

The Effect of Local Landlords on Rental Housing Prices & Returns

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Motivation

- Canonical view of prices in housing markets:
 - Demand for housing - labor market and amenities.
 - Supply of housing - geography and regulation
- Highly successful model, both across and within cities
- However, neglects a key aspect - housing is also an *asset*.
 - Growing literature on housing returns, particularly *spatial differences in returns* ????.
 - Growing literature on rent-price ratios ???
 - Gap between rents and prices behaves differently across time and across space. →
 - In Israel: very low - only 2.5%, but much higher in, e.g. Dallas, TX. →
 - Evidence rent-price ratios predict returns.
- This paper: analyzes the role of small, local, investors in shaping housing markets.
 - Key finding: *capital supply* increases prices but lower returns, rent-price ratios,
 - Channels: (i) Investor wealth, (ii) Residents' affinity for real estate.

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- Rent-price ratios & Returns $?, ?, ?, ?, ?, ?, ?, ?, ?, ?, ?, ?, ?$
Novel asset pricing and urban model; suggest and test new investor-related mechanisms
- Housing Prices $?, ?, ?, ?, ?, ?, ?, ?, ?, ?$
Local landlords' characteristics affect housing prices; 'absentee landlord' assumption fails
- Asset Pricing
 - Household finance & real estate $?, ?, ?, ?, ?, ?, ?, ?, ?, ?$
Document the behavior of household investors in cross-section of rental real estate
 - Home-bias $?, ? ? ?, ?, ?, ?$
Home-biased investors generate returns as a function of investors' wealth

- ① Key facts on household investors:
 - ① Importance
 - ② Home-bias
 - ③ Demographics
- ② Model that nests asset pricing ('asset view') in spatial equilibrium ('urban view')
- ③ Empirical Evidence

Data & Sample

- Construct dataset linking local price, rent-price ratios and investor prevalence and wealth.
- Backbone: 'DataQuick' - US deed and sale data - at the property level 2013
 - Unit details (location, physical & building characteristics, assessed value)
 - Owner (owner-occupier flag, name, mailing address)
 - Sale information for transacted properties
 - Additional data: rent (zip - ACS, unit sample AHS); additional local variables (income, etc.)
- Estimate unit-level rent and price (→, →) based on hedonic on characteristics and location
 - Construct estimates at each decade 1980-2020; 2013
 - Net out real-estate taxes
- Identify investors' own home (location and value)
 - Estimate investor wealth from own house value, based on the tight relationship in the SCF
Details: →
 - Focus on properties held by small investors and rental properties.
- Additional data - surveys: RHFS and SCF.

Sample details →, Match Rate →

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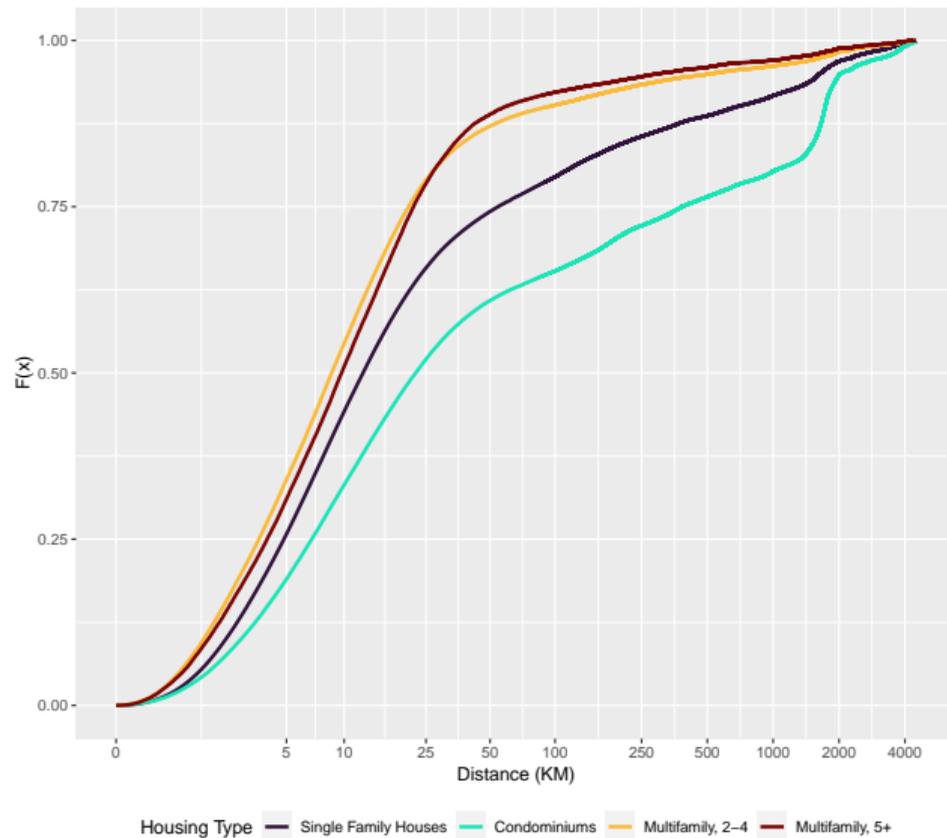
Real Estate Investor Facts

