Rent Control, Market Segmentation, and Misallocation: Causal Evidence from a Large-Scale Policy Intervention

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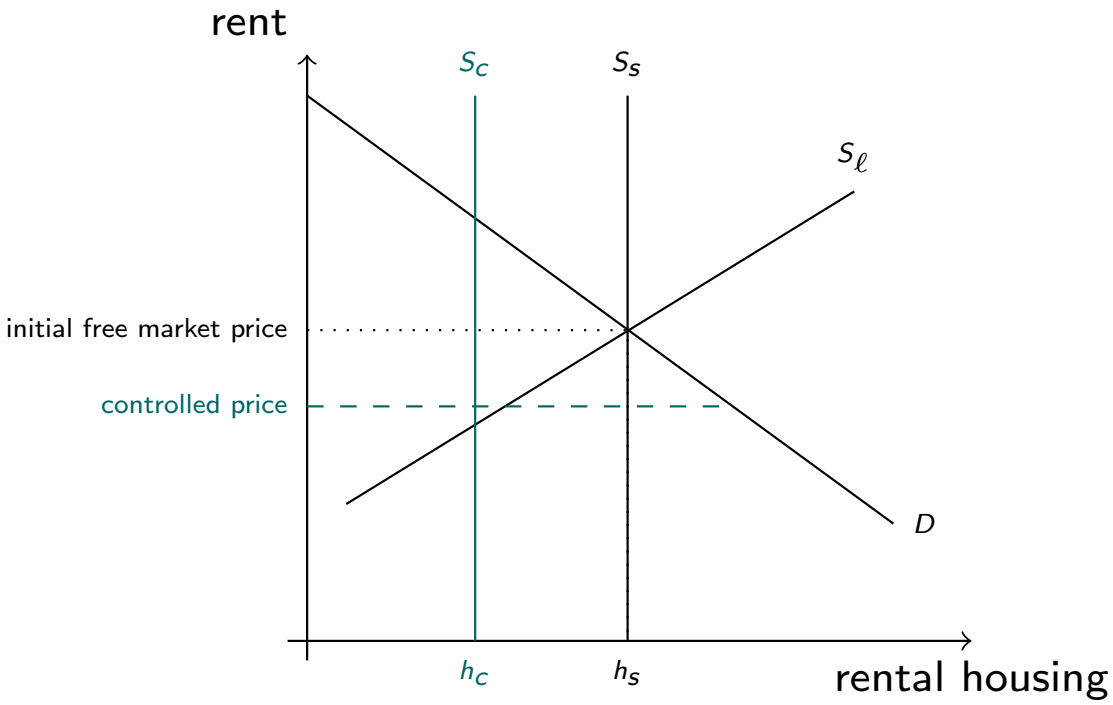
Bank of Spain Housing Conference, 20 November 2019

Misallocation of housing under second-generation rent control

Second-generation rent control: regulation of a part of the market; random assignment of households to units



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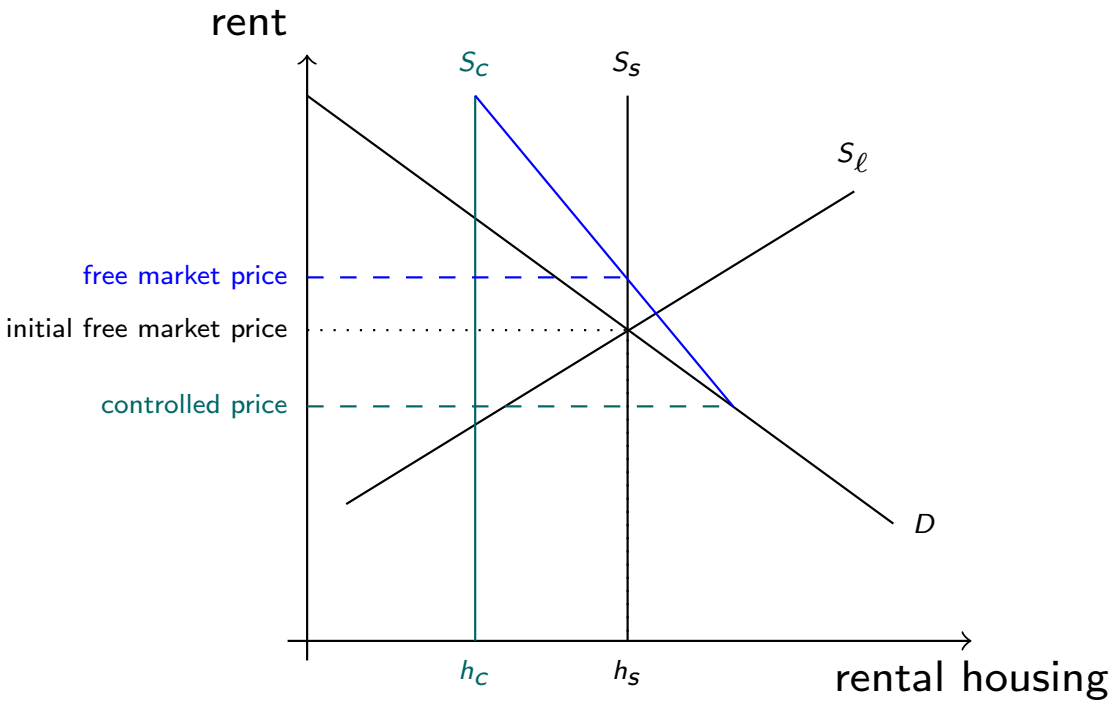

