

# Property Taxes and Rental Housing

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# Motivation

- ▶ Research question: Who bears the burden of the property tax?
- ▶ Why is this relevant?
  - ▶ Rents and mortgages relevant share of households' expenditures
  - ▶ Long-standing political debate on dynamics of housing market (gentrification in metropolitan areas, *Mietpreisbremse* in Germany)
- ▶ Property taxes...
  - ▶ Revenues amount to roughly 0.4-1.0% of GDP in OECD countries
  - ▶ Typically higher in (metropolitan) areas with higher rent level
- ▶ Incidence has been discussed for over a century now (Edgeworth, 1897)
  - ▶ But still no consensus reached (Nechyba, 2001, Fischel et al., 2011)

▶ literature

# Our paper

- ▶ Provides evidence on the **property tax incidence** on rental prices
  - ▶ Rent indices and panel data from German municipalities (1992-2012)
- ▶ Exploits **quasi-experimental setting** of property taxation in Germany
  - ▶ Tax base definition set at the federal level, very stable over time
  - ▶ 11,441 municipalities decide yearly on local property tax multiplier
  - ▶ 88 % of all apartments owned by individuals or real estate companies
- ▶ Landlords and tenants **share the burden of property taxation**
  - ▶ Shifting depends on construction types and quality of the apartment
  - ▶ Housing supply fix in the short run, tax shifting in the longer run

# Property taxes in Germany: *Grundsteuer B*

- ▶ Real estate property tax: **levied on the value of land and buildings**
    - ▶ Most important tax on property in Germany, introduced in 1861
    - ▶ Approx. 11.6 billion EUR in 2012, 14 % of municipalities' tax revenues
  - ▶  $Tax = Tax\ Multiplier_{local} \times Tax\ Rate_{federal} \times Rateable\ Value$ 
    - ▶ Municipalities decide on local **property tax multiplier** (*Hebesatz*)
    - ▶ State assessed rateable values in 1935 (East) and 1964 (West)
    - ▶ Reassessment only when owner changes or substantial improvements
- ▶ federal tax rates
- ▶ Paid by house owners, can be/is **shifted on top of net rent legally**
    - ▶ On national average, +4 % property taxes on top of net rents
    - ▶ Average property tax rate in 2012: 4.0 % (East), 1.3 % (West)

# Partial equilibrium model

- ▶ Theory of **property tax incidence** heavily discussed, empirical focus on partial analysis (as in corporate tax literature) ▶ [property tax views](#)
- ▶ Two goods: **rental housing  $x$  taxed at rate  $t$**  and untaxed numeraire  $y$ 
  - ▶ Consumer utility assumed as concave in  $x$  and linear in  $y$
  - ▶  $p$  is producer price of housing, set to marginal production costs
  - ▶ Consumer prices  $q = p + t + c$ , including taxes and operating costs
  - ▶ We assume market clearing at  $D(q) = S(p)$
- ▶ **Tax incidence** defined by demand/supply elasticities:  $\frac{dp}{dt} = -\frac{\epsilon_D}{\epsilon_D - \epsilon_S}$
- ▶ Suggest that shifting is lower if housing demand is more elastic, e.g., when tenants are more mobile

## Simple example

- Introduction of a 20 EUR property tax on apartments in Mannheim

Invoice/rent bill (in EUR)	Pre Tax	After Tax			
		Full shifting on tenants		No shifting on tenants	
Net rent/producer price	400		400	-20	380
Operating costs	30		30		30
Property taxes	0	+20	20	+20	20
Gross rents/consumer price	430	+20	450		430