1. Household Investors are Very Important

Table 1: Importance of Household Rental Real Estate Ownership

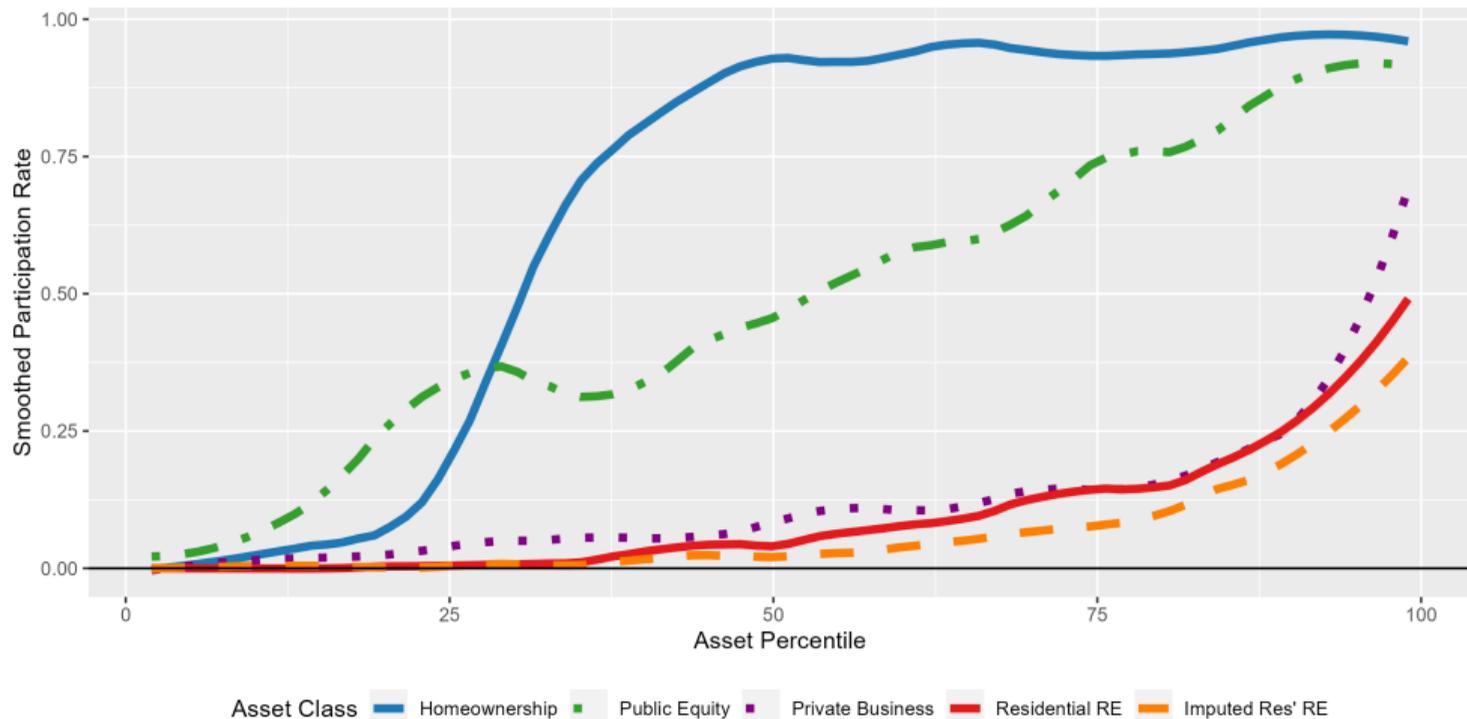
Segment	Properties (1,000s)		Units (1,000s)	
	Stock	% Hh' Owned	Stock	% Hh' Owned
All Rental	21,724	81.8%	46,711	53.5%
<i>Units in Property</i>				
(2015)				
SFH/Condo	18,981	84.1%	18,981	84.1%
Duplex	1,282	79.2%	2,564	79.2%
3-4	702	57.4%	2,340	57.8%
4-9	388	61.3%	2,452	62.0%
9-19	138	47.7%	1,946	45.8%
20-49	128	38.5%	4,081	36.8%
50+	70	11.9%	14,345	12.3%

2. Overwhelming Home Bias Among Investors



3a. Investors Come From Across the Upper-Middle Class

[Back](#)



3b. Conditional on Wealth, Non-traditional Set of Investors

Table 1: Demographic Determinants of Real Estate Investment

	Whether a Household Owns a Given Asset		
	Binomial Model		
	<i>Dependent variable:</i>		
	Equity (1)	Private Bus' (2)	Res' RE (3)
Demographic Variables			
Race - Black	-0.13 (0.13)	0.09 (0.20)	1.05*** (0.27)
Race - Latino	-0.66*** (0.16)	-0.25 (0.22)	0.27 (0.37)
Race - Other	-0.40*** (0.14)	-0.08 (0.18)	-0.03 (0.23)
No Risk Tolerance	-0.87*** (0.08)	-0.35*** (0.13)	-0.27 (0.21)
Education Variables			
Education - High School	0.46*** (0.14)	0.32 (0.24)	-0.48 (0.35)
Education - College	0.93*** (0.17)	0.06 (0.26)	-0.84** (0.37)
Education - Graduate	0.77*** (0.19)	0.17 (0.28)	-0.72* (0.38)
Income & Wealth Variables			
Wealth	0.53** (0.25)	-0.16 (0.25)	5.82*** (1.55)
Wealth ²	-0.003 (0.01)	0.04*** (0.01)	-0.17*** (0.06)
Observations	5,046	5,046	5,046

