Political Distortion in Spatial Development: Evidence from South Korea

Sanghyun Park

Graduate Institute, Geneva

January 25, 2023

Motivation

- Economic activity is unevenly distributed throughout different regions.
  - In S.Korea, 67% GDP is from top 10 cities (7.7% of total area)
  - Infrastructure concentration through place-based initiatives
    - e.g. residential areas, enterprise zones, industrial cluster policies
  - Positive association between GDP growth and infrastructure spending

- Vested interests of policymakers (weak governance, corruption) affect place-based infrastructure development decisions (Bajar, 2018)

- Challenge:
  - The decision process of infrastructure investment is not observable.
  - Difficult to establish causality (politician $\rightarrow$ infrastructure investment)
  - Hard to find data on place-based development projects over a long period.

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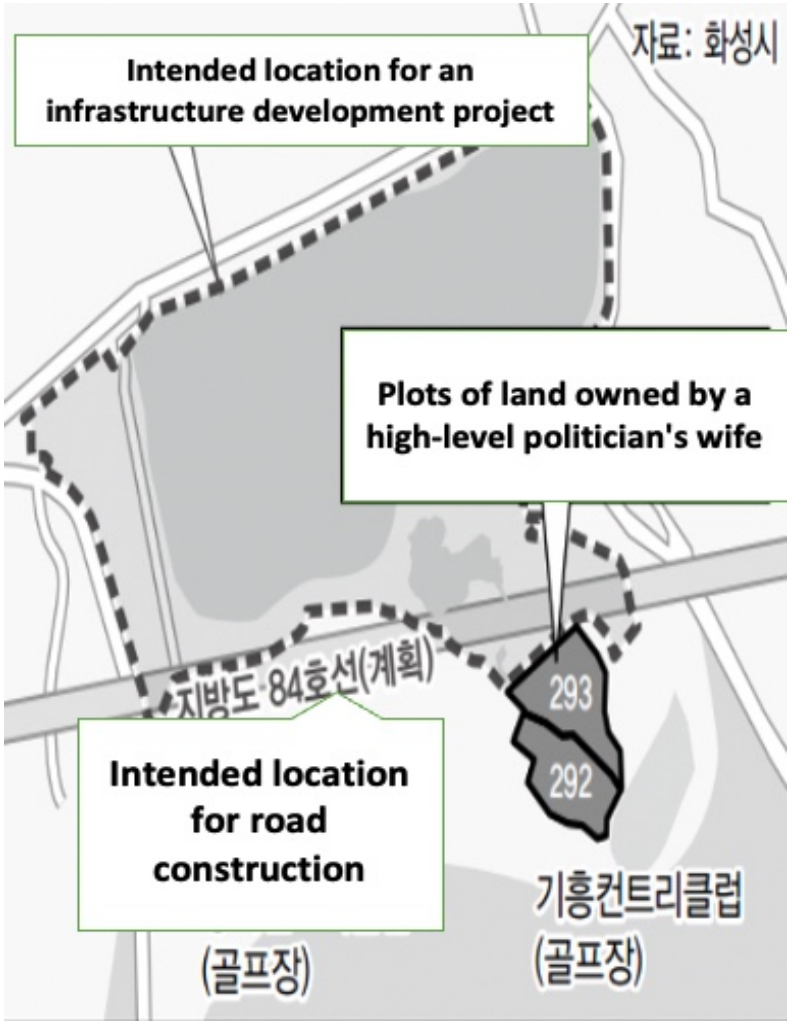
- South Korea's context
- Conflict of interest is widespread
- Korean MPs
  - 33% have farmlands outside their constituencies
  - 28% promised developed projects during election campaigns in the proximity (*The Hankyoreh, 2019*)
- Having a real estate property near development sites gives 37.4% return upon the announcement of a dev. plan (Kim and Kim, 2012)



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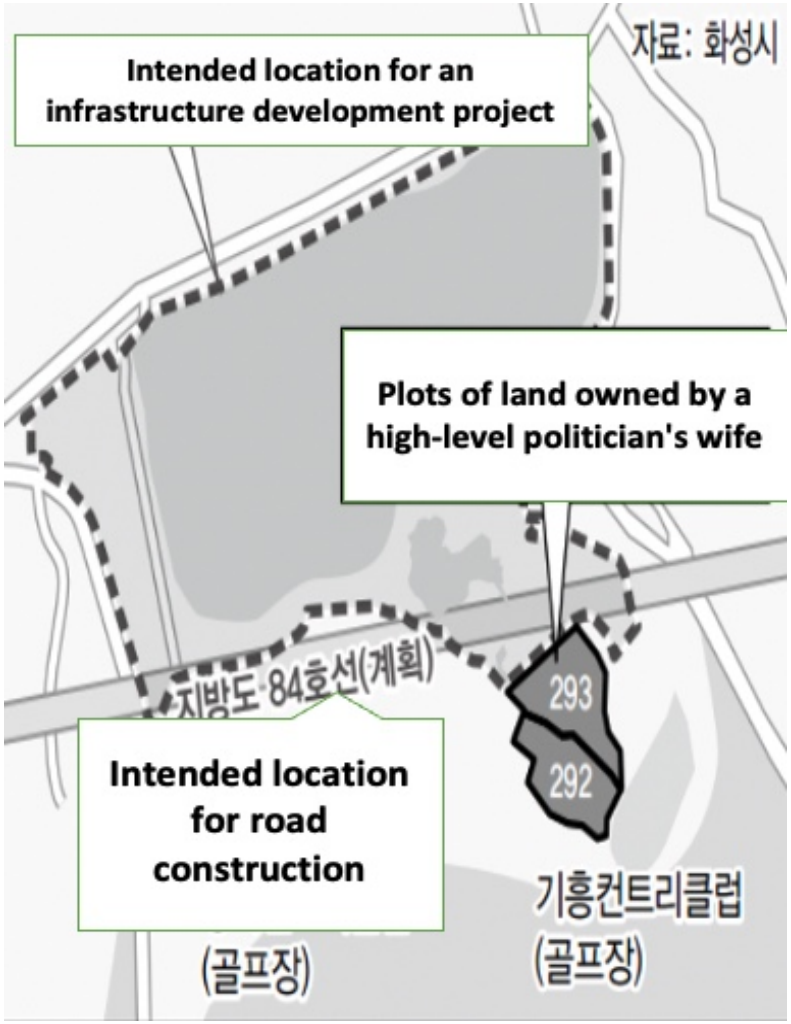

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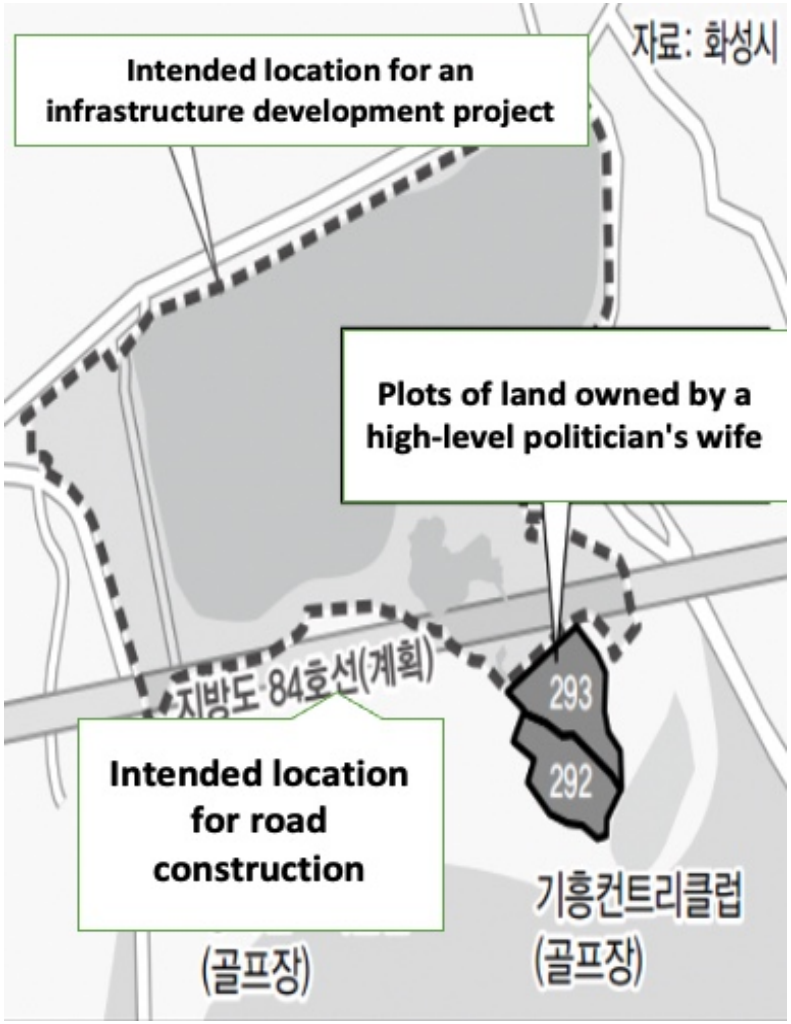

Research Question

- Are locations with incumbent politicians' real estate assets more likely to be developed?
  - Unique data sets and Close-election RD design
  - Find evidence of politicians distorting the location of infrastructure development.
    - Heterogeneity based on the distance from assets
    - Heterogeneity based on the type of politicians
    - Self-interest vs. Clientelistic behavior?

