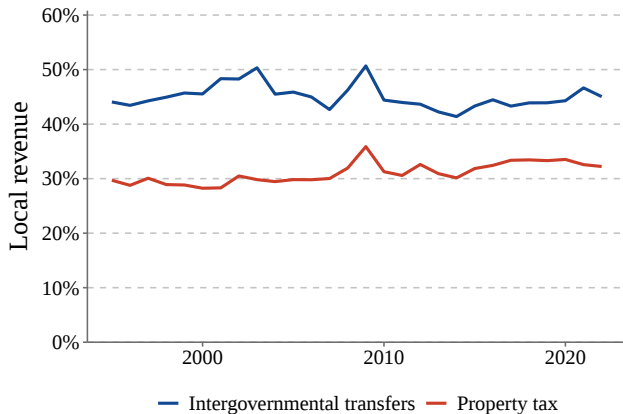


The Redistributive and Efficiency Effects of Property Taxes

Zong Huang

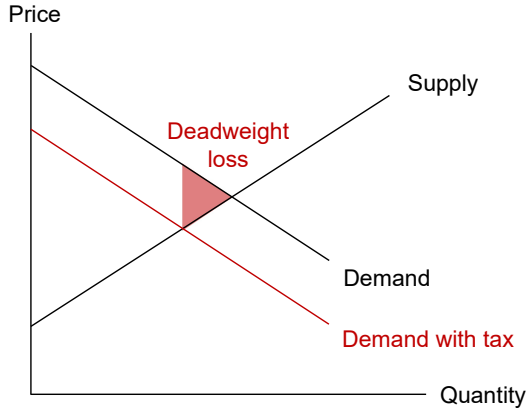
U.S. funding for local public goods heavily relies on property taxes



- \$650 billion of state and local property taxes collected in 2022
- Despite ubiquity, public finance literature traditionally argues *against* property taxes

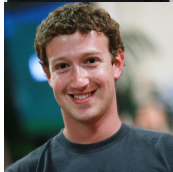
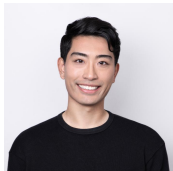
Property taxes distort consumption away from housing

Oates (1972): “Residents [...] will tend to purchase less than efficient levels of housing”



Property taxes distort location choice from implicit redistribution

Oates (1972): “Those living in relatively low-value dwellings will find [...] their position is improved since their tax price is less



- Little known—even descriptively—about the redistributive effects of property taxes

Quantify equity-efficiency trade-off relative to alternative tax regimes

1. Head taxes (benchmark)

- First-best tax instrument (Tiebout 1956)
- E.g., introduced in the United Kingdom in 1989, repealed in 1991



2. Non-linear property taxes

- E.g., introduced in Washington D.C. in 2024

This paper

1. Measure statutory intrajurisdictional redistribution via property taxes

- Top income quartile households: pay \$2,000 *more* per year
- Bottom income quartile households: pay \$1,000 *less* per year

2. Develop spatial equilibrium model of housing markets

- Causally estimate reduced form elasticities that are key parameters to the model
- 1% increase in housing prices increases housing expenditure share by 0.54%

3. Simulate counterfactual welfare under different tax regimes

- High-income households: implicitly *pay* \$4,000 per year
- Low-income households: implicitly *receive* \$1,500 per year
- Household mobility constrains additional redistribution via non-linear property taxes

- **Property taxes**

- Avenancio-Leon and Howard (2022); Koster and Pinchbeck (2022); Barseghyan and Coate (2016); Lutz (2015); Calabrese, Epple, and Romano (2012); Fischel (2001); Ross and Yinger (1999); Zodrow and Mieszkowski (1986); Brueckner (1979); Hamilton (1976); Oates (1972); Tiebout (1956)
- ▶ Empirically quantify redistributive and efficiency effects

