobility across submarkets

THE NEW REPUBLIC

Michael Friedrich / February 9, 2023

FOUNDATIONS

More Building Won't Make Housing Affordable

America's housing crisis has reached unfathomable proportions. But new construction isn't enough to solve it.

Feb. 13, 2020

The New York Times

Build Build Build Build Build Build Build Build Build Build Build Build

When California's housing crisis slammed into a wealthy suburb, one public servant

THIS PAPER

Question: Can expanding suburban housing supply lower urban housing costs?

Hard to answer with standard approach

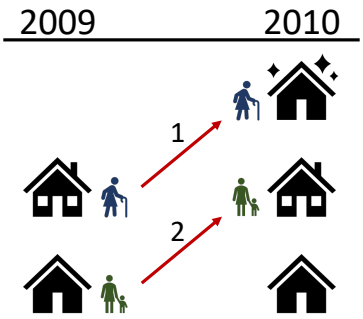
- Need variation in housing supply from natural experiment
- High-dimensional problem

We take an alternative approach

- Exploit rich admin data to construct residential vacancy chains
- Use simulations to understand price effects of new housing

WHAT IS A VACANCY CHAIN?

- Series of moves initiated by new housing unit
- First round creates vacancies in origin units
- Second round of moves into vacated units creates additional vacancies
- Chain traces impact of new housing across different submarkets



PREVIEW OF RESULTS

Descriptive Evidence

- Vacancy chains connect housing submarkets
- But vacancy chains are short
- 100 new suburban homes $\rightarrow$ 1.5 vacancies in low-income urban tracts

Simulation Results

- Number of vacancies strongly predicts price effects

$\rightarrow$ Where we build matters!

ROAD MAP

1. Introduction
2. Data
3. Vacancy Chain Characteristics
4. Simulation Exercise
5. Conclusion

DATA

DATA

Link individuals across restricted Census Bureau data sources:

- Inventory of US housing units, 2022 (Master Address File Extract)
- Residential histories, 2000-2021 (Master Address File Auxiliary Reference File)
- Age, race, and ethnicity (Decennial Censuses, 2000 and 2010)
- Tract-level characteristics (American Community Surveys, 2005-2019)

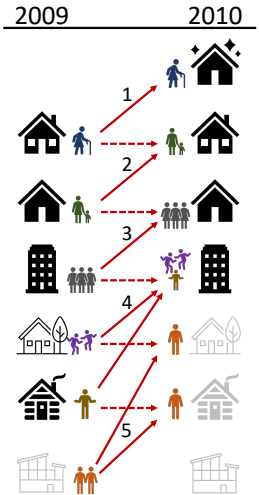
Impute housing unit age and building size:

- Impute age from year unit ID first observed in residential histories
- Impute size from number of unit IDs with same street address

BUILDING VACANCY CHAINS

Start from new units

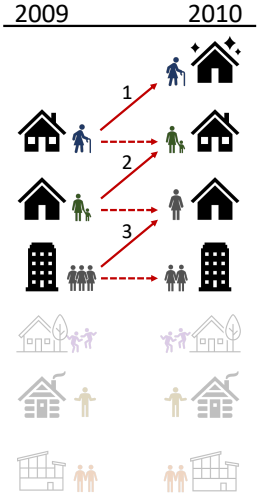
- Link 1: Moves into new units
- Link 2: Moves into link 1 origin units
- One vacancy can create many
- Many vacancies can create one



BUILDING VACANCY CHAINS

Chains end if:

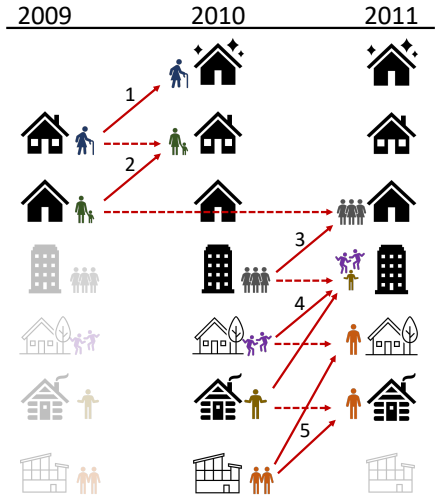
- Move doesn't create a vacant unit
- Move from abroad or group quarters
- Vacated unit doesn't become occupied