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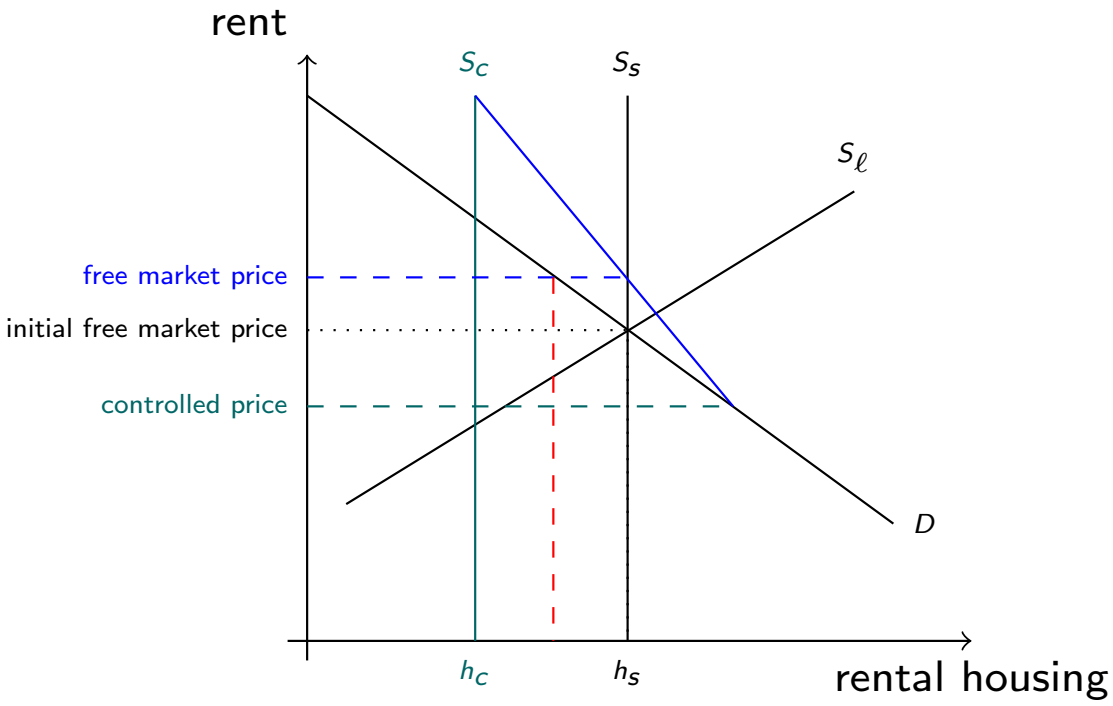

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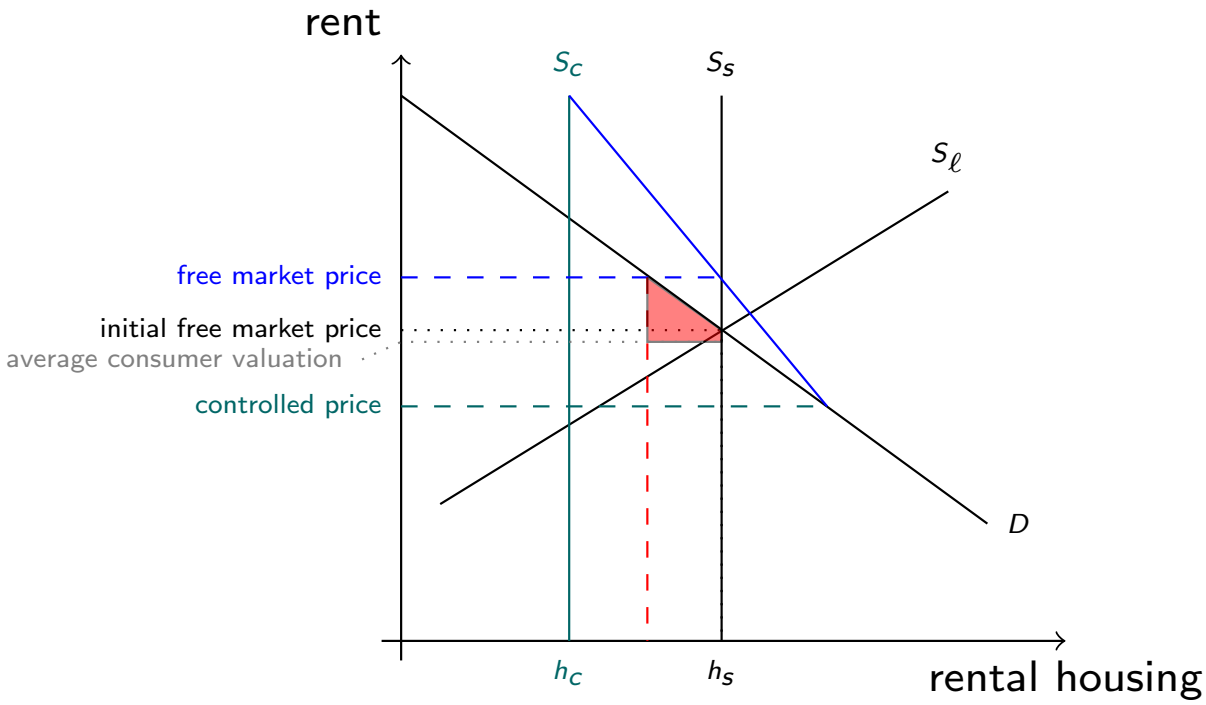