- **Quantitative spatial economics**

- Tsivanidis (2025); Baum Snow and Lu (2023); Couture et al. (2021); Diamond (2016); Redding and Sturm (2016); Suárez Serrato and Zidar (2016); Ahlfeldt et al. (2015); Allen et al. (2015); Allen & Arkolakis (2014); Busso, Gregory, and Kline (2013); Bayer, Ferreira, and McMillan (2007)
- ▶ Incorporate local taxation and heterogeneous preferences for housing variety

Data

Data sources

- **Primary:**

- **Corelogic Tax:** parcel-level property taxes from 2007-2021
- **Corelogic Deeds:** property transactions from 2000-2021 (impute owner's equivalent rent)
- **Home Mortgage Disclosure Act (HMDA):** mortgage-level income data from 1990-2021
- Reweight income to match American Community Survey (ACS)

- **Supplementary:**

- Zillow Housing Data (Zillow)
- Consumer Expenditure Survey (CEX)
- Census Transportation Planning Project (CTPP)
- Quarterly Census of Employment and Wages (QCEW)
- Nielsen Consumer Panel (Nielsen)
- Infutor Data Solutions (Infutor)
- Baum-Snow & Han (2024), Card, Rothstein, and Yi (2025)
- Individual Income Tax Statistics (IRS)
- Stanford Education Data Archive (SEDA)

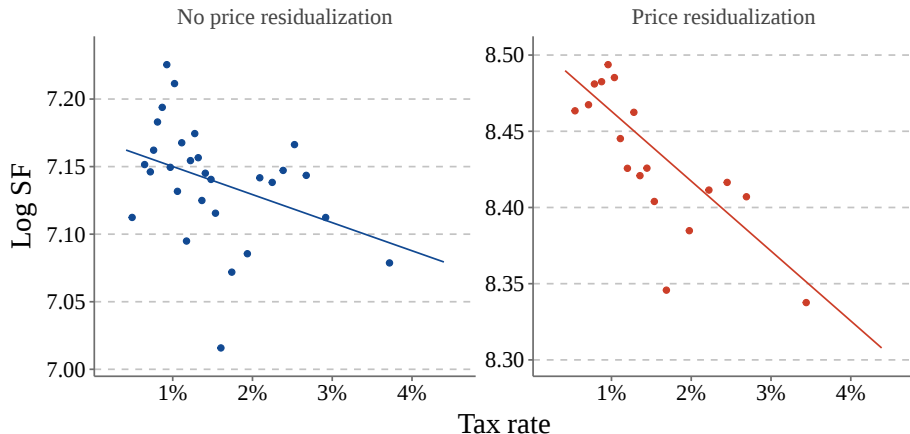
U.S. property taxation

Ad valorem tax on the assessment value of property

$$\underbrace{\text{Tax amount}}_{\text{Data}} = \underbrace{\text{Property value} \times \underbrace{\text{Assessment ratio}}_{\text{State statutes}}}_{\text{Data}} \times \text{Tax rate}$$

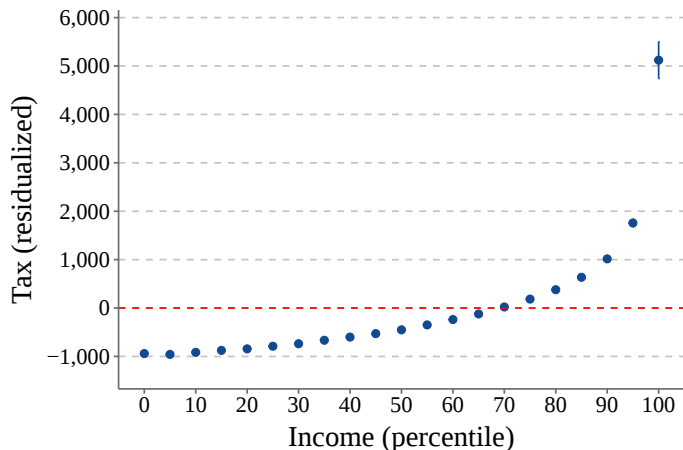
- County governments administratively assess property values and collect taxes
 - Property values are supposed to reflect fair market values
- State governments set assessment ratios
- Local governments set tax rates
 - School districts receive majority of property taxes

