Pricing in the Taxman: Corporate Tax Incidence and Commercial Real Estate

David Gstrein, Florian Neumeier, Andreas Peichl, Pascal Zamorski

ifo Institut & LMU Munich

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Motivation

Who bears the burden of corporate taxes?

- **Capital owners** through lower profits (Harberger '62)
- **Workers** through lower wages (Fuest et al. '18, Kotlikoff & Summers '87)
- **Consumers** through higher retail prices (Baker, Sun, & Yannelis '20)
- **Residential land owners** through lower rents (Suárez Serrato and Zidar '16, '23)

- What about Commercial Land?

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- What about **Commercial Land**?

Motivation

Why should we study tax incidence on commercial property?

- land is a necessary **factor of production** for almost all firms
- **immobile factors** of production are likely to bear a higher fraction of the corporate tax burden (Auerbach '06)
- current research abstracts from firm mobility wrt. corporate taxes to affect real estate markets (Suárez Serrato and Zidar '16, '23)
- neglecting this could **lead to an overestimation** of the burden born by other factors of production
- it may affect the **progressivity of corporate taxes**

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This Paper

1. **$>$ 4,000 Tax Changes + Rich Microdata**
   - exploit variation from German local business tax
   - unique real estate data + municipal panel

2. **Empirics**
   - local open economy DiD comparing municipalities of similar size, and growth path
   - estimate causal effect of corp. tax hikes on commercial property prices & rents + residential property + corporate profits

3. **Stylized Model**
   - add a commercial real estate market to spatial equilibrium model
   - calculate the distributional effects across capital owners + workers + residential and commercial property owners

Institutions and Data

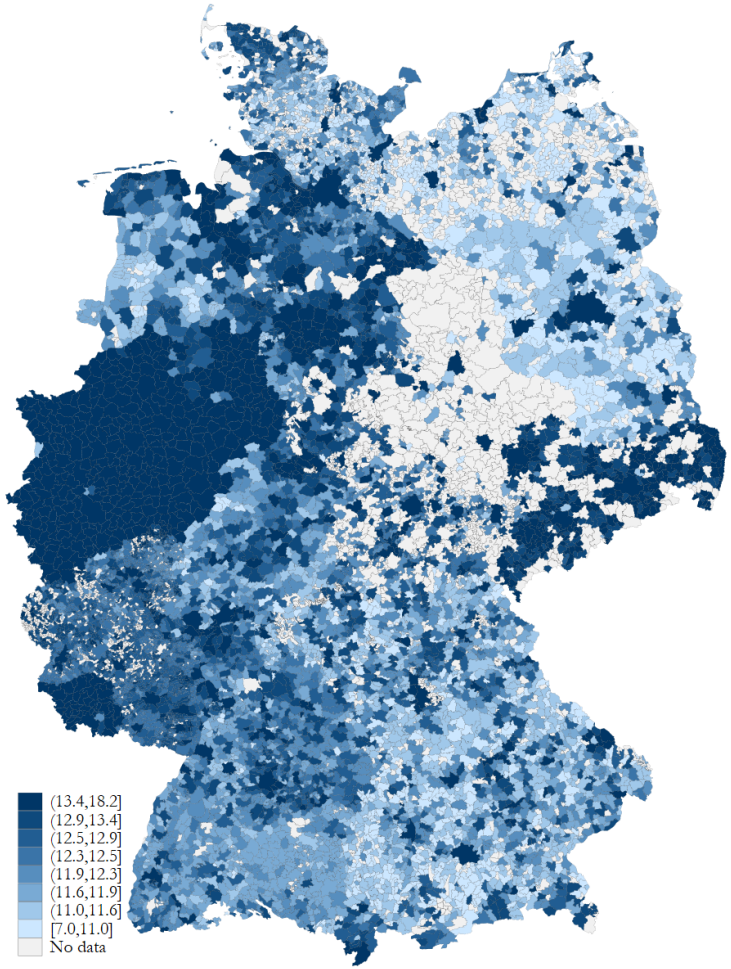
- Use variation in local business tax (LBT) rates in Germany (Fuest et al. '18; Link et al. '24)
- Panel data on $\sim$ 11,000 German municipalities and their LBT rates between 2008-18
- Municipal governments set scaling factor independently every year:

  LBT Rate = Federal Basic Tax Rate x ***Municipal Scaling Factor***

- Every year 10% of municipalities change their LBT

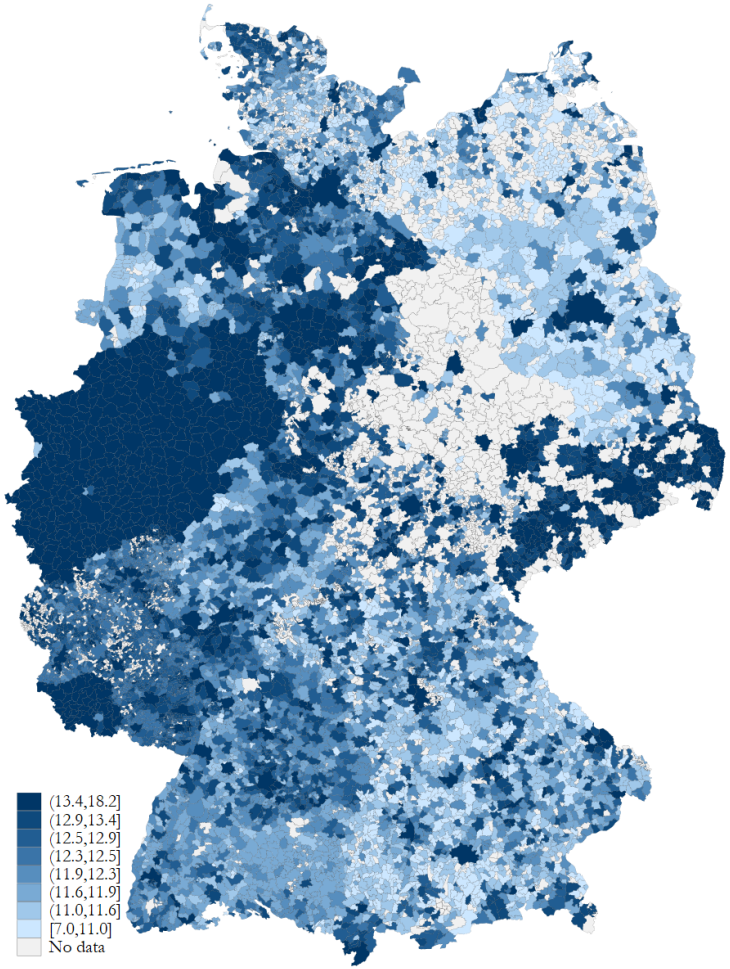
  $\Rightarrow \sim$ 4,000 hikes in sample

Local Business Taxation in Germany



Average LBT rates are $\sim 7 - 20\%$
(2008-18)

Local Business Taxation in Germany



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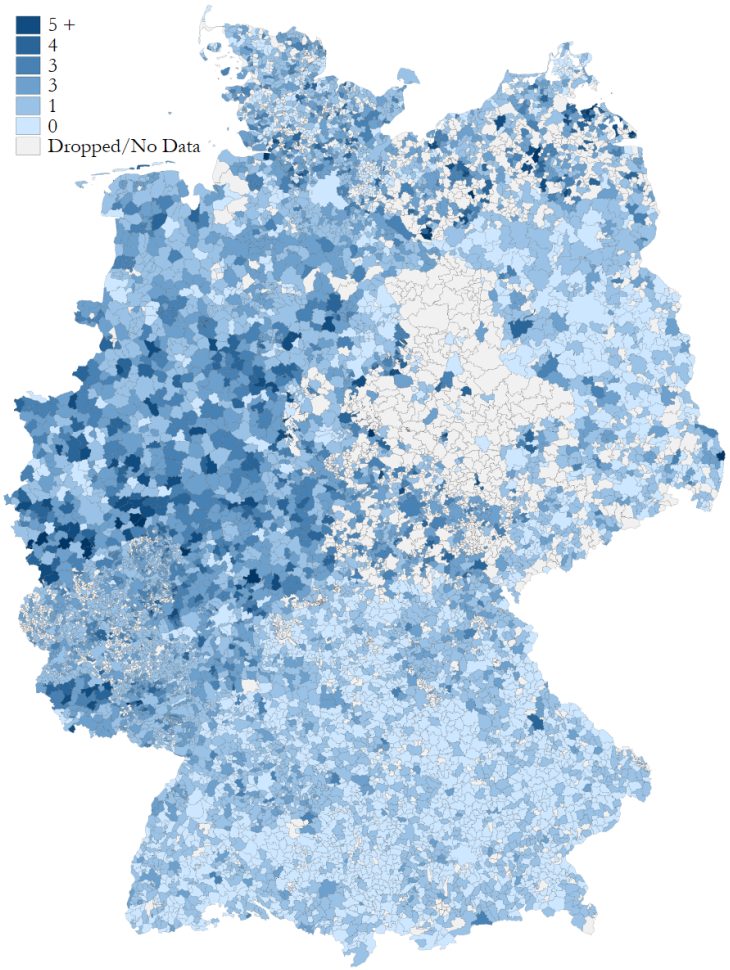
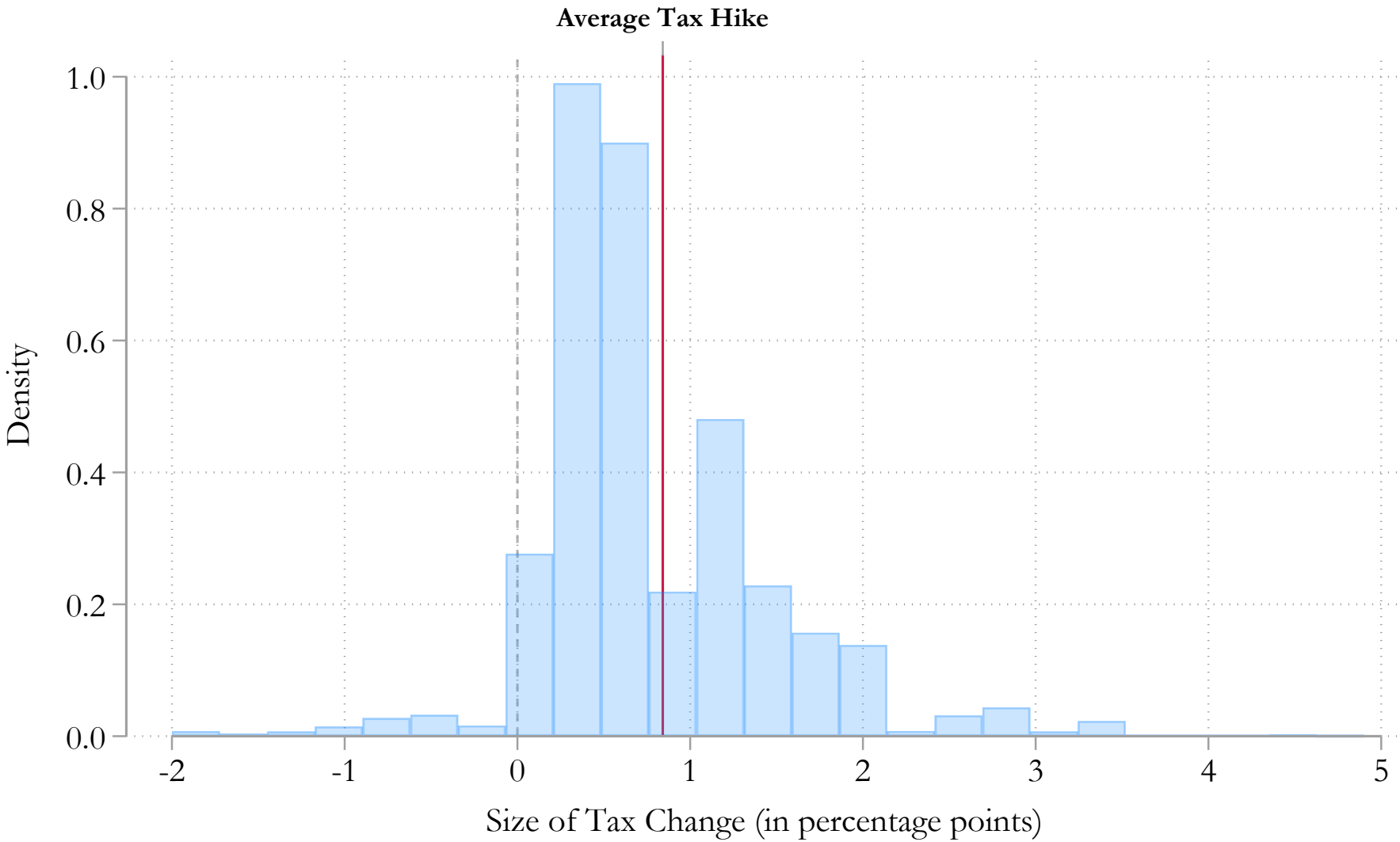