Model

Supply and Demand in Local Housing Investment

- **Basic idea:** The model captures supply and demand in the market for owning rental housing.
- **Supply of capital:** Comes from local residents who invest in rental housing.
 - Residents differ in wealth and in how costly it is for them to manage properties.
 - Higher expected returns attract more investors — just like in any market.
 - This creates an **upward-sloping supply curve** for capital.
- **Demand for capital:** Comes from the value of the rental housing stock.
 - Rents are paid by mobile renters.
 - Higher rents make rental housing more valuable — raising demand for investment.
 - This leads to a **downward-sloping demand curve** for capital.
- **Returns adjust to clear the market.**
 - Prices today move, given future rents, setting future expected returns.

Timing, Uncertainty, and Who Invests

- The model unfolds over two periods:
 - **Period 1:** Residents choose whether to become homeowners and whether to invest in rental housing.
 - **Period 2:** Uncertainty resolves — income and housing returns are realized, and residents consume.
- **Uncertainty matters.** Because housing returns are risky, only some residents are willing to invest.
 - Residents differ in wealth and in how costly it is for them to operate property.
 - Investment is continuous: wealthy, low-cost residents invest more; others not at all.
- **Separation between homeownership and investment:**
 - Residents may own a home to live in, invest in housing, both, or neither.
 - Marginal homeowner poorer than the marginal investor.
 - Liquidity constraints determine who can buy a home to live in.
- **Key insight:** The distribution of wealth and operating ability shapes who becomes an investor — and how much they invest.
 - This generates an upward-sloping capital supply curve from micro-level heterogeneity.
 - Only those above a threshold of wealth and ability enter as investors; variance within wealth.

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Comparative Statics and Insights

- **Returns to rental housing** are determined by where supply meets demand.
- **Capital supply shifts out** (returns fall) when:
 - Local residents are wealthier,
 - More residents are inclined to become landlords.
 - → Price increase today relative to rents, lower return.
- **Capital demand shifts up** (returns rise) when:
 - Rent levels increase,
 - The number of renters grows,
- **Takeaway:** Supply-and-demand, prices (here, returns) balance competing pressures from investors and renters.
- The model provides a simple economic logic to interpret empirical patterns in rents, prices, and investment.

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Evidence

Model makes the following predictions:

- A negative covariance between wealth and rent-price ratios, driven by market aggregates
 - ① Wealth and rent-price ratio correlation mostly captured by investor location fixed effects (→).
 - ② Property-level rent-price falls in local wealth, controlling for investor wealth (→) & FE (→).
- Wealth and investor share lower local rent-price ratios. (Cross-section)
 - ③ Market-level regressions testing model comparative statics, IV for investor share.
- Wealth shocks lower future returns. (Panel)
 - ④ Shift-share instrument for local returns, utilizing exogenous shifts in equity market.
→ \$10,000 per hh equity shock leads to a $-0.9-1.28pp$ in local returns.

Market Level Regressions - Specification

- Cluster zip codes in a 5-km radius, measure aggregate variables
 - On average, $\sim 45\%$ of investors live within 10km of their units
 - Calculate market-level variables (averages, shares)
 - Rich within-city variation
- Market level specification

$$\begin{aligned}\log(R/P_c) = & \alpha_1 \log(\phi_{Ic}) + \alpha_2 \log(\phi_{Rc}) + \beta \log(W_c) \\ & + \delta X_c + \text{Metro} + \epsilon_c\end{aligned}\tag{1}$$

- Growth as a confounder - controls X includes $\log(P_{oc})$, race, amenities, income.
- Remaining concern - reverse causality, simultaneity bias, unobserved expectations.
- Develop novel IV for investor participation - AREP.

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- Motivated by (??).
- Estimate ancestries' proclivity to work in real estate licensing
 - ACS and Census micro-data, 2000-2013,
 - Conditional on metro, time, race, and education fixed effects.

$$Y_{it} = \delta_c + \delta_t + \log(Inc_i) + Educ_i + Race_i + \sum_j \phi_j \cdot \mathbb{1}(A_i = j)$$

- $\hat{\phi}_l$: ancestry fixed-effects from national regressions of real-estate-licensing employment
 - (controls: year, metro, race, education, log-wage).
- mean is small $\bar{g} = 1.92$ bp, but with a significant standard deviation of $\sigma_g = 33.84$ bp.
- Strong regional patterns - reflect culture, not US effects or noise. 