- Paid by landowner, but statutory incidence on the tenant if rented

# Property tax incidence

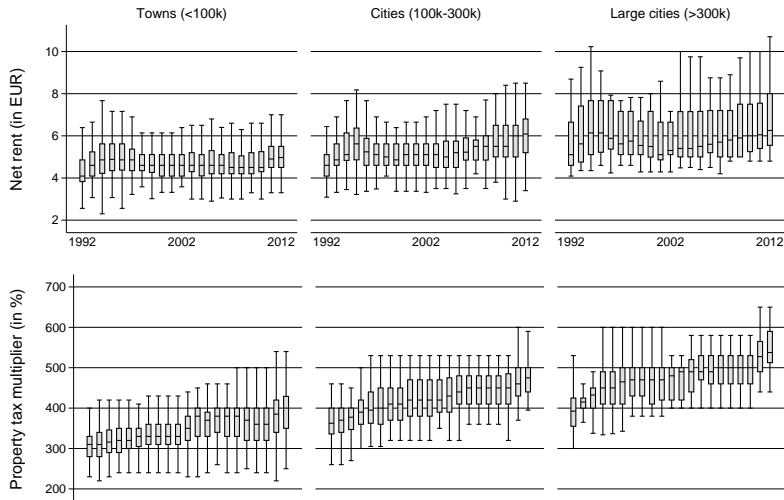
- ▶ We estimate the **multiplier elasticity** of prices:  $\hat{\alpha} = \epsilon_{p,\tau} = \frac{\Delta p/p}{\Delta \tau/\tau}$
- ▶ Estimate  $\hat{\alpha}$  hard to interpret, but
  - ▶  $Tax = \underbrace{Tax\ Multiplier_{local}}_{\tau} \times Tax\ Rate_{federal} \times Rateable\ Value$
  - ▶ With everything else constant it holds that  $\frac{\Delta p/p}{\Delta \tau/\tau} = \frac{\Delta p/p}{\Delta tax/tax}$
  - ▶ We are interested in tax incidence  $\frac{\Delta p}{\Delta tax} = \hat{\alpha} \times \frac{p}{tax}$
- ▶ Theoretical predictions under perfect competition
  - ▶ **No shifting in the short run:**  $\frac{\Delta p}{\Delta tax} = -1$ , thus  $\hat{\alpha} = -\frac{tax}{p}$
  - ▶ **Tax shifting in the longer run:**  $-1 \leq \frac{\Delta p}{\Delta tax} \leq 0$ , thus  $-\frac{tax}{p} \leq \hat{\alpha} \leq 0$

# Data

- ▶ **Rental housing indices:** (unbalanced) panel from 1992-2012
  - ▶ Net rent indices for 3-room-apartments, 70  $m^2$  (*Nettokaltmiete*)
  - ▶ 8 indices, differentiated by construction year and apartment quality
  - ▶ Only new contracts, only private sector rents, no public housing
  - ▶ Reported annually by German real estate association IVD
- ▶ Our sample contains 547 German municipalities [▶ details](#)
  - ▶ All cities with population above 100,000 (*Großstädte*)
  - ▶ 30 % of middle towns with population 20k-100k, few below
  - ▶ Only 3 % of municipalities, but roughly 40 % of the population
- ▶ (Still collecting data on rateable values, housing supply, expenses. . . )



# Descriptives

[▶ details](#)[▶ changes](#)

Note: Rents refer to medium quality apartments, construction year after 1948.

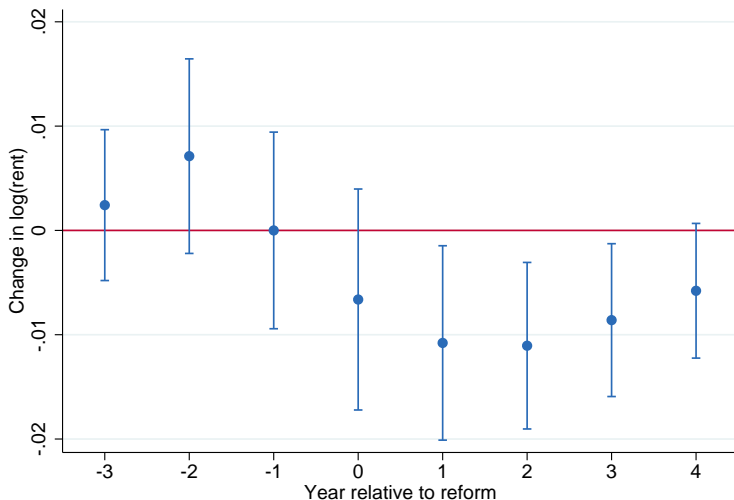
# Event study design

- ▶ Following Autor (2003), we estimate the following equation:

$$\ln r_{c q m t} = \sum_{j=-3}^4 \alpha_{t+j} \text{Tax Increase}_{m,t+j} + \mu_{c q m} + \mu_{s t} + t \nu_m + \epsilon_{c q m t}$$