Households purchase smaller houses in areas with high property taxes



- Binscatter using transactions in 2021, residualizing for household income

Within school district, richer households pay more property taxes



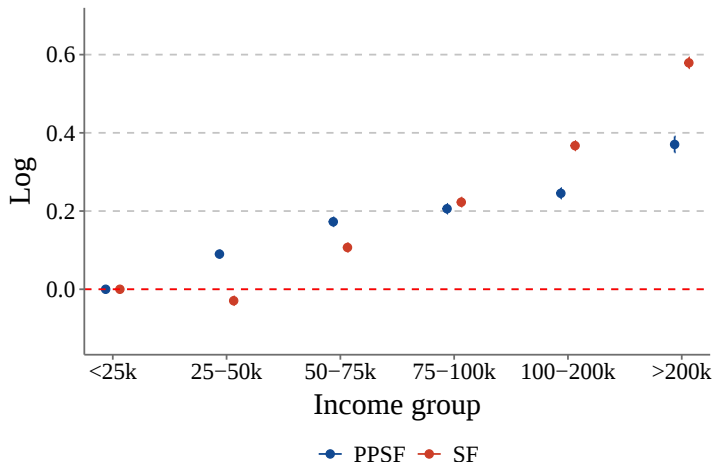
$$\text{Tax}_i^{2021} - \frac{\sum_{j \in g_i} \text{Tax}_j^{2021}}{\sum_{j \in g_i} 1}$$

i : residential parcel

g : school district

- Nominally: richer households subsidize local public goods for poorer households

Richer households consume both more housing and higher quality housing



- Regression using transactions in 2021, income group and school district fixed effects

Need structural model to account for general equilibrium effects

Two behavioral effects from property taxes:

1. Distort consumption away from housing (*intensive margin*)
 - Excess burden depends on housing supply and demand
 - **Estimate: price elasticity of housing expenditure**
2. Distort location choice (*extensive margin*)
 - Household sorting determines magnitude of redistribution
 - **Estimate: household migration elasticities**

Model of housing markets

Housing demand

- **Rosen-Roback:** unit mass of households, J neighborhoods
- Household i of type θ derives utility from neighborhood j :

$$u_{ij} = \log \left(\left(\underbrace{\alpha_{\theta} \alpha_j}_{\text{Taste}} \left(\underbrace{h_{Lj}^{\delta_{\theta j}}}_{\text{Low quality housing}} \underbrace{h_{Hj}^{1-\delta_{\theta j}}}_{\text{High quality housing}} \right)^{\frac{\eta-1}{\eta}} + \underbrace{c^{\frac{\eta-1}{\eta}}}_{\text{Non-housing consumption}} \right)^{\frac{\eta}{\eta-1}} + \underbrace{\beta G_j}_{\text{Public good}} + \underbrace{A_{\theta j}}_{\text{Amenities}} + \underbrace{\sigma \varepsilon_{ij}}_{\text{EV type I}} \right)$$

- Subject to budget constraint:

$$\underbrace{w_{\theta}}_{\text{Wage}} - \underbrace{T_j}_{\text{Head tax}} = \underbrace{r_{Hj}}_{\text{Rent}} \underbrace{(1 + \tau_{Hj})}_{\text{Ad valorem tax}} h_{Hj} + r_{Lj} (1 + \tau_{Lj}) h_{Lj} + p_j c$$