BUILDING VACANCY CHAINS

We build chains over multiple horizons

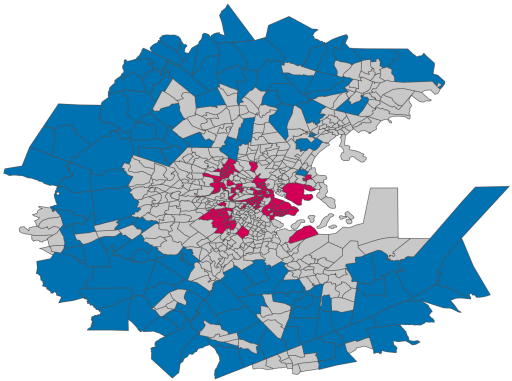
- If no one found in 2010, search in 2011
- Construct one-year chain from 2011
- Build chains up to four-year horizon



NEW HOUSING LOCATIONS, 2009-2018

Two kinds of new housing in large metros

1. Low-density suburban single-family
   - Below-median density tracts
   - Outside principal city
   - → 1.2 million chains
2. High-income urban multi-family
   - Above-median income tracts
   - Within 5 miles of city center
   - 20+ unit buildings
   - → 0.36 million chains



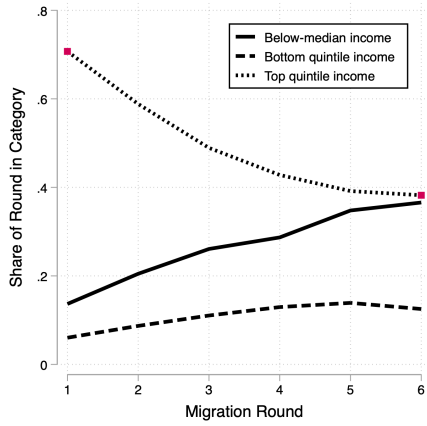
VACANCY CHAIN CHARACTERISTICS

ORIGIN TRACT CHARACTERISTICS BY MIGRATION ROUND

New urban housing → 356,000 chains

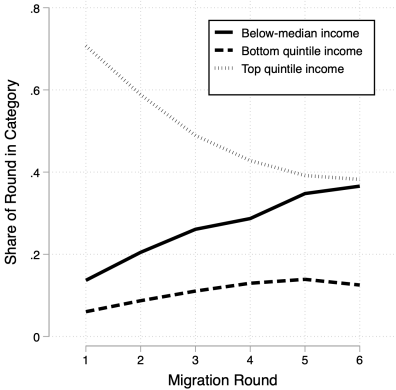
- 14% of first-round moves are from below-median income tracts
- Increases to 20% by round two...
- ...and 37% by round six
- Bottom quintile: 6% → 13%
- Top quintile: 71% → 38%

High-Income Urban Multi-Family



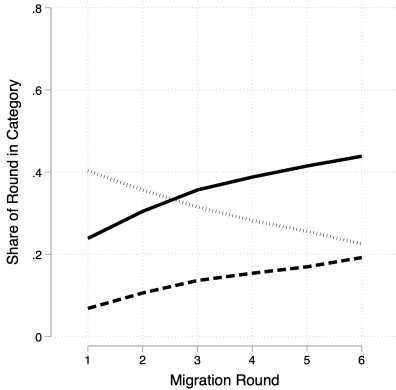
VACANCY CHAINS CONNECT SUBMARKETS...

