Property Taxes and Housing Allocation under Financial Constraints

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Property Taxes Affect Housing Allocation via Financial Constraints

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   - Stylized fact: most housing is owned by aging-in-place empty nesters
   - Young homeownership rates 3–6pp higher with 1pp of property tax increase
   - Strong evidence of capitalization: 1pp tax increase $\rightarrow$ 23–26% house price decline
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   - Raising CA prop taxes to TX level increases young homeownership
   - Lowering capital gains taxes also raises homeownership

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Takeaway: Property taxes reduce lock-in effects, enabling housing access, while capital gains taxes amplify them

Data and Motivating Facts

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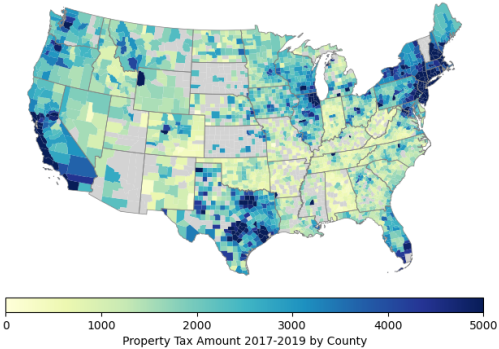
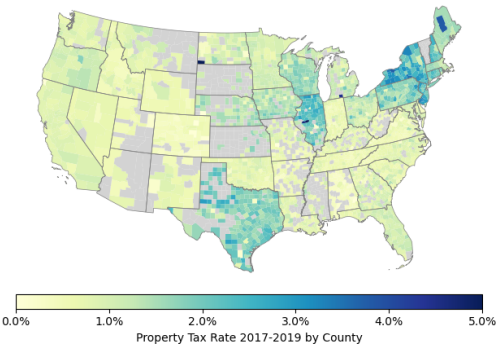
Variation in Property Tax Amounts and Tax Rates

Tax Amounts

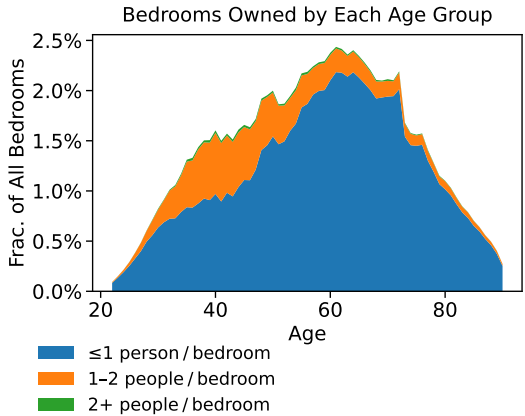


Effective Tax Rates



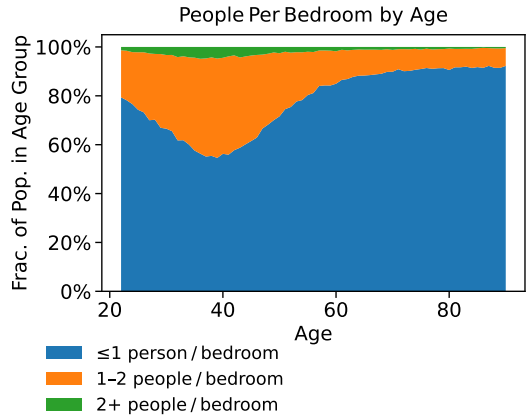
Tax assessment data on all lots 2017–2019 (left),
combined with Deeds sales transactions to produce effective tax rates (right)

Housing Mostly Owned by Aging-in-Place Empty Nesters



Most bedrooms owned by 50-70 yo.

(for owner-occupied homes)

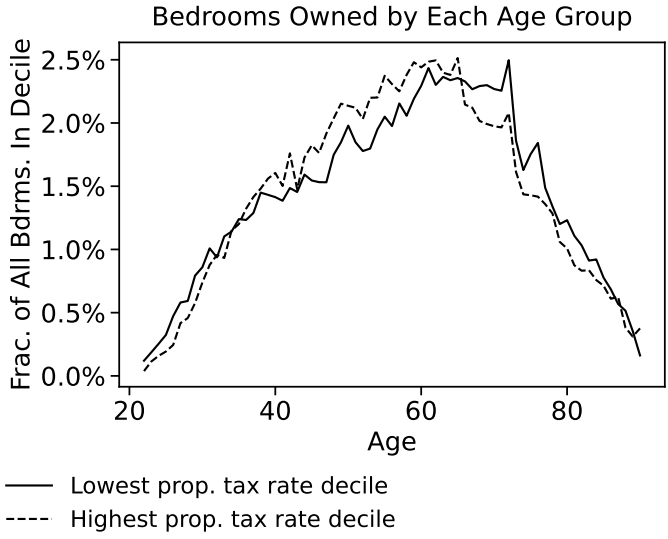


Young ppl most likely to live in crowded housing

(no assumptions about couples, just people in hh/br)

ACS microdata from 2019 at household level

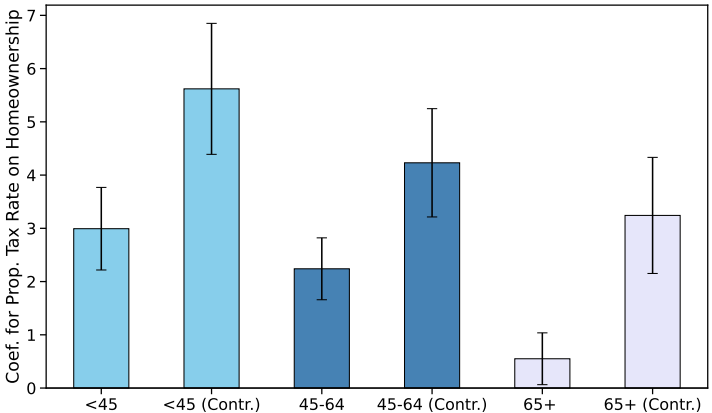
More Gerontocratic Homeownership Distribution w/Lower Prop Taxes



ACS microdata from 2019 at household level, combined with PUMA-level property tax deciles from assessment and transaction data. For owner-occupied homes.