Few Municipalities increase LBT more than 5 times between 2008-18

Municipalities increase the LBT by 0.8%p on average



Property Data

- Large and detailed micro-dataset on the German real estate market provided by F+B
- Information on prices, rents, constr. year, floor size, # rooms, and more
- Sample comprises information on residential and commercial properties offered for sale and rent between 2008-18:

Property Type	Rents	Sales
Residential	$\sim$ 13 Mio. obs.	$\sim$ 15 Mio. obs.
Commercial	$\sim$ 2.4 Mio. obs.	$\sim$ 1.1 Mio. obs.

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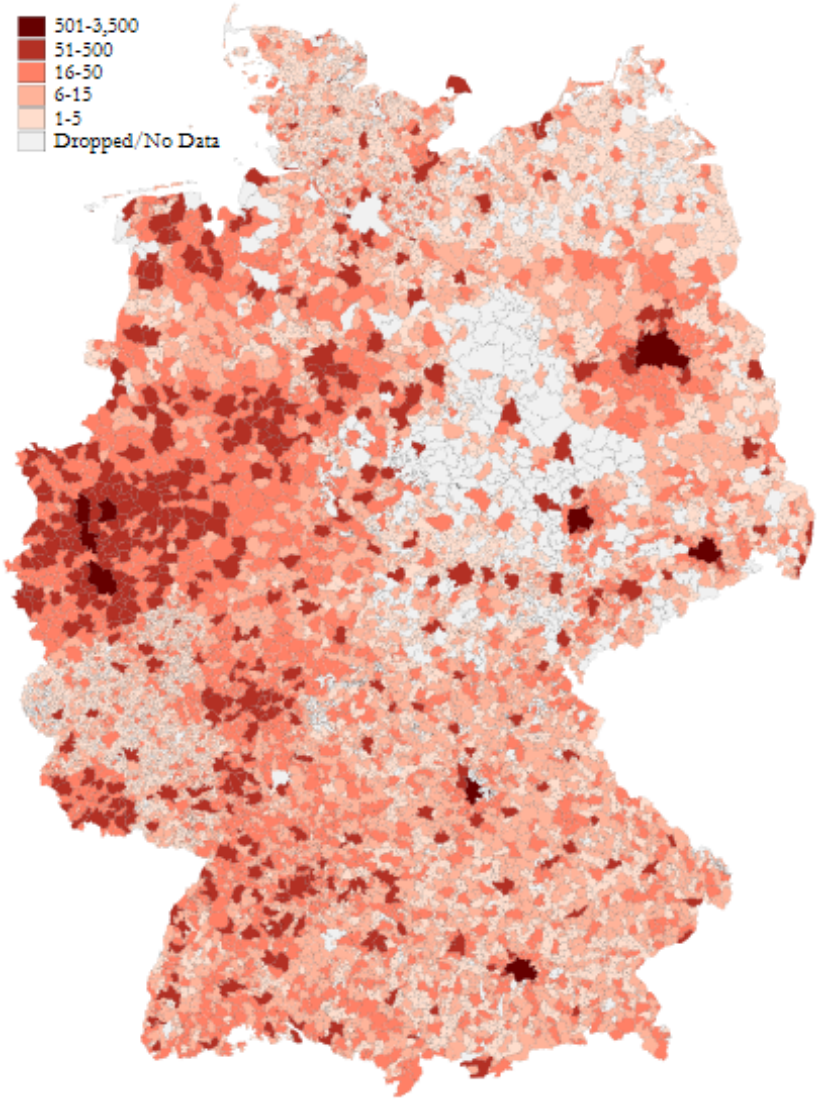
▸ Dist. of Commercial Types ▸ Aggragate Value ▸ Summery Stats

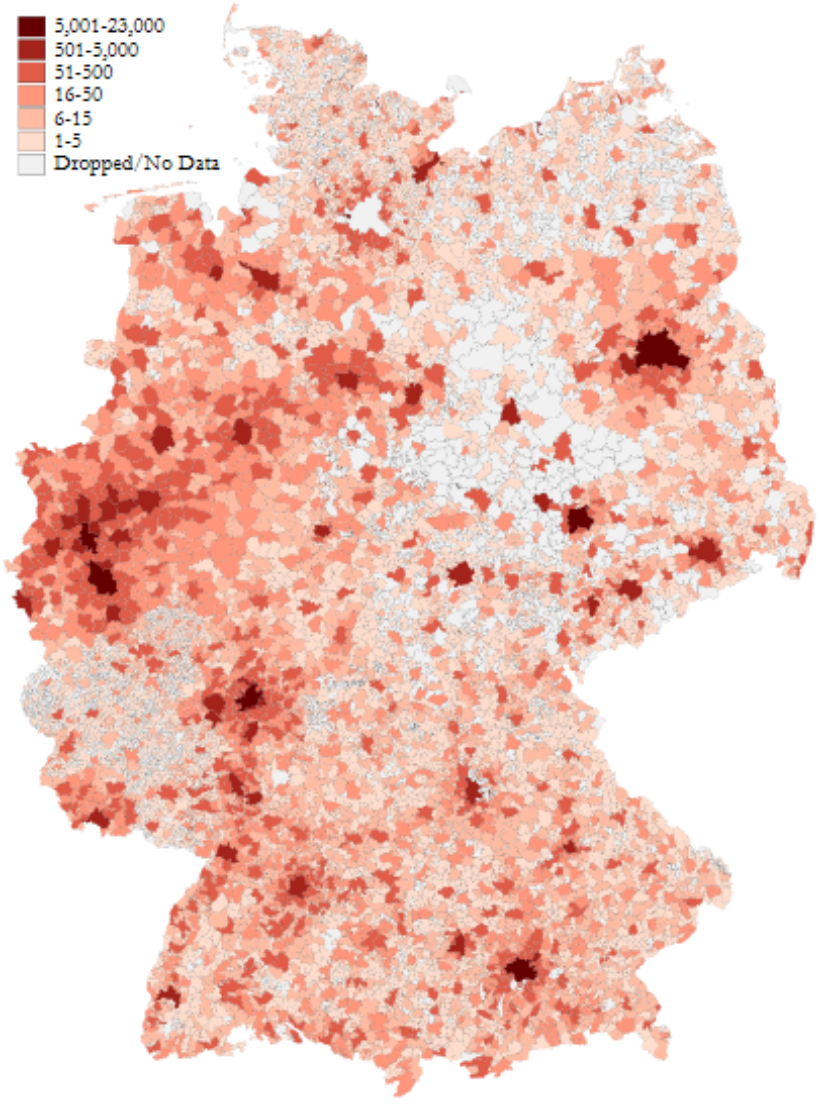
Sample Restrictions

	# Municipalities	# Tax Hikes	# Properties
Municipality Data (2008–18)	11,085	13,859	-
Dropped mergers	10,638	12,640	-
No tax drops (results robust to drops)	10,113	11,924	-
Merge with Property Data	9,556	8,094	1,074,272
$>$5 Ads per year	6,561	4,627	1,002,914
Max. 1 Tax Hike	4,218	1,214	598,775