- **Ancestry–Real-Estate Proclivity (AREP) IV**

$$AREP_z = \sum_l s_{zl} \hat{\phi}_l$$

- s_{zl} : ancestry shares in zip z (predetermined by historical migration).
- Exogeneity: shifters are national, shares local \Rightarrow no mechanical link to current housing shocks.
- **First-stage strength** (zip-clusters, 5 km radius)
 - 1 bp increase in local $AREP \rightarrow 0.047-0.11$ pp higher investor share.
 - F -statistics = 38–67 across specifications \Rightarrow comfortably above weak-IV thresholds.
- **Secondary IV – Investor Wealth** Zip-level *equity-wealth* (IRS data, ?) instrument for average investor wealth, purge measurement error [Identification Discussion](#) 

Market Level Regressions - Results

Table 2: Within City, Net Ancestry Effect IV, 5km Sample

Dependent Variable:	log(1+ Average Rent/Price)				
	OLS	IV		OLS	IV
Model:	(1)	(2)	(3)	(4)	(5)
log(Investor Share)	-0.004*** (0.001)	-0.047 (0.029)	-0.062** (0.028)	-0.003*** (0.0008)	-0.070** (0.027)
log(Renter Share)	0.006*** (0.001)	0.030 (0.020)	0.033** (0.017)	0.006*** (0.0009)	0.038** (0.016)
log(Mean Investor Wealth)				-0.027*** (0.002)	-0.052** (0.021)
log(Mean Owner Price)			-0.019*** (0.004)		0.0001 (0.010)
<i>Controls</i>					
Metro Fixed Effects	✓	✓	✓	✓	✓
Amenities & Income	✓	✓	✓	✓	✓
Race	✓	✓	✓	✓	✓
<i>Statistics</i>					
Observations	11,103	11,103	10,629	11,103	10,629
Within R ²	0.456	-	-	0.509	-
Investor 1st F	-	76.25	65.41	-	34.16
Wealth 1st F	-	-	-	-	203.49
IVs	-	1	1	-	2

3. Wealth Shocks - Specification

- Goal: Identify the causal effect of wealth shocks (level) on returns, $\alpha < 0$.

$$\Delta r_{c,t} = \delta_c + \delta_t + \alpha \Delta W_{c,t} + \epsilon_{c,t}$$

- Concern: City-level correlation between housing demand & returns and local wealth.
- Construct shift-share instrument for equity wealth shocks, $\Delta EW_{c,t}$
 - Shares: $EW_{c,t=0}$ baseline per-household exposure to equity market, $\beta_{c,t=0}$ city beta
 - Shocks: $r_{eq,t}$ return to equity market at t

$$B_{c,t} = EW_{c,0} \cdot \beta_{c,t=0} \cdot \left(\underbrace{\prod_{\tau=0}^{t-1} (1 + r_{eq,\tau})}_{\text{Cum' return}} \cdot \underbrace{(r_{eq,t} - \bar{r}_q)}_{\text{Surprise at } t} \right) \quad (2)$$

- Regress changes to rent/price or returns on per-capita *equity* wealth changes, IV with $B_{c,t}$

$$\begin{aligned} \Delta r_{c,t} &= \delta_c + \delta_t + \alpha \Delta EW_{c,t} + \epsilon_{c,t} \\ \Delta EW_{c,t} &= \psi_c + \psi_t + \gamma B_{c,t} + \nu_{c,t} \end{aligned} \quad (3)$$

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3. Wealth Shocks - Data

- Outcomes - Rent-price ratios and returns
 - BLS/FHFA panel (22 metros, 47 years) - used in Campbell-Shiller decomp'
- Shares - initial exposure and beta
 - Imputed annual county total equity wealth and betas, from ?
 - Based on annual IRS reported dividend taxes
 - Aggregate counties to metros, compute annual per-person average equity wealth
- Shocks - S&P 500 returns
 - Robert Shiller's website
- Set baseline at 1990 or 2000

3. Wealth Shocks

Table 3: Changes to Returns & Rents, Levels

Dependent Variables:	$\Delta \log(D/P_{ct})$			Δr_{ct}		
	(1)	(2)	(3)	(4)	(5)	(6)
ΔEW (\$10,000)	-1.55 (0.956)	-1.54 (1.04)	-0.769 (1.41)	-0.799** (0.361)	-0.796** (0.365)	-1.63* (0.899)
<i>Fixed-effects</i>						
CBSA FE		✓	✓		✓	✓
Year FE			✓			✓
<i>Fit statistics</i>						
Observations	368	368	368	368	368	368
1st F	117.6	118.2	58.4	117.6	118.2	58.4

Driscoll-Kraay Standard errors computed with optimal bandwidth as in ?. Base-line is 2000. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Conclusion

- Behavior of small investors drives price differences:
 - Document investors are local; driven to real estate for idiosyncratic reasons
 - Develop model that can explain different local returns
 - Model suggests local wealth and propensity to invest affect local rent prices
- Reduced form evidence confirms these mechanisms
 - Novel dataset linking investor wealth to local rent price ratios
 - Negative correlation between wealth and rent price driven by investor location
 - Local rent price ratios lower where investors' wealth or propensity to invest is higher
 - Positive wealth shocks to city lead to lower local returns
- Investor wealth & rent volatility quantitatively matter for dispersion
- *Future possible research:* effects on prices, wealth levels vs. inequality, why so segmented, what drives households to invest in real estate, Israeli case.