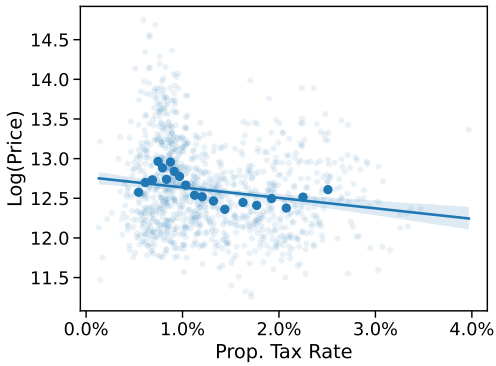
Higher Property Taxes → Higher Young Homeownership

Young hhs are 3–5.6 pp more likely to be homeowners in areas with a 1 pp increase in property tax rates, higher than comparable change for elderly households. Full regression



ACS household data on homeownership regressed on PUMA-level property tax rates with controls of math scores, housing supply elasticities, income, state FE, etc.

Cross-Sectional Variation in Prices, Price/Rents Explained by Prop Taxes

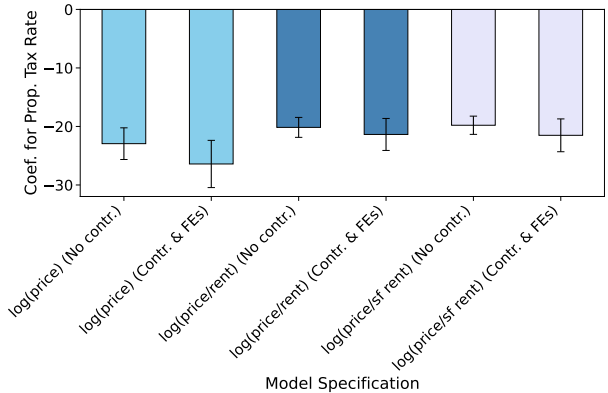


PUMA-level data on average house prices and price/rent ratios plotted against property tax rates

Controls

Property Taxes Strongly Capitalized into House Values

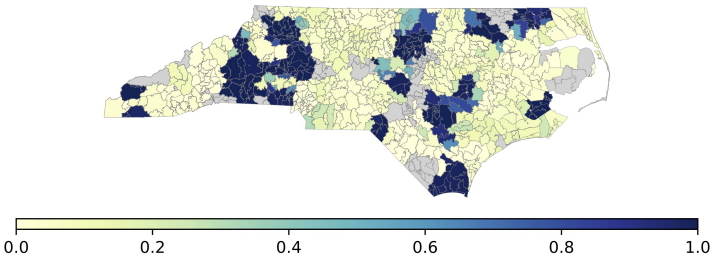
A 1pp increase in the property tax rate is associated with a 23–26.4% decrease in property value (implied discount rate of 4.5%), mostly driven by changes in price/rent ratios. Full regression



ACS microdata for prices; PUMA-level price/rent ratios. Assessment and deeds data for tax rates. Last two columns restrict rents to single-family renters.

Periodic Assessments Provide Quasi-Experimental Variation in NC

Fraction of houses reassessed, Feb 2021, mostly all or nothing



Motivates staggered DiD design with treated areas defined as those which experience a mass appraisal shock (Giesecke Haaris 2022, Fraenkel 2022)

Quasi-Experimental Analysis Suggests Causal Role for Property Taxes on Property Valuation

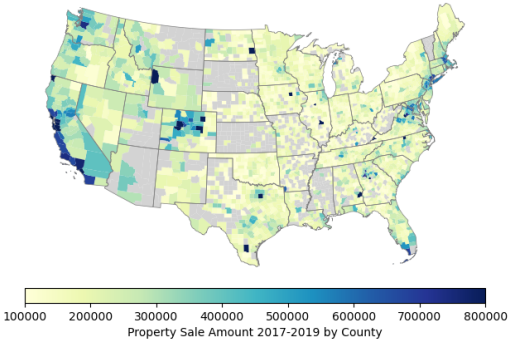
Being in ZIP code treated with mass reassessment shock raises tax amounts $88–130, lowers price 1%, with implied discount rate 3.2–5.1%.

	Property Tax Amount			log(price)		
	(1)	(2)	(3)	(4)	(5)	(6)
Treated × Post	87.7***	130.3***	101.6***	-0.011**	-0.010**	-0.012**
	(22.9)	(31.0)	(16.7)	(0.005)	(0.005)	(0.005)
log(Prev. Sale Amt.)				0.365***	0.364***	0.365***
				(0.011)	(0.012)	(0.011)
DiD Specification	TWFE	Stacked	Sun and Abraham	TWFE	Stacked	Sun and Abraham
Implied Disc. Rate				3.16%	5.09%	3.3%
Property FE	Y	Y	Y	N	N	N
Unit-Level Controls	N	N	N	Y	Y	Y
ZIP FE	N	N	N	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Clusters Level	ZIP	ZIP	ZIP	ZIP	ZIP	ZIP
Observations	376250	659830	376250	92708	325454	92708

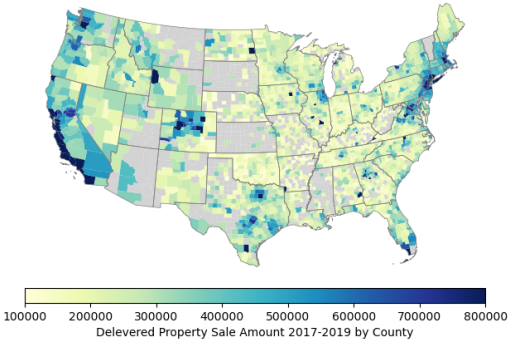
$$Y_{it} = \alpha + \beta \cdot \text{Treat}_i \times \text{Post}_{it} + \gamma_i + \delta_t + \mathbf{X}'_{\mathbf{it}}\theta + \varepsilon_{\mathbf{it}}$$