Distribution of Postings



Sales Sample



Rents Sample

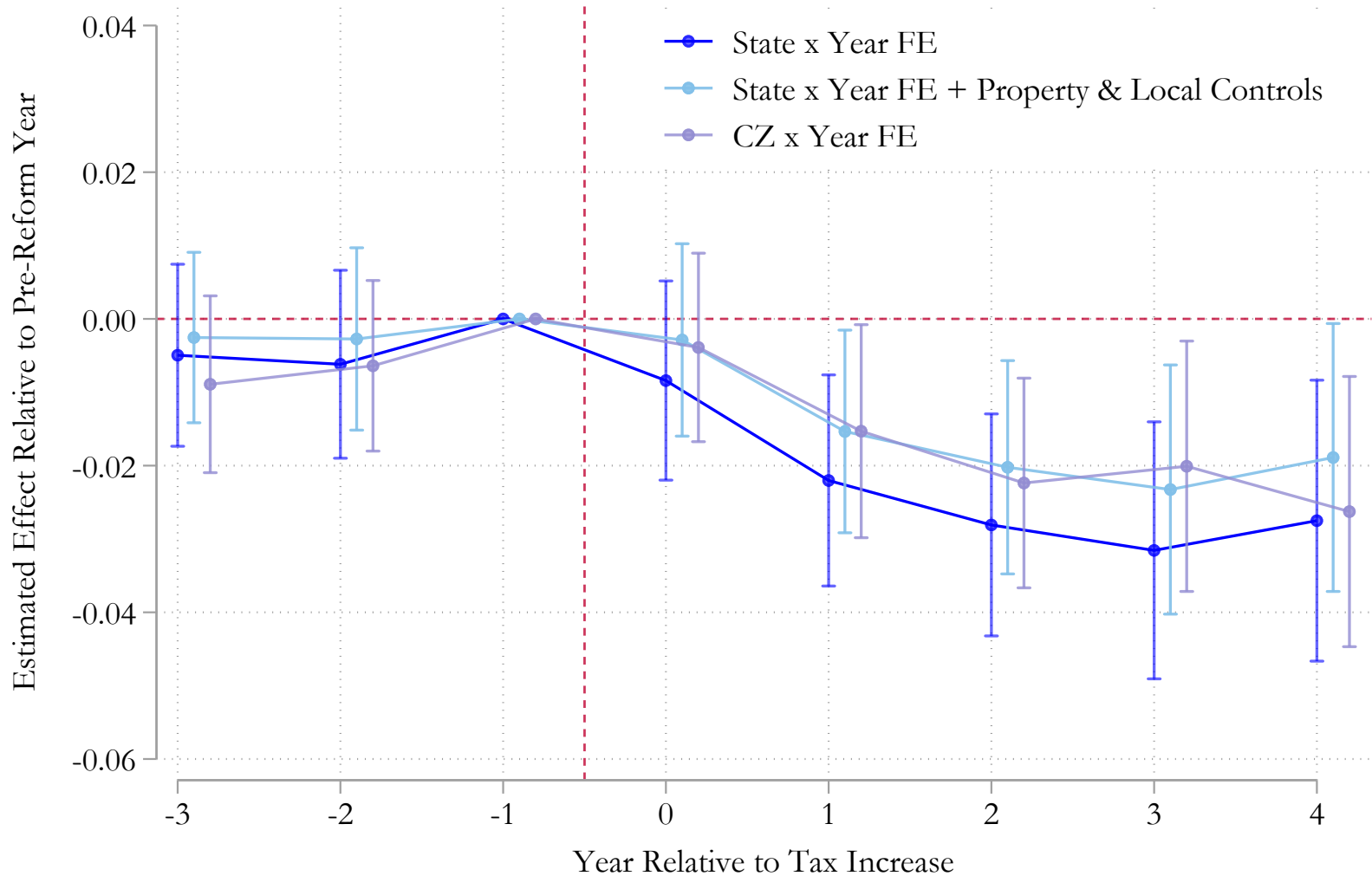
▸ 5 Min. Postings

Empirical Strategy

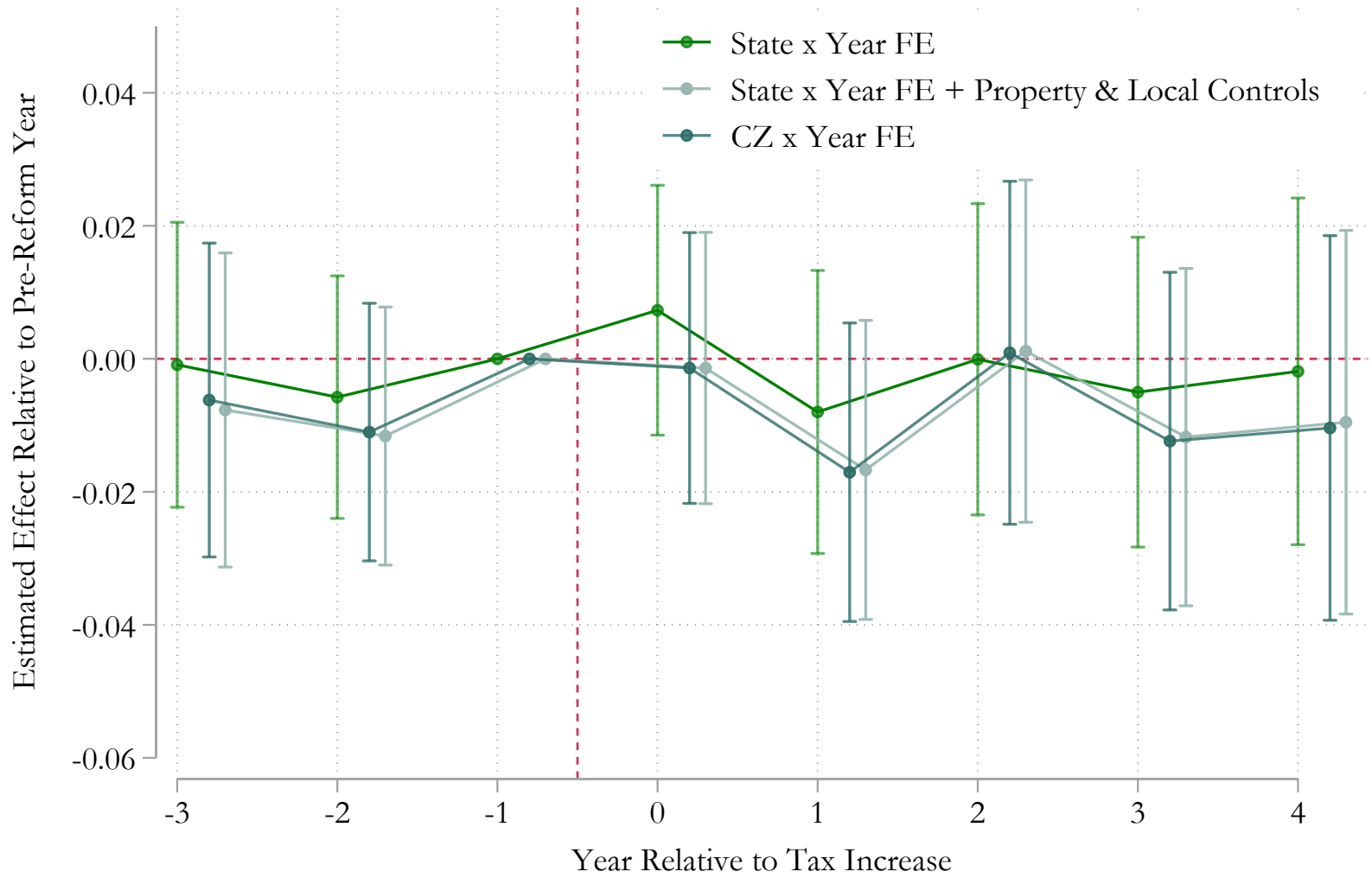
$$ln(p_{i,m,t}) = \sum_{j=-4}^{5} \beta_j \Delta LBT^j_{m,t} + \delta X_{i,m,t} + \mu_m + \theta_{s,t} + \varepsilon_{i,m,t}.$$

- $ln(p_{i,m,t})$: Log price/rent of property i, in year t, and municipality m
- $\Delta LBT^j_{m,t}$: Event study indicator scaled by tax change
- $X_{i,m,t}$: Property & district/municipality controls
- μ_m : Municipality FE
- $\theta_{s,t}$: State x Year FE