Housing supply

- Landowner in each neighborhood j with marginal cost:

$$c_{Hj}(x) = H_{Hj}^0 - \frac{1}{\gamma_{Hj}} x^{\frac{1}{\gamma_{Hj}}}$$

$$c_{Lj}(x) = H_{Lj}^0 - \frac{1}{\gamma_{Lj}} x^{\frac{1}{\gamma_{Lj}}}$$

- Assume landowners are price-takers:

$$\underbrace{\log(H_{Hj})}_{\text{Housing supply}} = \log(H_{Hj}^0) + \underbrace{\gamma_{Hj}}_{\substack{\text{Housing supply} \\ \text{elasticity}}} \log(r_{Hj})$$

$$\log(H_{Lj}) = \log(H_{Lj}^0) + \gamma_{Lj} \log(r_{Lj})$$

Labor supply and demand

- Household i of type θ in neighborhood j provides labor:

$$\ell_{ij} = \theta$$

- Firms in neighborhood j produce a tradable intermediate good:

$$\underbrace{F(K_j, B_j L_j)}_{\text{Output}} = \underbrace{B_j}_{\text{Productivity}} \times \underbrace{L_j}_{\text{Total labor}} \times \underbrace{f\left(\frac{K_j}{B_j L_j}\right)}_{\text{Non-land capital}}$$

- Cost of capital is fixed at ρ and intermediate good is sold nationally at a price of one
- Free entry condition:

$$w_{\theta j} = B_j R(\rho) \theta$$

Local government budget constraint

- Assume fixed public goods G_j and constant (per household) marginal cost MC_j
 - Full model includes Tiebout with politics: level of public goods determined by median voter
- Denote $N_{\theta j}$ as the number of households of type θ in neighborhood j
- Balanced budget constraint:

$$T_j + \sum_{\theta} \left(\frac{N_{\theta j}}{\sum_{\theta} N_{\theta j}} (h_{\theta H j}^* r_{H j} \tau_{H j} + h_{\theta L j}^* r_{L j} \tau_{L j}) \right) = MC_j$$

- **Market clearing and balanced budget constraints give equilibrium**

Housing demand estimation

Demand parameters

	Interpretation	Identification
Intensive margin		
α_θ	Non-homothetic housing demand	Expenditure by income
α_j	Unobserved housing quality	Expenditure by neighborhood
η	Price elasticity of housing expenditure	Waldfoegel instrument
Extensive margin		
σ^{-1}	Household mobility	Border discontinuity design
$\beta_\theta A_j$	Neighborhood amenities	Population shares
ε_{ij}	Neighborhood substitution patterns	Gross migration flows

Identifying elasticity of substitution

	$\log(s) - \log(1 - s)$				$\log(s)$
	OLS	IV	OLS	IV	IV
$\log p$	0.575 (0.015)	0.742 (0.109)	0.563 (0.015)	0.728 (0.104)	0.538 (0.078)
Bartik IV		1.324 (0.189)		1.553 (0.198)	1.553 (0.198)
F-stat		464.1		610.3	610.3
Observation: ZIP code-income decile					
Income decile FE	X	X	X	X	X
Commuting zone FE	X	X			
County FE			X	X	X

Albouy et al. (2016): $\frac{\partial \log(s)}{\partial \log(p)} \approx 0.51$, Finlay and Williams (2022): $\frac{\partial \log(s)}{\partial \log(p)} \approx 0.48$

Structural model

Set-up

1. **Demand parameters:** prior estimates
2. **Supply parameters:** housing supply elasticities from Baum-Snow and Han (2024)
3. **Productivity parameters:** commuting zone wage effects from Card, Rothstein, and Yi (2024)
4. **Cost of public good:** calculate mean per residential parcel using Corelogic Tax
5. **Household shares:** calculate school district-level shares by income group using IRS
6. **Budget:** convert income to post-tax budget using ACS