Appendix

Mapped Ancestry Effects

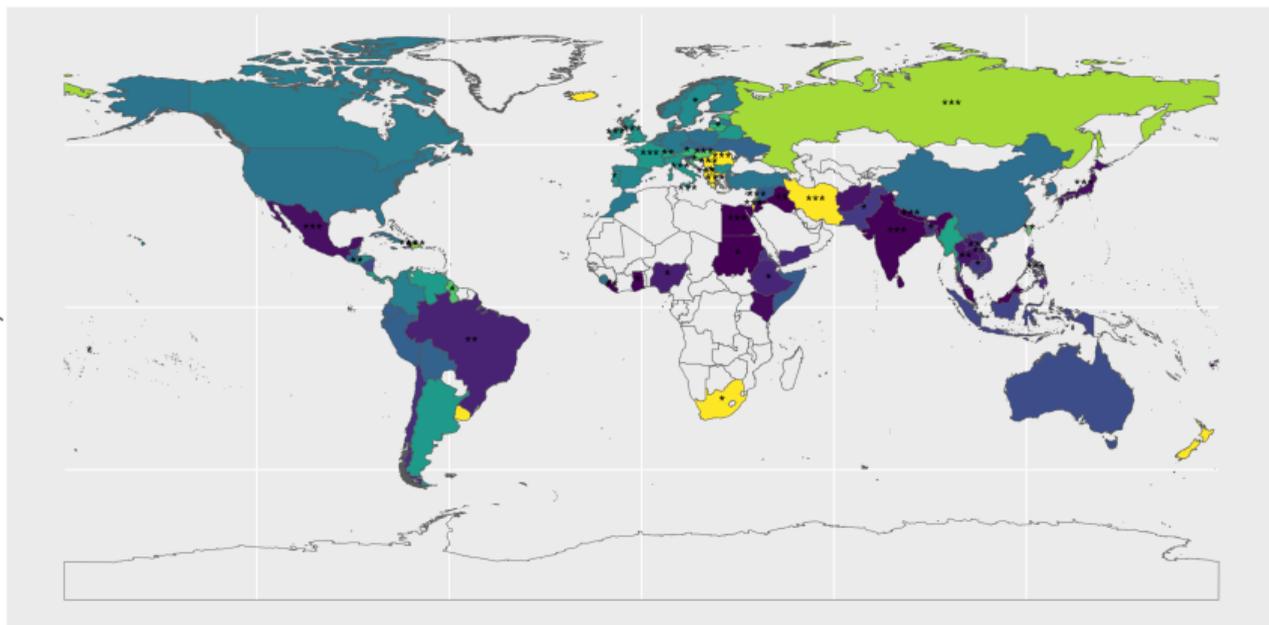
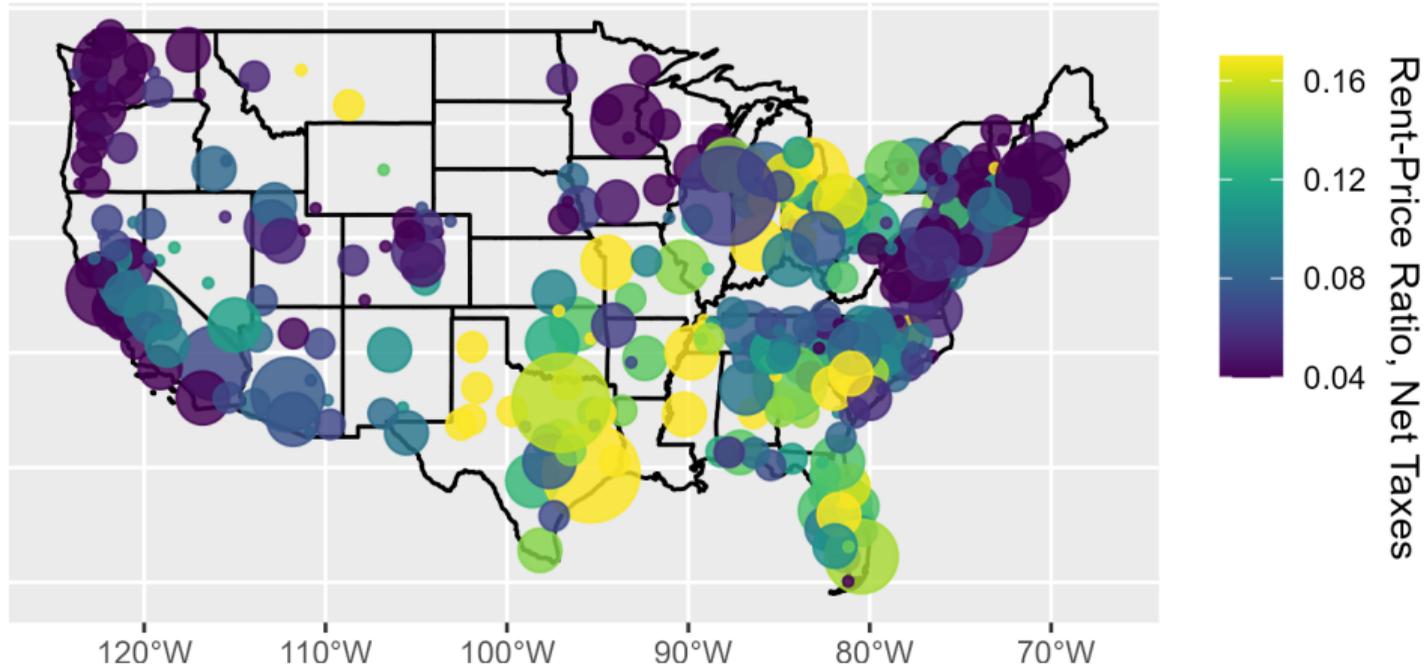