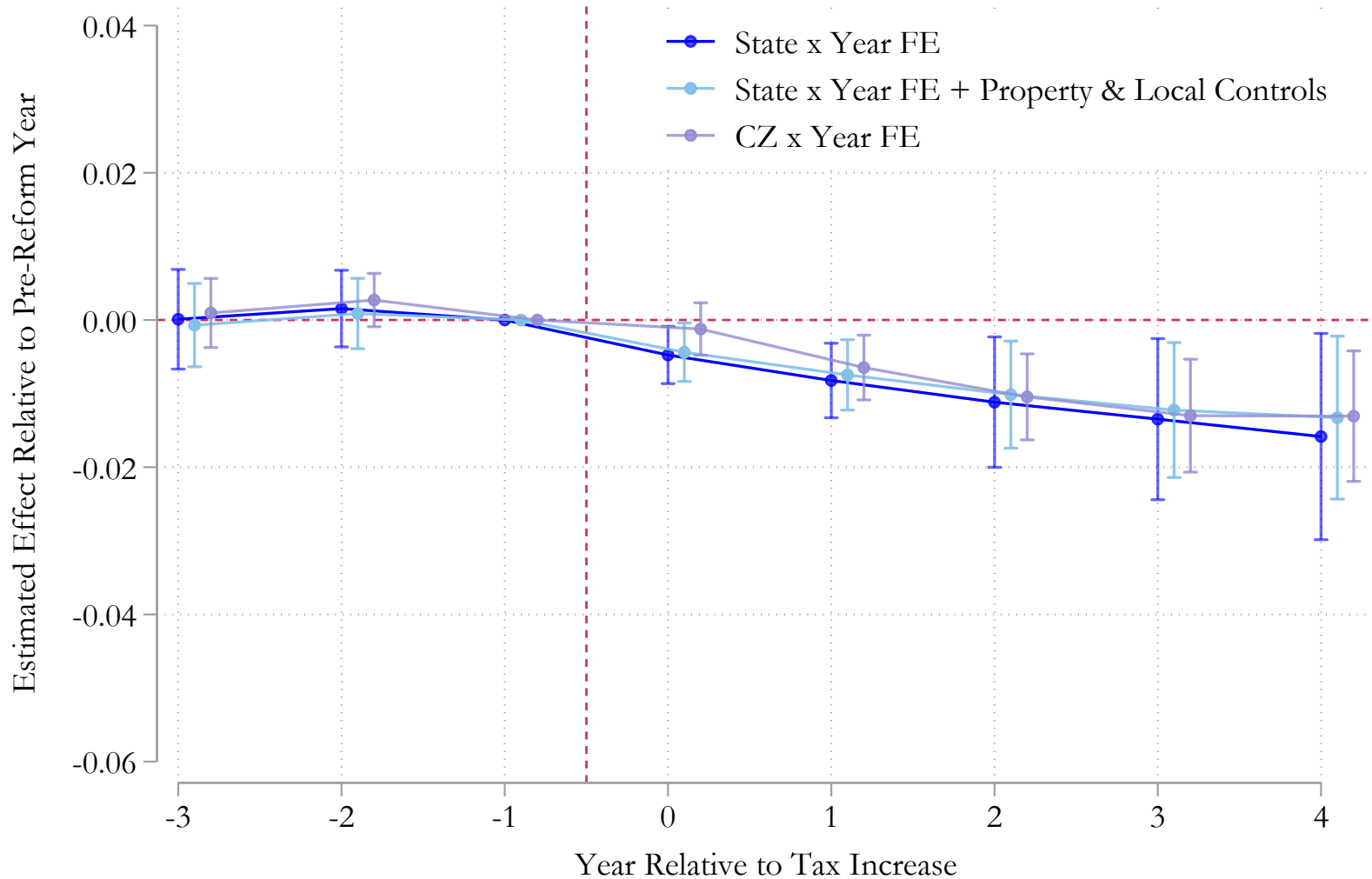
Effects on Commercial Sales Prices



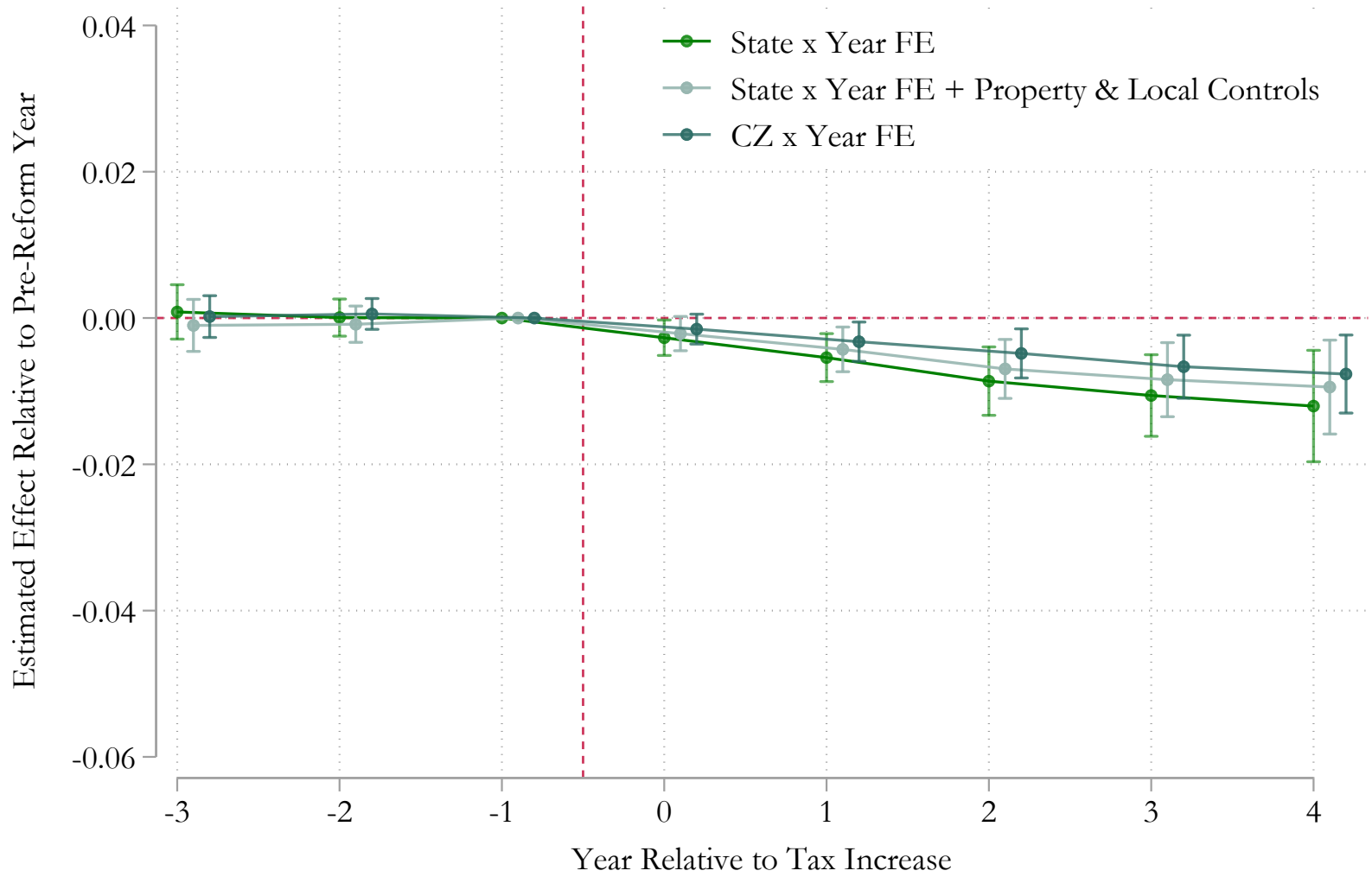
Effects on Commercial Rental Prices



Effects on Residential Sales Prices



Effects on Residential Rental Prices



Potential Mechanisms and Robustness

We conduct several robustness checks and heterogeneity analyses

- Heterogeneity-robust estimation à la De Chaisemartin and d'Haultfoeuille '20, '22, '24
- Separate effects for different property types (offices, retail, storage, production, restaurants)
- Separate effects for urban vs rural municipalities and different municipality sizes
- Focus on municipalities with only one tax hike during sample period

▸ Mechanisms ▸ Heterogeneity Robust

Incidence Analysis

- What do our results imply for the distribution of the corporate tax burden?
- We extend the spatial equilibrium model by Suárez Serrato and Zidar (2016) to compute the distribution of the tax burden across four groups/inputs:
  - Firm owners
  - Workers
  - Residential property
  - Commercial property

Incidence – Theory

Table: Parameters to identify Incidence

Stakeholder	Required Parameters
Workers (disposable income)	$\gamma^W - \alpha\gamma^{RH}$
Residential Landowners (housing costs)	γ^{RH}
Commercial Landowners (rent of comm. property)	γ^{RG}
Firm owners (after-tax profit)	γ^{Π}

- γ^W: Tax-elasticity of wages (taken from Fuest, Peichl, and Siegloch (2018))
- γ^{RH}: Tax-elasticity of residential property prices (own estimations)
- γ^{RG}: Tax-elasticity of commercial property prices (own estimations)
- γ^{Π}: Tax-elasticity of corporate profit (own estimations)

Results – Incidence Analysis

Table: Incidence Estimates

A. Incidence			
Landowners (Residential)	1.708***	0.877**	0.716***
	(0.504)	(0.316)	(0.204)
Landowners (Commercial)	1.646***	1.215**	1.095*
	(0.475)	(0.467)	(0.446)
Workers	0.490***	0.737***	0.785***
	(0.099)	(0.155)	(0.189)
Firm owners	3.001***	2.329***	3.017***
	(0.776)	(0.803)	(0.708)
B. Share of Incidence			
Landowners (Residential)	24.9%	17%	12.8%
Landowners (Commercial)	24%	23.6%	19.5%
Workers	7.2%	14.3%	14%
Firm owners	43.8%	45.2%	53.8%
Property Controls		✓	✓
Municipality Controls		✓	✓
State x Year FE	✓	✓	
CZ x Year FE			✓

Summary

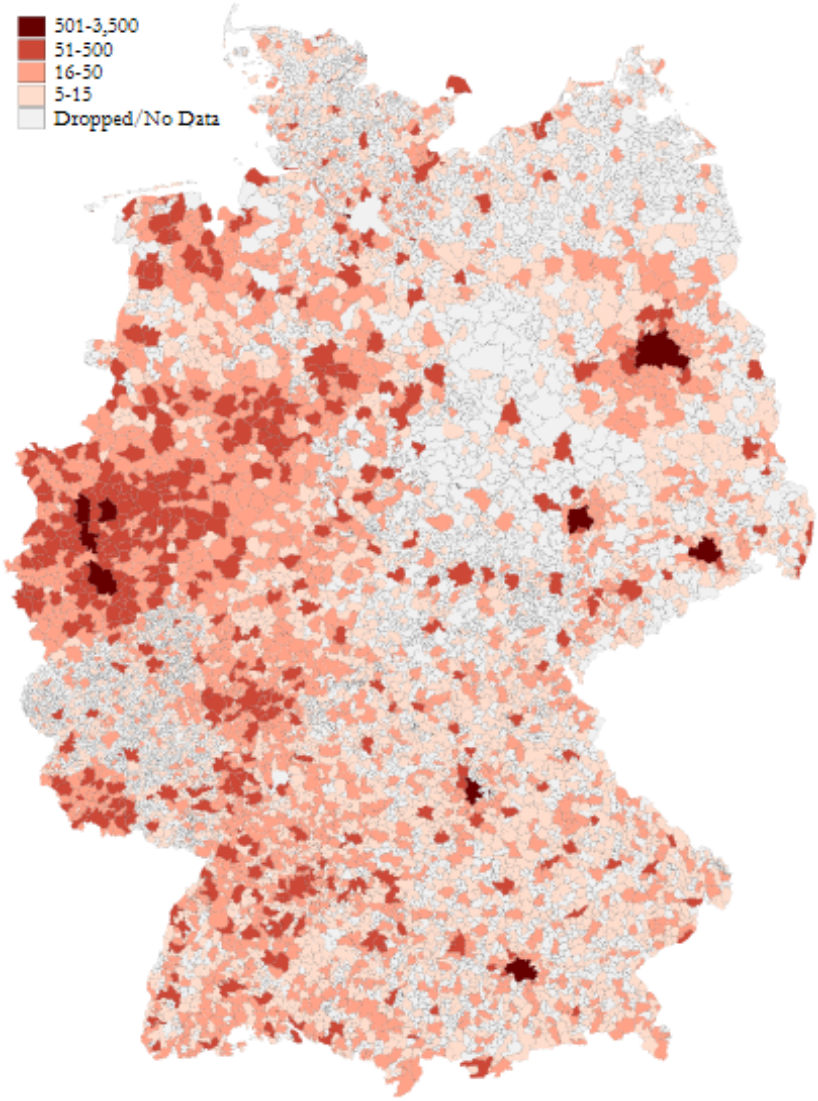
- We investigate the **causal effect of corporate tax increases on commercial property prices** by exploiting the local character of business taxation in Germany
- **Event study design finds significant and negative effect on sales prices**
- **Incidence analysis** reveals commercial land owners bear roughly **one quarter** of corporate tax incidence

Thanks for your attention!