- How will the distortion (if any,) affect the distribution of city sizes in the long run?
  - City growth model by Desmet and Rossi-Hansberg (2013)
  - Show how much politicians' real estate assets can explain the size of cities.
    - Work in Progress

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  - Insider trading at private firms (Bourveau et al., 2021), provision of public goods (Cruz et al., 2020), labor market outcomes (Gagliarducci and Manacorda, 2020), public procurement (Schoenherr, 2019) and political careers (Folke et al., 2017).
  - Political connections affect economic growth through infrastructure development (Kahn et al., 2021; Kennedy, 2020; Bai et al., 2014)
  - I use close-election RD, to isolate the effect of exogenous formation of political power on the determination of infrastructure investment.
- (2) **Estimation of urban system model**
  - Geographic distribution of economic activity is shaped by productivity, amenity, and spatial frictions (Desmet & Rossi-Hansberg 2013; Behrens et al. 2017)
  - Models on the city-size distribution (Duranton 2007; Rossi-Hansberg & Wright 2007; and Córdoba 2008)
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- Background and Data
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- Close-Election RDD
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II. Background and Data

Background

- Since 1970s, South Korea relied heavily on government-led development projects to accommodate higher demand for housing units.
- Urban infrastructure provision
  - Public transportation, roads, utilities..
  - Land values would increase in the vicinity of the development sites
- Characteristics
  - Around 1,400 projects since 1970s.
  - Greatest part of the development areas was for residential purposes (48.3%).
  - Average project cost 692 mil USD, had a size of 1.16 km^2, which accommodated around 18,000 population.
- Rent-seeking
  - MPs have the ability to affect the development projects when incumbent
  - Other types of politicians don't (e.g. Local MPs), although they may have similar motivation

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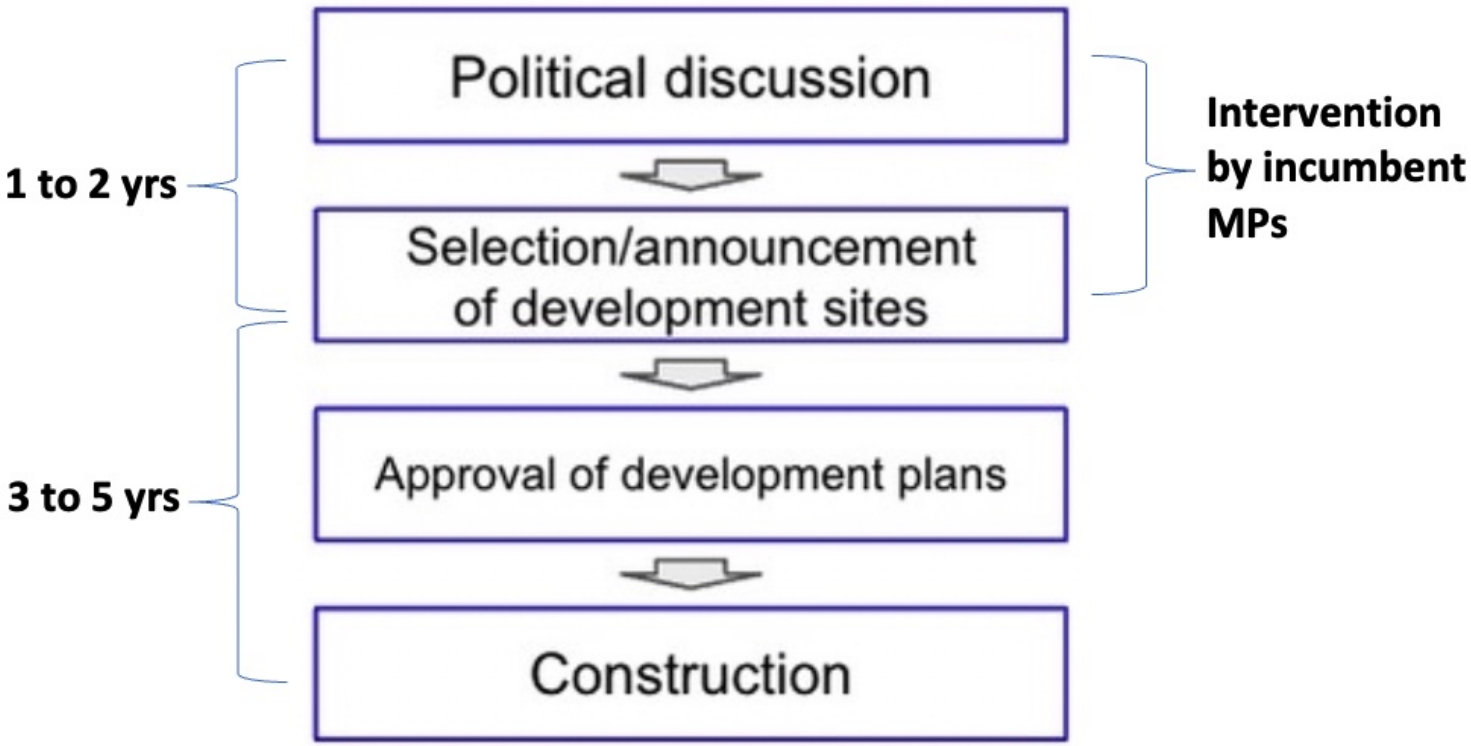
Administrative procedures for land development projects



Source: Ministry of Land, Infrastructure and Transport, 2022

Data

Politician Wealth Data (2011-2020) ▸ Appendix

- Unit of obs: Real estate asset (i,j,t)
- 9,671 real estate items (i), owned by 1,718 politicians (j) over 10 years (t)
- Politician type: MPs, Local MPs, Mayors
- Assets belonging to the politician, their spouse, parents, and children.
- Geo-codable locations

Land Development Project ▸ Appendix

- Unit of obs: Development project announcement (i,t)
- 332 announced projects (i) over 10 years (t)
- Location, announced date, perimeters

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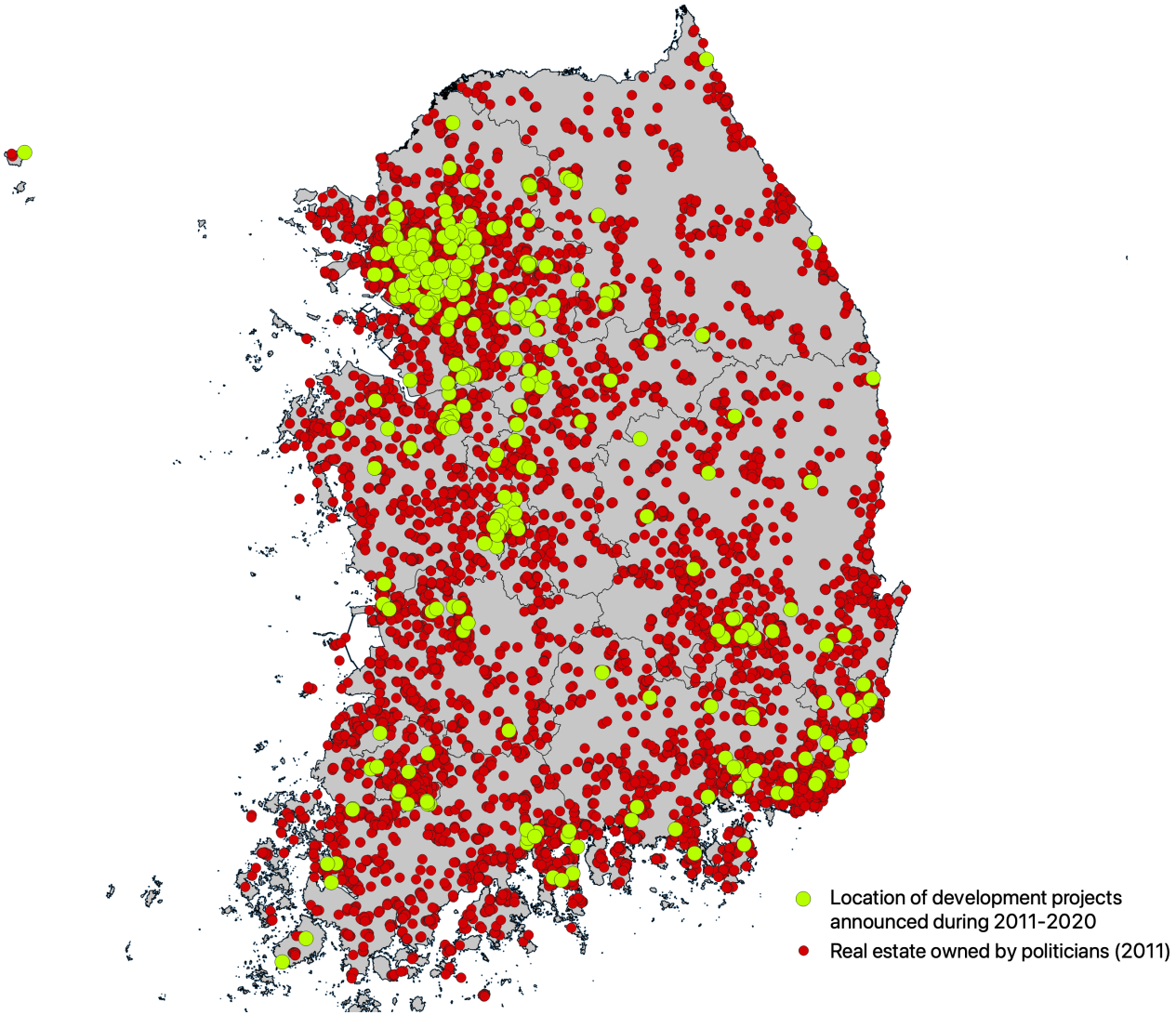
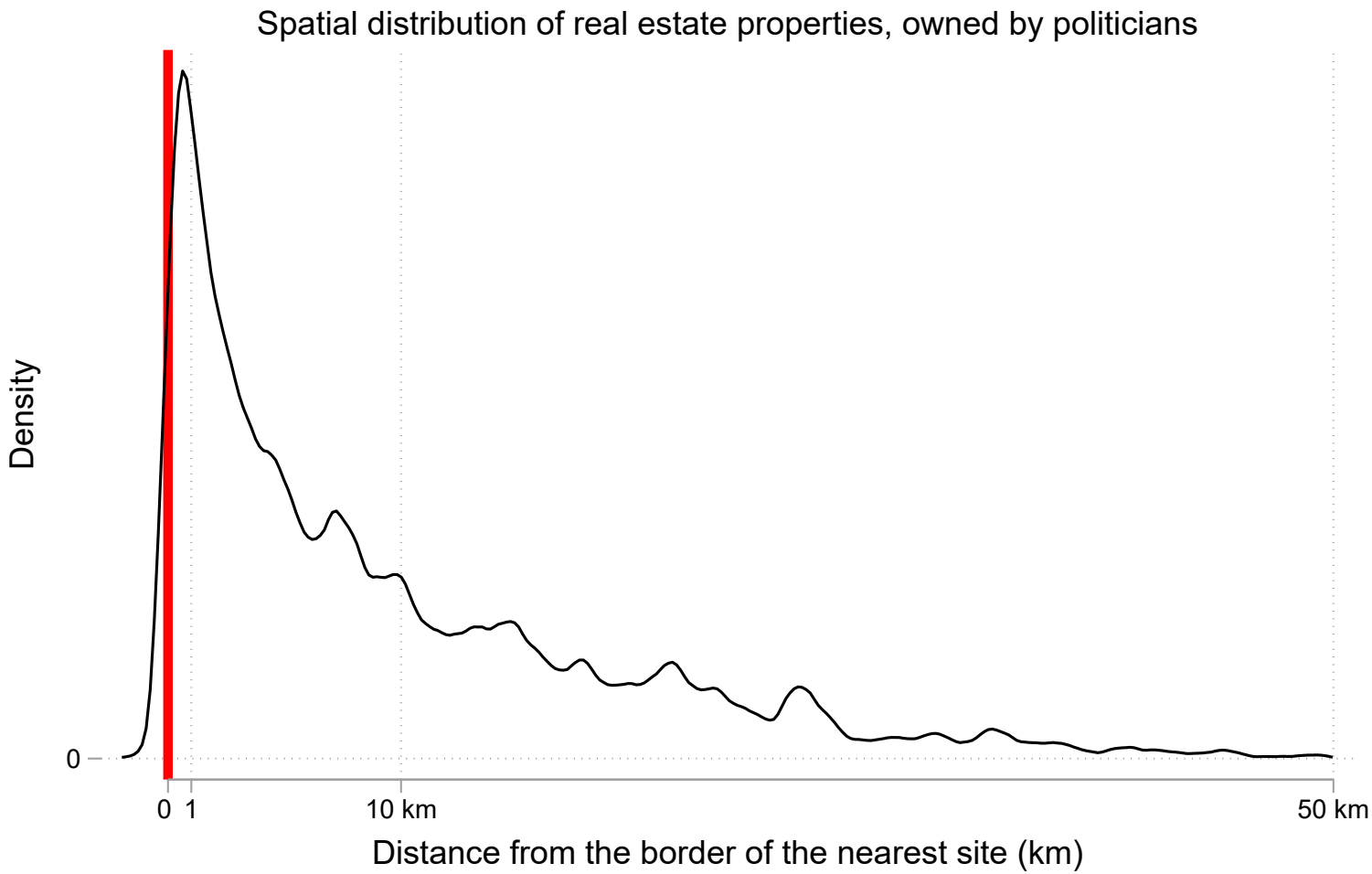
III. Descriptives