- ▶ **Sample selection:** municipalities with at least one tax increase
  - ▶  $r_{c q m t}$  – rent index for type  $c$  of quality  $q$  in municipality  $m$  at time  $t$
  - ▶  $\text{Tax Increase}_{m,t+j}$  – **dummy variable** indicating a tax increase in municipality  $m$  at time  $t+j$
  - ▶  $\mu_{c q m}$  – type  $\times$  quality  $\times$  municipality fixed effects
  - ▶  $\mu_{s t}, \nu_m$  – state  $\times$  year fixed effects, municipality time trends
  - ▶  $\epsilon_{c q m t}$  – clustered at the level of the municipality

# Event study evidence



Note: Standard errors clustered on municipal level, 90 % confidence intervals.

# Fixed effects framework

- ▶  $\ln r_{cqmt} = \alpha_{cqt} \log \tau_{mt} + \mu_{cqm} + \mu_{st} + t \nu_m + x_{mt} \gamma' + \epsilon_{cqmt}$
- ▶ where
  - ▶  $r_{cqmt}$  – rent index for type  $c$  of quality  $q$  in municipality  $m$  at time  $t$
  - ▶  $\tau_{mt}$  – property tax multiplier in municipality  $m$ , year  $t$
  - ▶  $\mu_{cqm}$  – type  $\times$  quality  $\times$  municipality fixed effects
  - ▶  $\mu_{st}, \nu_m$  – state  $\times$  year fixed effects, municipality time trends
  - ▶  $x_{mt}$  – municipality  $m$  controls in year  $t$
  - ▶  $\epsilon_{cqmt}$  – error term, clustered on labor market regions

## Effect on log(net rents)

	(1)	(2)	(3)	(4)
log(Property Tax)	-0.020 (0.029)	-0.029 (0.032)	0.001 (0.036)	0.030 (0.038)
Year × State	Yes	Yes	Yes	Yes
Community Trends			Yes	Yes
Community Controls		Yes		Yes
Fixed Effects	Yes	Yes	Yes	Yes
Observations	40673	40657	40673	40657
Adjusted $R^2$	0.278	0.283	0.409	0.413

Standard errors clustered on labor market regions.

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Effect on log(net rents) by construction type

	(1)	(2)	(3)	(4)
log(Property Tax)				
x Construction Year $\leq$ 1948	0.077** (0.035)	0.067* (0.037)	0.100*** (0.037)	0.131*** (0.039)
x Construction Year $\geq$ 1949	-0.007 (0.033)	-0.016 (0.036)	0.011 (0.038)	0.041 (0.040)
x New Building	-0.182*** (0.040)	-0.192*** (0.044)	-0.167*** (0.049)	-0.137*** (0.052)
Year x State	Yes	Yes	Yes	Yes
Community Trends			Yes	Yes
Community Controls		Yes		Yes
Fixed Effects	Yes	Yes	Yes	Yes
Observations	40673	40657	40673	40657
Adjusted $R^2$	0.285	0.289	0.416	0.420

Standard errors clustered on labor market regions.

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## Effect on log(net rents) by apartment quality

	(1)	(2)	(3)	(4)
× Basic Quality	0.216*** (0.053)	0.208*** (0.055)	0.236*** (0.049)	0.265*** (0.052)
× Medium Quality	-0.040 (0.028)	-0.049 (0.032)	-0.019 (0.036)	0.010 (0.039)
× (Very) Good Quality	-0.142*** (0.032)	-0.152*** (0.034)	-0.122*** (0.041)	-0.093** (0.043)
Year × State	Yes	Yes	Yes	Yes
Community Trends			Yes	Yes
Community Controls		Yes		Yes
Fixed Effects	Yes	Yes	Yes	Yes
Observations	40673	40657	40673	40657
Adjusted $R^2$	0.290	0.295	0.421	0.425

Standard errors clustered on labor market regions.

