

Jurisdictional Fragmentation and Sprawl

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Motivation

Urban sprawl is associated with many problems (e.g., long commutes, emissions, biodiversity loss OECD 2018).

Jurisdictional fragmentation and decentralized land use policy are often put forward as an explanation for sprawl due to lack of coordination and conflicting regulations (Burchfield et al. 2006; Cappelli et al. 2021).

We still miss causal evidence on this issue.

Our contribution

We provide to our knowledge the first quasi-experimental evidence on the effects of local jurisdictional boundaries on sprawl and land use.

Our research design is based on municipal mergers, which eliminate jurisdictional borders and reduce the number of jurisdictions making independent land use decisions in a given area.

- We compare the location of new buildings (and their residents) in the actual mergers to the location of new buildings in a control group of hypothetical mergers simulated from the pre-merger municipality map in a difference-in-differences (DID) framework.

We use Finnish population-wide register data including granular residential location information.

- Data span four years before and fourteen years after the mergers took place. Planning and building are sluggish, and thus, long term effects are important.

Prior literature I

The current literature on the effects of jurisdictional fragmentation and sprawl provides mixed results and relies on research designs that are not ideal for causal inference.

- For example, Glaeser and Kahn (2004) and Burchfield et al. (2006) find that jurisdictional fragmentation is not associated with sprawl in the US (relatively recent review Duranton and Puga 2015).
- Ehrlich et al. (2018) find that countries with more municipalities have more residential sprawl when measured at the country level.
- Cappelli et al. (2021) show that an increase in the number of municipalities per capita is associated with a spatial expansion of urbanized areas in a cross-section of EU cities.

Prior literature II

Quasi-experimental evidence on jurisdictional fragmentation and the overall housing supply:

- Greenaway-McGrevy and Phillips (2023) show that eliminating jurisdictional boundaries in the Auckland led to zoning reform and increases in building permits and housing construction.
- Larsen and Kettel (2023) analyze the Danish mergers. They use housing permit data aggregated to the post-merger municipality level and observe that housing permits decreased after merging.
- Tricaud (2024) employs French data finding that municipalities that were forced to enter an inter-municipal cooperation experienced a large increase in housing permits.

Prior literature III

Boundary discontinuities in land use policy

- Turner et al. 2014; Gyourko and McCulloch 2023; Kulka et al. 2023.
- Differences in land use policy at the boundaries and they matter for residential construction, house prices, and residential sorting.

Prior literature IV

The impact of mergers on municipal finances and economic activity

- Blom-Hansen et al. (2016): mergers' impact is, on aggregate, net neutral (post-merger municipal-level analysis)
- Harjunen et al. (2021): small merging municipalities suffered in terms of public jobs and service-tax bundles (pre-merger municipal-level analysis)
- Egger et al. (2022): night-light data shows that absorbing municipalities gain in economic activity while absorbed municipalities lose (pre-merger municipal-level analysis)

Institutions: Municipalities in Finland

Finnish municipalities act as the country's smallest self-governing administrative unit

Municipalities have the right to levy a (flat rate) income tax, which varied between 16 and 21 percent in 2008

Municipalities are responsible for a number of things

- Mandatory tasks include key public services, e.g., day care, education, youth and sports services, urban planning and land use, water and waste management, health and social services, and fire and rescue services

Institutions: Municipal mergers

During the latter part of the 2000s, the central government encouraged municipalities to merge due to, e.g., concerns about rising health care costs

- ① Monetary subsidies for merging municipalities
- ② Grants from the government would not decrease during first five years after the merger
- ③ Employees of the merging municipalities could not be laid off for first five years (for economic reasons)

Merging was **voluntary**: it had to be approved by the council of all the participating municipalities

- The number of municipalities decreased from 419 in 2007 to 336 in 2012
- Size of the merger varied between 2 and 10

Research design

Merging municipalities are a selected sample and thus different from non-merging municipalities

- Saarimaa and Tukiainen (2014) and Hytinen et al. (2014)

We simulate all possible contingent hypothetical mergers within county borders (Harjunen et al. 2021)

Then we match each actual merger with a placebo merger using nearest neighbor matching on a number of variables

- Exact match on number of merging municipalities
- Pre-merger variables: total population, population growth, population HHI, prior health care cooperation, median distance of the citizens to the center of the largest municipality, population weighted mean distance from the centers of small municipalities to the center of the large municipality

Data

Population-wide register data from Statistics Finland spanning the years 2005–2022 including granular residential location for all individuals at the end of each year.

- Type and coordinates of the building if the building contains at least three households. If not, coordinates either for 250 square meters or one square kilometer grids, depending on the number of households within the grids.

For each year, we define new buildings as those that are occupied by new residents for the first time in the register data.

Fiscal and geographical data on municipalities used for creating placebo mergers.