Significant part of politicians' wealth is real estate

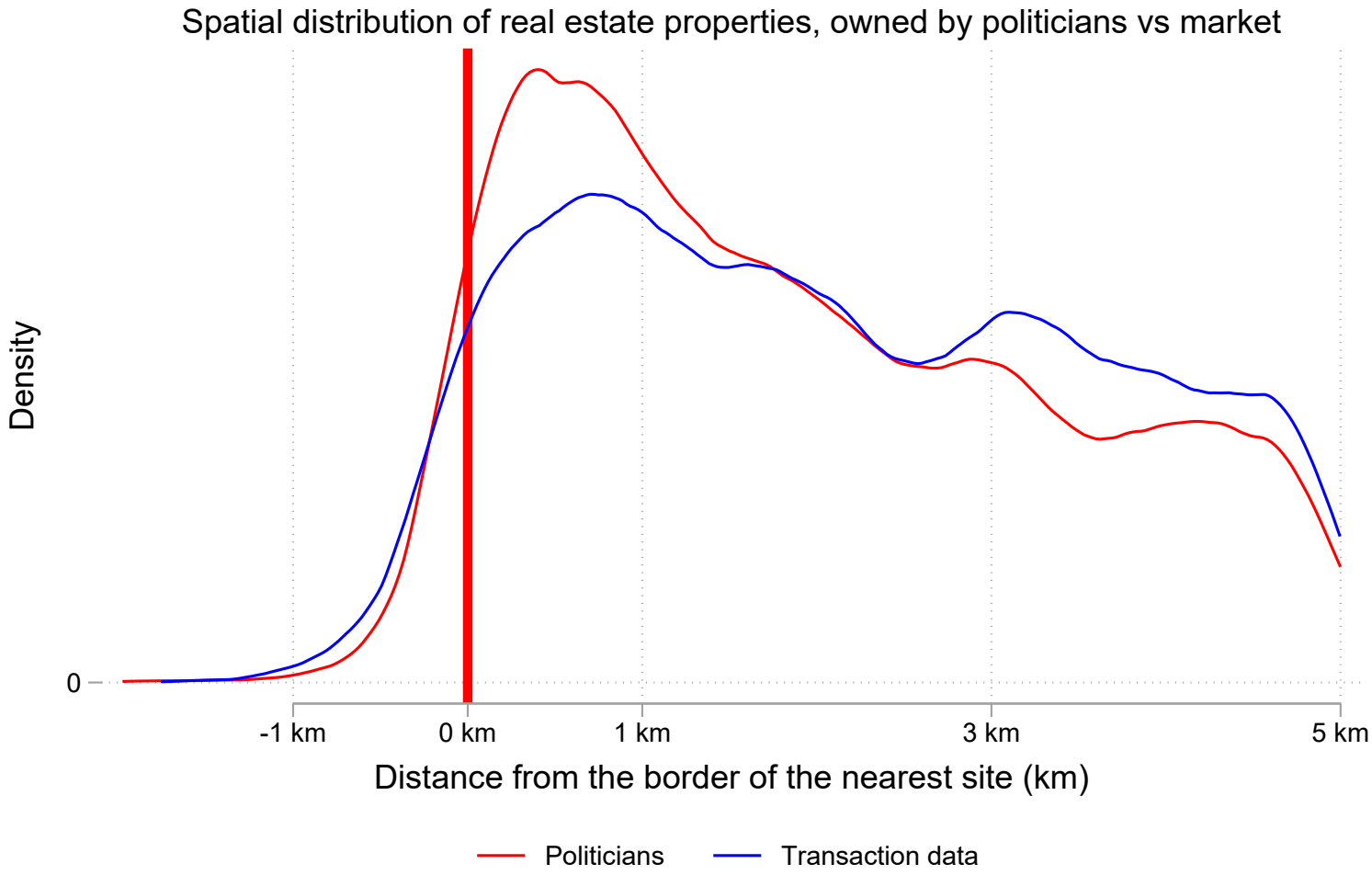
- On average, a politician is quite rich
  - has total net wealth of 1.49 mil USD (Average SK household wealth 0.22 mil USD),
  - which increases by 13% during their incumbency (average incumbency years: 4.33 years)
- Average composition of real estate assets
  - 59% of the total net wealth is real estate,
  - 79.6% of the real estate asset is building,
  - 7.66 real estate items on average (0.11 mil USD per asset)
  - 58.2% are registered under their own names (the rest under the names of closest family members)

Politicians' real estate assets are unusually close to the future development sites




Spatial distribution of real estate properties, owned by politicians
Density
0
0
1
10 km
50 km
Distance from the border of the nearest site (km)

Politicians' assets predict development projects better than the market



IV. Close-election Regression Discontinuity Design

Empirical strategy

Are places with incumbent politicians' assets more likely to be developed?

- Problems: Factors that affect the decision to own real estate in a certain location may vary, and many of these factors are not observable.
  - e.g. Incumbent politicians are more knowledgeable, so simply their assets have better predictability for potential infrastructure investments.
  - Need to isolate the effect of incumbency on infrastructure investment (assets owned by winners vs. losers)
  - But winning politicians and runner-up politicians have different unobserved characteristics.
- Exploit an exogenous shift in political status: **Close-election RD design**
  - Compare assets owned by election winners and runner-ups, who won/lost the election by a very small margin.
  - Among elections that turn out to be close, wins are considered as-if randomly assigned (Lee et al., 2004)

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Close-election RD design

- Asset(i)-Politician(j)-year(t) level analysis
- Does the likelihood of development plans announced near asset i increase *discontinuously* if the owner j wins the election (in year t) by a small margin?

$$y_{ijt} = \beta_1 Win_{jt} + \beta_2 VoteMargin_{jt} + \beta_3 VoteMargin_{jt} \times Win_{jt} + \varepsilon_{ijt}$$

  - y_{ijt}: dummy variable if a development plan is announced within 1 km vicinity of asset i owned by politician j within 4 years following the election year t.
  - $VoteMargin_{jt}$ refers to the difference in vote shares (%) between the winner and runner-up:
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Close election regression discontinuity design

- Data: 9,671 real estate items owned by 1,718 politicians during 2012-2020, 332 development projects announced during the same period. 4 waves of elections (2012,14,16,18)

- Exploring heterogeneity
  - **Distance**
    - Locations too far away from politicians' assets will not be affected
  - **Clientelism vs. Self-interest**
    - If these distortions are motivated by self-interests, RDD estimates will be stronger outside their constituencies.
  - **Politician type**
    - Distortive effects will be observed only for politicians who have the ability and information to do so (MPs)

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Result - RDD by politician type