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Who bears the burden of the property tax?

- ▶ Heavily discussed in the literature, no consensus yet
- ▶ We provide panel data evidence from German municipalities
  - ▶ Event study **confirms theoretical predictions** on timing of tax shifting
  - ▶ **Tax shifting differs considerably** by construction type and quality
- ▶ Evidence shows that
  - ▶ **Short run**: incidence on landlords, **longer run**: tax shifting onto tenants
  - ▶ Estimates **suggest overshifting** of taxes on rents (differentiated goods?)



# Thanks for your attention!

Comments or questions? — [loeffler@zew.de](mailto:loeffler@zew.de)

# Appendix

## Existing literature ◀

- ▶ Extensive literature on the **capitalization** of property taxes into house values and the **shifting** on housing rents
  - ▶ Different views: “capital tax view” vs. “benefit tax view” (Marshall, 1890, Edgeworth, 1897, Simon, 1943, Mieszkowski, 1972, Hamilton, 1976, Mieszkowski and Zodrow, 1989, Fischel, 1992, Zodrow, 2001a,b) ▶ **property tax views**
  - ▶ Some empirical evidence (Orr, 1968, 1970, 1972, Heinberg and Oates, 1970, Hyman and Pasour, 1973, Dusansky et al., 1981, Carroll and Yinger, 1994)
- ▶ **No theoretical or empirical consensus** on the property tax incidence
- ▶ Empirical studies mainly for the US
  - ▶ Usually one year cross-sectional data, less than 100 observations
  - ▶ Estimates range between 0-115 %, **identification rather complicated**
- ▶ One study for Baden-Württemberg, no shifting on rents (Buettner, 2003)

# Property tax views

[◀ motivation](#)[◀ model](#)

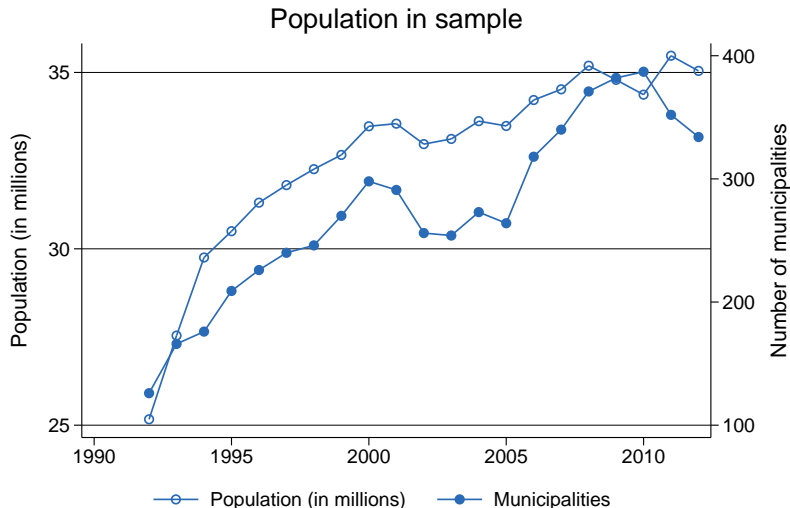
- ▶ **Traditional view** (Edgeworth, 1897, Simon, 1943, Netzer, 1966)
  - ▶ Tax introduced in single municipality, perfectly elastic capital supply
  - ▶ Tenants bear the full tax burden of property taxation
- ▶ **Capital tax view** (Mieszkowski, 1972, Mieszkowski and Zodrow, 1989)
  - ▶ Extends “old view” with Harberger general equilibrium model
  - ▶ Capital owners bear the national average burden of property taxes
- ▶ **Benefit tax view** (Tiebout, 1956, Oates, 1969, Hamilton, 1976, Fischel, 1992)
  - ▶ Households choose “optimal municipality”, competing communities
  - ▶ Property taxes to finance local public goods, non-distortional
- ▶ **Hard to provide exclusive evidence for different views** (Fischel et al., 2011)
  - ▶ General equilibrium aspects hard to pin down empirically
  - ▶ Empirics focused on partial analysis (as in corporate tax literature)