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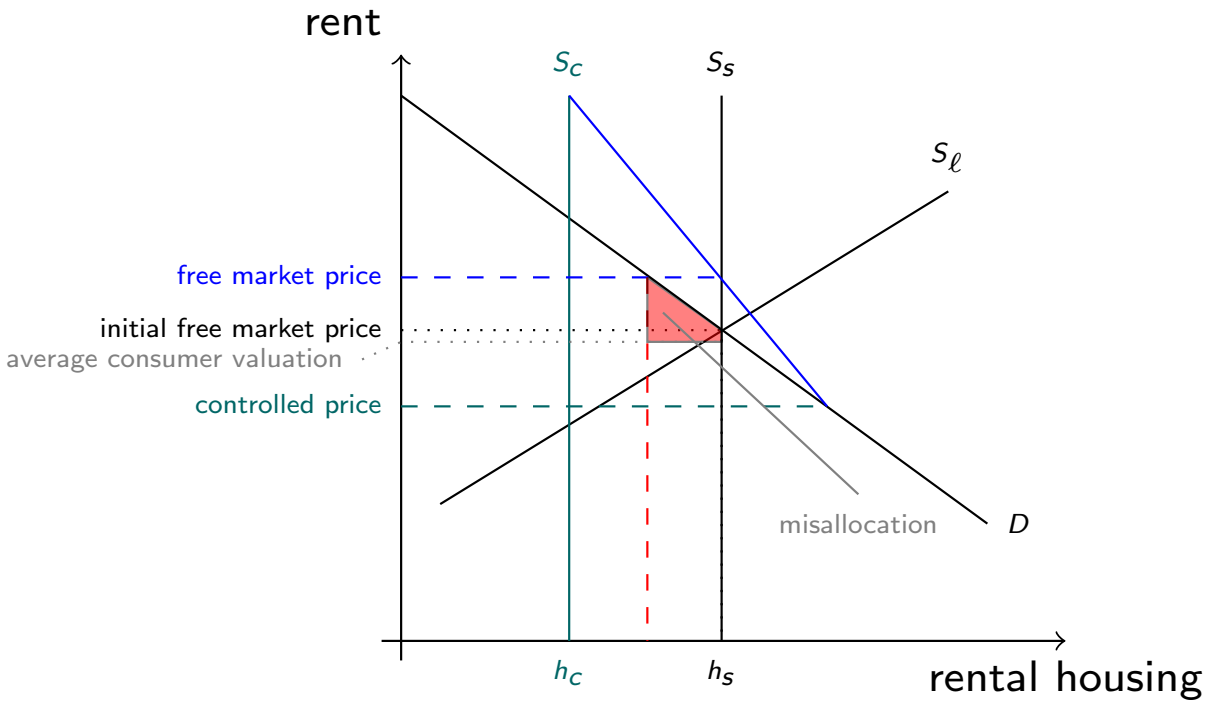

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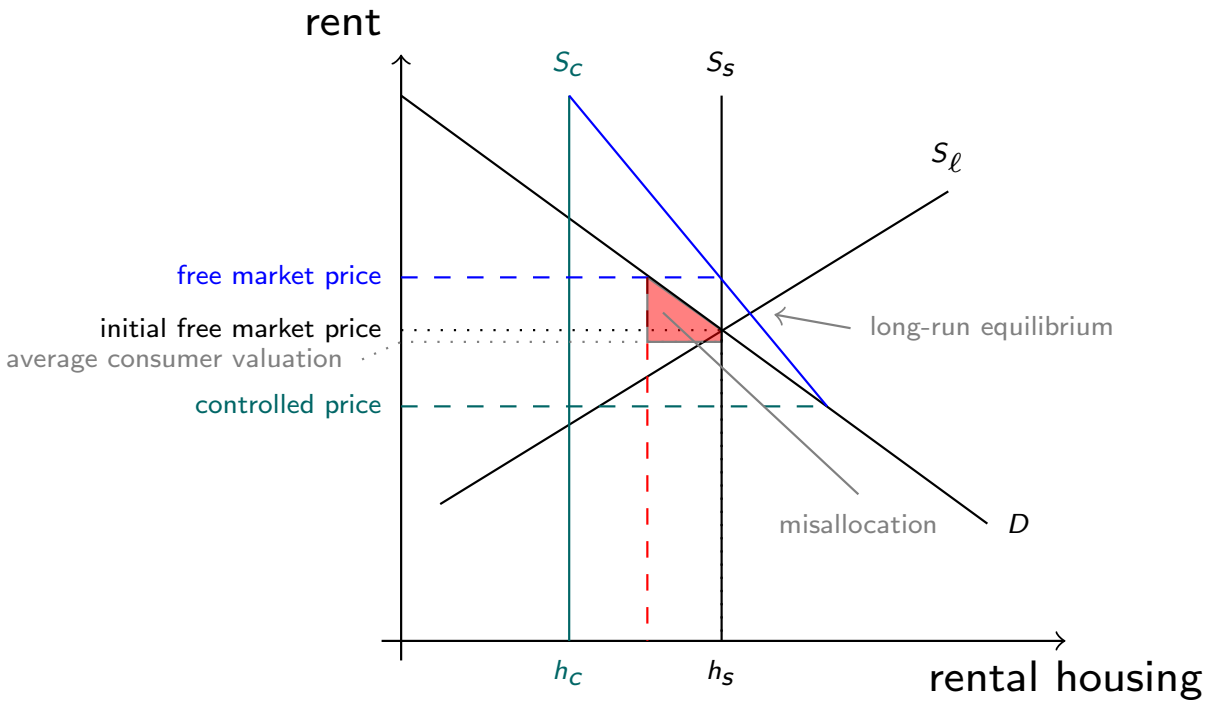

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Misallocation of housing under second-generation rent control

Proposition Under second-generation rent control, an opposite-sign spillover to free market rents indicates misallocation.

(subject to minor qualifications)

Introduction of second-generation rent control in Germany in 2015

We exploit variation created by the "Mietpreisbremse" [*lit: rent brake*], which exempts units first used October 2014 or later.

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- We interpret the opposite-sign spillover to free-market rents as **evidence for misallocation**.
- The mechanism is **relevant for minimum wages**. With our approach, misallocation from minimum wages can be measured if the researcher observes only wages in regulated and unregulated parts of the market, but no worker characteristics.

The German case

Quasi-experimental setup: introduction of a rent cap for new contracts, starting in June 2015

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3. start dates chosen by State governments $\rightarrow$ temporal variation