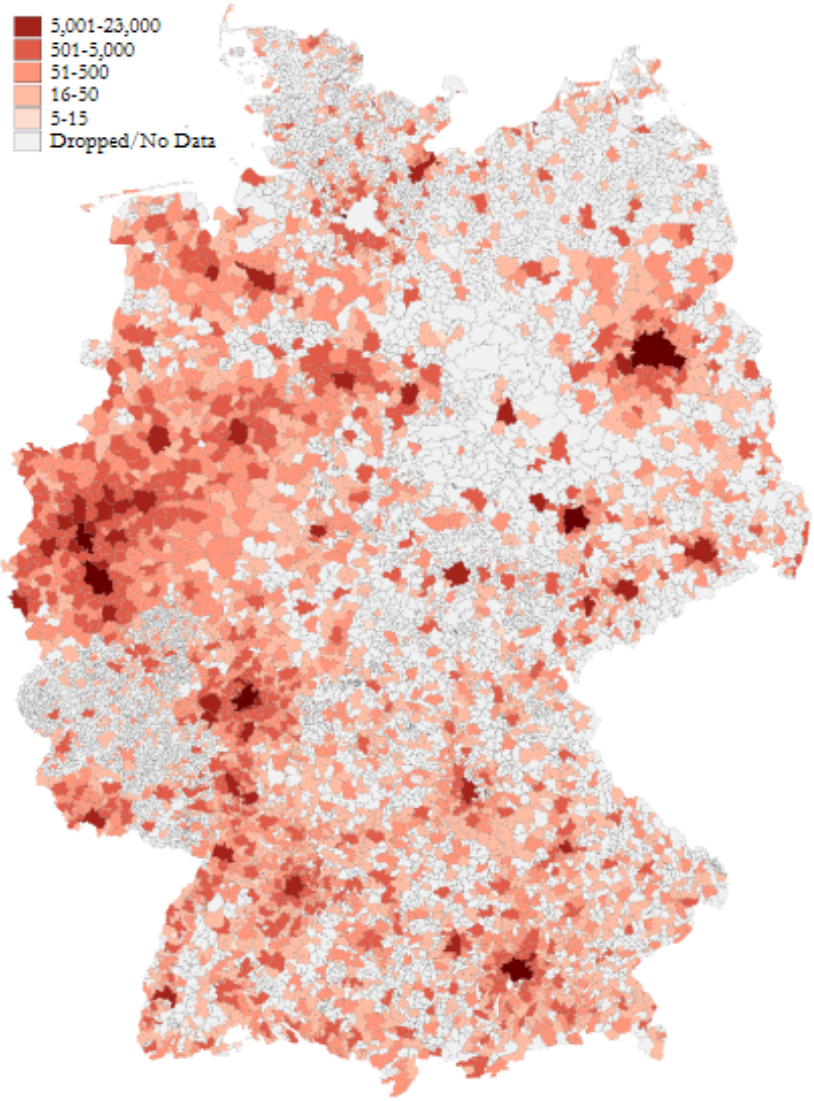
Zamorski@ifo.de

APPENDIX

Average Number of Postings per Year



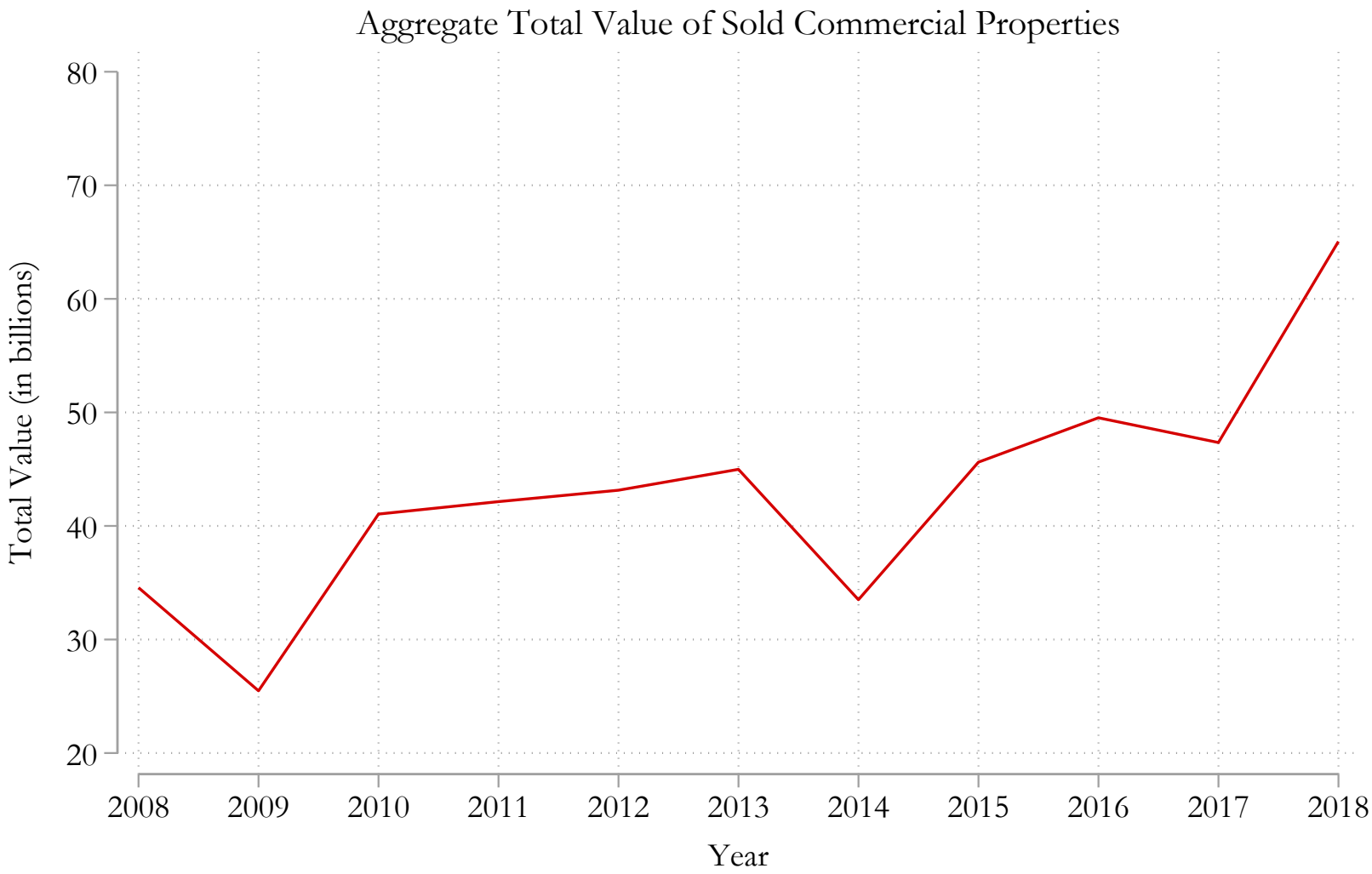
Sales Sample



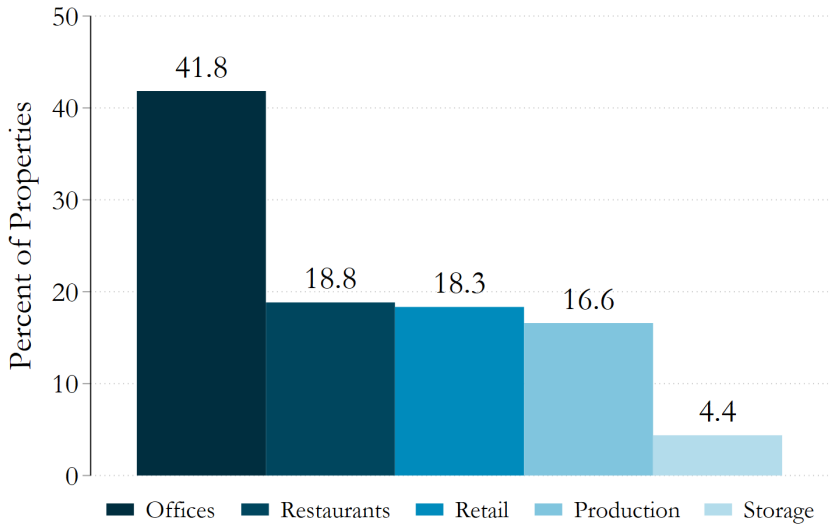
Rents Sample

Back

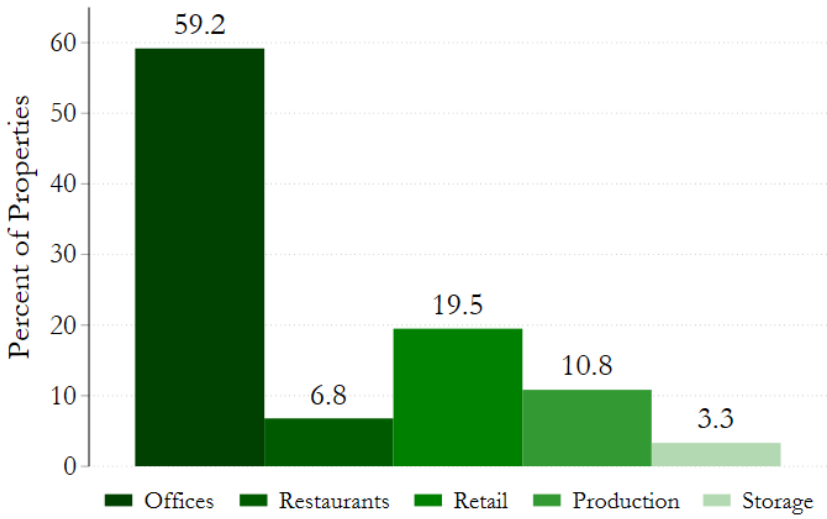
Aggregate Value of Commercial Properties