Property Taxes Result in Implied Leverage which Affects Prices

Empirical House Price Distribution



Imputed "unlevered" value under zero prop tax



State	Prop. Tax Amt.	Price	Prop. Tax Rate	Unlevered Price	Implicit Leverage
California	$5,247	$655,318	0.80%	$801,328	$146,009
Illinois	$5,710	$276,077	2.07%	$464,163	$188,086
Indiana	$1,508	$196,847	0.77%	$238,619	$41,771
New Jersey	$9,224	$411,193	2.24%	$722,368	$311,174
Texas	$5,866	$282,256	2.08%	$475,726	$193,470

Taking Stock of Empirical Results

1. Characterizing gerontocratic housing distributions
   - Owner-occupied housing stock mostly owned by elderly households
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   - Ownership distribution more elderly-biased in low property tax areas

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   - Substantial price and price/rent variation in the cross-section captured by property taxes
   - NC quasi-experimental design suggests causality
   - Heterogeneity by housing supply elasticity (in paper) Link
   - Suggests property taxes can be thought of as implicit leverage with discount rate of 4.5%

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3. Distributional Implications of Property Taxes
   - More young homeownership in high property tax areas
   - Homeownership increase driven by households with sufficient flow income to make property tax payments (in paper) Link
   - Greater presence of young households in high property tax areas (in paper) Link
   - Housing tenure shorter in high property tax areas (in paper) Link

Data and Motivating Facts

Quantitative Model

Policy Counterfactuals

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Model Overview: Life Cycle Housing Decisions with Location Choice

- **Setting:** Overlapping generations model with realistic lifecycle
  - Work for 40 years (ages 25–65), retire for 20 years (ages 65–85)

- **Key Decision:** Each year, households solve:
  - Where to live? California or Texas
  - How to live? Rent or own housing
  - How much housing? Quantity of housing services

- **Financial Constraints:** Realistic mortgage market frictions
  - Down payment requirement: Can borrow up to 80% of house value
  - Payment-to-Income constraint: Mortgage payments cannot exceed 36% of income

- **Income Process:** Stochastic earnings with location differences

$$\text{Income}_t = \exp(\text{Age Effect} + \text{Location Premium} + \text{Random Shock})$$

Household Preferences and Life Cycle Motives

- **Utility Function:** Standard consumption-housing preferences

$$\text{Utility} = \frac{(\text{Consumption}^{\alpha} \times \text{Housing}^{1-\alpha})^{1-\sigma}}{1-\sigma}$$

  - Plus location-specific amenities (beaches, weather, etc.)
  - Plus homeownership benefits (stability, control, etc.)
  - Plus moving cost frictions which generate inertia in location choice

- **Bequest Motive:** Incentive to accumulate wealth for heirs

$$\text{Bequest Utility} = \Psi \times \frac{\text{Wealth}^{1-\sigma}}{1-\sigma}$$

  - Encourages housing wealth accumulation, especially for elderly
  - Interacts with capital gains tax to create lock-in

- **Survival Uncertainty:** Realistic mortality risk by age

Model Components: Taxes and Market Structure

- **Tax Environment:** Multiple tax instruments affect housing decisions
  - Property taxes: California 0.8% vs Texas 2.0% annually
  - Capital gains tax: 15% on housing gains when sold
  - Income taxes: Progressive federal + state differences
  - Transaction costs: 5% of home value when selling

- **Housing Markets:** Endogenous prices with supply constraints
  - House prices and rents adjust to clear markets
  - Different supply elasticities: Texas more elastic than California
  - No-arbitrage user-cost condition links rents to ownership costs:

$$\text{Rent} = (\text{Property Tax} + \text{Interest} + \text{Depreciation}) \times \text{Price}$$

- **Equilibrium:** All markets clear, migration flows balance

Key Model Mechanisms

Full Calibration

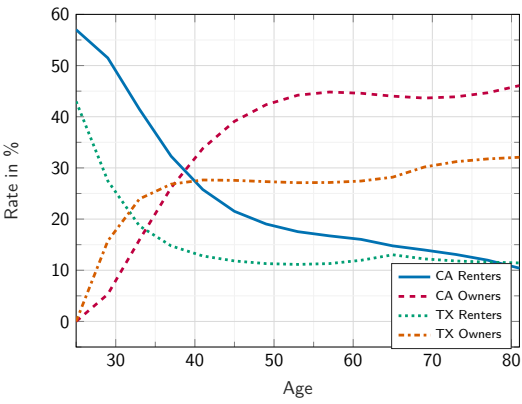
- **Location Differences:** California vs Texas trade-offs
  - California: Higher wages, higher housing costs, lower property taxes
  - Texas: Lower wages, lower housing costs, higher property taxes

- **Property Tax Capitalization:** Core mechanism for housing affordability
  - Higher property taxes $\rightarrow$ lower house prices
  - Lower prices $\rightarrow$ smaller down payments needed
  - Helps young, cash-constrained households access homeownership

- **Lock-in Effects:** Forces that keep households in current housing
  - Capital gains taxes: Penalty for selling appreciated homes
  - Moving costs: Direct utility cost of relocation
  - Low property taxes: Low ongoing costs encourage staying

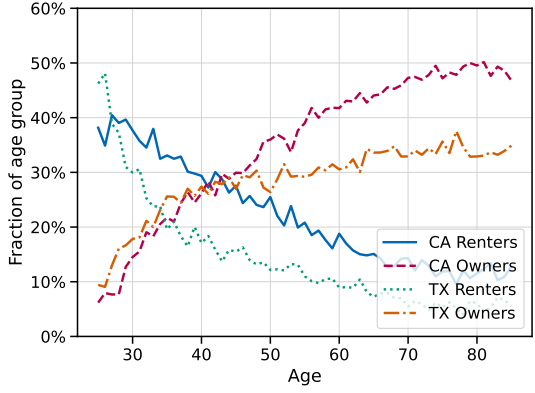
Model Matches Cross-State Variation in Homeownership-Age Gradients