High-Income Urban Multifamily



N = 356,000; Horizon = 1

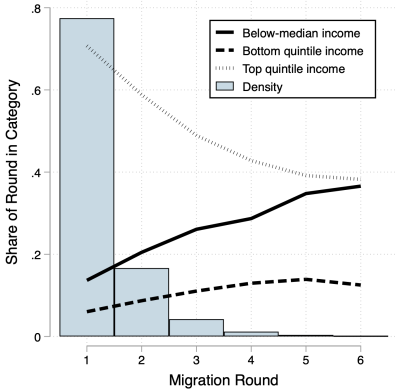
Low-Density Suburban Single-Family



N = 1,159,000; Horizon = 1

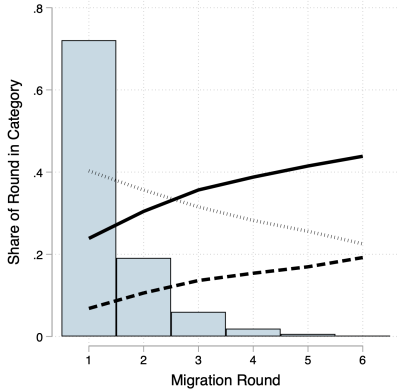
...BUT VACANCY CHAINS ARE SHORT

High-Income Urban Multifamily



N = 356,000; Horizon = 1

Low-Density Suburban Single-Family



N = 1,159,000; Horizon = 1

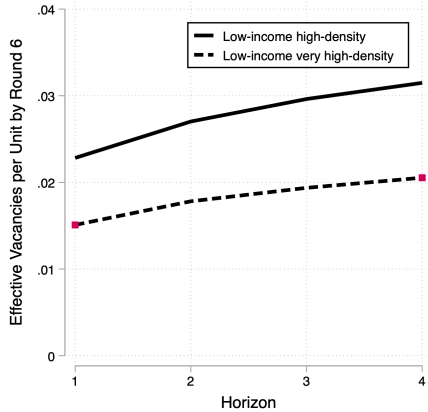
▸ Horizon = 4

LOW-INCOME HIGH-DENSITY VACANCIES PER UNIT

100 new urban units create:

- 2.2 low-income high-density vacancies within 1 year
- Increasing to 3.1 within 4 years
- 1.5 low-income very high-density vacancies within 1 year
- Increasing to 2 within 4 years

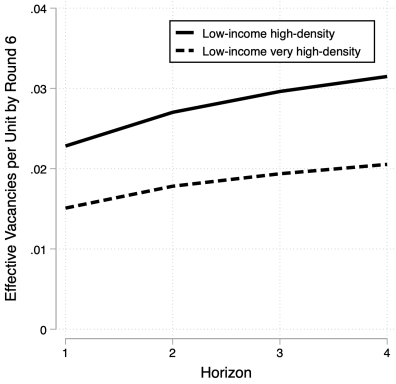
High-Income Urban Multi-Family



N = 356,000; Migration Rounds = 6

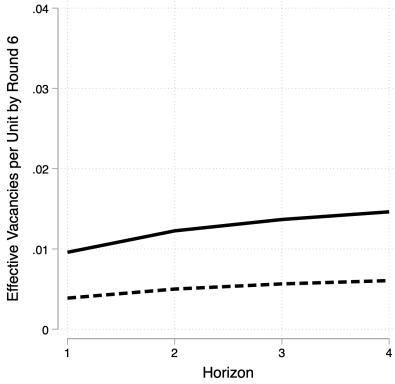
LOW-INCOME HIGH-DENSITY VACANCIES PER UNIT

High-Income Urban Multifamily



N = 356,000; Migration Rounds = 6

Low-Density Suburban Single-Family



N = 1,159,000; Migration Rounds = 6

▸ Other Outcomes ▸ Total Vacancies

TAKEAWAYS

1. Vacancy chains connect different submarkets
2. But vacancy chains are short $\Longrightarrow$ Segmented submarkets
   - Where we build matters!
3. High-income urban multi-family creates more low-income urban vacancies per unit than low-density suburban single-family housing