Figure 1: Map of estimated ancestry real estate proclivity, $\hat{\phi}$. [Back](#)

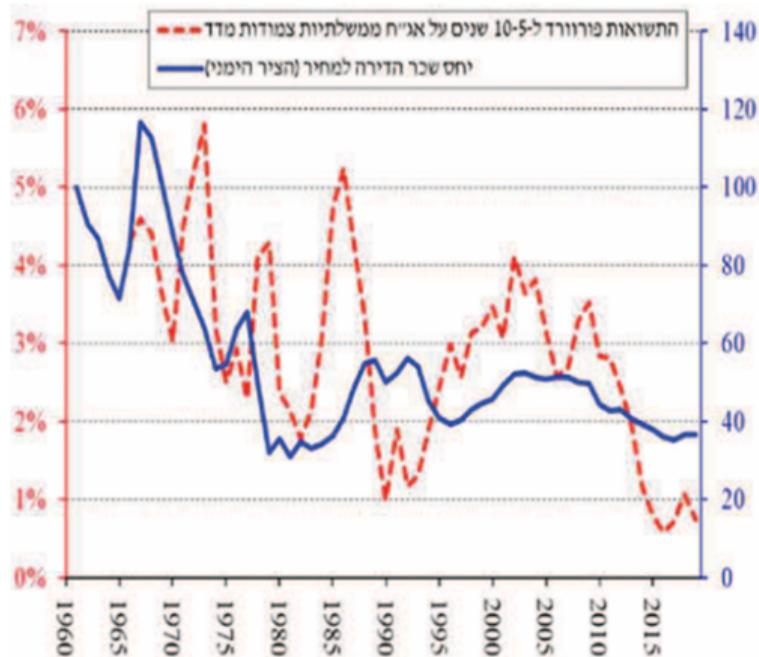
Rent-Price Dispersion Across Space



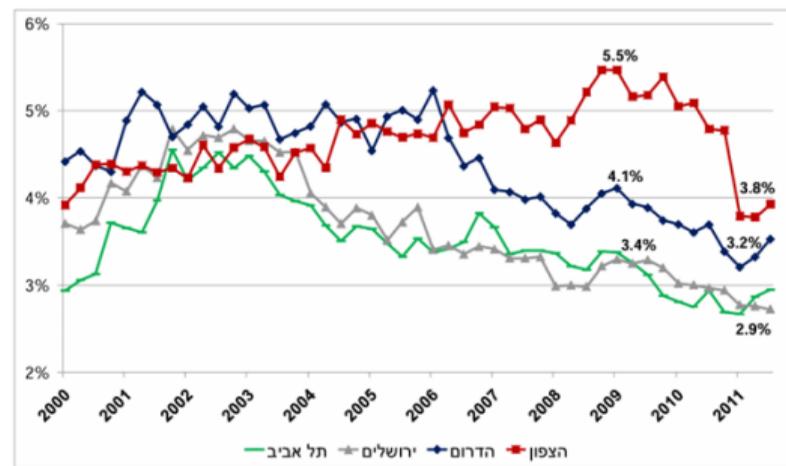
• **Across-cities:** $sd = 6.4\%$ **Within-cities:** $sd = 7.8\%$; Boston example →

• [Back](#)

Rent-Price Ratios in Israel



(a) BoI, Yakhin & Gamrasani



(b) Gazit-Globe, Ecstein, Tolkowsky, Tsur, 2021

Figure 2: Rent-Price Ratios in Israel - time series and cross-sectional differences. [Back](#)

Why Study Spatial Dispersion in Rent-Price Ratios?

- 1 Rent-price dispersion as a puzzle
- 2 Housing prices are a key price in the economy
 - Mechanisms illuminated by rent/price informative on prices
- 3 Rent-price ratios influence real outcomes
 - Tenure decisions, housing supply and place-based policy incidence, welfare
- 4 Better understand the household finance decision around rental real-estate
 - 7-8% of American households invest in rental real-estate
 - 35% of investors below 85th wealth percentile

[Back](#)

I estimate unit-level rent using the AHS and ACS mean rent at zip

- 1 Estimate hedonic regression using the AHS, i.e.:
 - Unit i , in zip z in metro m
 - bathrooms, bedrooms, rooms (quadratic), square footage (quadratic)
 - # unit category, and category-specific unit slopes
 - location m fixed effects (metro)

$$R_{i,t}^{\text{AHS}} = \exp(\delta_{m,t} + \beta_{1,t}BATH_i + \beta_{2,t}BEDRMS_i + \beta_{3,t}RMS_i + \beta_{4,t}RMS_i^2 + \beta_{5,t}SQFT_i + \beta_{6,t}SQFT_i^2 + \beta_{7,t}NUNITS_i \cdot NUNITS_CAT_i + \delta_m)$$

- Denote estimated coefficients as $\hat{\beta}_t^{\text{AHS}}$

Rent Estimation Details 2

- 2 Project rent for hedonics in DataQuick: $\hat{\beta}_t^{AHS} X_i^{DQ}$
 - What is the expected rent from hedonics for one unit at property i
- 2 Merge mean zip-level rent from ACS, and impute zip-level location rent

$$\bar{R}_{z,t}^{ACS} = \sum_{i \in z} \exp(L_{z,t} + \hat{\beta}_T^{AHS} X_i^{DQ})$$