# Federal tax rates (in %)

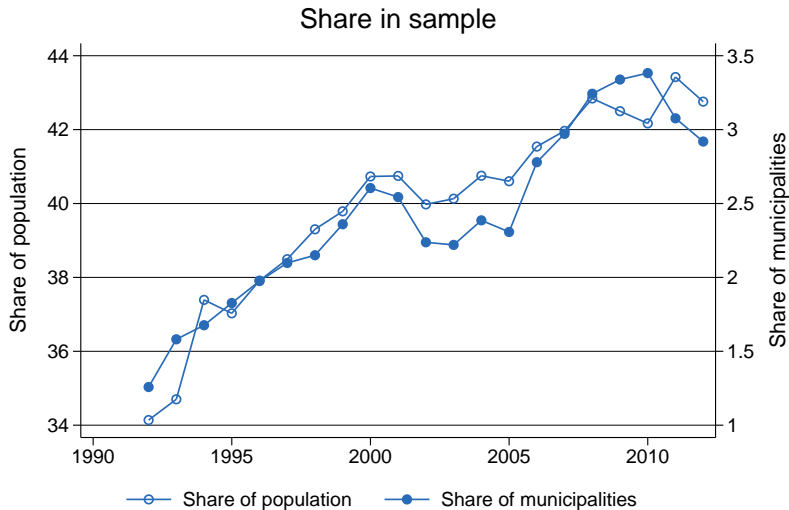
West Germany		East Germany			
Building type	Tax rate	Building type	Tax rate by population 1933		
			<25k	25k-1,000k	>1,000k
Built before 1924					
One-family houses		One-family houses			
First 38,347 EUR	0.26	First 15,339 EUR	1.0	0.8	0.6
Additional value	0.35	Additional value	1.0	1.0	1.0
Two-family houses	0.31	Other houses	1.0	1.0	1.0
Built after 1924					
		One-family houses			
		First 15,339 EUR	0.8	0.6	0.5
		Additional value	0.8	0.7	0.6
		Other houses	0.8	0.7	0.6
Vacant lots					
		Business purpose	1.0	1.0	1.0
Other houses/vacant lots	0.35	Other	0.5	0.5	0.5

Source: §§ 15, 41 Grundsteuergesetz, §§ 29-33 Grundsteuerdurchführungsverordnung.