SIMULATION EXERCISE

SUMMARY

1. Take parameter estimates from discrete choice model of residential demand

   Bayer, Ferreira, and McMillan (2007)

2. Sample households and housing units from 1990 IPUMs 5% sample
3. Compute equilibrium matching and prices
4. For many iterations:
   1. "Build" new housing in randomly chosen neighborhood
   2. Compute new equilibrium prices and matching
   3. Calculate implied welfare and price effects, vacancy chain characteristics
5. Correlate vacancy chain characteristics with price and welfare effects

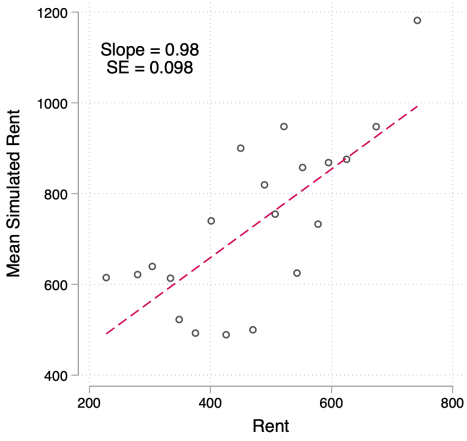
▸ Algorithm

SAMPLE

- 10 PUMAs randomly sampled from Chicago metro area
- 100 housing units sampled from each PUMA
- 133 households sampled from each PUMA
- 1000 iterations, each time adding 5 new housing units to a single PUMA

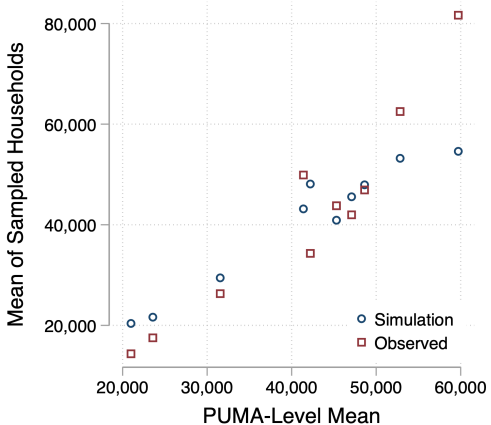
Map

INITIAL EQUILIBRIUM: SIMULATED VS. OBSERVED RENT

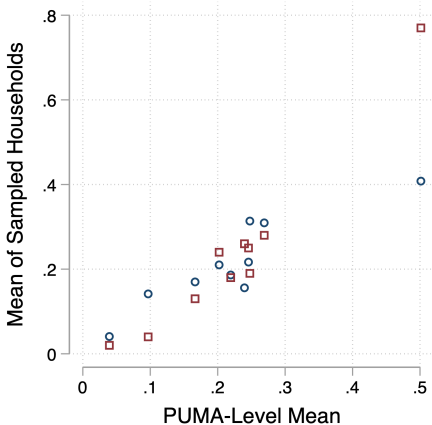


INITIAL EQUILIBRIUM: RESIDENTIAL SORTING

Household Income



College Share

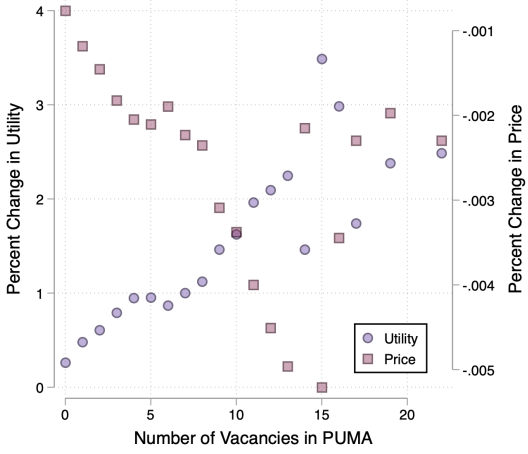


▸ By Race/Ethnicity

VACANCIES PREDICT PRICE AND WELFARE EFFECTS

- Welfare effects are stronger for households who start in PUMAs that get more vacancies
- Price effects are stronger for homes in PUMAs with more vacancies