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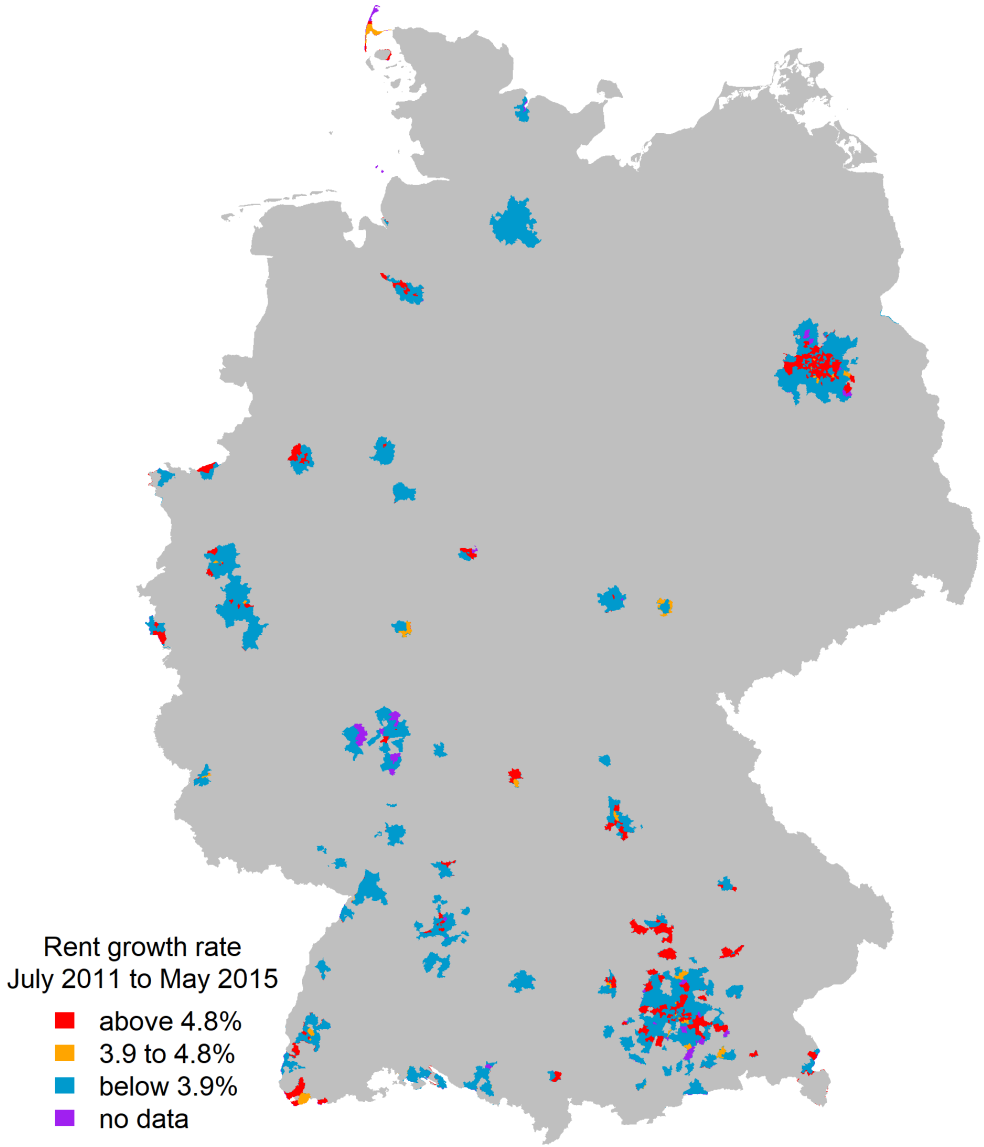
3. start dates chosen by State governments → temporal variation
4. municipalities selected by State governments → spatial variation

Regulated areas and past rent growth



Which postal codes face a binding regulation?

Dependent variable:	*indicator: above-threshold rent growth*	
	OLS	Logit
median house price/m^2	-0.057***	-0.532***
	(0.015)	(0.148)
vacancy rate	0.031*	0.242
	(0.014)	(0.124)
pop density	0.022***	0.132**
	(0.006)	(0.049)
(pop density)^2	-0.001**	-0.009*
	(0.000)	(0.004)
share under 18	0.005	0.023
	(0.005)	(0.048)
share above 65	0.003	0.005
	(0.003)	(0.024)
share foreign	0.011***	0.088***
	(0.002)	(0.023)
adj. R^2	0.375	
Observations	974	974
Mean dep. var	0.252	0.252

The unit of observation is the postal code. Both models include sub-region fixed effects. The unit of median house prices/sqm is 1000 Euro. It is calculated from listing prices that were online between July and December 2011, for all postal codes with at least six observations. All other variables were taken from the Census 2011 and were aggregated to postal codes from a 1km $\times$ 1km grid. Population density is demeaned. The unit is 1000 inh./sqkm.)

Heteroskedasticity-corrected standard errors in parentheses.

Empirical literature on the effects of rent control

Recent Literature:

- Glaeser and Luttmer (2003): misallocation under first-generation rent control; different empirical approach based on a cross-section of households.
- Sims (2007), Autor et al (2014) study the end of Massachusetts rent control.
  - same-sign spillover from regulated to free-market rents
  - potential channels: neighborhood sorting; less investment into the controlled housing stock
- Current work: Asquith (2018), Autor et al. (2017), Chapelle and Wasmer (2018), Diamond et al. (2019)

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This paper: We study the introduction of rent control.

- oppsite-sign spillover from regulated to free-market rents due to misallocation
- short-run perspective — fixed supply, negligible sorting repsonse
- ≈300 municipalities (25% of Germany's population) — external validity
- evidence from a European housing market with a low homeownership rate

Rent data

Large sample of units offered for rent (web scraped data)

- 7/2011–11/2016
- variables: long list of housing characteristics, address or zip code
- month of first appearance and posted rent
- rent control status (controlled/exempt)

Effects on rents: Empirical strategy

A. Difference–in–differences
Identifying variation: First-use (free segment) vs. young units (controlled segment)

$$\log R_i = x_i\beta + \rho_{z_i} + f(t_i; \text{rc}_i) + \delta_0 \text{rc}_i + \delta_1 \text{effective}_{t_i} + \delta_2(\text{rc}_i \times \text{effective}_{t_i}) + \eta_i. \quad (1)$$

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$$\log R_i = x_i\beta + \rho_{z_i} + \sum_{\text{State } s} \gamma_s(t_i \times \text{s}_i) + \delta \text{ effective}_{t_i} + \eta_i \quad (2)$$

(separately for controlled and uncontrolled units).