# Sample descriptives I ◀

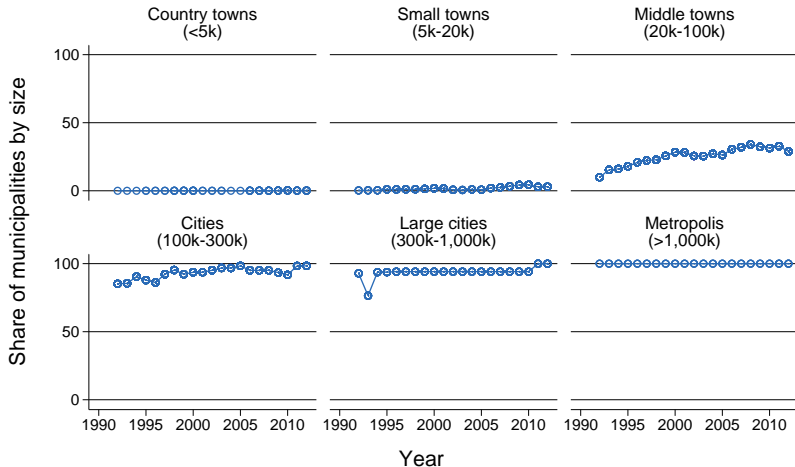


## Sample descriptives II ◀



## Sample descriptives III

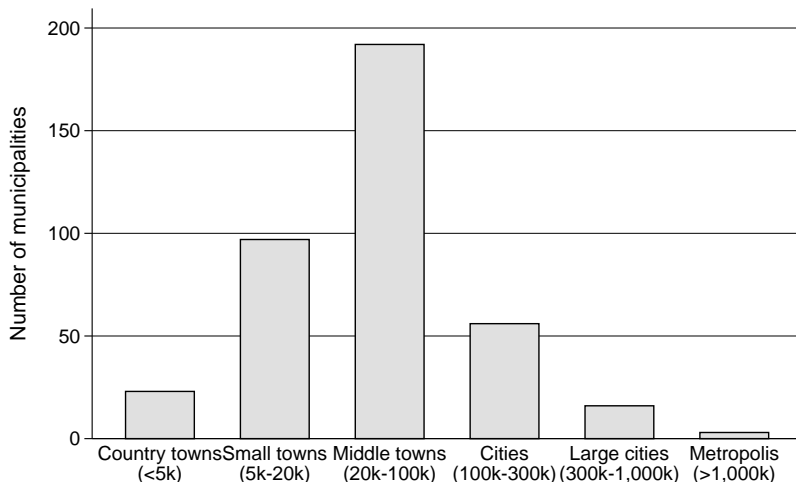
### Share of municipalities in sample





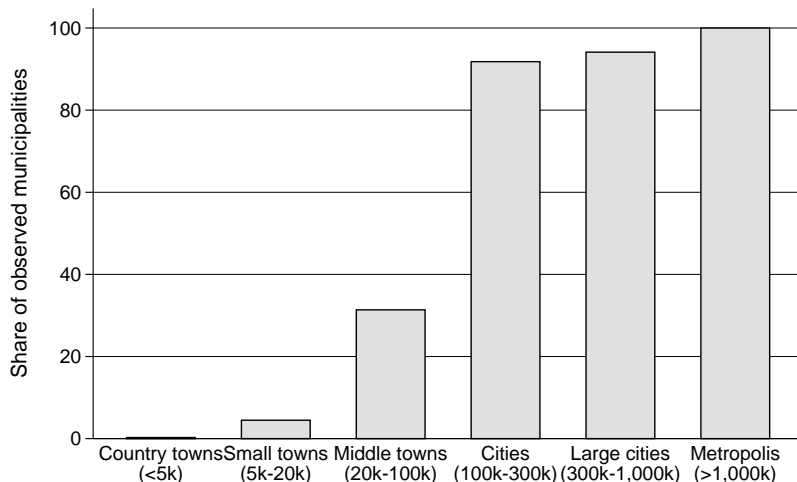
## Sample descriptives IV ◀

Observed municipalities by size (2010)