	All			All, excluding primary residence		
	(1) 1km	(2) 2km	(3) 10km	(4) 1km	(5) 2km	(6) 10km
Panel 1: MPs						
Win	0.0705***	0.0502*	0.0191	0.0698***	0.0533**	-0.0045
	(0.0197)	(0.0249)	(0.0504)	(0.0224)	(0.0183)	(0.0595)
Obs.	965	965	787	952	952	768
Mean	0.08	0.16	0.85	0.09	0.16	0.85
Panel 2: Local MPs						
Win	0.0099	-0.0404	-0.0996	-0.0228	-0.0741*	-0.1410
	(0.0335)	(0.0360)	(0.0971)	(0.0306)	(0.0365)	(0.1119)
Obs.	1307	2088	726	1868	1848	525
Mean	0.04	0.12	0.66	0.05	0.12	0.66

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	(0.0335)	(0.0360)	(0.0971)	(0.0306)	(0.0365)	(0.1119)
Obs.	1307	2088	726	1868	1848	525
Mean	0.04	0.12	0.66	0.05	0.12	0.66

Dep var: Binary var. that takes 1 if a development plan is announced in n km vicinity of asset i within 4 years. ▸ RDD Plot

Result - RDD by politician type

	All			All, excluding primary residence		
	(1) 1km	(2) 2km	(3) 10km	(4) 1km	(5) 2km	(6) 10km
Panel 1: MPs						
Win	0.0705***	0.0502*	0.0191	0.0698***	0.0533**	-0.0045
	(0.0197)	(0.0249)	(0.0504)	(0.0224)	(0.0183)	(0.0595)
Obs.	965	965	787	952	952	768
Mean	0.08	0.16	0.85	0.09	0.16	0.85
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Result - RDD by geographical scope

	Assets within constituency			Assets outside constituency		
	(1) 1km	(2) 2km	(3) 10km	(4) 1km	(5) 2km	(6) 10km
Panel 3: MPs						
Win	0.0248	0.0673	0.0496	0.1515***	0.1064***	-0.2982
	(0.0306)	(0.0579)	(0.1468)	(0.0136)	(0.0215)	(0.2936)
Obs.	64	63	140	168	165	88
Mean	0.02	0.04	0.80	0.06	0.14	0.87

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Recap

- RDD result
  - Within 1 km vicinity, 7.1% higher chance to see a development plan announced within 4 years of election (Base: 8%)
- The estimated coefficient is larger
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  - for assets owned by MPs, not local MPs
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- Politicians' rent-seeking behavior $\rightarrow$ Urban development projects in sub-optimal locations
- What would urban development look like in Korea, had it not been for the political distortions?

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V. Urban growth model (Work in Progress)

Urban growth accounting

- Questions
  - Did this affect the distribution of city sizes during the 2011-2020 period?
  - How much different cities will gain/lose if we re-allocate infrastructure investment in a counterfactual South Korea?
- Urban growth accounting framework by Desmet and Rossi-Hansberg (2013)
- Idea: Decompose city size distribution: efficiency, **amenities**, & urban congestion wedge.
- Intuition
  - Higher efficiency, better amenities -> Larger cities
  - But they also engender larger frictions through congestion
  - Politicians' real estate items are located near congested cities
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Urban growth accounting (DRH, 2013 AER)

- Model
  - Setting: Multi-monocentric cities, single good. Workers are mobile. ▸ Model
    - Efficiency=TFP,
    - Congestion=cost to mitigate frictions
    - Amenity=residual part of the model to fit the size distribution of cities.

- Application to South Korean data
  - DRH model explains the size distribution of South Korean cities well (Original paper: US & China).
  - Estimated coefficients have signs and values predicted by the model.

- TBD
  - Further disaggregate the estimated "amenity wedge" into two: part explained by MP's assets vs. the rest.
  - Counterfactual analysis

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VI. Concluding Remarks

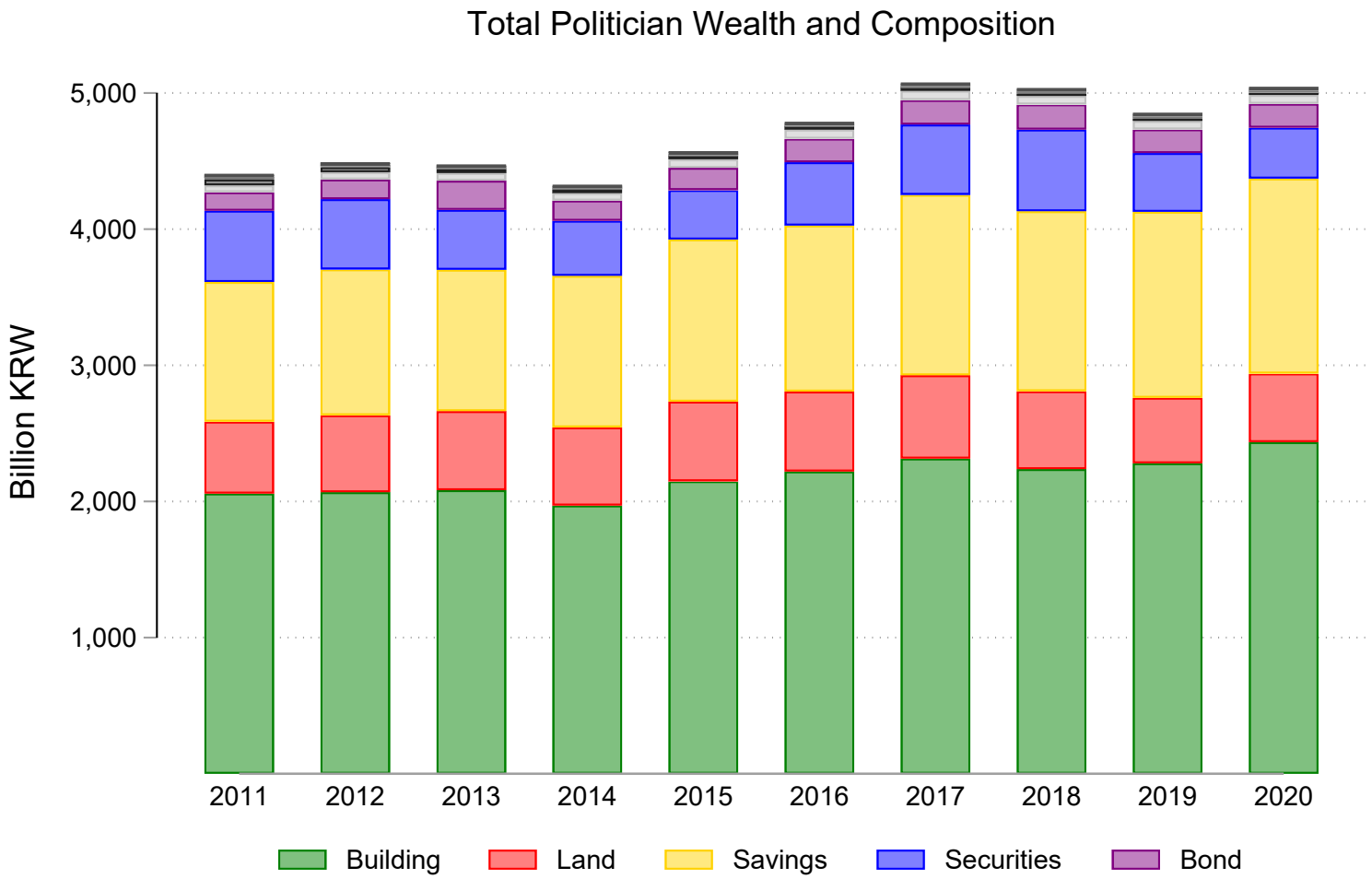
Summary and Next Steps

- Politicians' real estate assets bunch near the perimeter of urban development project sites.
- RDD result: Areas near real estate assets owned by incumbent politicians are more likely to be developed.
- (TBD) Use an urban growth model to show how much of the city size distribution can be accounted for by political distortions.

Appendix

Data

Data: Wealth Data (2011-2020)



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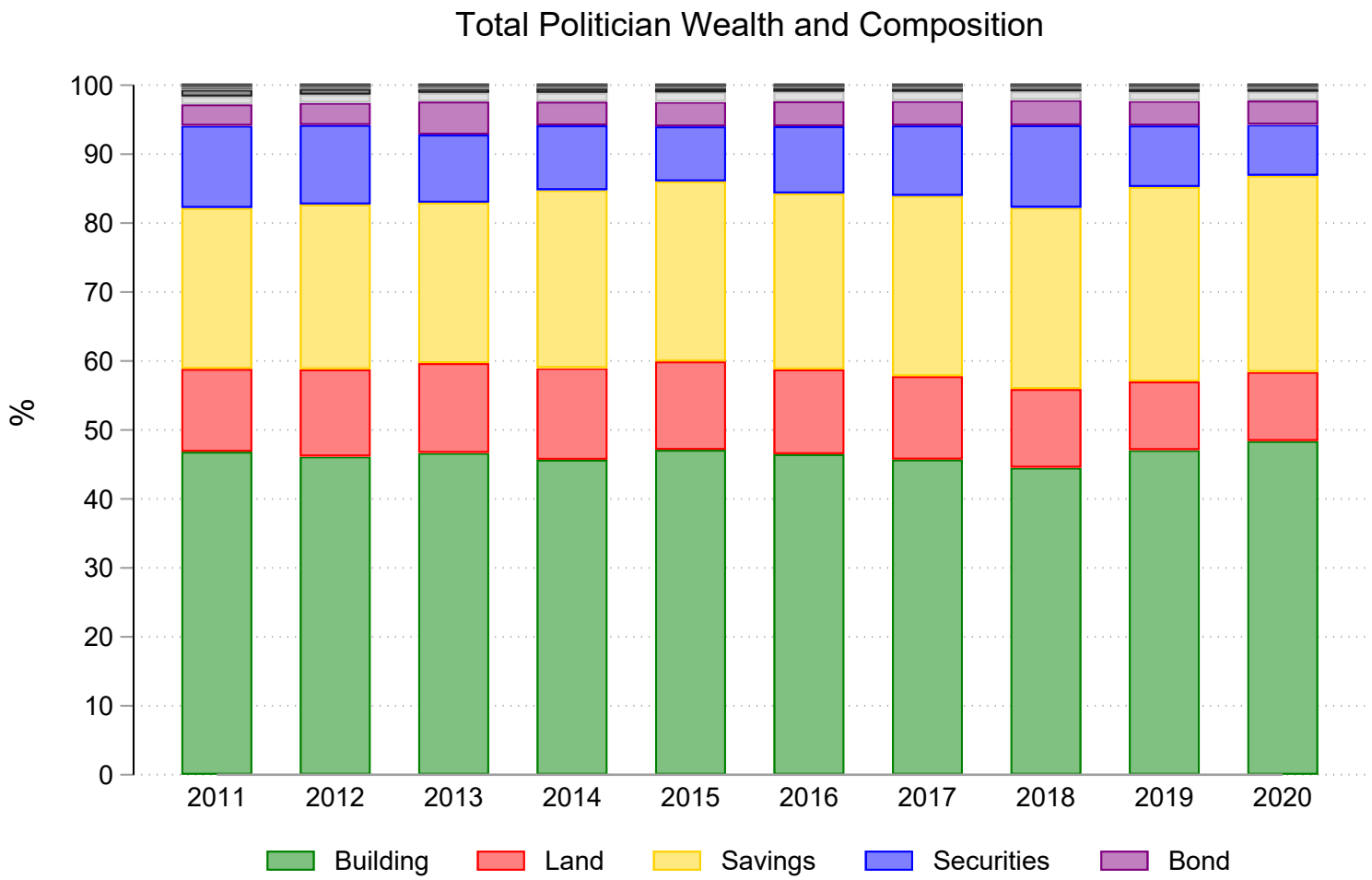