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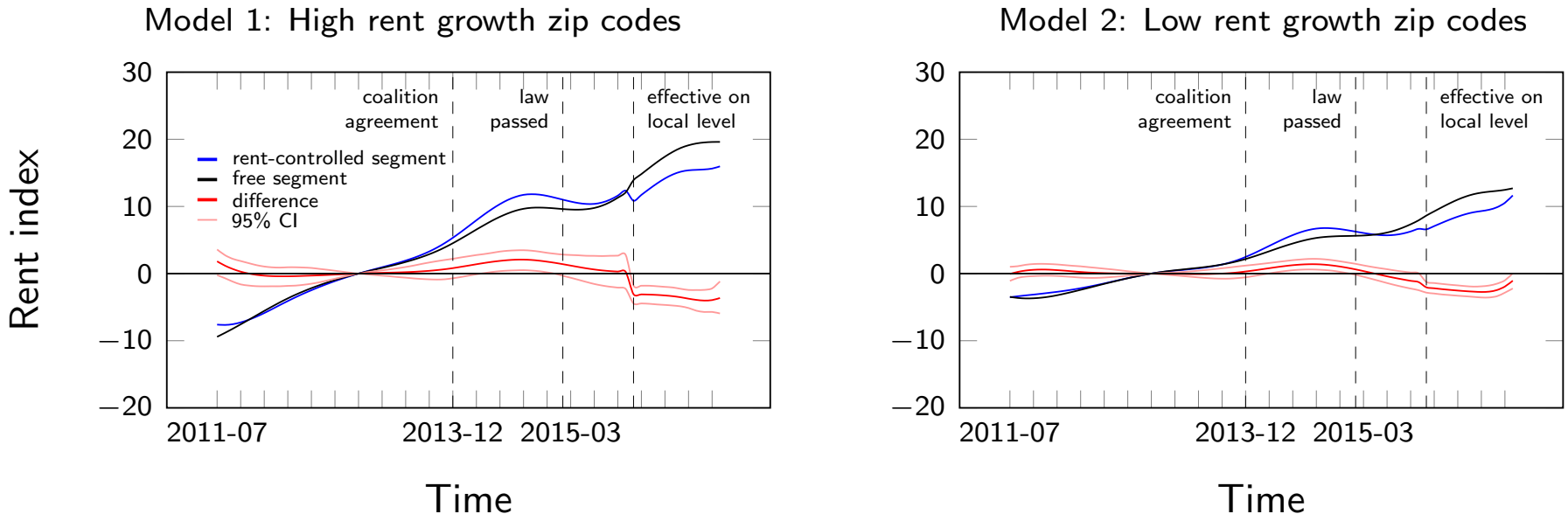
C. Additional variation: State-specific start dates.

Short run effects on rents - young vs. new units



Confidence intervals were bootstrapped (cluster-robust at the zip code-level).

After the rent cap was introduced, free-market rents are significantly higher than regulated rents (gap: ≈0.04 log points).

Decomposition via RDiT

Panel A. *Rent controlled segment*

	(1)	(2)	(3)	(4)	(5)	(6)
rent cap effective	-0.014***	-0.009**	-0.010**	-0.014***	-0.015***	-0.016**
	(0.003)	(0.003)	(0.004)	(0.002)	(0.003)	(0.006)
Observations	179773	184179	187301	179773	179773	42627
$t = 0$ excluded	no	yes	yes	yes	yes	yes
$t = 1$ excluded	no	no	yes	yes	yes	yes
Trend polynomial	linear	linear	linear	quadratic	quadratic	quadratic
Kernel	Gaussian	Gaussian	Gaussian	uniform	Gaussian	Gaussian
Sample	all	all	all	all	all	high growth

Panel B. *Free-market segment (first use)*

	(7)	(8)	(9)	(10)	(11)	(12)
rent cap effective	0.003	0.013	0.027**	0.021*	0.029**	0.033*
	(0.006)	(0.008)	(0.010)	(0.009)	(0.010)	(0.016)
Observations	36187	36301	36353	36353	36353	8712
$t = 0$ excluded	no	yes	yes	yes	yes	yes
$t = 1$ excluded	no	no	yes	yes	yes	yes
Trend polynomial	linear	linear	linear	quadratic	quadratic	quadratic
Kernel	Gaussian	Gaussian	Gaussian	uniform	Gaussian	Gaussian
Sample	all	all	all	all	all	high growth

Postcode clustered standard errors in parentheses; $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Decomposition of rent effects: Rent cap and other municipalities

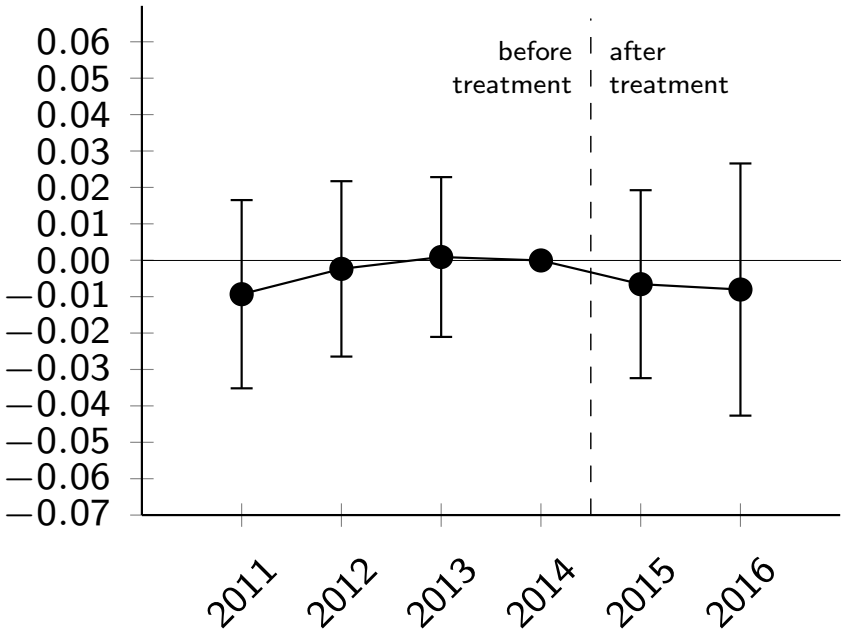
Propensity score weighting and trimming approach. The propensity score model ist estimated based on municipality-level data from 2013 or earlier, from federal states that had introduced the rent cap until March 2017.