Model-Implied Homeownership by Age



HH more likely to rent in CA when young,
but more likely to own in CA when old →

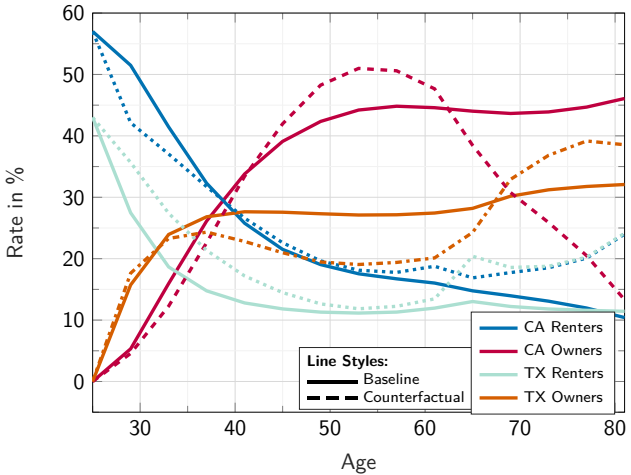
Empirical Homeownership by Age



Asset accumulation choices of elderly lead
to concentrated ownership in low prop tax region

Role of Lock-in Mechanisms on Life Cycle Homeownership

Lock-in forces entrench homeownership among the elderly, crowding out homeownership at younger ages.



Counterfactual estimates model without lock-in forces: moving costs, transactions cost of housing, capital gains tax, bequest motive, and income risk (to shut down precautionary savings) set to 0. Each age sums to 100%.

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Main Counterfactual Analysis: Increase Property Taxes

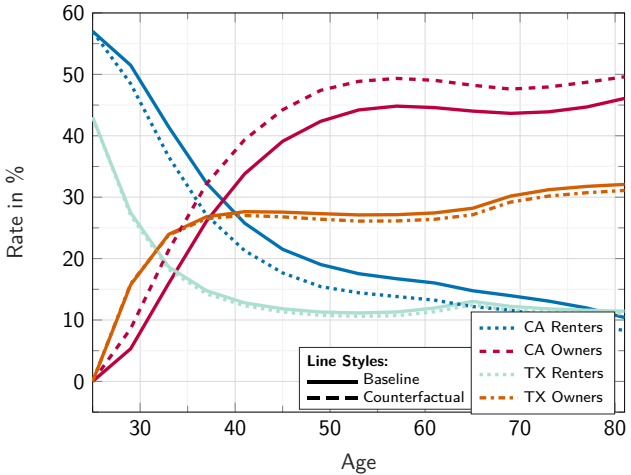
- **Policy Change:** Raise California property tax from 0.8% to 2.0% (matching Texas)
  - Additional tax revenue redistributed as lump-sum transfers to CA residents
  - Texas property tax rate remains unchanged at 2.0%
  - All other policies (income taxes, capital gains, etc.) stay the same

- **Market Response:** Capitalization effect drives down house prices
  - California house prices fall 11.2%: \$500k $\rightarrow$ \$444k
  - Texas house prices fall 3.5%: \$170k $\rightarrow$ \$164k (spillover effect)
  - Rental prices adjust according to user cost relationship
  - Housing supply responds to new price levels

- **Household Response:** Lower prices enable more homeownership through relaxed down payment constraints
  - Overall CA homeownership: 61% $\rightarrow$ 67% (+6 percentage points)
  - Young households (25–44) in CA: 35% $\rightarrow$ 43% (+8 percentage points)
  - Migration flows: More households move from Texas to California
  - Lock-in effects reduced due to higher ongoing property tax costs

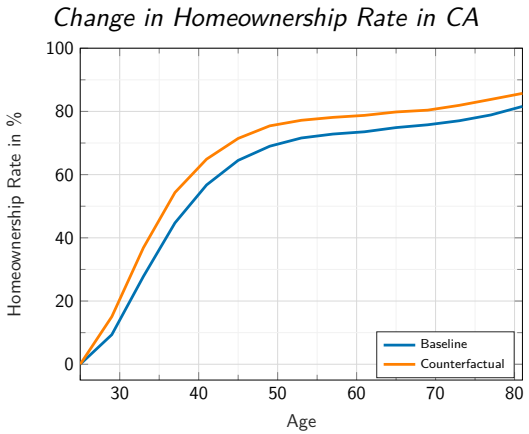
Counterfactual Homeownership Rate Over Life Cycle

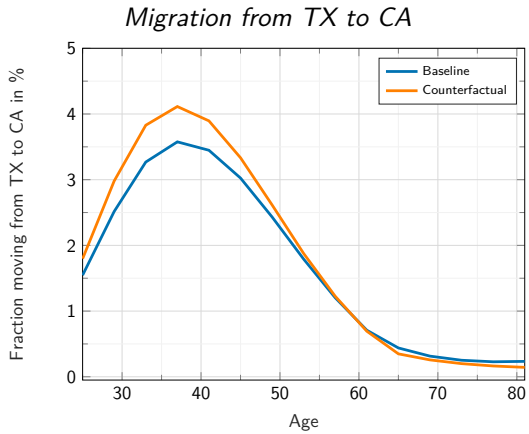
Higher CA property taxes increase homeownership



Counterfactual estimates model with CA property tax increased from 0.8% to 2%, matching the level in TX, and proceeds redistributed lump-sum. Each age sums to 100%.