→ Can use vacancy chains to understand non-local effects of new housing



CONCLUSION

TAKEAWAYS

Main Results

- Vacancy chains connect housing submarkets
- Short vacancy chains $\Longrightarrow$ Segmented housing markets
- New suburban housing creates few low-income urban vacancies per unit
- Number of vacancies predicts price and welfare effects

Some Policy Implications

- Incentivize supply of affordable units
- Reduce developer costs
- Assist low-income households with housing costs

TAKEAWAYS

Next Steps

- Trace vacancy chains at the room level, block$\times$street level
- Further characterize heterogeneity
- Characterize reasons that vacancy chains end
- Extend simulation model $\rightarrow$ match observed moments in the data

THANK YOU!

Valentine Gilbert

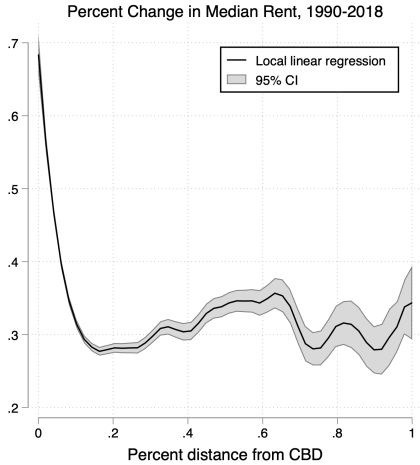
jvgilbert@g.harvard.edu

Robert French

robertfrench@g.harvard.edu

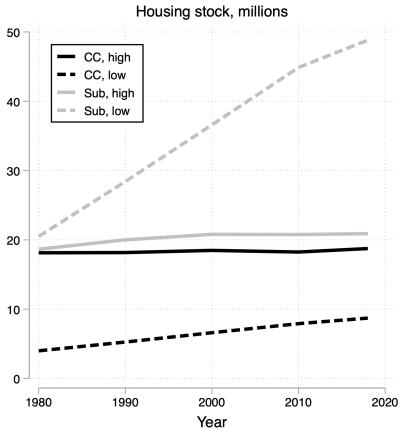
APPENDIX

RISING URBAN HOUSING COSTS

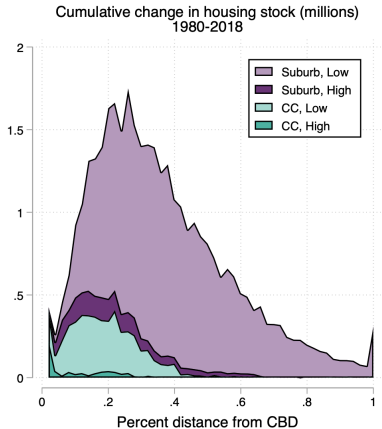


Back

RISING SUBURBAN HOUSING SUPPLY



Low-Density Suburban Single-Family



Back

DIRECT AND INDIRECT PRICE EFFECTS OF NEW HOUSING

WLOG, consider the price effects of an exogenous increase in housing in neighborhood 1:

$$\frac{dD_1}{dS_1} = \sum_{n=1}^{N} \frac{\partial D_1}{\partial p_n} \frac{d p_n}{dS_1} = 1$$