	Uncontrolled rents		Controlled rents	
	(1)	(2)	(3)	(4)
rent cap effective	-0.004	-0.006	0.006	-0.003
in the State	(0.012)	(0.014)	(0.004)	(0.006)
rent cap effective	0.038**	0.033	-0.018**	-0.023**
in the State × treatment group	(0.015)	(0.018)	(0.006)	(0.009)
Observations	58885	58885	91837	91837
Adj. R^2	0.884	0.885	0.909	0.910
Treated municipalities	179	179	182	182
Control municipalities	356	356	364	364
Year FE	yes	no	yes	no
Trend B-Spline	no	yes	no	yes

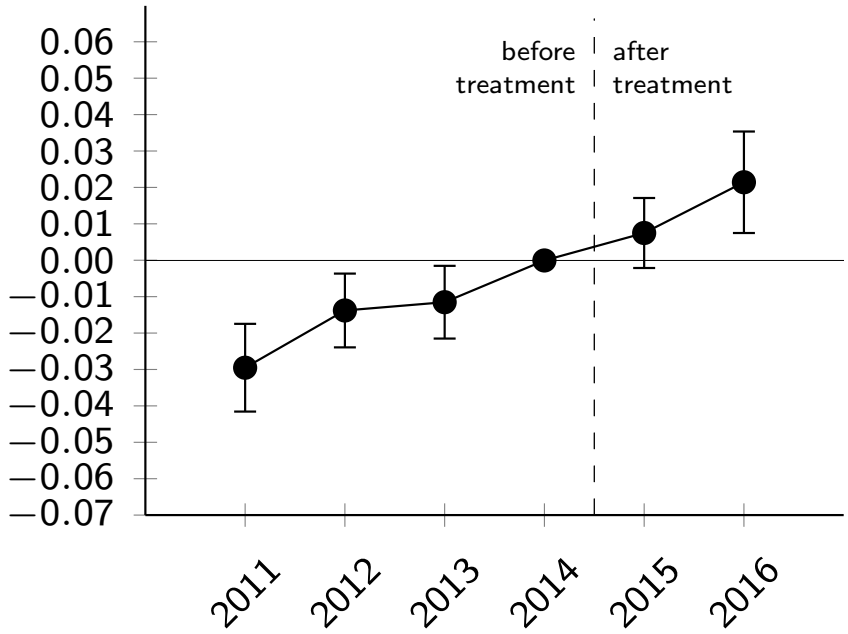
Note: Propensity score weights are $\hat{p}_i(1 - \hat{p}_i)$. The sample only includes observations from municipalities with $\hat{p}_i \in [0.1, 0.9]$; $^{**}p < 0.01$.

Common trends in propensity score-trimmed and -weighted treatment and control groups

(1) Uncontrolled rents



(3) Controlled rents



Demand response

German Socio-Economic Panel (GSOEP)

- renter households; surveyed 2002–2016
- GSOEP does not contain precise information on year of construction, which determines whether a unit is regulated or not.
- We consider short- ($\leq$ 5km) and long-distance moves ($>$ 5km) within/ into regulated markets, relying on the propensity score weighted and trimmed sample.
- We study the propensity to move in different income quartiles Q.

$$\begin{aligned} Pr(m_i = 1) =& x_i\beta + \rho_{z_i} + \psi_{\text{year}_i} \\ &+ \delta_1 \text{rent cap}_j + \delta_2 \text{active}_{t_j} + \delta_3 \text{Q}_i + \delta_4 \text{rent cap}_j \times \text{active}_{t_j} \\ &+ \delta_5 \text{rent cap}_j \times \text{Q}_i + \delta_6 \text{active}_{t_j} \times \text{Q}_i \times \text{rent cap}_j + \eta_i \end{aligned} \tag{3}$$

Residential moves within and into regulated markets

	Model 1 residential move short distance $\leq$ 5,000m	Model 2 (restricted) residential move short distance $\leq$ 5,000m	Model 3 residential move long distance $>$ 5,000m	Model 4 (restricted) residential move long distance $>$ 5,000m
rent cap	0.353	0.473*	0.309	0.247
	(0.243)	(0.257)	(0.278)	(0.294)
active	0.269	0.282	-0.215	-0.216
	(0.332)	(0.367)	(0.396)	(0.435)
rent cap×Q1	-0.428*	-0.517*	0.257	0.327
	(0.205)	(0.219)	(0.211)	(0.223)
rent cap×Q2	-0.542**	-0.604**	0.034	0.095
	(0.209)	(0.222)	(0.217)	(0.229)
rent cap×Q3	-0.415*	-0.478*	0.242	0.407*
	(0.218)	(0.232)	(0.234)	(0.246)
active×Q1	-0.229	-0.198	0.206	0.345
	(0.337)	(0.370)	(0.395)	(0.428)
active×Q2	-0.421	-0.484	-0.141	-0.141
	(0.346)	(0.380)	(0.411)	(0.454)
active×Q3	-0.335	-0.298	0.292	0.335
	(0.362)	(0.394)	(0.428)	(0.470)
rent cap×active	-1.655***	-1.626**	-0.107	-0.070
	(0.591)	(0.617)	(0.517)	(0.562)
rent cap×active×Q1	1.406*	1.239*	-0.499	-0.726
	(0.594)	(0.622)	(0.523)	(0.563)
rent cap×active×Q2	1.358*	1.225	-0.610	-0.801
	(0.610)	(0.640)	(0.569)	(0.626)
rent cap×active×Q3	1.246*	1.031	-0.372	-0.614
	(0.631)	(0.662)	(0.568)	(0.615)
main effecs of Q1, ..., Q4	yes	yes	yes	yes
housing characteristics	yes	yes	yes	yes
household characteristics	yes	yes	yes	yes
spatial fixed effects	yes	yes	yes	yes
time fixed effects	yes	yes	yes	yes
N	35,981	35,792	35,238	35,110

Clustered standard errors in parentheses, $^{***}: p < .001, ^{**}: p < .01, ^{*}: p < .05$.