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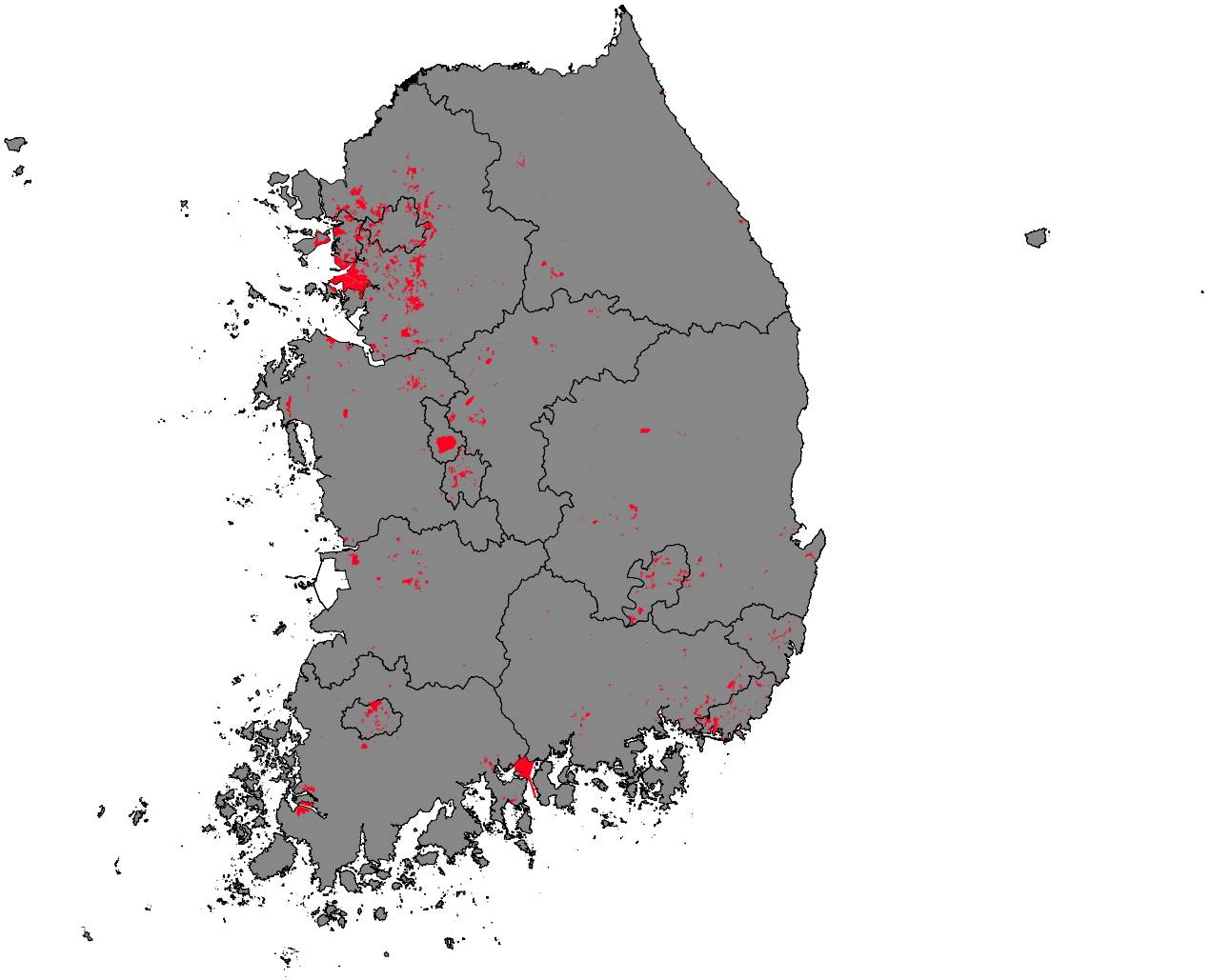
Data

Development projects (all years)



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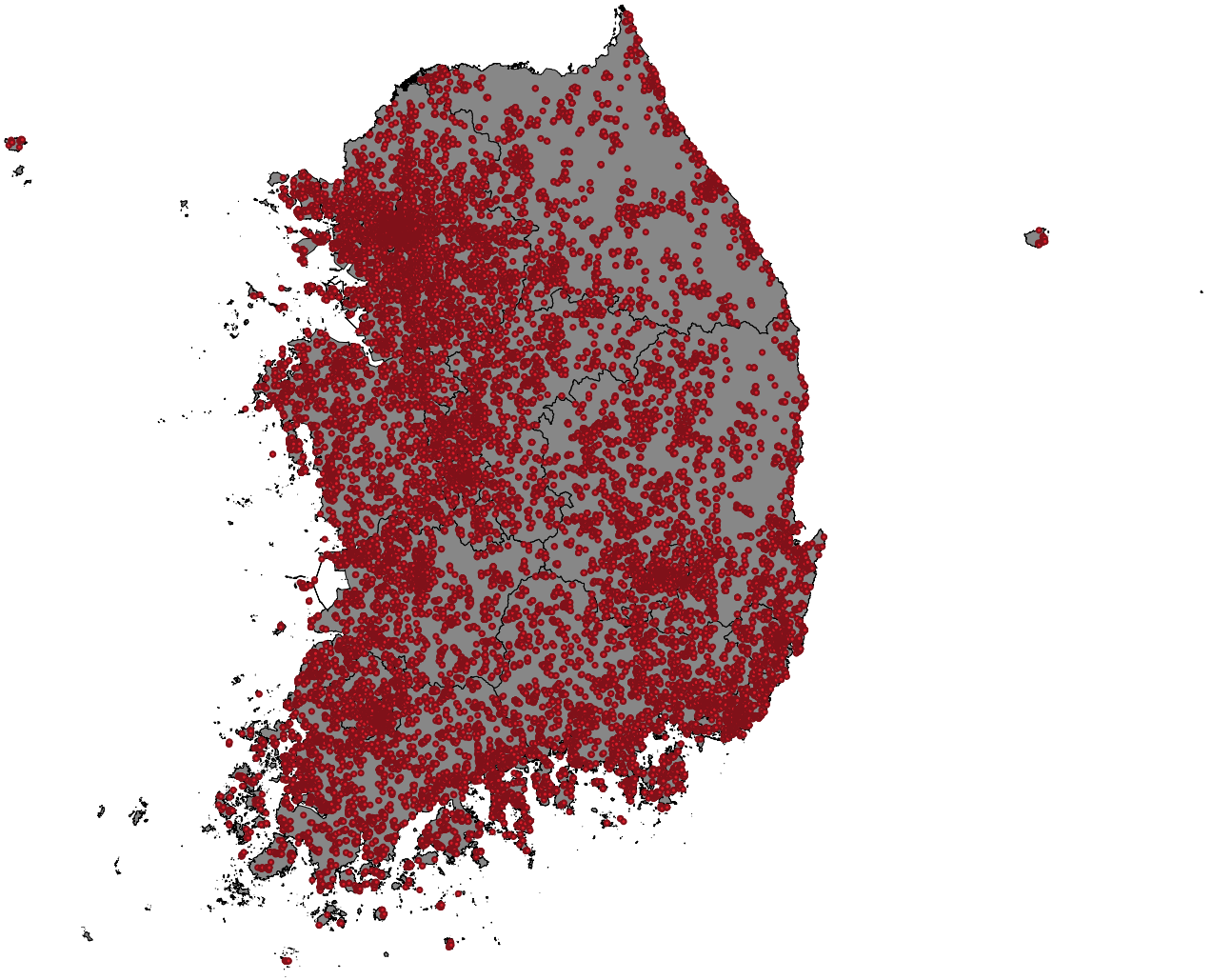