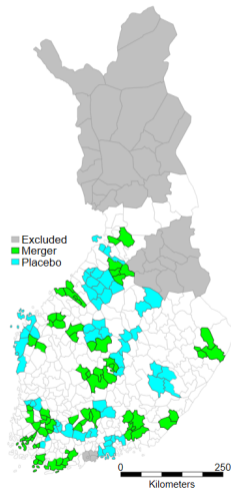
Our main sample

Our main sample consist of 26 mergers and their placebos

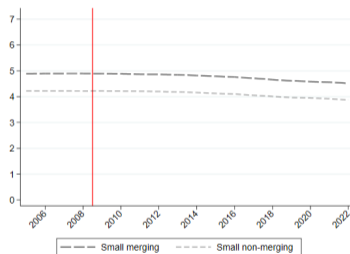
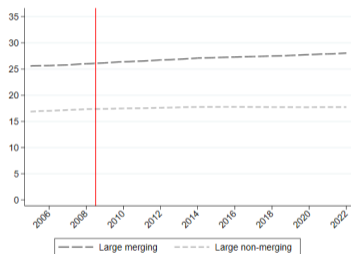
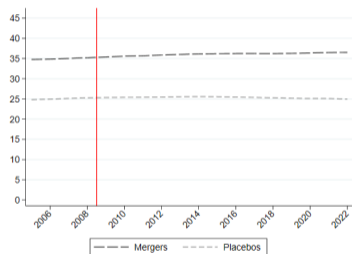
- Three mergers were part of a another merger just before or after 2009 so we exclude those mergers from our analysis
- We omit post-merger municipalities of sizes 5 and 10 (measured in number of pre-merger municipalities) from our sample as they are geographical outliers and thus the matching results are not adequate
- In one merger (of size 2) the municipalities did not share a common border so we omit that, too

The number of observations is around 300,000 in our main sample (new housing units for that many people)

Our main sample - map of mergers and placebos



Our main sample - Population trends in actual and placebo mergers



Descriptive statistics

Table A2: Distance (km) to the center of the new administrative center.

Panel A: Treatment group, All buildings			
	All	Large	Small
Observations	230,176	176,720	53,456
Mean	6.87	4.45	14.90
Standard deviation	7.42	4.25	9.65
Panel B: Control group, All buildings			
	All	Large	Small
Observations	174,344	119,487	54,857
Mean	10.79	5.31	22.72
Standard deviation	10.19	5.16	8.00
Panel C: Treatment group, Detached and row houses			
	All	Large	Small
Observations	158,188	109,553	48,635
Mean	8.70	5.68	15.48
Standard deviation	8.06	4.74	9.71
Panel D: Control group, Detached and row houses			
	All	Large	Small
Observations	151,007	100,244	50,763
Mean	11.67	6.02	22.83
Standard deviation	10.24	5.32	8.26

Note: The table presents descriptive statistics for our outcome of interest in different subgroups using data from 2005–2022.

DID model

$$\log(dist_{imt}) = \sum_{\substack{s=2005 \\ s \neq 2008}}^{2022} \delta_s 1_{\{s=t\}} 1_{\{merger_m=1\}} + \gamma_t + \theta_m + u_{imt}. \quad (1)$$

- $\log(dist_{imt})$ log distance to the center of the largest municipality in the merger of individual i living in a building constructed in year t in pre-merger municipality m .
- $1(\cdot)$ indicator functions: a. value one at certain years and zero otherwise, b. one for municipalities merging in 2009 and zero otherwise.
- Year, γ_t , and pre-merger level municipality, θ_m , fixed effects
- We cluster the standard errors at the pre-merger municipality level.

DID samples

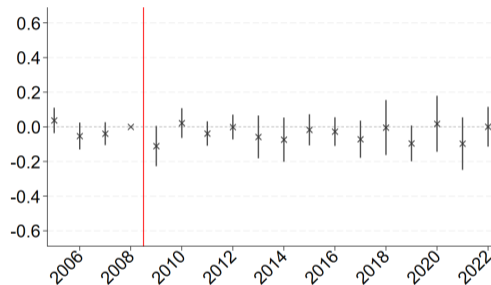
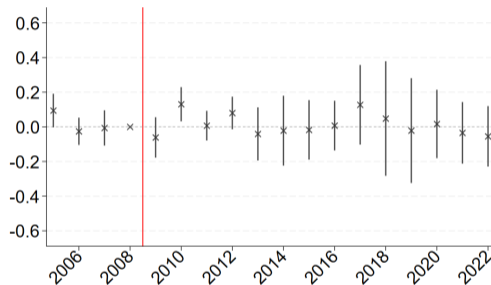
We analyze either all buildings or a subsample of detached and row houses, which are the most common types of buildings in these municipalities.

We analyze the largest municipality of each merger and the smaller merger partners separately.

- A political power shift in land use policy from individual smaller municipalities toward the largest municipality (Saarimaa and Tukiainen 2016).
- These same mergers led to a relocation of some local public jobs from small municipalities to the new administrative center (see Harjunen et al. 2021).