Short-run supply response: Demolitions of small residential buildings

Demolishion and Conversion Statistic

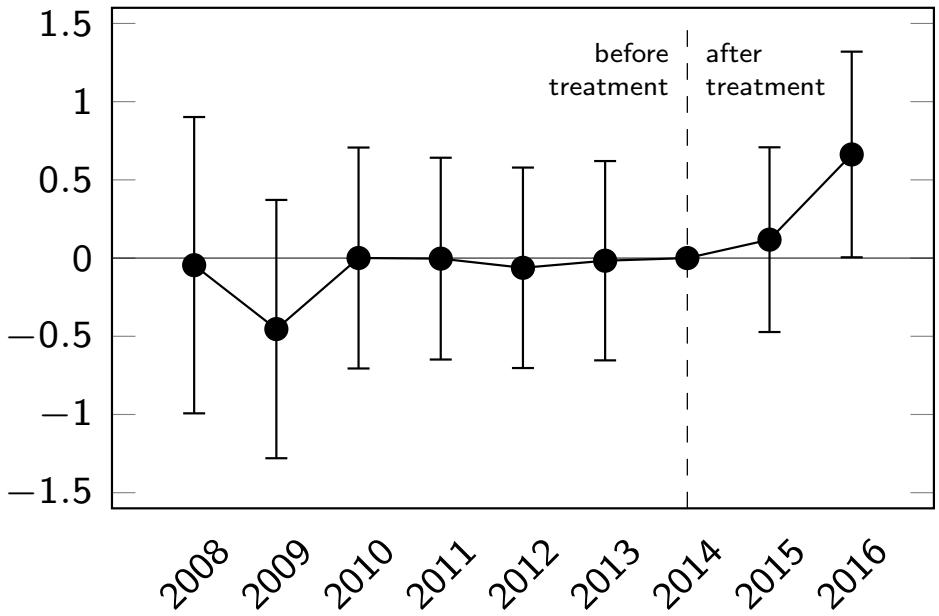
- Admin data on the universe of demolished buildings in Germany, 2008–2016.
- We consider residential buildings that were demolished w/ the intention to build a new residential building.
- We focus on buildings w/ 1–2 residential units (single-family housing).
- We regress the number of demolished units per municipality and year, on municipality fixed effects, two dummies for the years 2015 and 2016, a rent cap indicator, and an interaction of the year dummies with the rent cap indicator.

Short-run supply response: Demolitions of small residential buildings

Dependent variable	*Demolished buildings w/ 1–2 units*	
	(1)	(2)
year 2015	0.29*	0.28
	(0.14)	(0.18)
year 2016	0.10	0.04
	(0.15)	(0.18)
year 2015 × rent cap	0.20	0.20
	(0.27)	(0.31)
year 2016 × rent cap	0.71*	0.75*
	(0.29)	(0.32)
Observations	4716	4716
municipalities	524	524
rent cap municipalities	181	181
weighting and trimming	no	yes

Standard errors are clustered.

Short-run supply response: Demolitions of small residential buildings – event study design



Vertical bars indicate 95% confidence intervals (cluster-robust); $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

Conclusions

To wrap up:

- By taking a short-run perspective, we are able to measure an **opposite-sign spillover** to free-market rents.
- This opposite-sign spillover indicates **misallocation** of households to housing units.
- Long-run consequences are beyond the scope of this paper.

Thank you very much for your attention.

Ordinances by start dates

back

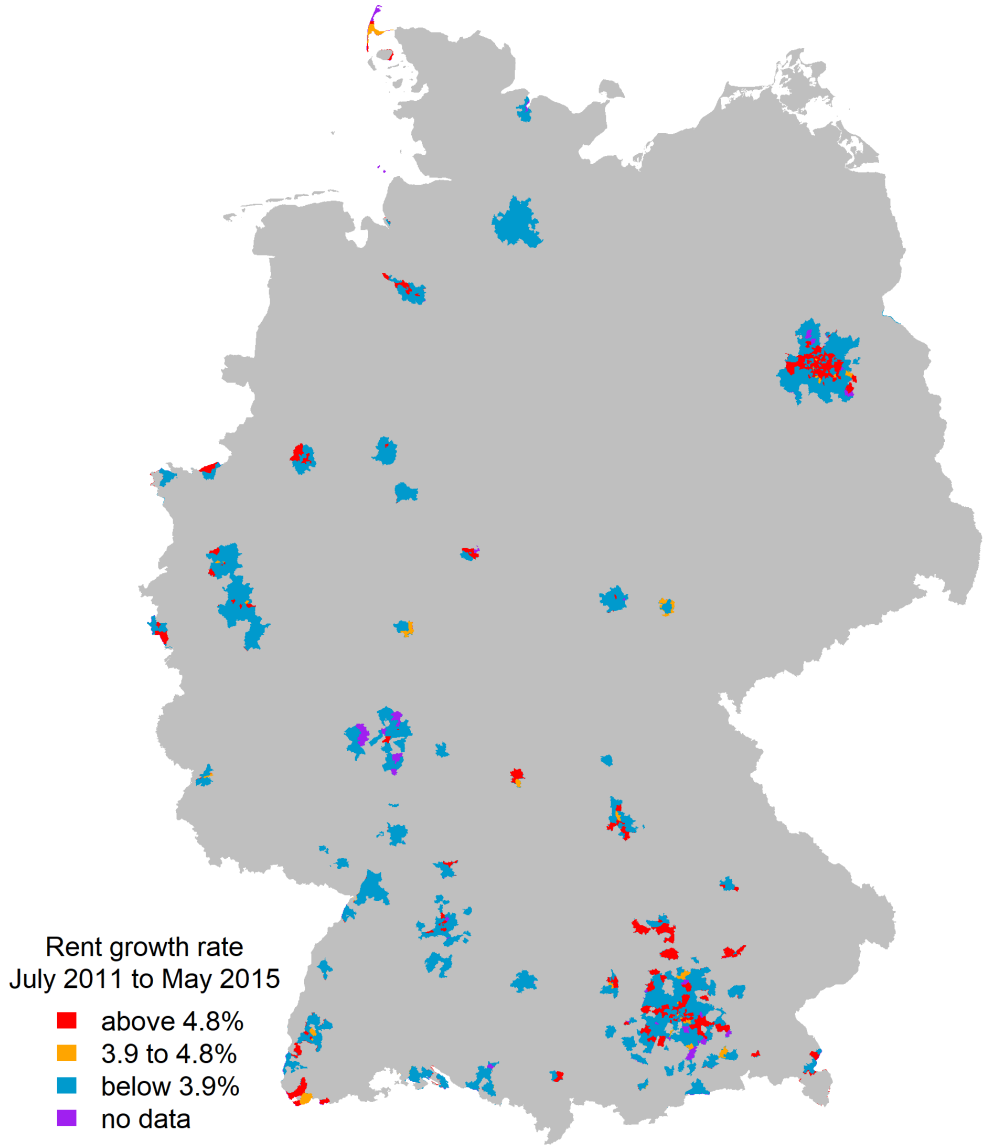
Table: Rent cap ordinances by start date