Distribution of Commercial Property Types

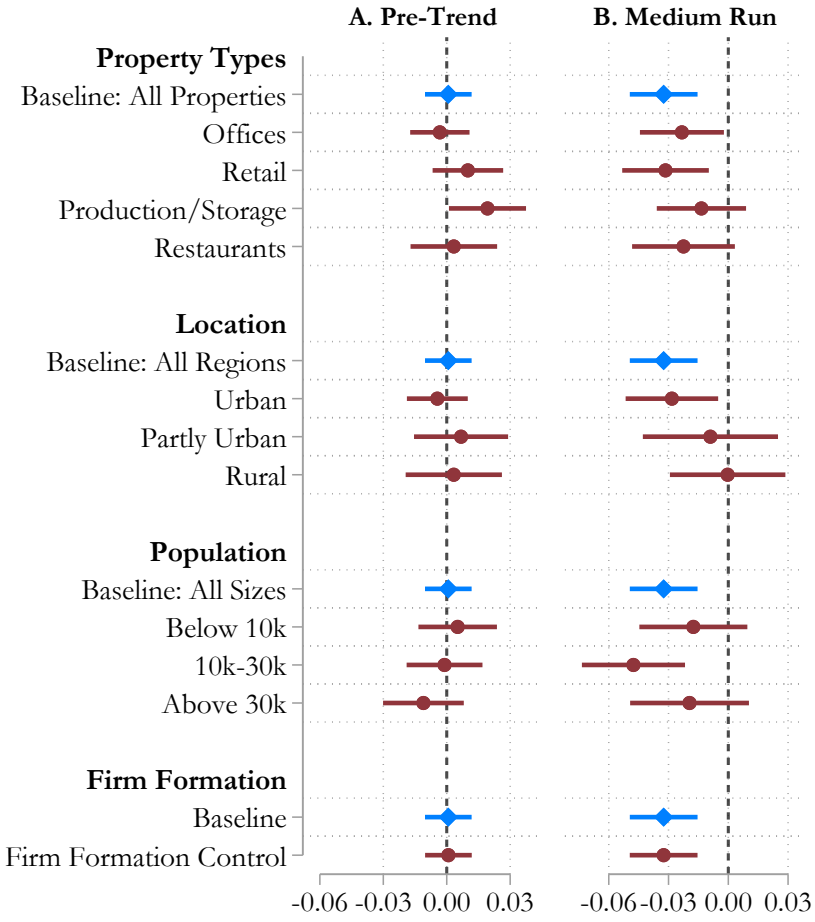


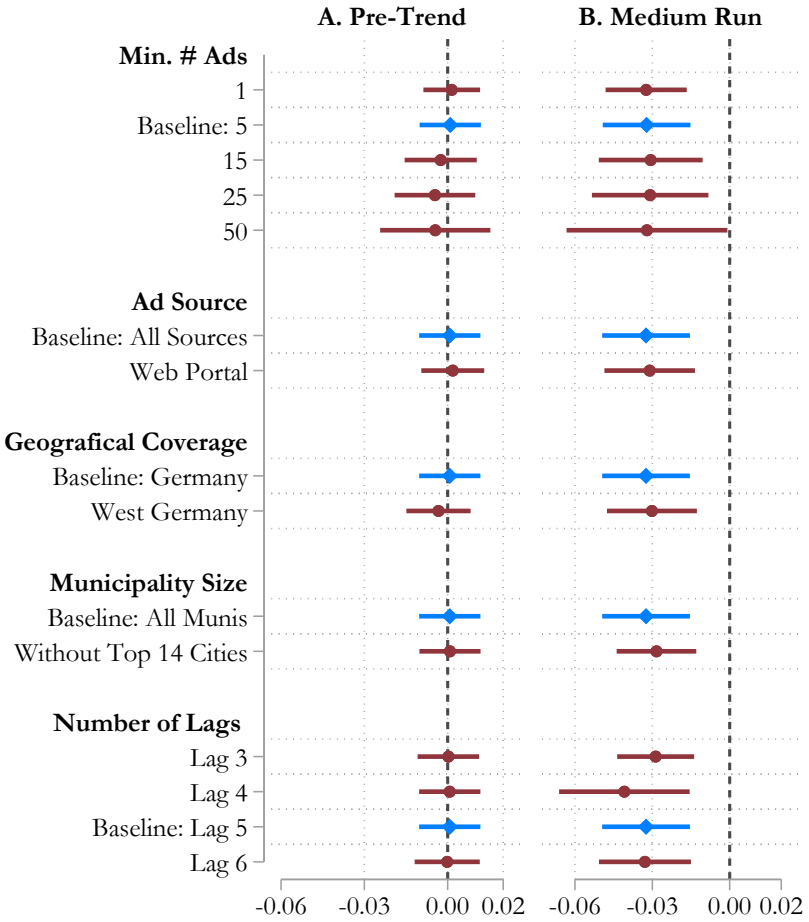
Sales Sample



Rents Sample

Sales Results – Heterogeneity & Robustness

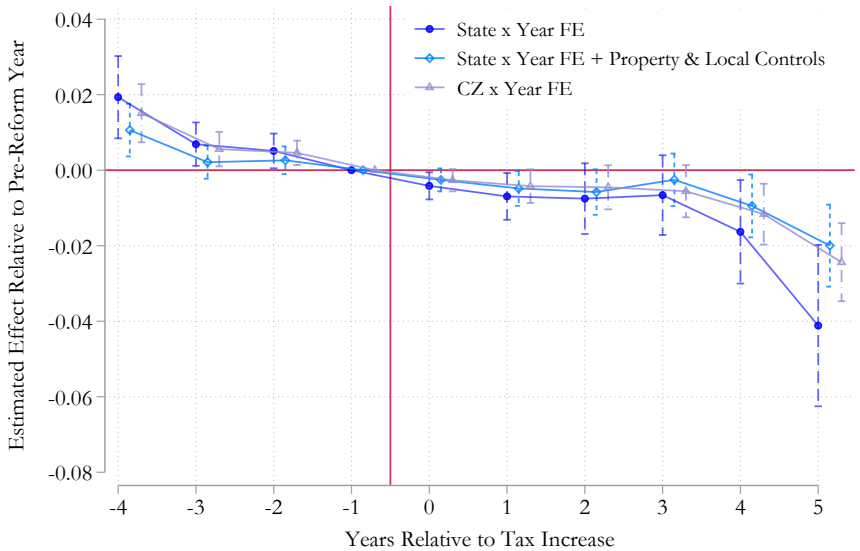




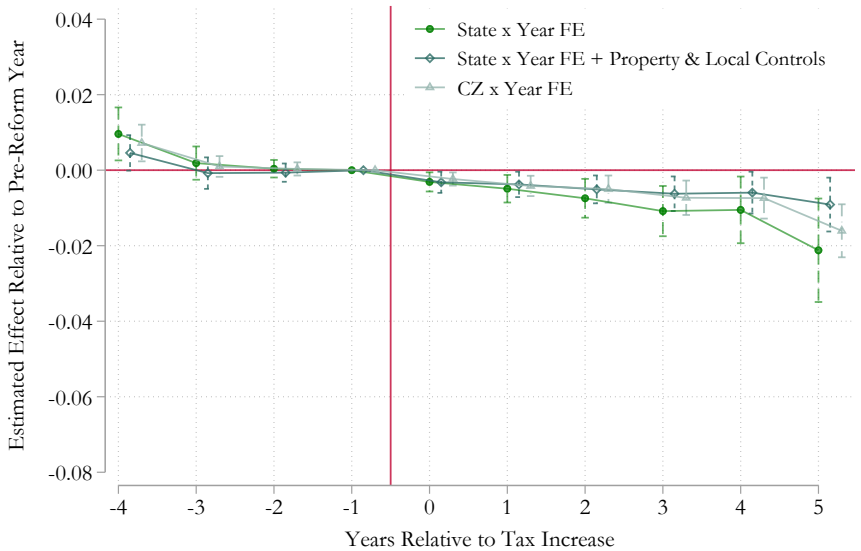
Property Data – Summary Statistics

	Mean	Std.Dev.	Min	Max	N
Panel A – Sales Sample					
Price (in €/m^2)	1,540	1,114	59.50	6,000	842,150
First price (in €/m^2)	1,551	1,126	0.01	48,750	842,150
Construction year	1962	52	1500	2020	689,788
Floor size (in m^2)	583.2	1,648	1	99,329	842,150
# Rooms	7.000	6.453	1	99	401,538
Basement dummy	0.254	0.435	0	1	842,150
Parking spots dummy	0.485	0.500	0	1	842,150
Web portal dummy	0.766	0.424	0	1	842,150
Panel B – Rents Sample					
Price (in €/m^2)	9.69	6.80	1	66.67	2,446,382
First price(in €/m^2)	9.48	5.83	1.43	40	2,446,382
Construction year	1973	44	1500	2018	1,340,624
Floor size (in m^2)	511.3	1.10	13	10,000	2,446,382
# Rooms	3.23	2.02	1	15	893,259
Basement dummy	0.16	0.37	0	1	2,446,382
Parking spots dummy	0.37	0.48	0	1	2,446,382
Web portal dummy	0.81	0.39	0	1	2,446,382

Event Study Results – Private Properties



Sales Sample



Rents Sample

DiD Results – Commercial Properties

Table: DiD Estimation

	Commercial Properties					
	Ln Sales Price sqm			Ln Rent Price sqm		
Δ Ln Net-of-Tax Rate	1.646***	1.215**	1.095*	1.108*	0.647	1.130**
	(0.475)	(0.467)	(0.446)	(0.434)	(0.394)	(0.391)
Property Controls		✓	✓		✓	✓
Municipality Controls		✓	✓		✓	✓
State x Year FE	✓	✓		✓	✓	
CZ x Year FE			✓			✓
Observations	897,804	890,163	890,160	2,125,364	2,099,526	2,099,522

DiD Results – Residential Properties

Table: DiD Estimation

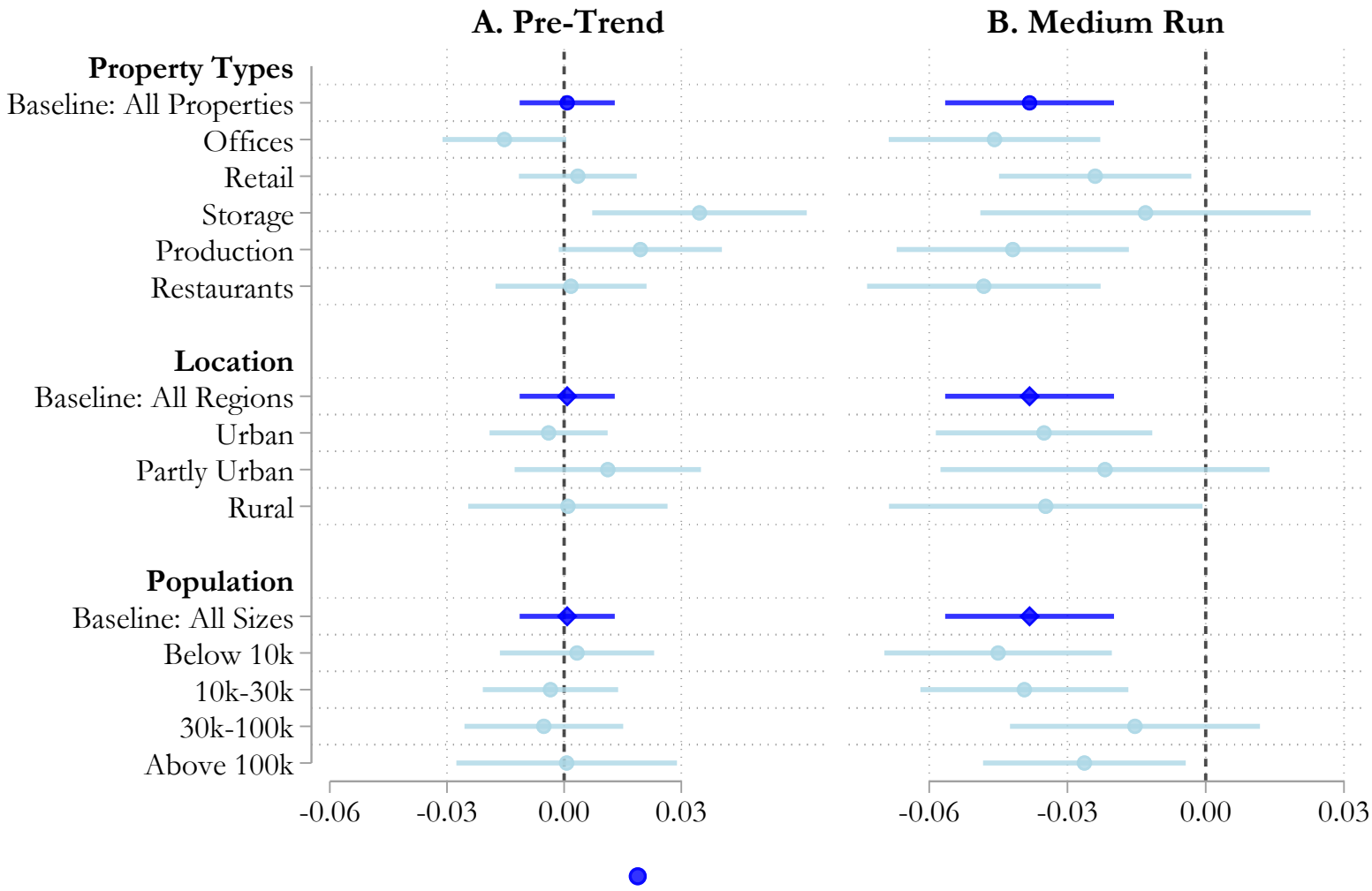
	Residential Properties					
	Ln Sales Price sqm			Ln Rent Price sqm		
Δ Ln Net-of-Tax Rate	1.708***	0.877**	0.716***	0.923***	0.451*	0.195
	(0.504)	(0.316)	(0.204)	(0.270)	(0.188)	(0.110)
Property Controls		✓	✓		✓	✓
Municipality Controls		✓	✓		✓	✓
State x Year FE	✓	✓		✓	✓	
CZ x Year FE			✓			✓
Observations	12,988,552	12,905,538	12,905,538	10,762,438	10,638,794	10,638,790