Change in Homeownership Rate and Housing Consumption in CA





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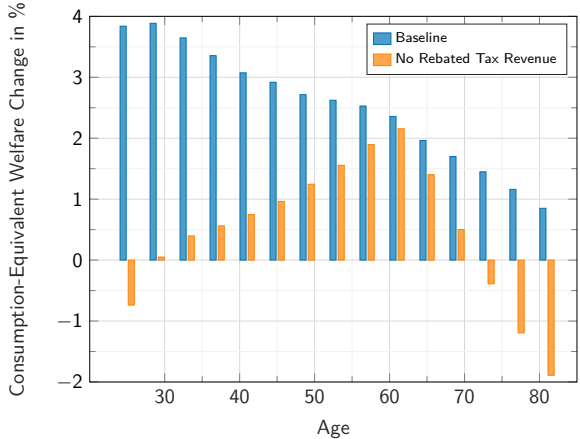
Welfare Impacts of Property Tax Change

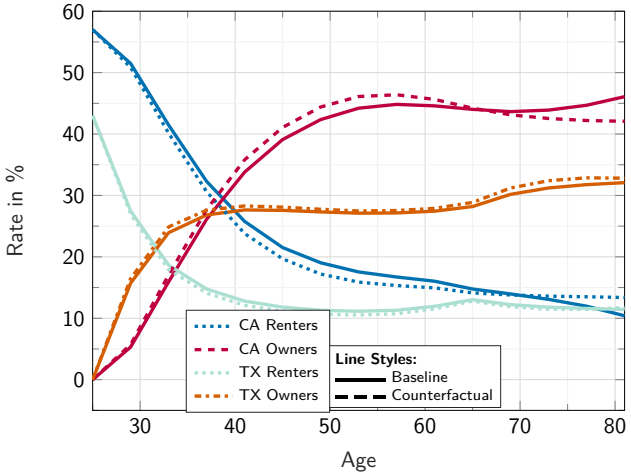
Welfare increases for all groups at baseline. Decomposition suggests redistribution dominates the gains for youngest groups, while middle-aged benefit from relieved financial constraints.



Baseline shows welfare of age groups with property tax revenues rebated lump sum. Alternative is welfare under counterfactual in which property tax revenue is thrown away Link

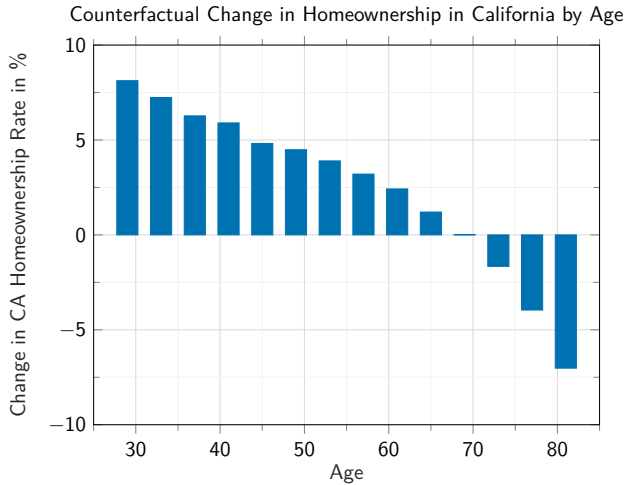
Counterfactual 2: Cut Capital Gains Tax

Capital gains tax cuts also raise homeownership, especially of the young



Set capital gains tax in both CA and TX from 15% to 0%, calculate new house prices in GE. Each age sums to 100%.

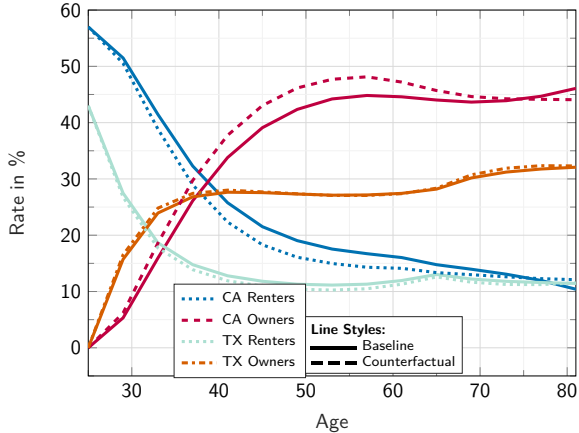
Counterfactual 2: Cut Capital Gains Tax



Set capital gains tax in both CA and TX from 15% to 0%, calculate new house prices in GE

Counterfactual 3: Revenue-neutral policy in CA

A budget-neutral combination of both policies (cutting capital gains taxes and paying for it by increasing property taxes) also raises homeownership



Counterfactual lowers capital gains tax from 15% to 0% everywhere and increases property taxes in CA (from 0.8% to 1.11%) to maintain constant lump-sum transfer payments. Each age sums to 100%.

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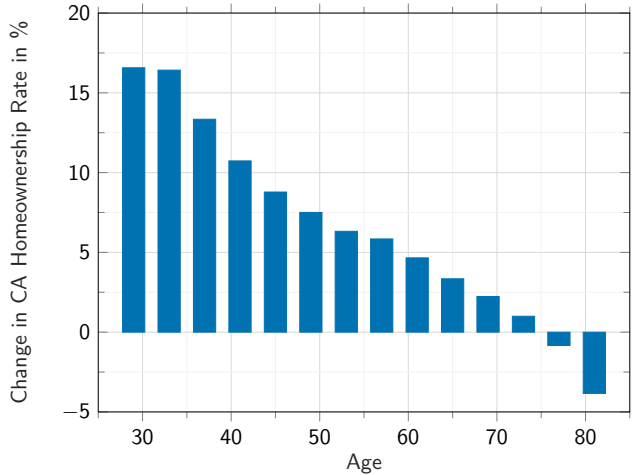

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Robustness

- Account for public goods component of property taxes (schools, amenities for young HHs)
  - Modeled as property taxes rebated **only** towards the young (aged 25–44)
  - We find substantially higher ownership in California as a result, driven by decreases in ownership in Texas and renting in both states Link