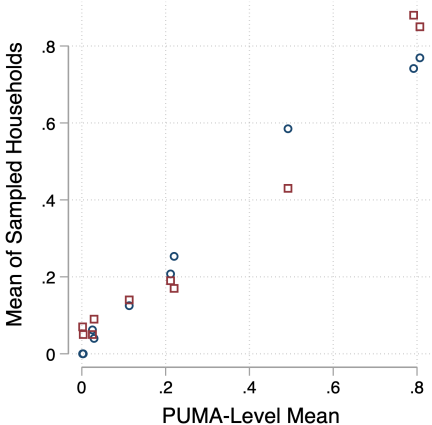
$$\frac{dD_2}{dS_1} = \sum_{n=1}^{N} \frac{\partial D_2}{\partial p_n} \frac{d p_n}{dS_1} = 0$$

$$\vdots$$

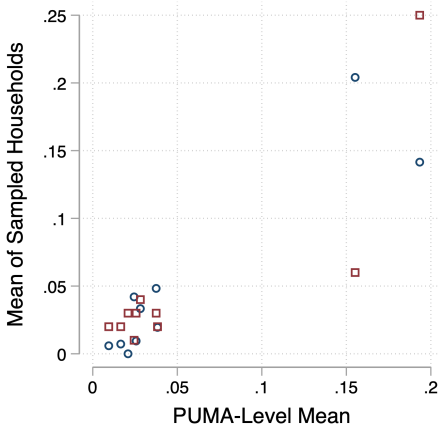
$$\frac{dD_N}{dS_1} = \sum_{n=1}^{N} \frac{\partial D_N}{\partial p_n} \frac{d p_n}{dS_1} = 0$$