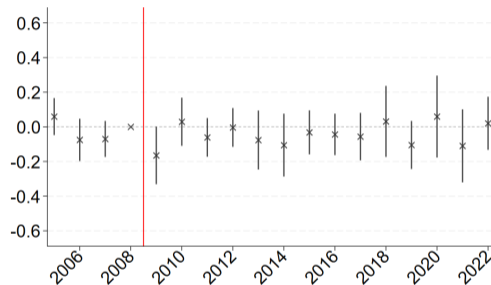
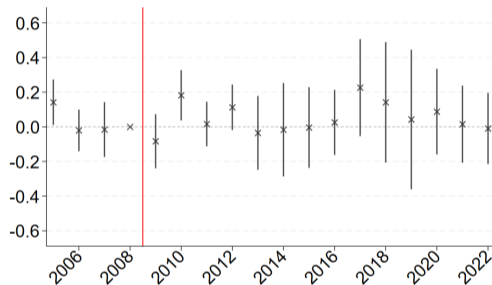
We also conduct heterogeneity analysis where we, first, split the sample at the merger level with respect to its spatial compactness, and second, the population of its largest pre-merger municipality.

Effects of mergers on the location of new buildings



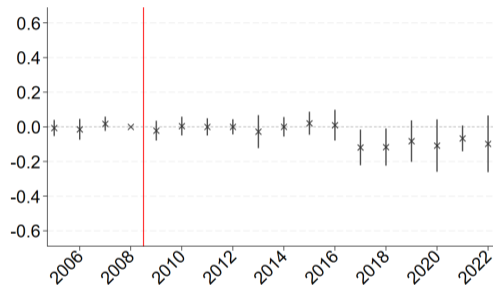
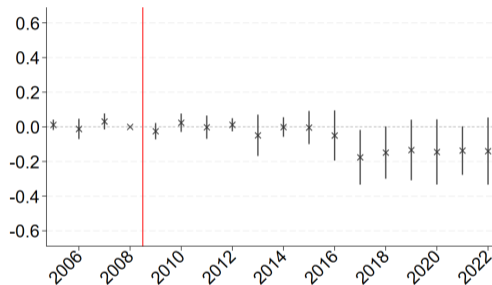
- Left: All buildings; Right: Detached and row

Effects of mergers on the location of new buildings: Large municipalities



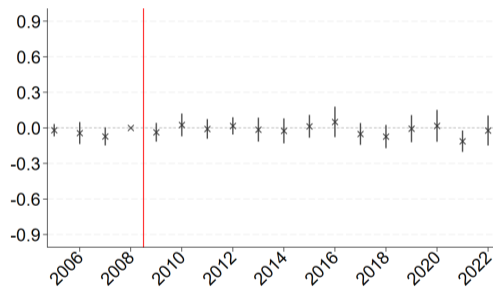
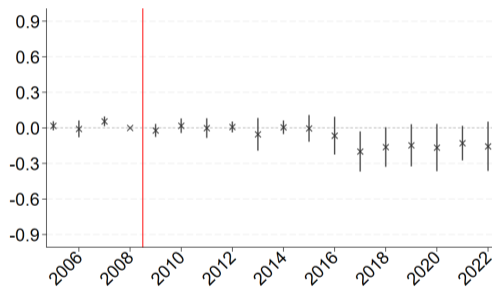
- Left: All buildings; Right: Detached and row

Effects of mergers on the location of new buildings: Small municipalities



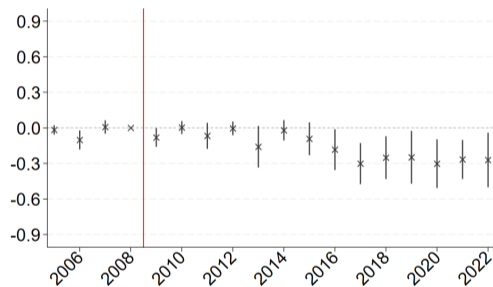
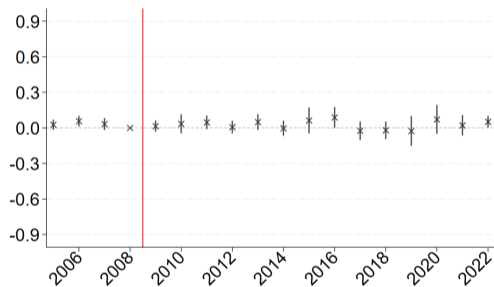
- Left: All buildings; Right: Detached and row

Effects of mergers on the location of new buildings: Small municipalities, all buildings, merger heterogeneity I



- Left: Mergers that involve a large municipality; Right: Other mergers

Effects of mergers on the location of new buildings: Small municipalities, all buildings, merger heterogeneity II



- Left: Dispersed mergers; Right: Compact mergers

Conclusions

We provide quasi-experimental evidence using geo-referenced population-wide register data showing that jurisdictional fragmentation affects land use and can facilitate sprawl.







We find that in smaller municipalities new single-family and row houses were built about 10% or 2 km closer to the new municipality center.

- The effect is driven by mergers that are spatially compact and involve one relatively large (pre-merger) municipality. This suggests that our results may extend to more urbanized settings.
- Effects materialize only after 8–9 years (two council terms). This long lag likely reflects the fact that unifying local land use policy takes time as does the planning and construction of new buildings (see also Greenaway-McGrevy and Phillips 2023).


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