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  - Modeled as property taxes rebated **only** towards the young (aged 25–44)
  - We find substantially higher ownership in California as a result, driven by decreases in ownership in Texas and renting in both states Link
- Address variation in down payment requirements
  - Try a 10% down payment requirement (i.e., FHA, VA, PMI options)
  - Response of homeownership to shifts in property taxes in CA are even higher under this shift
  - Intuition: even easier for owners in TX to accumulate down payment for a house in CA Link

Limitations and Extensions

- Outside of steady-state, in dynamics, property tax levies generate liquidity shocks. Can, in principle be limited by accruing the tax liability during ownership spells, but only collecting at realization, or though policies which minimize impacts on certain demographics,
- Inequality in assessments,
- Only focus on two regions for simplicity. Prop 13 has additional unmodeled effects that amplify this channel (property tax benefits accrue with tenure),
- Spatial income effects assumed to be fixed; in reality, selection likely,
- Framework can accommodate study of age-dependent housing affordability reforms.

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Key Takeaways

1. Housing lock-in can concentrate housing ownership among the elderly, adding to affordability challenges for the young.

2. Property taxes combat these lock-in forces, by raising the user cost of ownership, and lowering the up front cost to purchase housing (capitalization), which helps financially constrained young buyers. Capital gains taxes by contrast amplify lock-in motives.

3. Suggests interpretation of property tax as "embedded leverage" on properties, and alternate justification for property taxes.

Thanks!

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Property Tax Variation & House Prices: Capitalization Effect

	log(price)		log $\left(\frac{\text{price}}{\text{rent}}\right)$		log $\left(\frac{\text{price}}{\text{sf rent}}\right)$	
	(1)	(2)	(3)	(4)	(5)	(6)
Prop. Tax Rate	-22.94***	-26.41***	-20.16***	-21.37***	-19.80***	-21.52***
	(1.38)	(2.06)	(0.87)	(1.39)	(0.79)	(1.43)
Percent Difference	-20%	-23%	-18%	-19%	-18%	-19%
Bldg and Bdrms Controls	Y	Y	Y	Y	Y	Y
Math Scores, Dist. Controls	Y	Y	Y	Y	Y	Y
Supply Elasticity	Y	Y	Y	Y	Y	Y
State FE	N	Y	N	Y	N	Y
Observation Level	Indiv.	Indiv.	PUMA	PUMA	PUMA	PUMA
Clusters Level	PUMA	PUMA	PUMA	PUMA	PUMA	PUMA
Observations	1973136	1973136	5505	5505	5501	5501

A doubling of the property tax rate is associated with a 23–26.4% decrease in property value (implied discount rate of 4.5%).

Back to chart

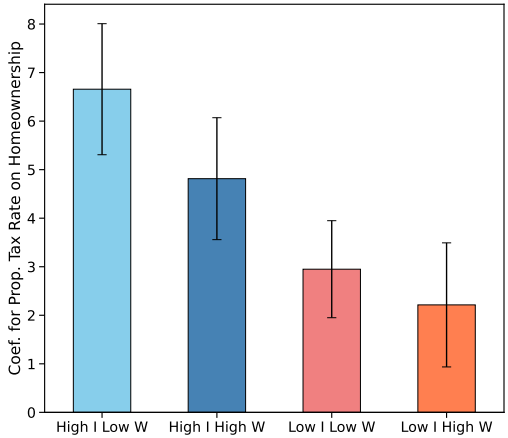
Capitalization Effect Interacted With Supply Elasticity

Back

	log(price)	log(price)	log $\left(\frac{\text{price}}{\text{rent}}\right)$	log $\left(\frac{\text{price}}{\text{rent}}\right)$	log $\left(\frac{\text{price}}{\text{sf rent}}\right)$	log $\left(\frac{\text{price}}{\text{sf rent}}\right)$
	(1)	(2)	(3)	(4)	(5)	(6)
Prop. Tax Rate	-36.59***	-21.53***	-25.09***	-15.69***	-26.29***	-18.11***
	(2.87)	(2.72)	(1.74)	(1.78)	(1.56)	(1.81)
Supply Elast.	-1.50***	-0.37***	0.02	0.62***	-0.19***	0.39***
	(0.12)	(0.10)	(0.08)	(0.07)	(0.07)	(0.07)
Prop. Tax Rate $\times$ Supply Elast.	37.12***	-14.63***	14.90***	-18.26***	19.33***	-10.91***
	(6.43)	(5.63)	(3.74)	(3.45)	(3.34)	(3.34)
Percent Difference	-31%	-19%	-22%	-15%	-23%	-17%
Bldg and Bdrms Controls	Y	Y	Y	Y	Y	Y
Math Scores, Dist. Controls	Y	Y	Y	Y	Y	Y
State FE	N	Y	N	Y	N	Y
Obvservation Level	Indiv.	Indiv.	PUMA	PUMA	PUMA	PUMA
Clusters Level	PUMA	PUMA	PUMA	PUMA	PUMA	PUMA
Observations	1973136	1973136	5505	5505	5501	5501

Property Tax and Homeownership by Income and Wealth

Back



Increase in homeownership driven by groups with high flow income (able to afford mortgage), and even higher for high income/low wealth.