INITIAL EQUILIBRIUM: RESIDENTIAL SORTING

Black Share

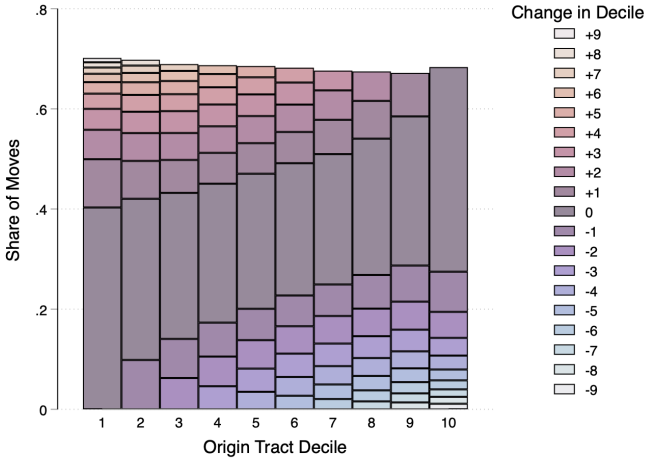


Hispanic Share



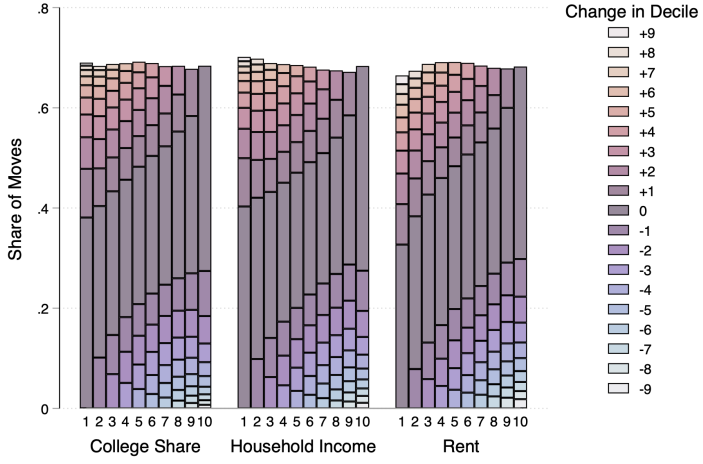
Back

MOVES ACROSS TRACTS OF DIFFERENT INCOME DECILES



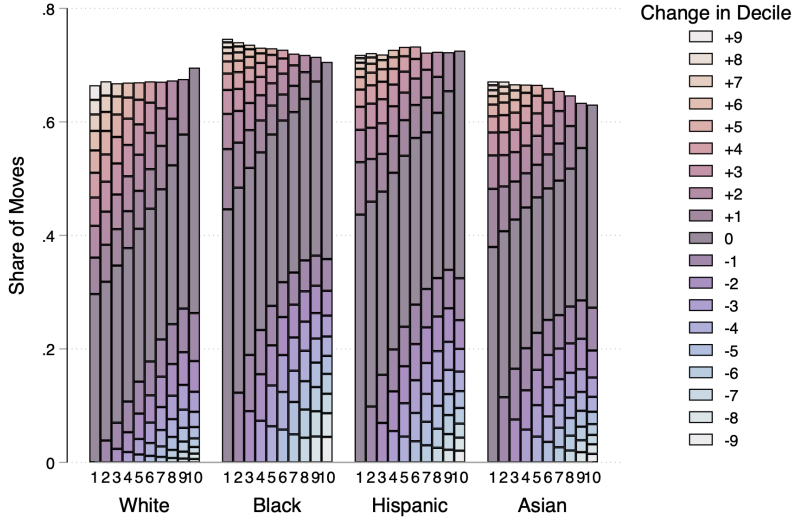
Other Outcomes | By Race | By Age

MOVES ACROSS TRACTS OF DIFFERENT DECILES



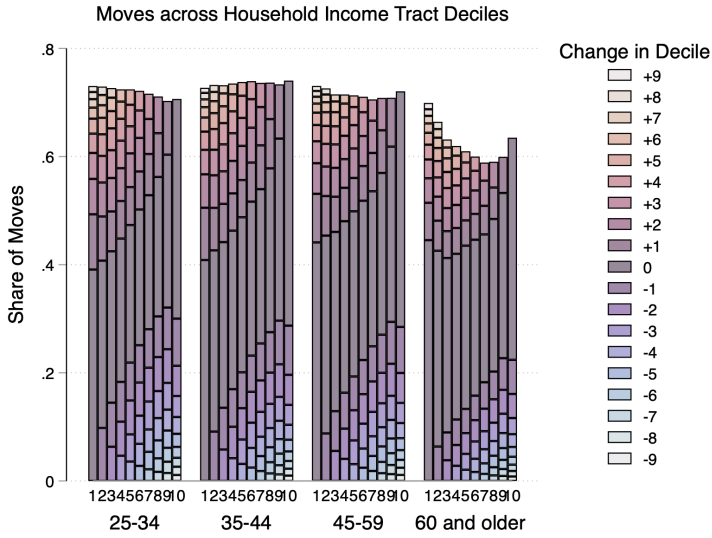
Back

TRACT FLOWS BY RACE



Back

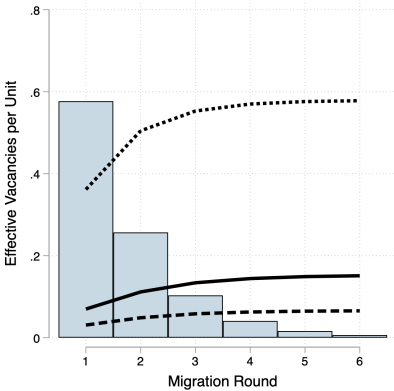
TRACT FLOWS BY RACE



Back

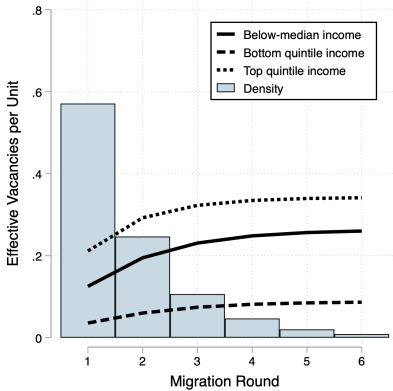
CUMULATIVE VACANCIES

High-Income Urban Multifamily



N = 356,000; Horizon = 4

Low-Density Suburban Single-Family

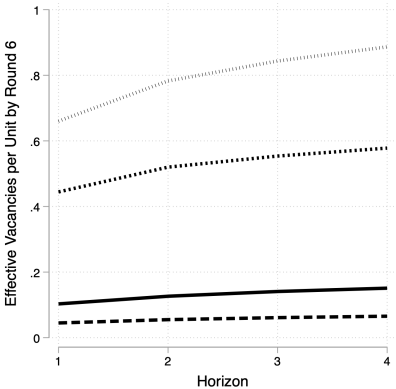


N = 1,159,000; Horizon = 4

Back

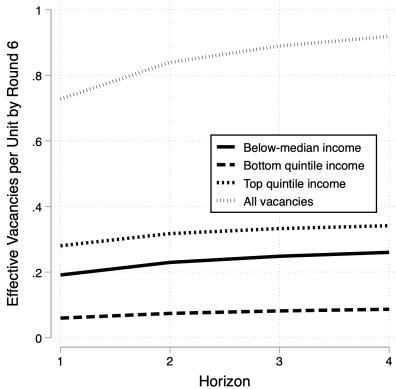
VACANCIES ACCUMULATE OVER TIME

High-Income Urban Multifamily