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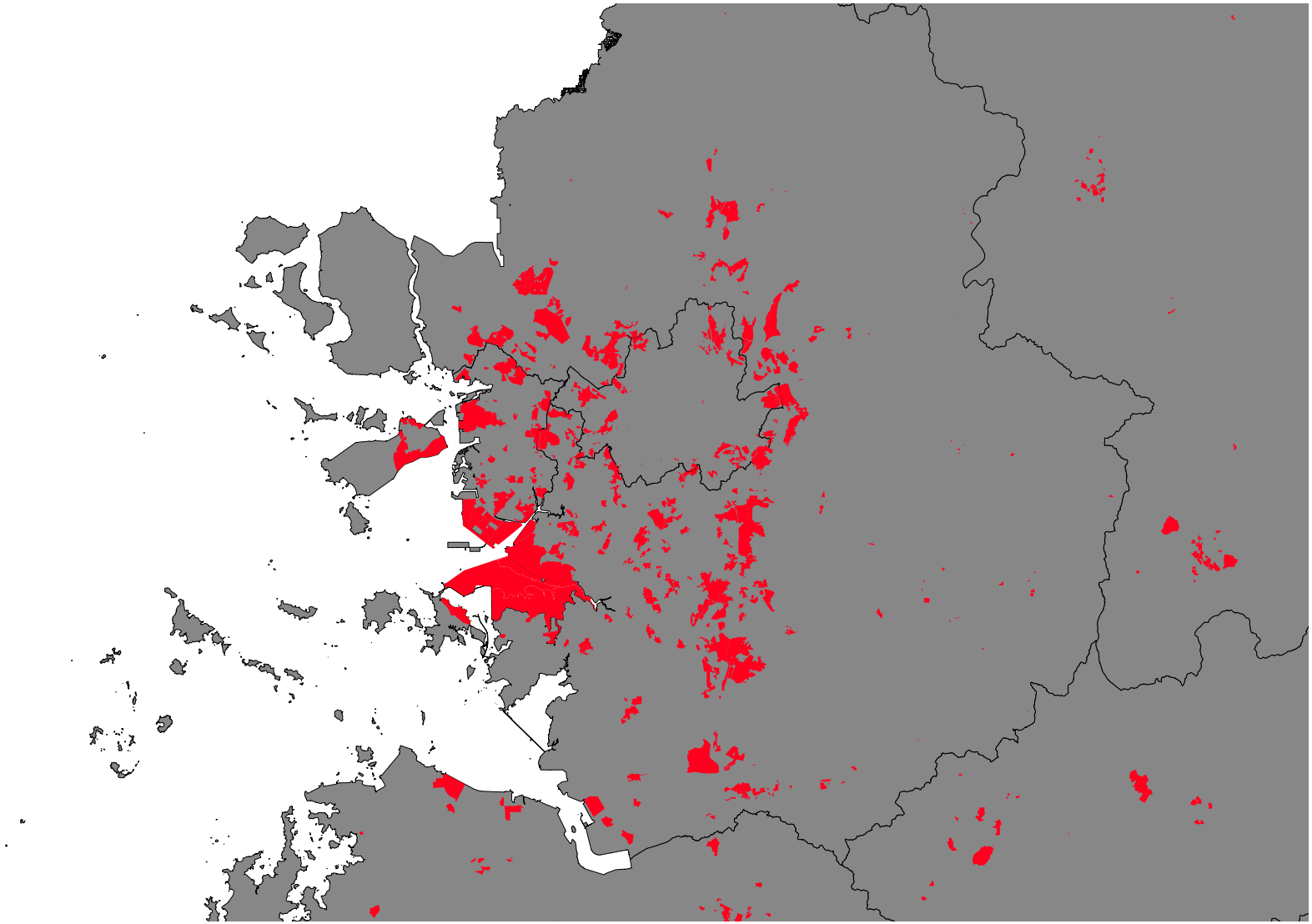

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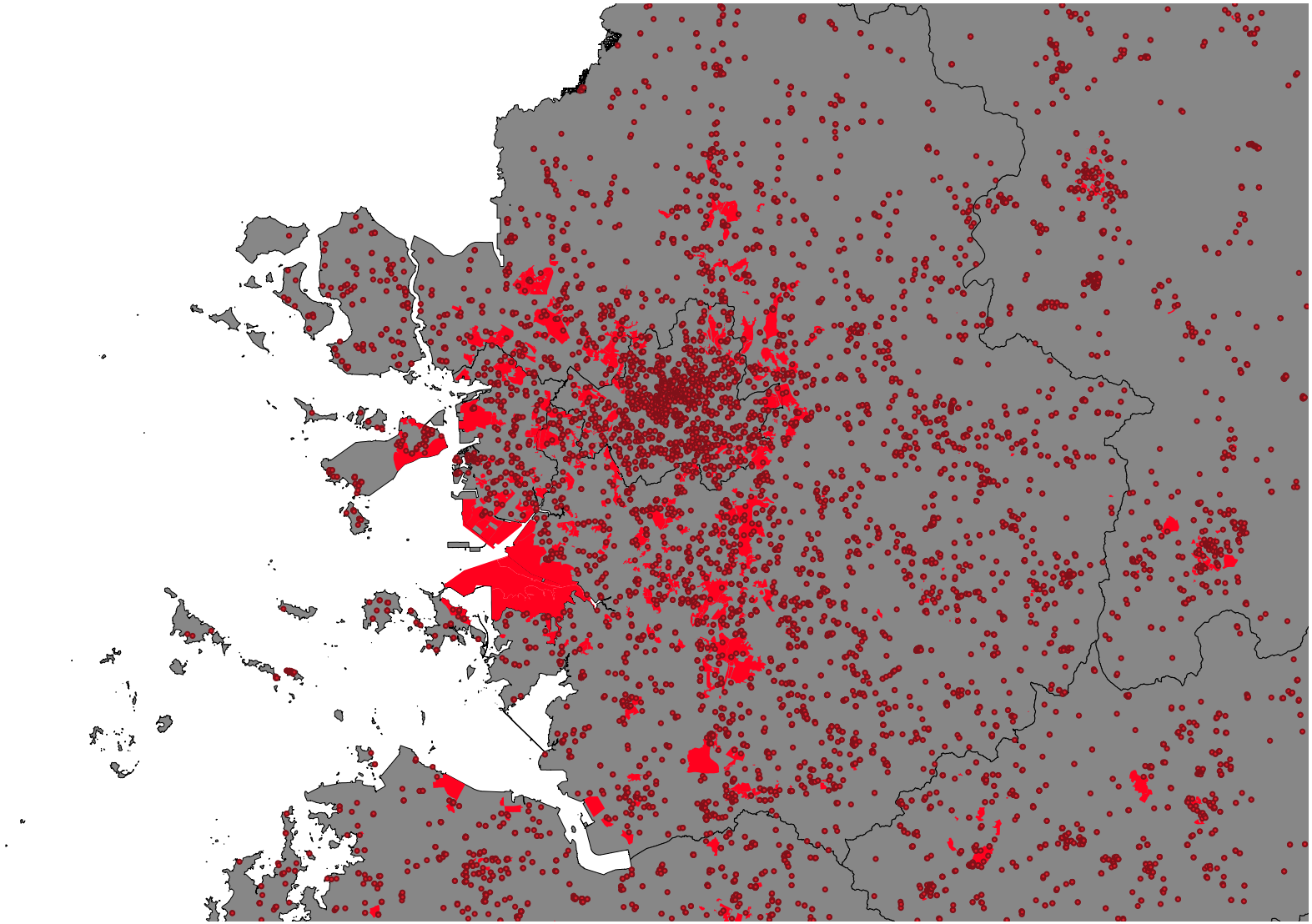
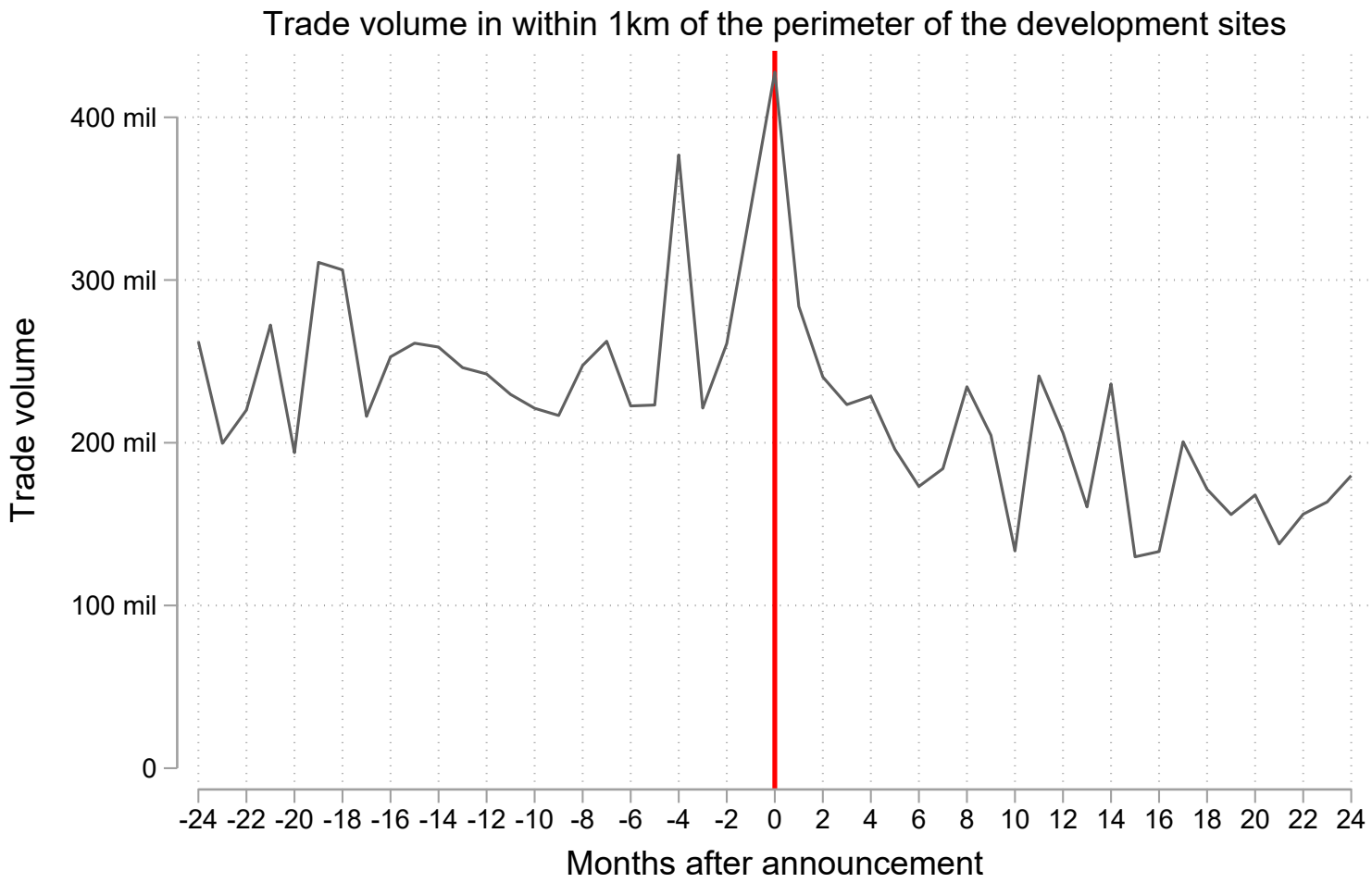