DiD Results – Corporate Profit

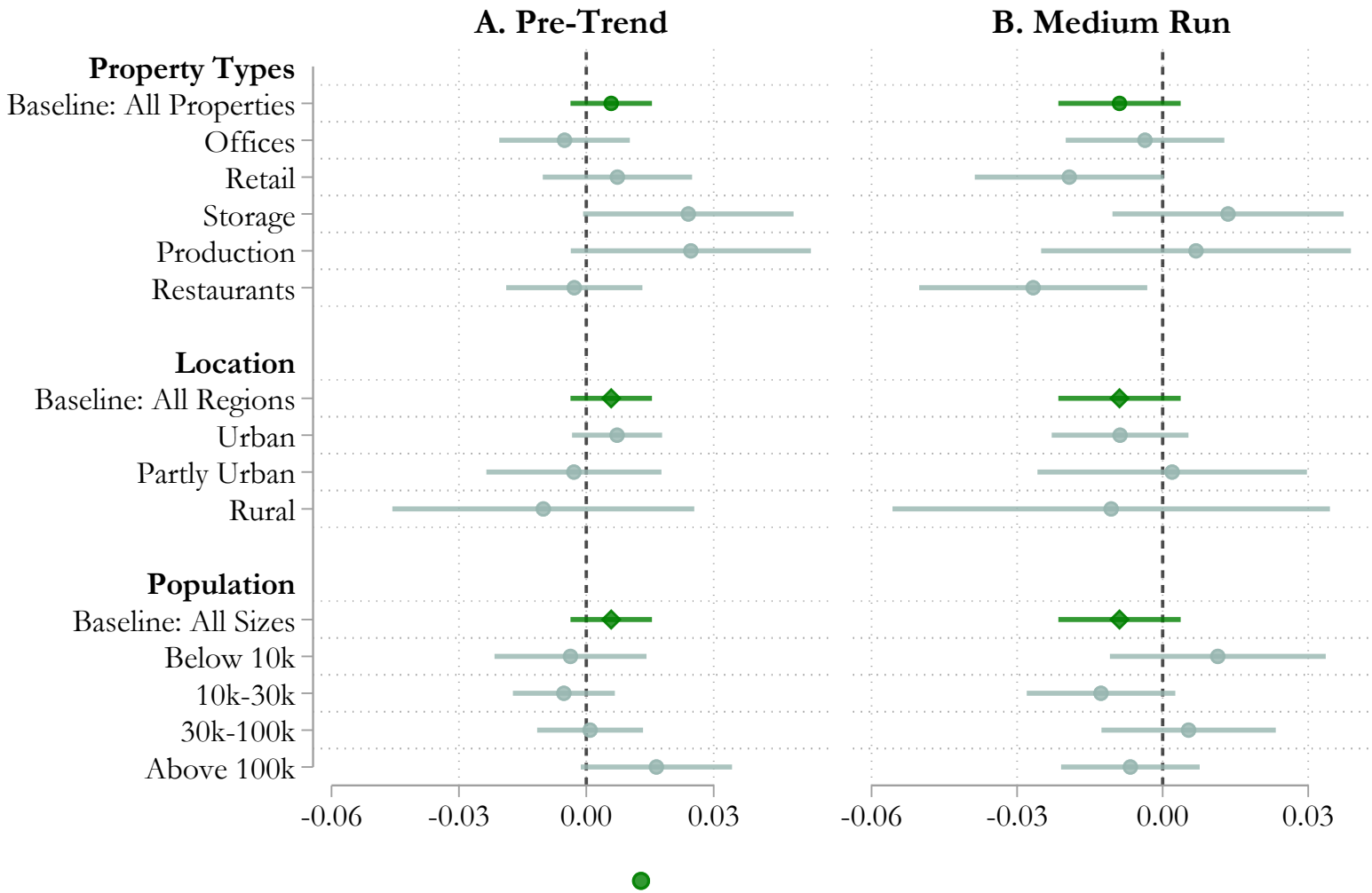
Table: DiD Estimation

	Ln Net Profit		
Δ Ln Net-of-Tax Rate	3.001***	2.329***	3.017***
	(0.776)	(0.803)	(0.708)
Property Controls		✓	✓
Municipality Controls		✓	✓
State x Year FE	✓	✓	
CZ x Year FE			✓
Observations	117,967	90,537	90,477