Full regression

Tax and Homeownership by Income and Wealth

	Dependent variable: homeowner			
	High I Low W	High I High W	Low I Low W	Low I High W
	(1)	(2)	(3)	(4)
Prop. Tax Rate	6.66***	4.81***	2.95***	2.21***
	(0.69)	(0.64)	(0.51)	(0.65)
log(HH Income)	0.15***	0.04***	0.09***	0.02***
	(0.00)	(0.00)	(0.00)	(0.00)
log(Int. Div. Rent Income)		0.00		0.01***
		(0.00)		(0.00)
Age and Income Controls	Y	Y	Y	Y
PUMA Level Controls	Y	Y	Y	Y
State FE	Y	Y	Y	Y
Clusters Level	PUMA	PUMA	PUMA	PUMA
Observations	1117511	338161	1101274	192078

Increase in homeownership driven by groups with high flow income (able to afford mortgage), and even higher for high income/low wealth. Back to chart

Property Tax and Household Demographics

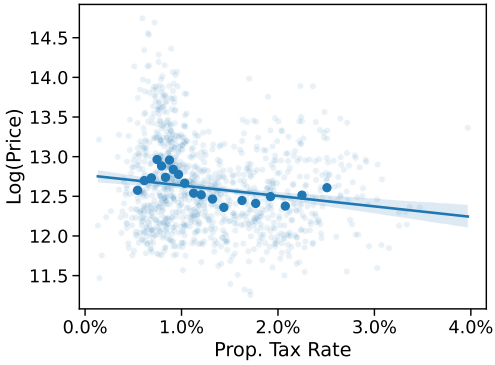
Back

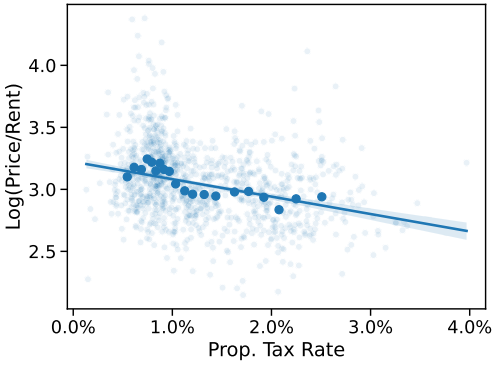
	Pop. 0–44	Pop. 0–44	Pop. 45–64	Pop. 45–64	Pop. 65+	Pop. 65+
	(1)	(2)	(3)	(4)	(5)	(6)
Prop. Tax Rate	-0.38***	0.18	0.55***	0.45***	-0.17**	-0.63***
	(0.11)	(0.19)	(0.06)	(0.10)	(0.07)	(0.13)
Percent Difference	-0.7%	0.3%	2.0%	1.6%	3.4%	-3.9%
PUMA Level Controls	N	Y	N	Y	N	Y
County and Year FEs	N	Y	N	Y	N	Y
Observations	28770	28770	28770	28770	28770	28770

Property Tax Associates with Lower Length of Residence (LOR) Back

	LOR $<$ 5 Years	LOR 5–9 years	LOR 10–20 years	LOR 20+ years
	(1)	(2)	(3)	(4)
Prop. Tax Rate	-0.20	0.38***	1.14***	-1.32***
	(0.21)	(0.11)	(0.19)	(0.33)
Individual, Bldg, Bdrms Controls	Y	Y	Y	Y
PUMA Level Controls	Y	Y	Y	Y
State FE	Y	Y	Y	Y
Observations	1973136	1973136	1973136	1973136

Cross-Sectional Variation in Prices, Price/Rents Explained by Prop Taxes



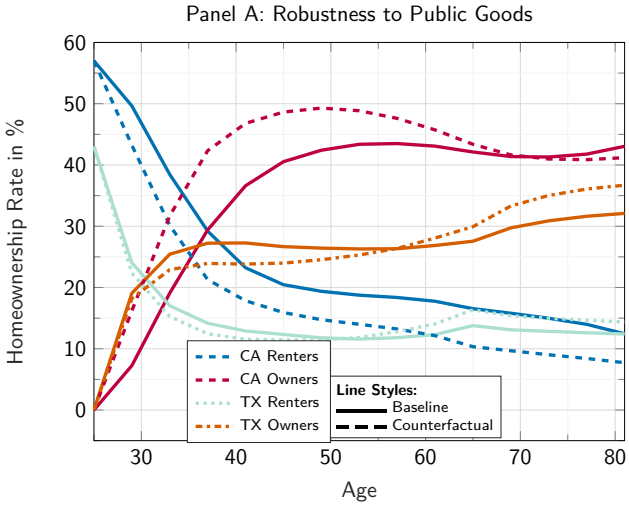


PUMA-level data on average house prices and price/rent ratios Back

Robustness

Back

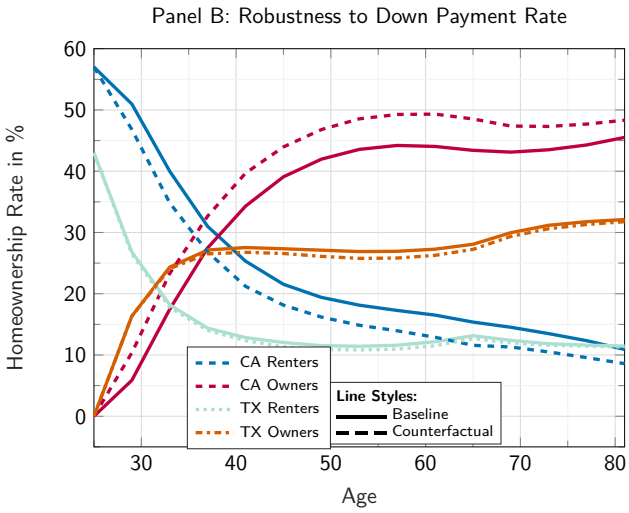
In this counterfactual, property taxes increase in CA to TX levels, but property tax receipts are rebated only to those aged 25-55



Robustness

Back

In this counterfactual, property taxes increase in CA to TX levels, but down payment requirements are 10%