Data

Announcement and transaction volume



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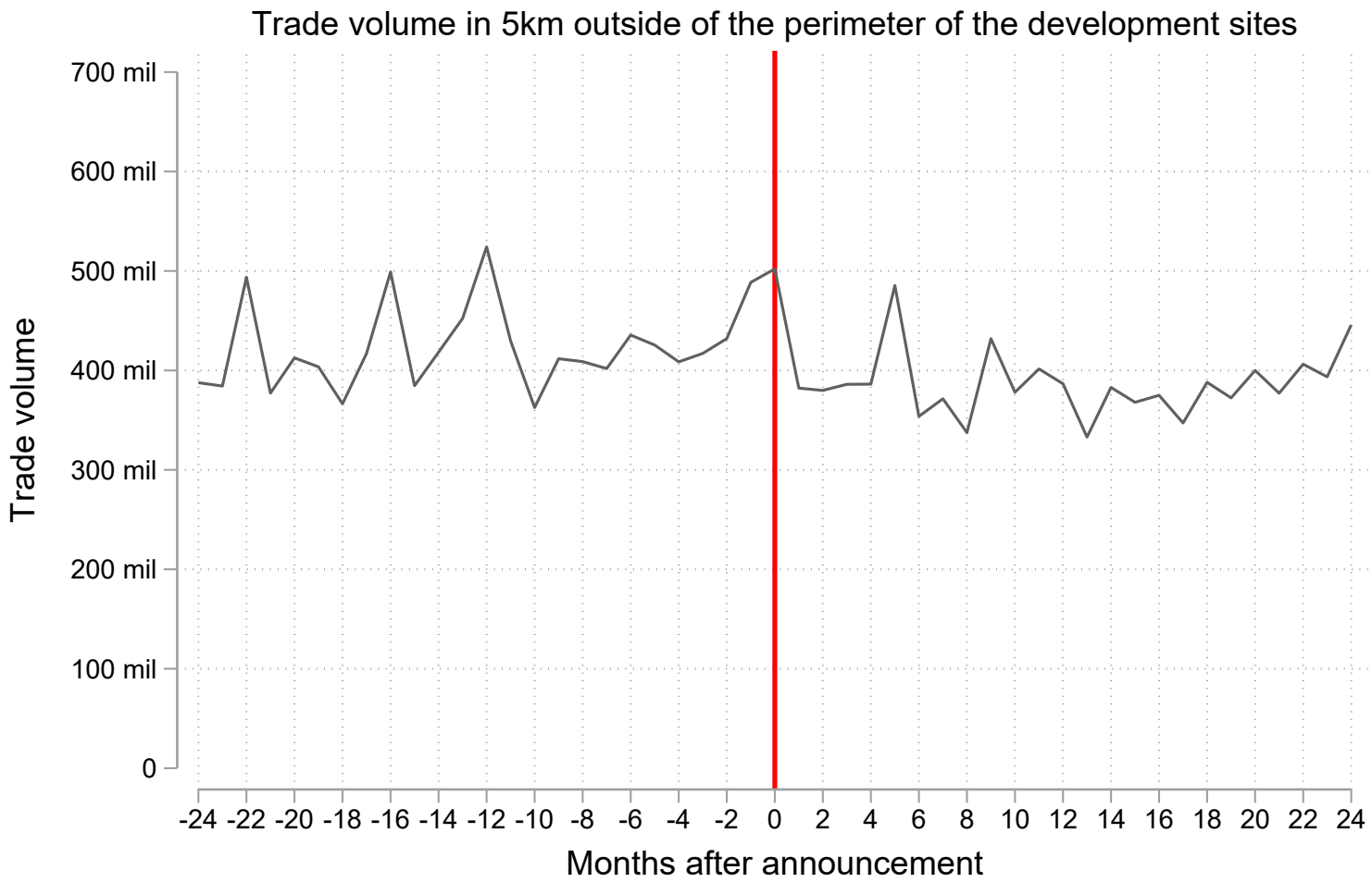

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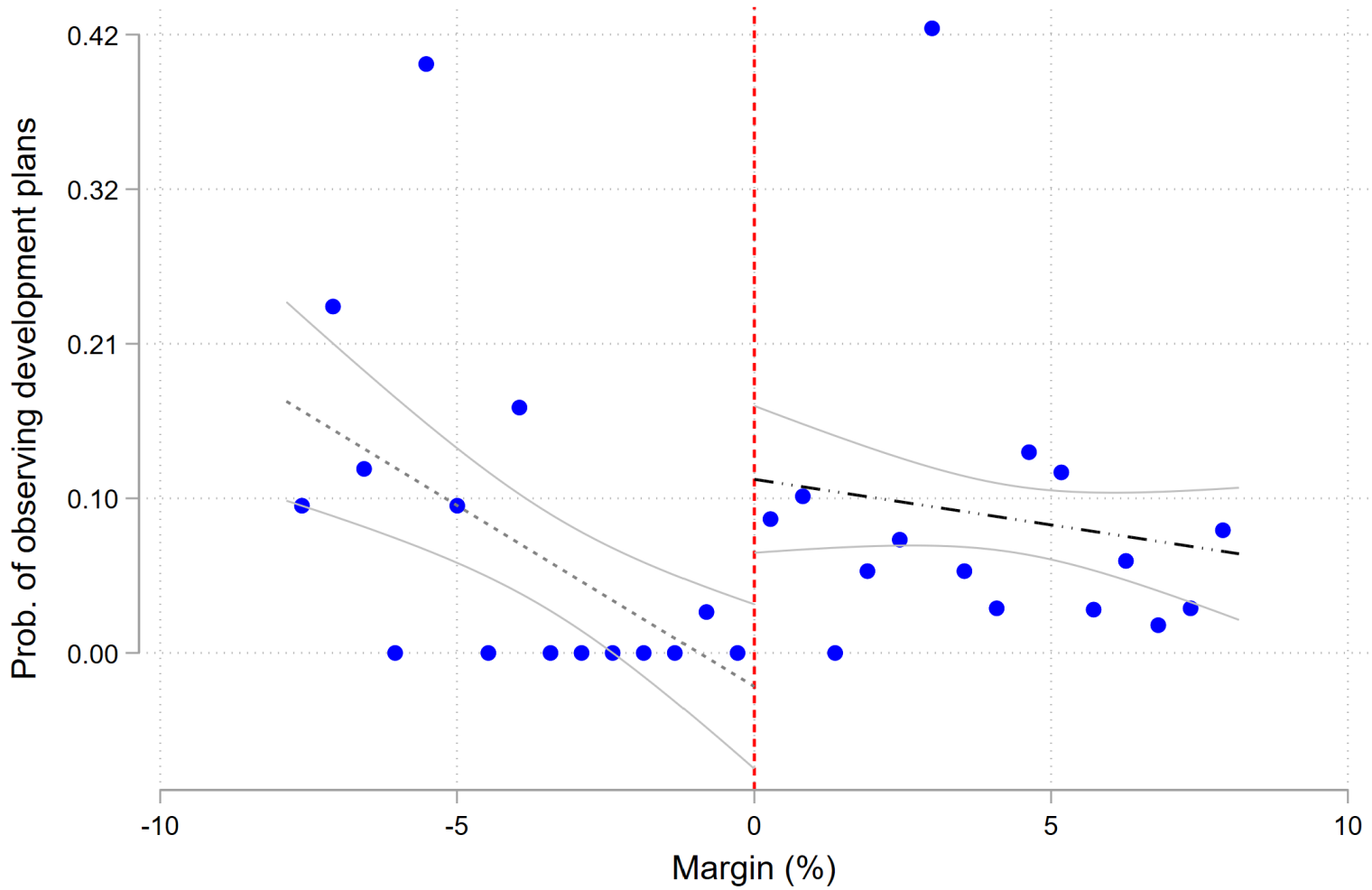
RDD plot