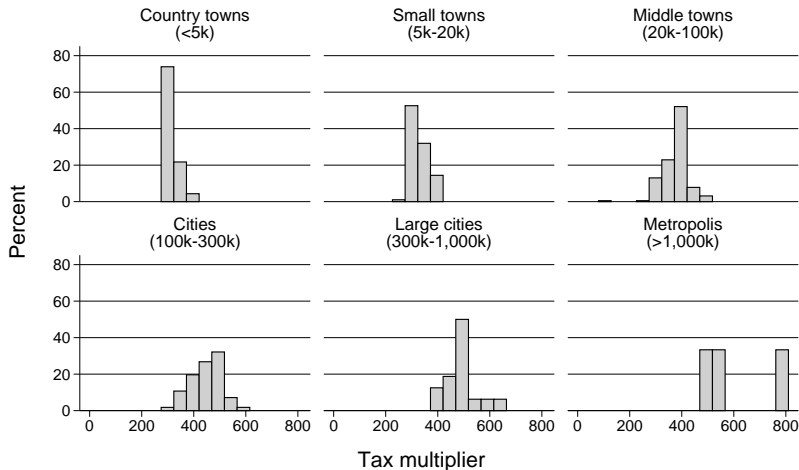
# Sample descriptives V

## Share of municipalities by size (2010)



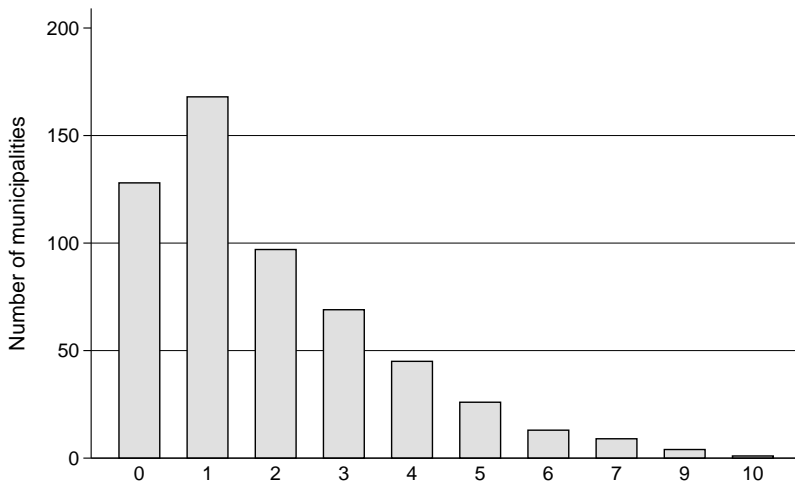
# Property tax descriptives ◀

## Local property tax multiplier (2010)

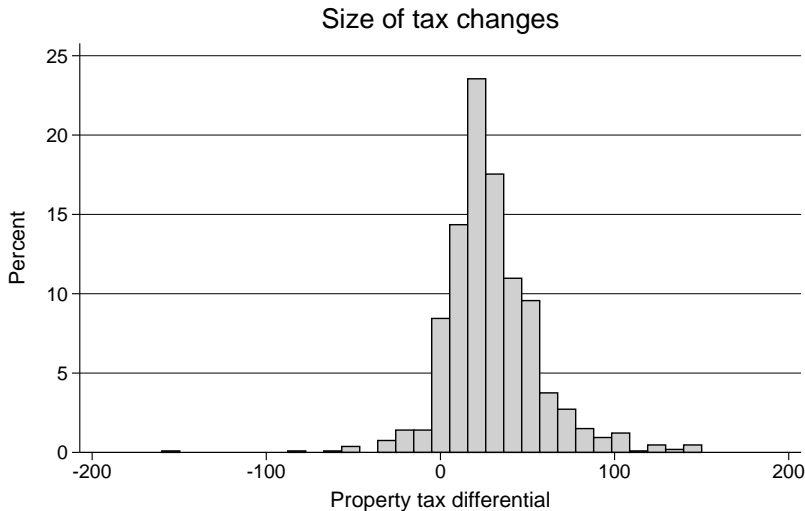


# Property tax changes I

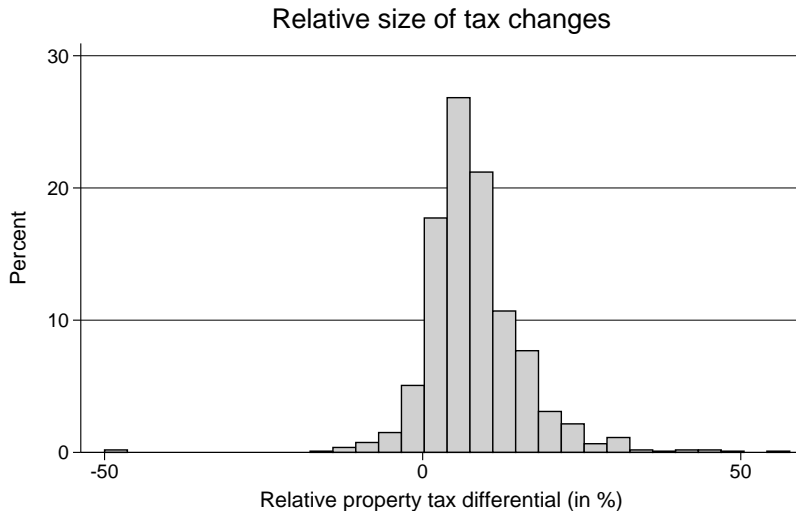
(Observed) tax changes within municipalities