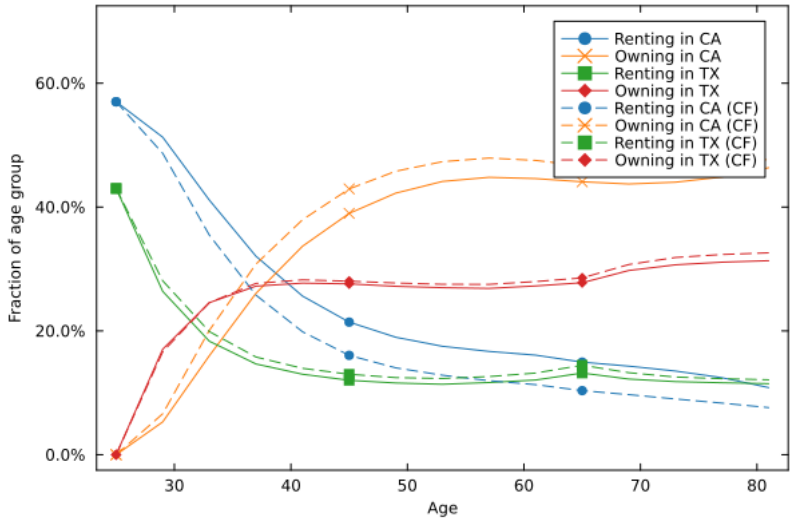


Parameter	Description	Value	Source/Target
		External	
σ	Relative risk aversion	2.000	Standard value
r	Interest rate	0.024	See text
δ	Depreciation rate	0.022	See text
θ_{LTV}	LTV limit	0.200	See text
θ_{PTI}	PTI limit	0.360	D. Greenwald (2018)
a	Mortgage amortization rate	0.0173	DL. Greenwald, Landvoigt Van Nieuwerburgh (2021)
F	Transaction cost selling	0.050	Díaz Luengo-Prado (2010)
ρ_z	Autocorrelation income	0.910	Floden Lindé (2001)
γ	Balanced growth rate	0.044	See text
σ_z	Standard deviation income	0.210	Floden Lindé (2001)
$\underline{H}$	Minimum house size	1.000	See text
β	Discount factor	0.950	See text
P_1	House price Texas ($100k)	1.700	See text
P_2	House price California ($100k)	5.000	See text
ϕ_1	Rent–price ratio Texas	0.045	Verisk Marketing Solutions
ϕ_2	Rent–price ratio California	0.030	Verisk Marketing Solutions
τ_1	Property tax Texas	0.020	Verisk Marketing Solutions
τ_2	Property tax California	0.008	Verisk Marketing Solutions
τ_k	Capital gains tax	0.150	See text
ρ_1	Housing supply elasticity Texas	0.320	Baum-Snow Han (2024)
ρ_2	Housing supply elasticity California	0.232	Baum-Snow Han (2024)
ϕ	Income tax progressivity rate	0.181	Heathcote, Storesletten Violante (2017)
λ	Income tax level	0.775	See text
δ_{TX}	Income tax difference Texas	-0.0214	See text
δ_{CA}	Income tax difference California	0.0088	See text
		Internal	
α	Preference for non-durable consumption	0.713	Rent to Income Ratio = 20%
Ψ	Bequest motive intensity	7.653	Wealth of the elderly (65–74) = 4.1
Ξ_2^R	Amenity benefit California	1.021	Share in California = 57%
Ξ_1^O	Homeownership benefit Texas	0.875	Texas Homeownership Rate = 66%
Ξ_2^O	Homeownership benefit California	1.928	California Homeownership Rate = 61%
μ_1	Income shifter Texas	-0.344	Texas Median Income = 0.604
μ_2	Income shifter California	-0.161	California Median Income = 0.76
m	Utility cost of moving	5.198	Moving rate = 0.37%

Back

No Tax Receipt Counterfactual

Back

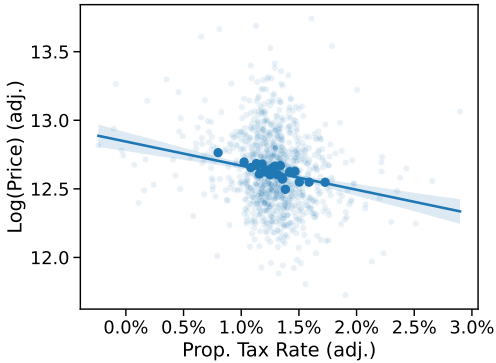


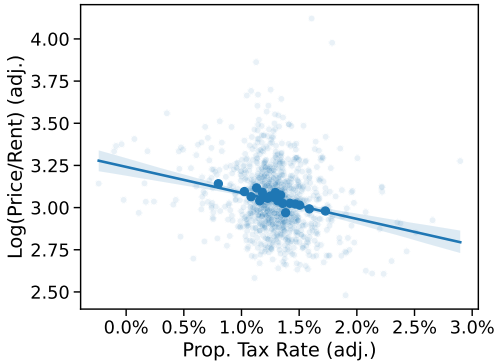
Property Tax Variation & Likelihood of Being Homeowner

	Dependent variable: homeowner					
	Under 45 (1)	Under 45 (2)	45–64 (3)	45–64 (4)	65+ (5)	65+ (6)
Prop Tax Rate	2.99***	5.62***	2.24***	4.23***	0.55**	3.24***
	(0.40)	(0.63)	(0.30)	(0.52)	(0.25)	(0.56)
log(HH Income)	0.15***	0.15***	0.13***	0.14***	0.09***	0.10***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Supply Elasticity	0.45***	0.41***	0.32***	0.29***	0.23***	0.21***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Age, Income, Div Income Controls	Y	Y	Y	Y	Y	Y
Math Scores, Dist. to City Controls	Y	Y	Y	Y	Y	Y
State FE	N	Y	N	Y	N	Y
Clusters Level	PUMA	PUMA	PUMA	PUMA	PUMA	PUMA
Observations	742932	742932	1074707	1074707	931385	931385

Young households are 3–5.6 percentage points more likely to be homeowners in areas with a 1 percentage point increase in property tax rates, higher than comparable change for elderly households. Back to chart

Cross-Sectional Variation in Prices, Prices/Rents with Controls





Controls are state FEs, dist to city center, supply elast, math scores, lot size, bedrooms. Back

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