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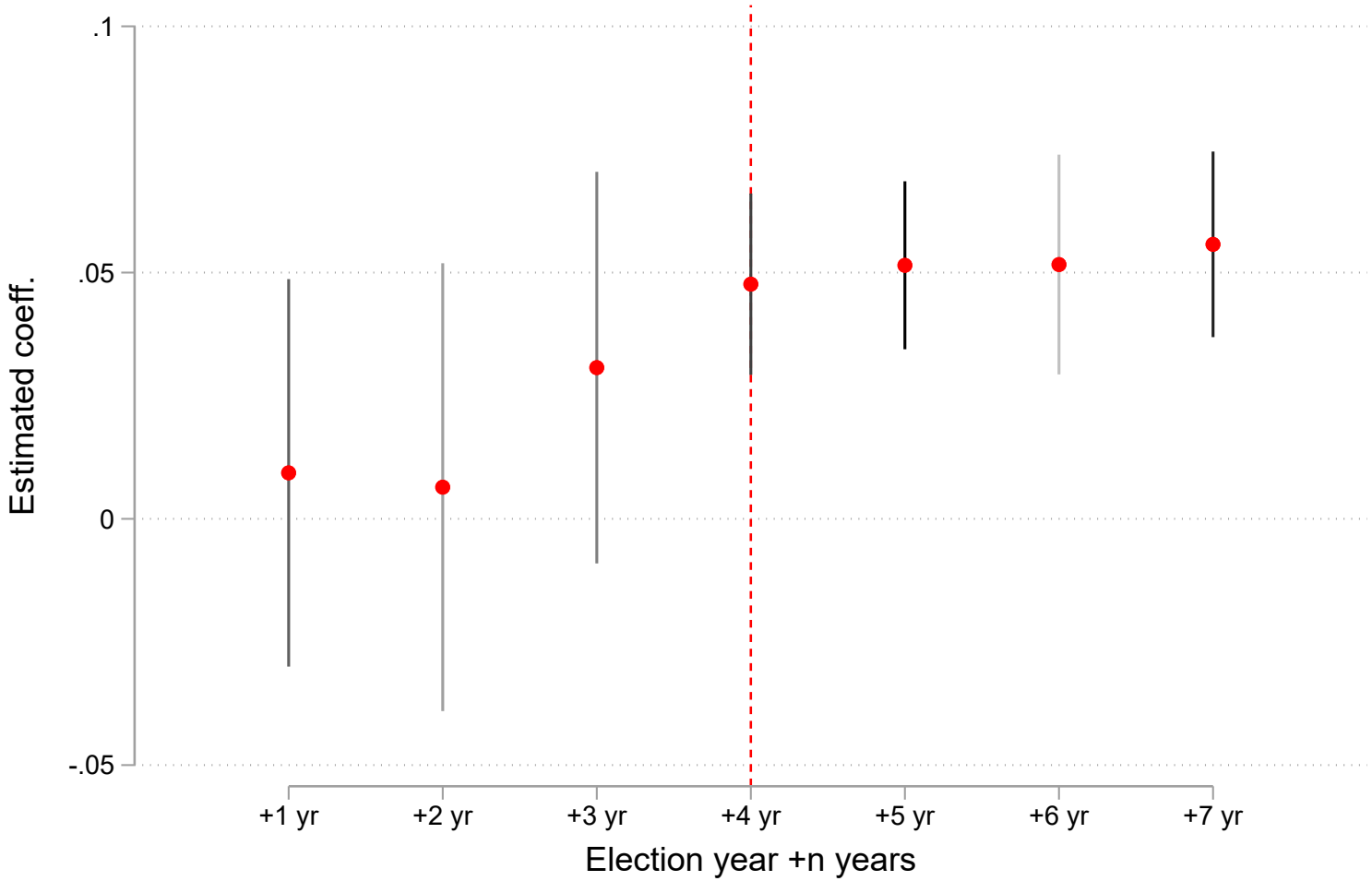
Result - Estimated coefficients for different time windows



Desmet & Rossi-Hansberg, 2013 AER

- Technology

$$Y_{it} = A_{it} K_{it}^{\theta} H_{it}^{1-\theta}$$

where we can write down the "efficiency wedge" as

$$A_{it} = \frac{y_{it}}{k_{it}^{\theta} h_{it}^{1-\theta}} \tag{1}$$

- An agent in city i with capital k faces the following maximization problem:

$$\max_{c_{i_t t}, h_{i_t t}, k_{i_t t}, i_t \infty_{t=0}} \sum_{t=0}^{\infty} \beta^t [\log c_{it} + \phi \log(1 - h_{it}) + \gamma_i]$$

subject to

$$c_{it} + x_{it} = r_t k_{it} + w_{it} h_{it} (1 - \tau_{it}) - R_{it} - T_{it}$$

$$k_{it+1} = (1 - \delta) k_{it} + x_{it}$$

where x_{it} is investment, τ_{it} is friction cost of building the commuting infrastructure, R_{it} are rents, T_{it} are commuting costs

Desmet & Rossi-Hansberg, 2013 AER

- (Continued) which simplifies to

$$(1-\tau_{it}) = \frac{\phi}{(1-\theta)} \frac{c_{it}}{1-h_{it}} \frac{h_{it}}{y_{it}} \tag{2}$$

- Commuting costs, Land rents, city equilibrium, with monocentric, and areas are defined by the distance to the center d and per mile commuting costs κ

$$R_{it}(d) + T(d) = T(\bar{d_{it}}) = \kappa \bar{d_{it}}$$

for all

$$d \in [0, \bar{d_{it}}]$$

since the total cost of rent plus commuting costs should be identical in all areas of the city for all identical agents in the city

Desmet & Rossi-Hansberg, 2013 AER

- (Continued) Everyone lives on one unit of land, $N_{it} = \bar{d_{it}}^2 \pi$, hence

$$R_{it}(d) + T(d) = \kappa(\frac{N_{it}}{\pi})^(\frac{1}{2})$$

where total rent (TR) and average rent (AR) is given by

$$TR = \int_0^{\bar{d}_{it}} (\kappa(\bar{d}_{it} - d)d2\pi)dd = \frac{\kappa}{3}\pi^{-\frac{1}{2}} N_{it}^{\frac{3}{2}}$$

$$AR = \frac{2\kappa}{3}(\frac{N_{it}}{\pi})^{\frac{1}{2}}$$

Taking logs and rearranging the terms,

$$ln(N_{it}) = o_1 + 2lnAR_{it} \tag{3}$$

Desmet & Rossi-Hansberg, 2013 AER

- Government budget constraint, where g_{it} is a measure of government inefficiency

$$G(h_{it}w_{it}, TC_{it}) = g_{it}h_{it}w_{it}\kappa TC_{it}$$

Re-arranging and taking log,

$$ln(\tau_{it}) = o_2 + ln(g_{it}) + \frac{1}{2}ln(N_{it}) \tag{4}$$

- Taking all things into account, at the equilibrium,
  - $\frac{dN_{it}}{dA_{it}} > 0$, $\frac{dN_{it}}{d\gamma_i} > 0$ and $\frac{dN_{it}}{dg_{it}} < 0$
  - Population increases in a more productive city or a city with more amenities, but it decreases in a city with a less efficient government

Desmet & Rossi-Hansberg, 2013 AER

- Estimate the coefficients of the previous equation (1), (2), (3), (4) and (5)

$$lnN_{it} = \alpha_1 + \beta_1 lnA_{it} + \varepsilon_{1it}$$

$$ln\tau_{it} = \alpha_2 + \beta_2 ln\tilde{N}_{it}(A_{it}) + \varepsilon_{2it}$$

$$ln(AR_{it}) = \alpha_3 + \beta_3 ln\tilde{\tau_{it}} + \beta_4 \varepsilon_{1it} + \beta_5 \varepsilon_{2it} + \varepsilon_{3it}$$

$$ln(N_{it}) = \alpha_4 + \beta_6 lnAR_{it} + \varepsilon_{4it}$$

- where the theory predicts that $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$, $\beta_5 < 0$ and $\beta_6 = 2$

City size distribution

Size of Si/Gun/Gu by city area population in 2010

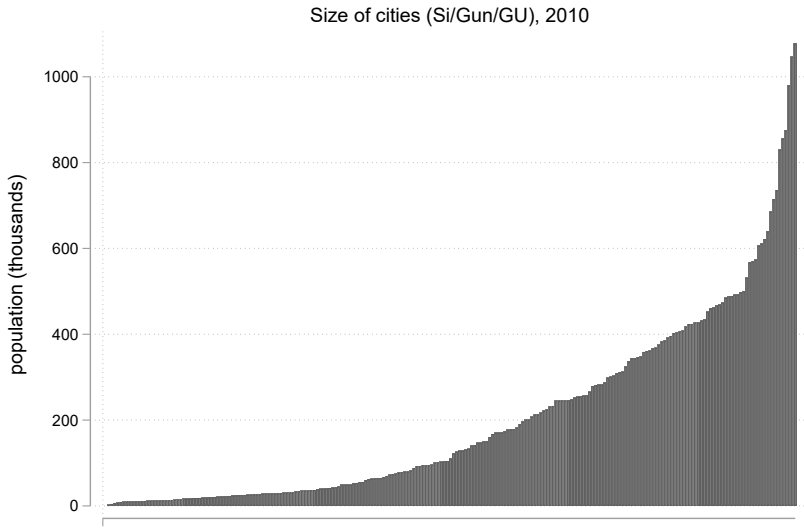


Figure: City (SGG) sizes

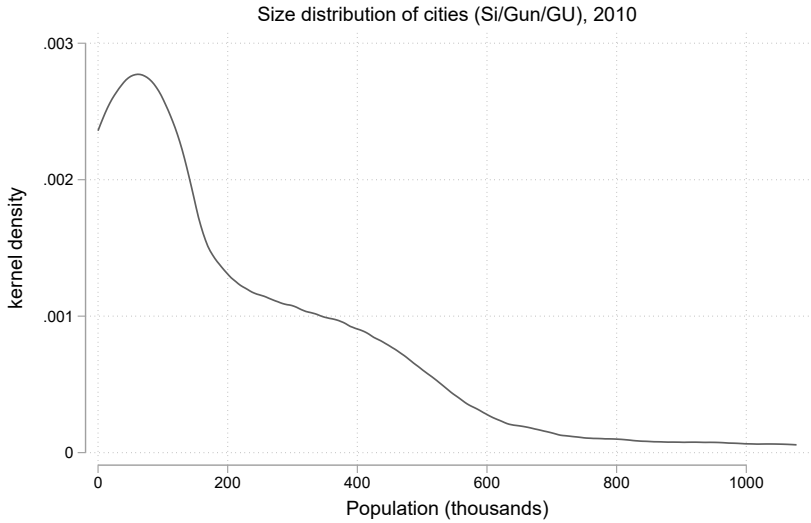


Figure: Kernel density of city size