N = 356,000; Migration Rounds = 6

Low-Density Suburban Single-Family

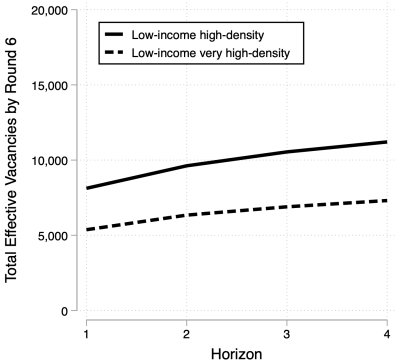


N = 1,159,000; Migration Rounds = 6

Back

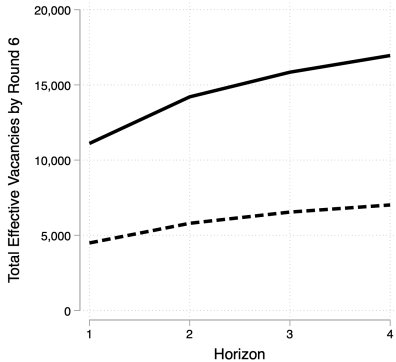
LOW-INCOME HIGH-DENSITY VACANCIES: TOTAL

High-Income Urban Multifamily



N = 356,000; Migration Rounds = 6

Low-Density Suburban Single-Family



N = 1,159,000; Migration Rounds = 6

Back

ALGORITHM

Implementation of Hungarian algorithm:

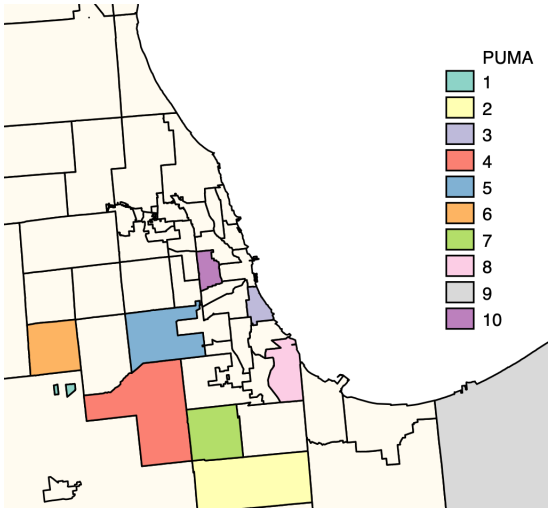
1. Start by setting prices = 0
2. Find maximum matching
3. If no perfect matching, find *constricted set* $\mathcal{S}$ and increment prices by 1
4. Repeat from 2 until perfect matching is found

Normalizations:

- WTP for outside option is 0
- WTP for lowest-valued inside option is 0
- WTP has integer support

Back

SIMULATION SAMPLE



Back