- 2 Calculate property i rent as

$$R_{i,t} = NUNITS_i \cdot \exp(\hat{L}_{z,t} + \hat{\beta}_t^{AHS} X_i^{DQ})$$

[Back](#)

- Price estimation using DataQuick data
 - Focuses on property transactions from 1980-2010 and 2013.
 - Utilizes county-level hedonic regression.
 - Assesses each transacted unit.
 - Incorporates unit characteristics, building type/age, and 2013 tax values.
- Regression details
 - Accounts for potential county assessment inaccuracies.
 - Leverages within-county variation for market value prediction.
 - Provides price estimates for each unit and time period.
- Price projection onto housing stock
 - Projects regression models onto each county's housing stock.
 - Ensures accurate market value estimation for each unit.
- Outcome
 - Delivers a comprehensive price estimate across time periods.

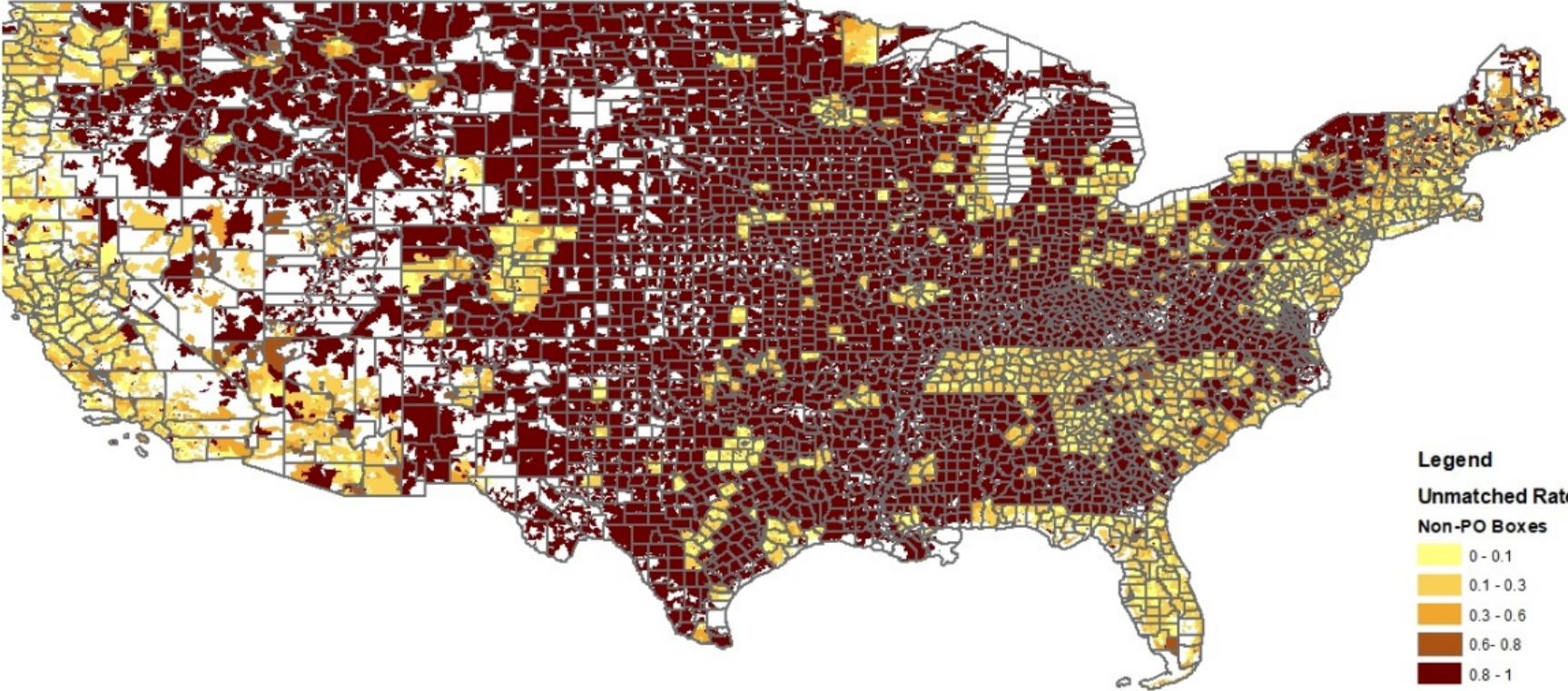
Regular Sample

- Rent estimates: requiring at least unit square footage or number of bedrooms, valid building type and number of units
- Price estimates: at least 200 transactions at county in preceding three years
- Rent-price ratio < 1
- Winsorized at 1st and 99th percentiles at each CBSA
- CBSA not classified as tourist heavy, based on employment in traveler accommodation (7211), scenic and sightseeing (487) and travel arrangement and reservation services (5615)

Matched Sample

- Owner address is *not* commercial use
- Owner of mailing address does *not* include broad set of corporate/bank-like words ('LLC', 'bank', 'LP', 'realty' etc.)
- Visualization 

Match Rate



[Back](#)