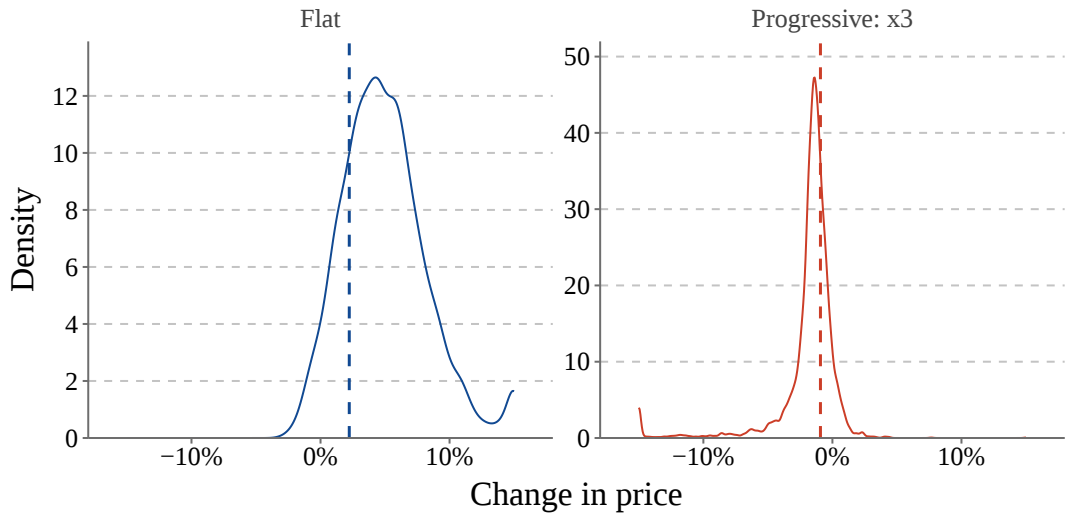
Validate model by replicating quasi-experimental literature (Lutz 2015)

Counterfactuals

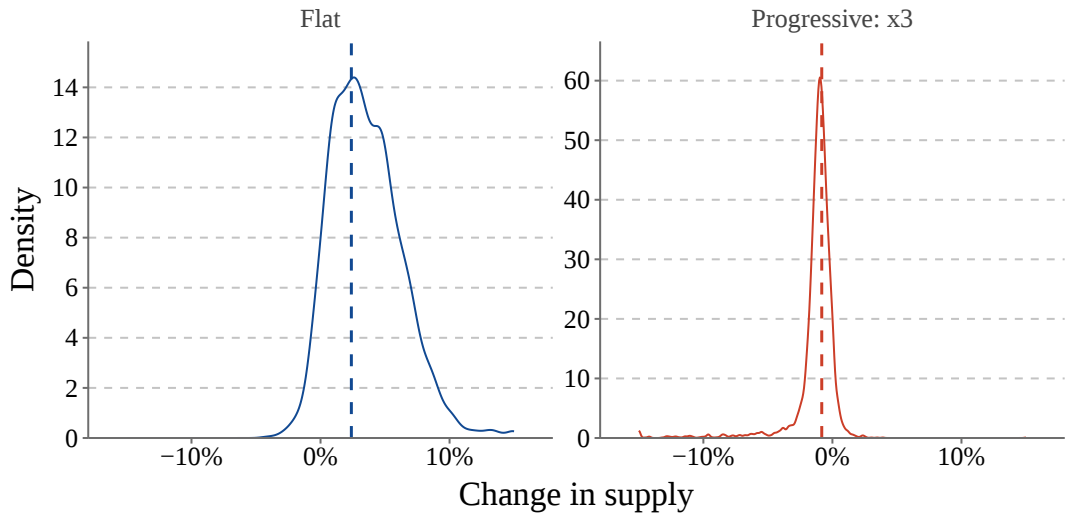
Evaluate counterfactual welfare of alternative tax regimes in general equilibrium:

1. **Status quo:** ad valorem tax
2. **Head tax:** lump-sum tax per household
3. **Progressive tax:** increasing marginal tax rate (a la Washington D.C.)
 - County-level kink at 75th percentile of housing consumption
 - Case 1: All school districts implement progressive tax (centralized)
 - Case 2: Only implement progressive tax in largest school district in each commuting zone (decentralized)