Federal state	Ordinance	Validty period	Regulated/all	Cumulative
Berlin	MietenbegrenzungsVO	2015/06-2020/05	1/1	1
Hamburg	MietpreisbegrenzungsVO	2015/07-2020/06	1/1	2
North Rhine-Westphalia	MietpreisbegrenzungsVO	2015/07-2020/06	22/396	24
Bavaria	MietpreisbremseVO	2015/08-2020/07	144/2056	168
Baden-Württemberg	MietpreisbegrenzungsVO	2015/10-2020/09	68/1101	236
Rhineland Palatinate	MietpreisbegrenzungsVO	2015/10-2020/10	3/2306	239
Hesse	MietenbegrenzungsVO	2015/11-2019/06	16/426	255
Bremen	Mietenbegrenzungs-VO	2015/12-2020/11	1/2	256
Schleswig-Holstein	MietpreisVO	2015/12-2020/11	12/1116	268
Bavaria	MieterschutzVO[a]	2016/01-2020/07	9/2056	261
Brandenburg	MietpreisbegrenzungsVO	2016/01-2020/12	31/419	292
Thuringia	MietpreisbegrenzungsVO	2016/04-2021/01	2/913	294

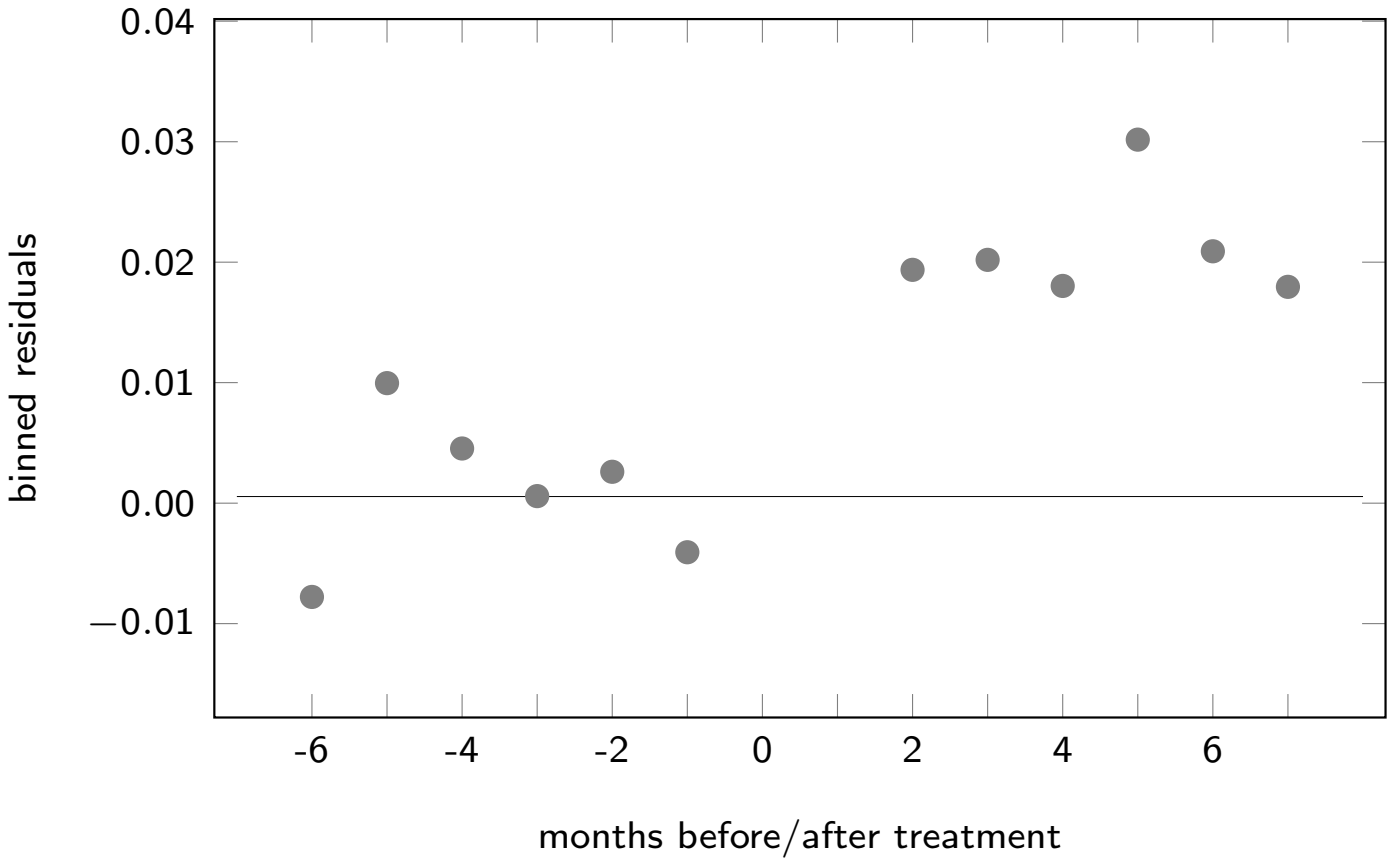
[a]: 16 municipalities listed in the Bavarian MietpreisbremseVO were removed, while nine new municipalities were added. In total, there are 137 Bavarian rent cap municipalities.

German municipalities with rent cap, as of March 2017

back



Decomposition via RDiT — binned residuals (model 10)



Treatment effect (cluster-robust SE): 0.021 (0.009) log points.