Data & Sample Advantages & Disadvantages

- Advantages
 - Consistent estimate of rent-price ratio
 - Adjusted for housing stock quality differences (?)
 - Matched to owner's location and housing value
- Disadvantages
 -

[Back](#)

- Data Preparation
 - Indices: rent from BLS, price from FHFA
 - Calculate of average annual rent and price indices.
 - Recenter indices around the year 2013, benchmark to rent and price averages from DQ.
- Measure ρ as $P\bar{D}/(1 + P\bar{D})$; $P\bar{D}$ - average price-rent ratio.
- Metric Generation:
 - Calculate Rent-Price ratios, rent growth, and returns for each year.
 - Aggregation over various horizons (1, 3, 5, 10, 15 years).
- Aggregation Methodology:
 - Utilization of a discount factor ρ for weighted aggregation.
 - Lead variables aggregated over specified horizons to capture multi-period dynamics.
 - Discount rent growth and returns over the full horizon, e.g. for $N = 10$ calculate
$$\tilde{r}(N)_i = \sum_{n=1}^{N=10} \rho^{n-1} r_{t,i}$$

Back

- **Cross Metro Sample:**

- Driscoll-Kraay standard errors, robust to heteroskedasticity and auto-correlation.
- Optimal bandwidth for auto-correlation determined empirically following Lazarus (2018).

- **Within Metro Sample:**

- Short panel restricts robust non-parametric error estimation.
- Report two sets of standard errors to capture city-level or local-level correlation structures.
 - (a) Clustered errors along CBSAs (in parentheses).
 - (b) Conley spatial standard errors within a 20-mile threshold (in square brackets).

- ① Stack OLS moments in a block-matrix and estimate variance-covariance matrix

- Driscoll-Kraay & Clustered errors are linearly summed across observations [Details](#) →

- ② **Delta Method for Coefficient Ratio** $\frac{b^r}{b^d - b^r}$:

- Calculate gradient vector g for the ratio $g = \left[\frac{b^r}{(-b^d + b^r)^2}, \frac{-b^d}{(-b^d + b^r)^2} \right]$
- Apply Delta Method to compute standard errors: $\sqrt{g' \cdot V \cdot g}$

Stacking OLS Moments in a Block Diagonal Matrix Format

- **Stacking OLS Moments:**

- Create a block diagonal matrix for OLS moments, with each block corresponding to a dependent variable.

$$\mathbf{M} = \begin{bmatrix} E[(d - \tilde{p})_{i,t} \cdot \epsilon_{i,t+1}^d] & 0 & 0 \\ 0 & E[(d - \tilde{p})_{i,t} \cdot \epsilon_{i,t+1}^r] & 0 \\ 0 & 0 & E[(d - \tilde{p})_{i,t} \cdot \epsilon_{i,t+1}^{dp}] \end{bmatrix}$$

- Similar to GMM standard error estimation
- Variance-Covariance Estimation:
 - Compute the variance-covariance matrix from the block diagonal matrix of OLS moments.
 - If \mathbf{M} represents the block diagonal matrix:

$$V = (\mathbf{M} \cdot \mathbf{M}')^{-1} S (\mathbf{M} \cdot \mathbf{M}')^{-1}$$

- Where S is calculated with either Driscoll-Kraay or Clustered correlation structures

Back

Cross-Metro Campbell-Shiller at Different Horizons

back

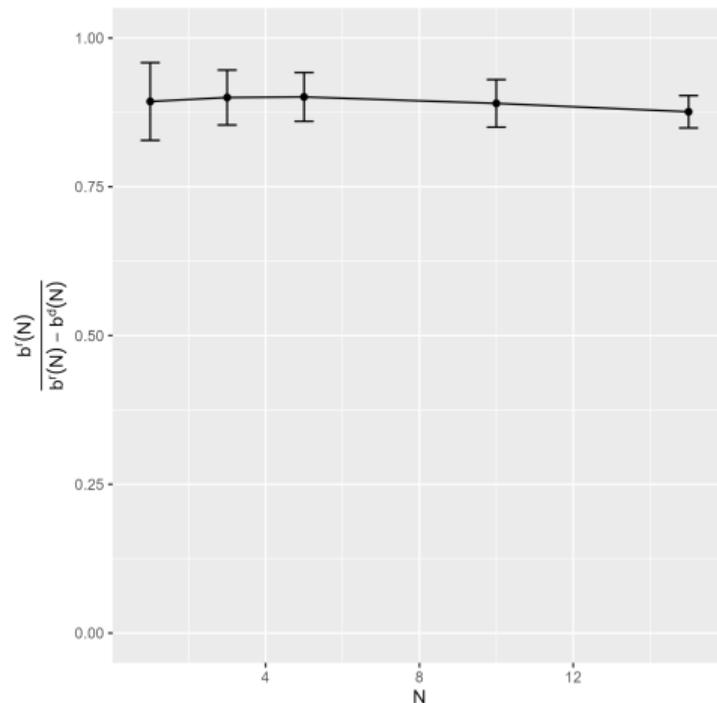


Figure 3: Estimated ratio of $b^r(N)/(b^r(N) - b^d(N))$ at different horizons N . Error bars denote 95% confidence intervals derived using Driscoll-Kraay standard errors and the delta-method. Horizons tested: 1,3,5,10,15