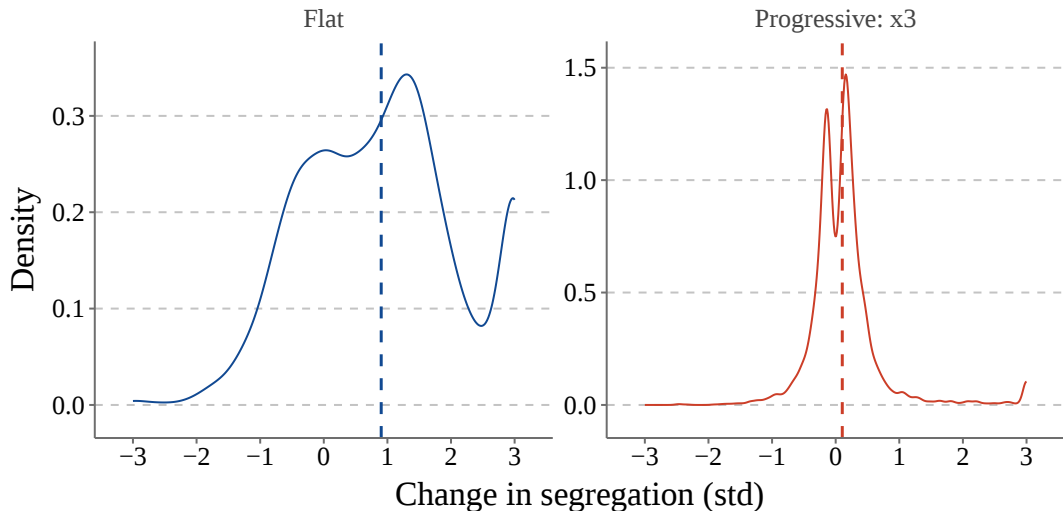
Neighborhood-level change in prices



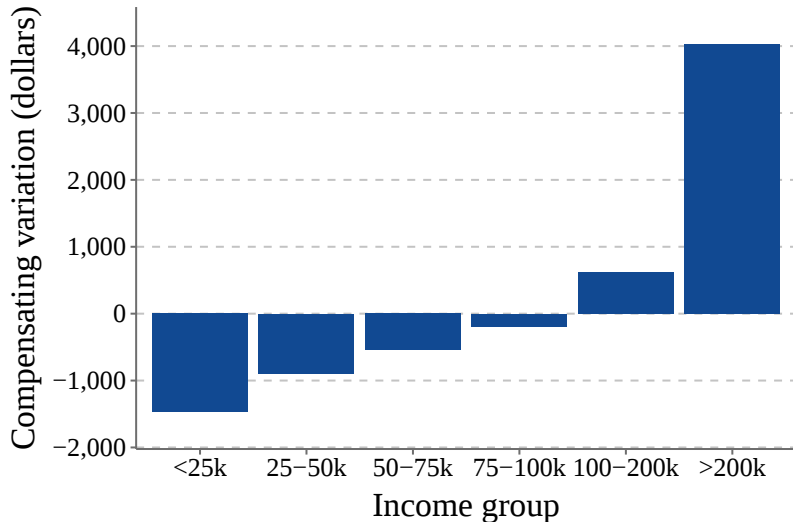
Neighborhood-level change in supply



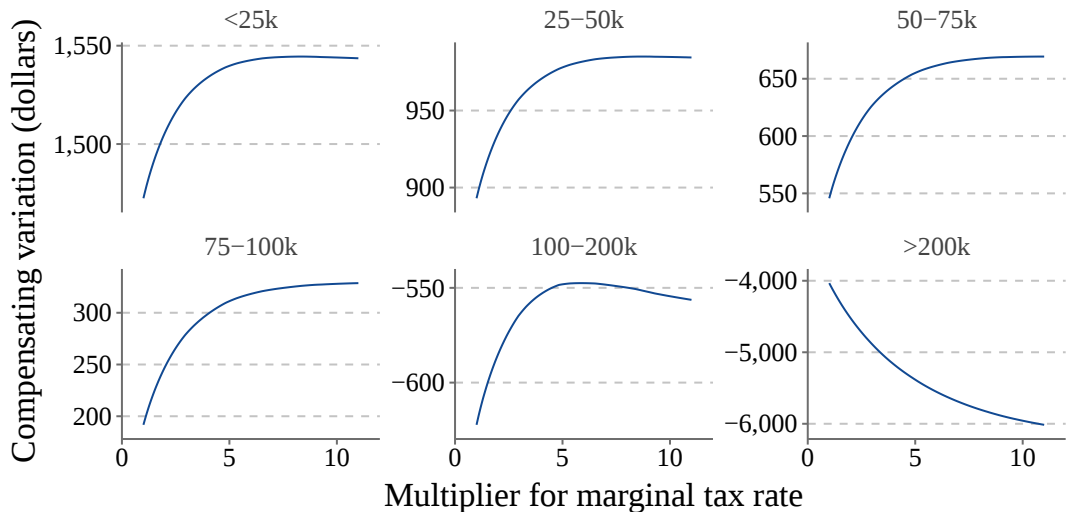
Neighborhood-level change in segregation



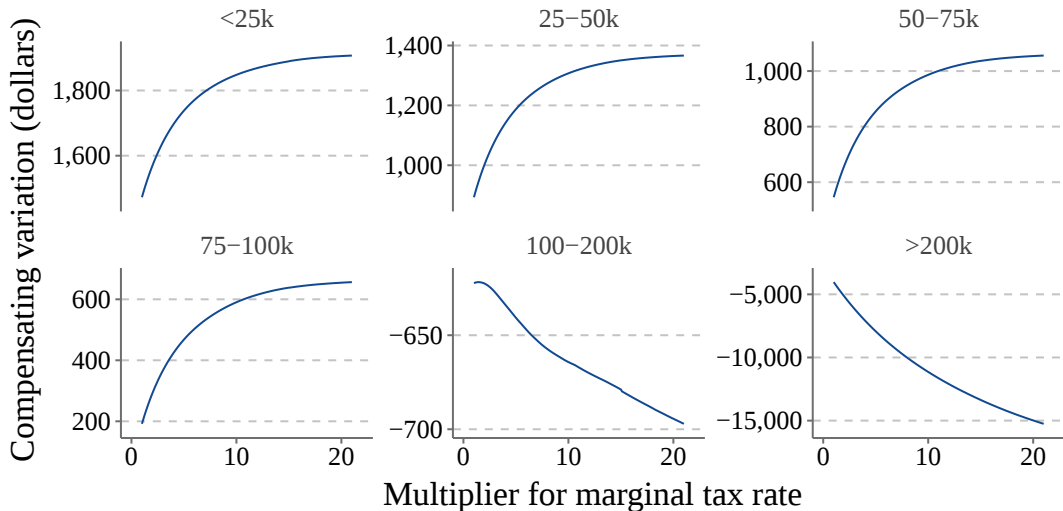
Average change in utility by income group: flat tax vs. ad valorem



Mobility of high-income households limit redistribution via progressive tax



Progressive tax requires implementation by all governments



Conclusion

Conclusion

1. Measure statutory intrajurisdictional redistribution via property taxes

- Bottom income quartile: households pay \$1,000 *less* per year
- Top income quartile: households pay \$2,000 *more* per year

2. Estimate general equilibrium model of housing markets

- 1% increase in housing prices increases housing expenditure share by 0.54%

3. Simulate counterfactual welfare under different tax regimes

- Status quo: low-income households receive implicit transfers of \$1,500 at a cost of 2.4% in housing quantity
- High-income household mobility constrains redistribution via non-linear property taxes