## Property tax changes II ◀



## Property tax changes III ◀



# References I

- Autor, D. H. (2003). Outsourcing at Will: The Contribution of Unjust Dismissal Doctrine to the Growth of Employment Outsourcing, *Journal of Labor Economics* **21**(1): 1–42.
- Buettner, T. (2003). Tiebout Visits Germany: Land Tax Capitalisation in a Sample of German Municipalities. Unpublished manuscript, presented at the Third Norwegian-German Seminar on Public Economics 2003.
- Carroll, R. J. and Yinger, J. (1994). Is The Property Tax a Benefit Tax? The Case of Rental Housing, *National Tax Journal* **47**(2): 295–316.
- Dusansky, R., Ingber, M. and Karatjas, N. (1981). The Impact of Property Taxation on Housing Values and Rents, *Journal of Urban Economics* **10**(2): 240–255.
- Edgeworth, F. Y. (1897). The Pure Theory of Taxation, *The Economic Journal* **7**(25): 46–70.
- Fischel, W. A. (1992). Property Taxation and The Tiebout Model: Evidence for the Benefit View From Zoning and Voting, *Journal of Economic Literature* **30**(1): 171–177.
- Fischel, W. A., Oates, W. E. and Youngman, J. (2011). Are local property taxes regressive, progressive, or what? Unpublished manuscript, presented at the IIPF Conference 2011.
- Hamilton, B. W. (1976). Capitalization of Intrajurisdictional Differences in Local Tax Prices, *American Economic Review* **66**(5): 743–753.
- Heinberg, J. D. and Oates, W. E. (1970). The Incidence of Differential Property Taxes on Urban Housing: A Comment And Some Further Evidence, *National Tax Journal* **23**(1): 92–98.

## References II

- Hyman, D. N. and Pasour, E. C. J. (1973). Property Tax Differentials and Residential Rents in North Carolina, *National Tax Journal* **26**(2): 303–307.
- Marshall, A. (1890). *Principles of Economics*, 8th edn, MacMillan and Co., London.
- Mieszkowski, P. (1972). The Property Tax: An Excise Tax Or a Profits Tax?, *Journal of Public Economics* **1**(1): 73–96.
- Mieszkowski, P. and Zodrow, G. R. (1989). Taxation and The Tiebout Model: The Differential Effects of Head Taxes, Taxes on Land Rents, and Property Taxes, *Journal of Economic Literature* **27**(3): 1098–1146.
- Nechyba, T. J. (2001). The Benefit View and the New View. Where Do We Stand, Twenty-Five Years into the Debate?, in W. E. Oates (ed.), *Property Taxation and Local Government Finance*, Lincoln Institute of Land Policy, Cambridge, Massachusetts, pp. 113–121.
- Netzer, D. (1966). *Economics of the Property Tax*, Brookings Institution, Washington, DC.
- Oates, W. E. (1969). The effects of property taxes and local public spending on property values: An empirical study of tax capitalization and the tiebout hypothesis, *The Journal of Political Economy* **77**(6): 957–971.
- Orr, L. L. (1968). The Incidence of Differential Property Taxes on Urban Housing, *National Tax Journal* **21**(3): 253–262.
- Orr, L. L. (1970). The Incidence of Differential Property Taxes: A Response, *National Tax Journal* **23**(1): 99–101.



## References III

- Orr, L. L. (1972). The Incidence of Differential Property Taxes on Urban Housing: Reply, *National Tax Journal* **25**(2): 217–220.
- Simon, H. A. (1943). The incidence of a tax on urban real property, *The Quarterly Journal of Economics* **57**(3): 398–420.
- Tiebout, C. M. (1956). A Pure Theory of Local Expenditures, *The Journal of Political Economy* **64**(5): 416–424.
- Zodrow, G. R. (2001a). The property tax as a capital tax: A room with three views, *National Tax Journal* **54**(1): 139–156.
- Zodrow, G. R. (2001b). Reflections on the New View and the Benefit View, in W. E. Oates (ed.), *Property Taxation and Local Government Finance*, Lincoln Institute of Land Policy, Cambridge, Massachusetts, pp. 79–111.