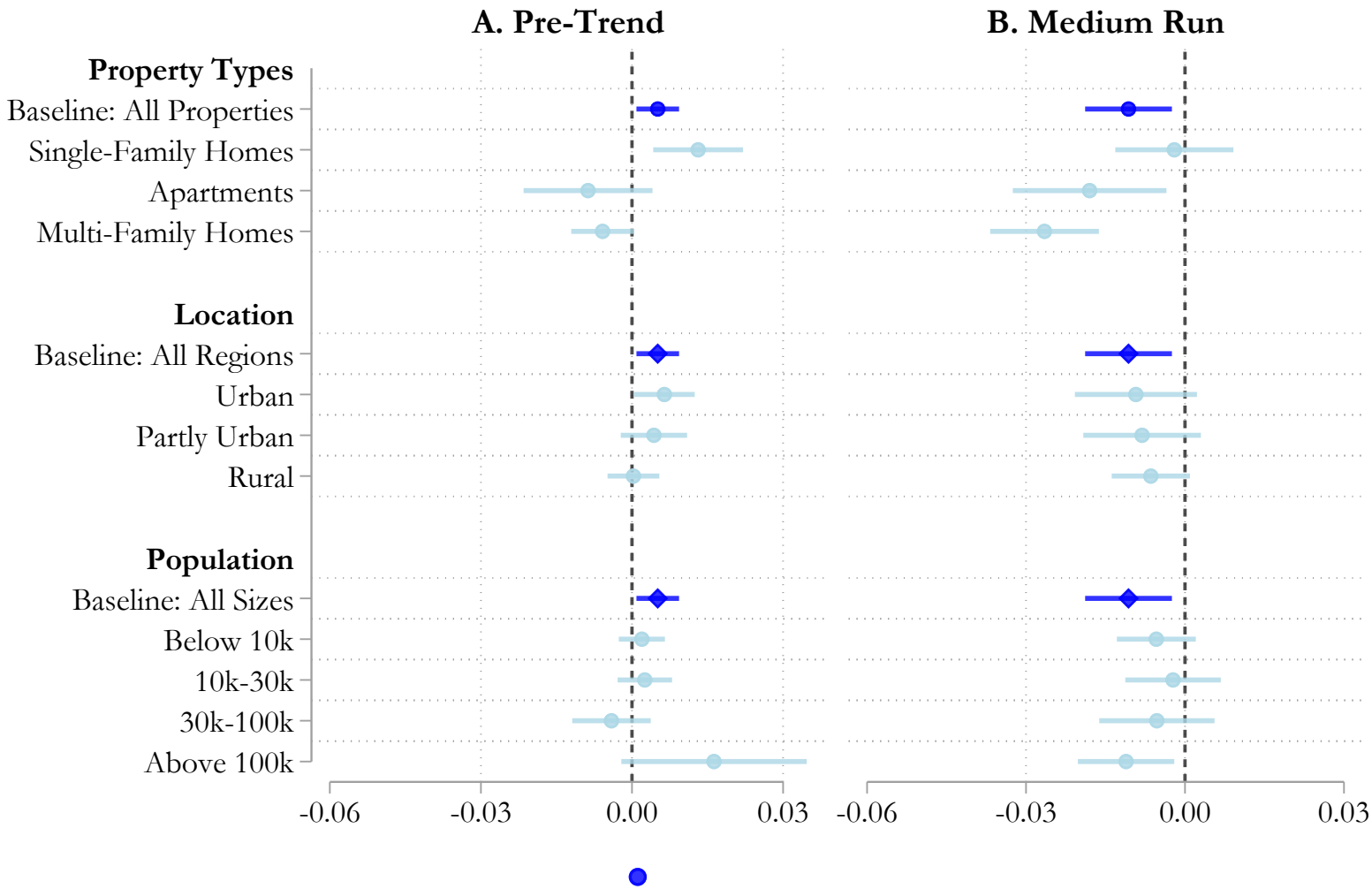
Heterogeneity Commercial Sales



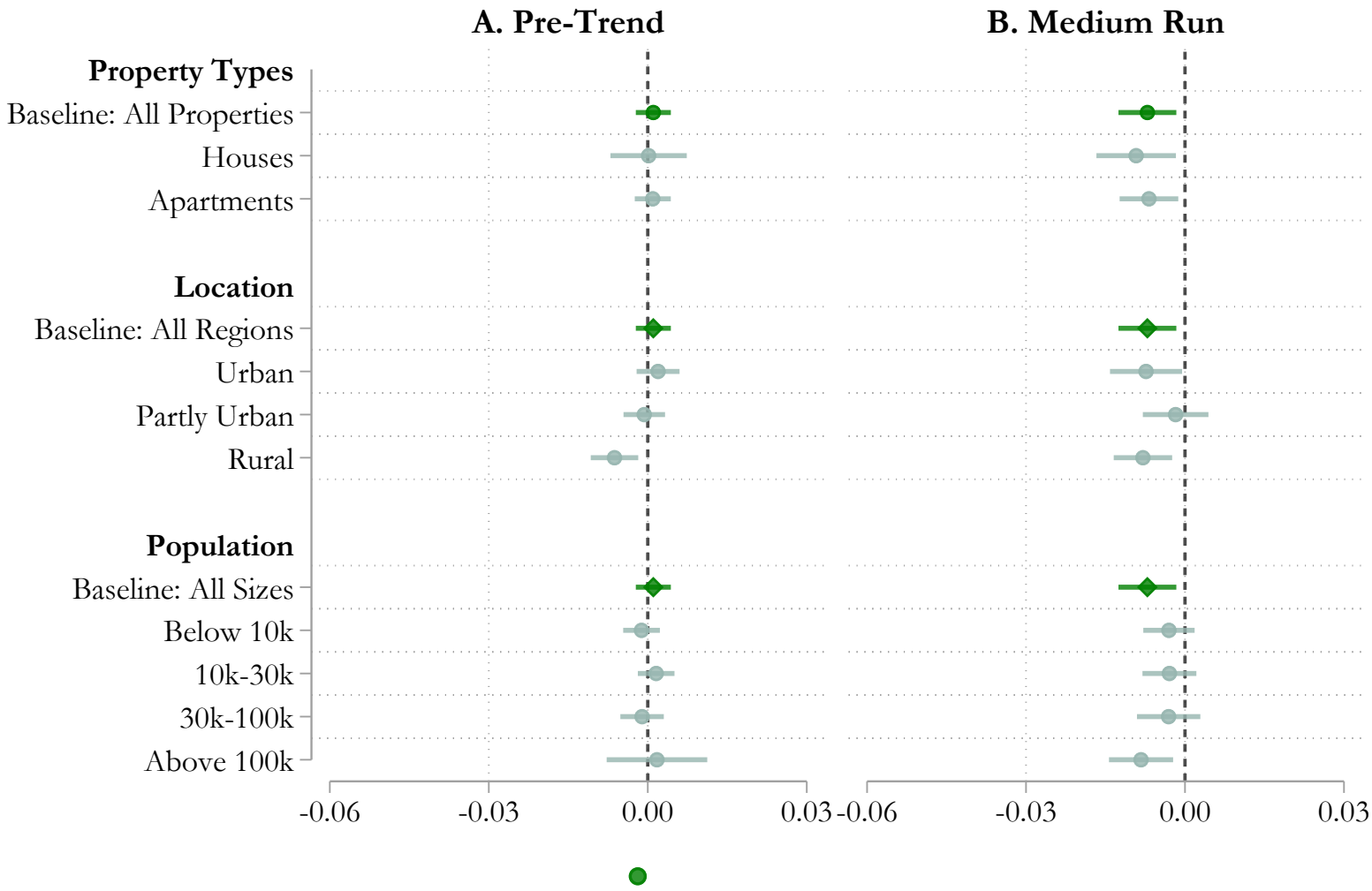
Heterogeneity Commercial Rents



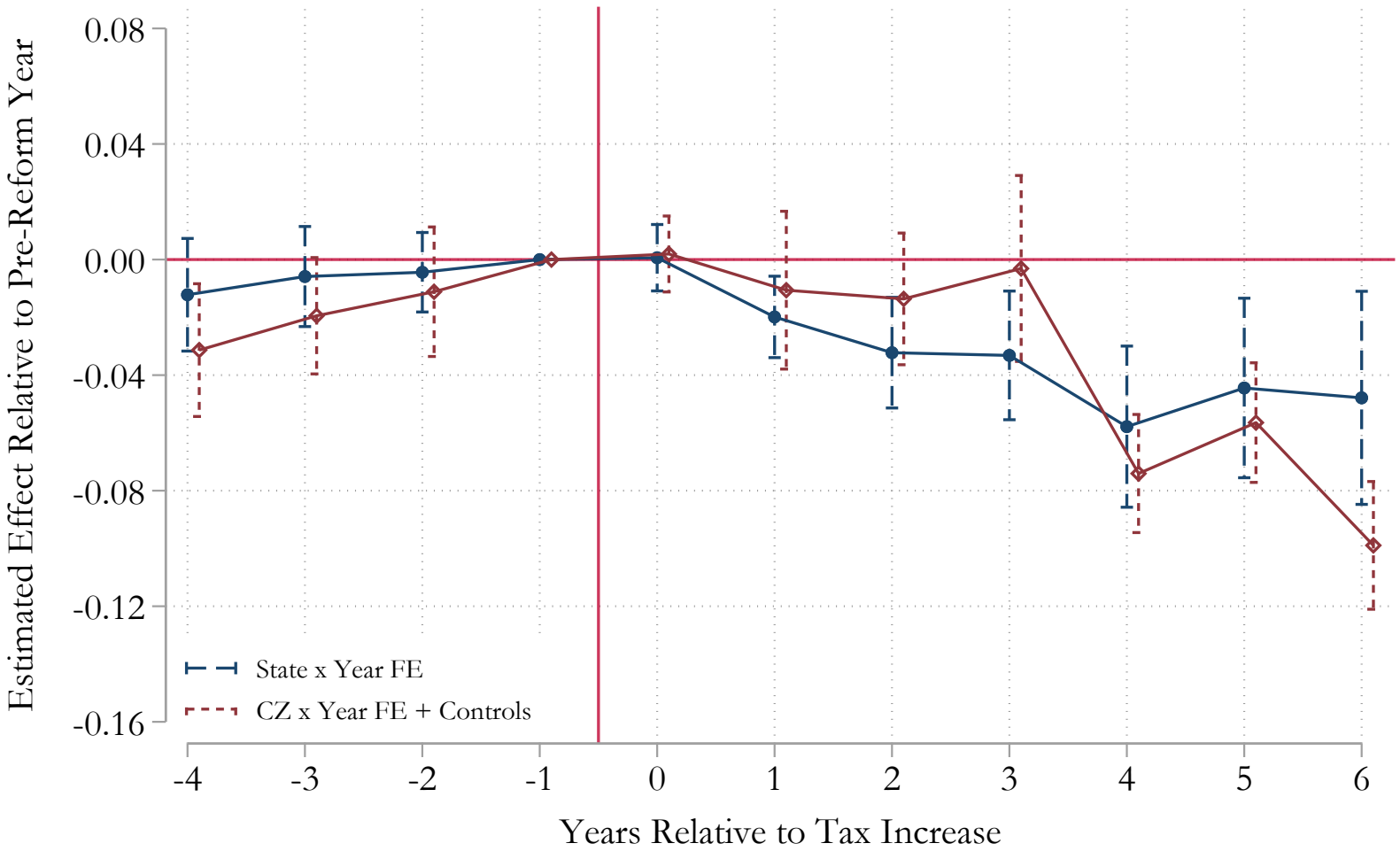
Heterogeneity Residential Sales



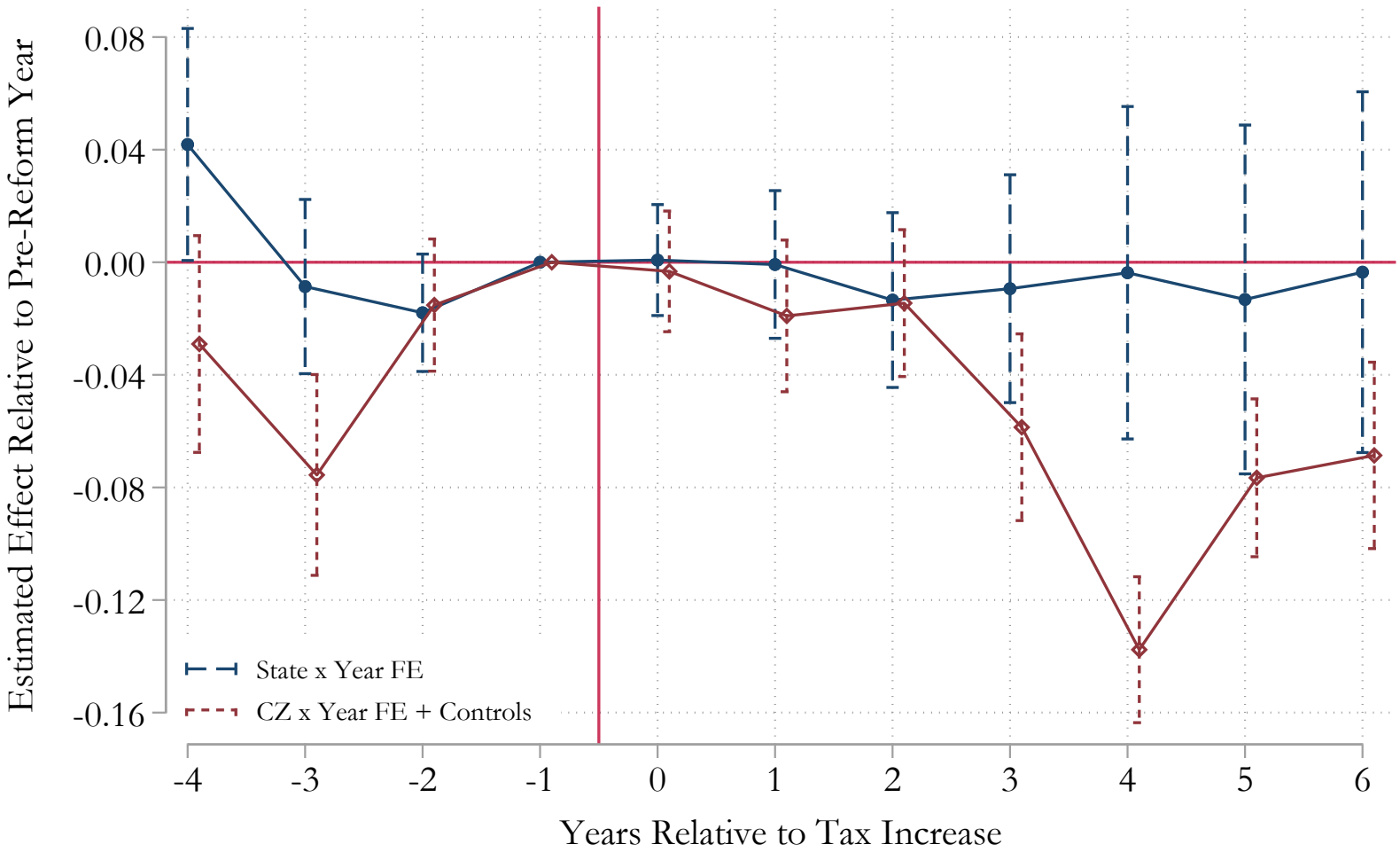
Heterogeneity Residential Rents



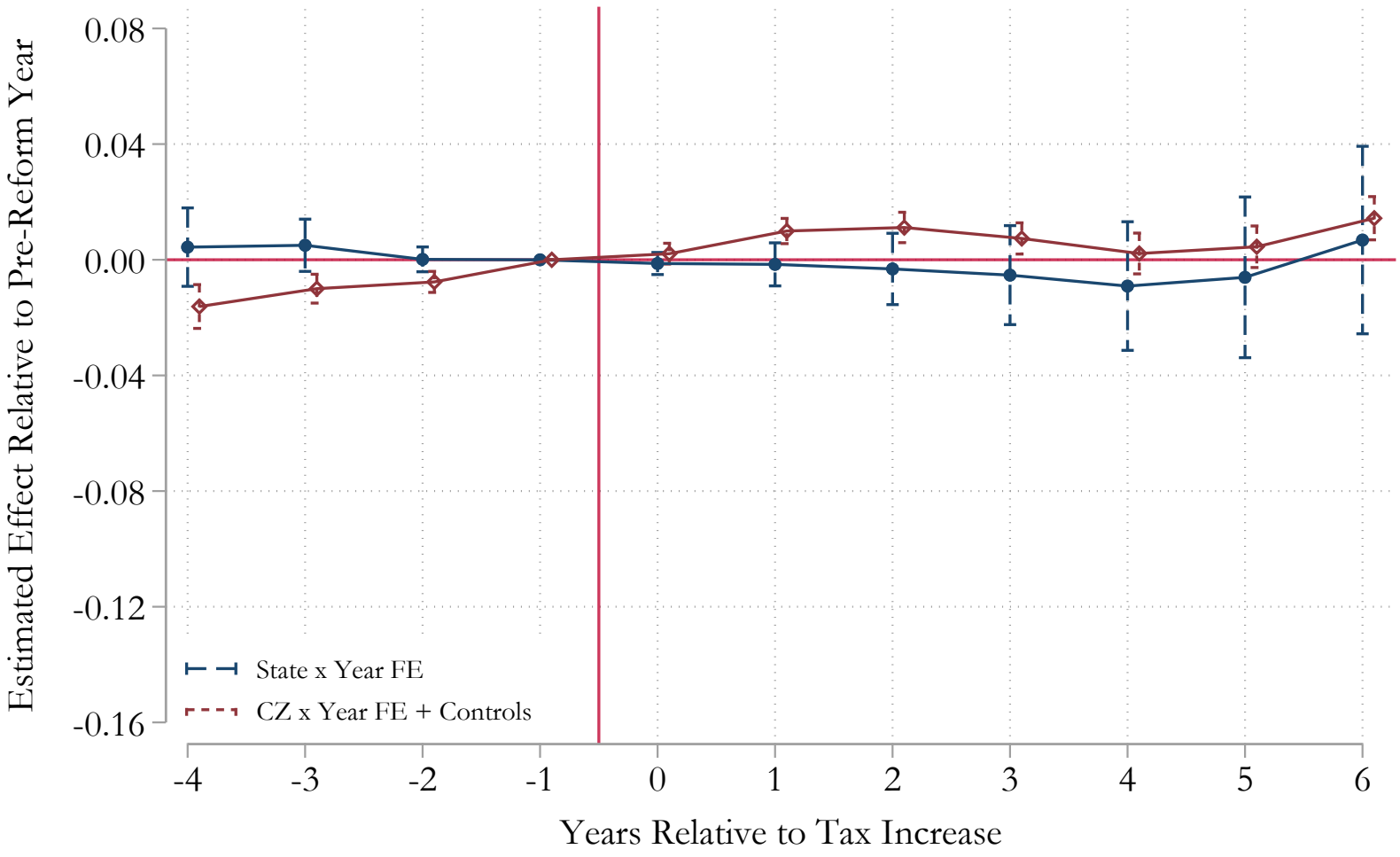
Heterogeneity Robust Effects on Commercial Sales Prices



Heterogeneity Robust Effects on Commercial Rental Prices



Heterogeneity Robust Effects on Residential Sales Prices



Heterogeneity Robust Effects on Residential Rental Prices