

Subsidized Housing as a Place-Based Policy: Evidence from South Africa

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Slums and Development

- ▶ Slum externalities → lasting poverty traps (Marx, 2013)
 - ▶ Poor infrastructure, high crime, health externalities
 - ▶ Weak incentives to invest in housing/public goods
- ▶ **Public Housing** → primary government response

① Direct Recipient Impacts

- ▶ Health, Wellbeing, Employment, Redistribution
(Cateneo et al. [2009], Franklin et al. [2016], Galiani et al. [2017])

② Neighborhood Development

- ▶ “combating crime, promoting social cohesion... spatial restructuring”
South Africa Dept. of Human Settlements
- ▶ Little research on spillovers (Diamond and McQuade (2016))

▶ **Question**

What are the spillovers from public housing in developing contexts?

This Paper

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What are the spillovers from public housing in developing contexts?

- ▶ **Positive:** Incentivize investments in housing/public goods
- ▶ **Negative:** Crowd in slum growth

- ▶ **Approach**

Leverage precise timing/geography of large housing projects

- ▶ **New Data and Setting**

172 projects in South Africa combined with GPS property transactions and slum growth data

- ▶ **Initial Findings**

Housing projects depress home prices by 5% within 300 meters

- ▶ heterogeneity
- ▶ ballpark estimates

Public Housing in South Africa

- ▶ Over 4.3 million houses since 1994 (13% of pop.)
 - ▶ 50 to 500 houses per project
- ▶ Who gets a house?
 - ▶ Official Policy:
 - ▶ National/provincial waiting lists
 - ▶ No resale within 7 years
 - ▶ Citizens, new homeowners, married or dependents, inc/month <R3,500
 - ▶ In Practice:
 - ▶ Waiting lists/eligibility weakly enforced
 - ▶ Only 82% of houses occupied by initial owners within 5 yrs

Where are these houses built?

- ① **Greenfield projects** on undeveloped land near slums
- ② **In-Situ upgrading** replacing existing slums
 - ▶ insert picture here
 - ▶ Projects are fully serviced (roads, water, sanitation, electricity)

Conceptual Framework: Public Housing Impacts

- ① **Amenity Effect:** Upgrading housing stock/services
 - ▶ Increase value of neighboring homes (Rossi-Hansberg [2010])
- ② **Crowd-In Slums:** Reduce costs of informal housing
 - ▶ Overburden services, health/crime externalities
 - ▶ Reduce value of nearby houses
- ③ **Demographic Effect:** New people in the neighborhood
 - ▶ Taste-based discrimination (Diamond and McQuade [2016])

Measuring Public Housing and Spillovers

- ▶ Focus on Gauteng Province (includes Johannesburg and Pretoria)
- ① **Property Transactions** measure housing projects and price impacts
 - ▶ 500,000 deeds records (bottom 20% of formal housing market)
 - ▶ Buyer/seller name, GPS, price, date from 2002-2011
- ② **Building Census** identifies slum-growth and in-situ upgrading
 - ▶ 4 mil. residential buildings (50% informal) GPS in 2001 and 2011
- ③ **Population Census** measures demographic and economic impacts
 - ▶ Full census for 18,000 census blocks in 2001 and 2011
- ④ **Administrative Data** map projects (construction dates and costs)
 - ▶ Not comprehensive
 - ▶ Includes planned but unconstructed projects

Identifying Housing Projects

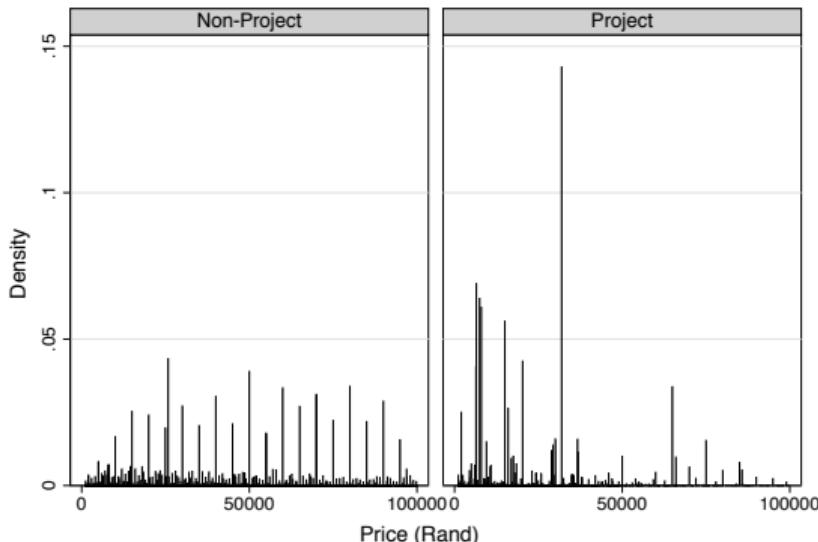
- ① **Seller Identity:** match government names and housing authorities in seller-names from transactions

Figure: Top 5 Seller Names

Seller Name	Observations
Ekurhuleni Metropolitan Municipality	40,665
City Of Johannesburg Metropolitan Municipality	28,097
City Of Johannesburg	22,736
City Of Tshwane Metropolitan Municipality	22,367
Gauteng Provincial Housing Advisory Board	6,124
Total Observations	537,661

Identifying Housing Projects

- ① **Seller Identity:** match government names and housing authorities in seller-names from transactions
 - ② **Subsidy Value:** exclude purchase prices R50,000 above subsidy value
- Figure: Purchase Price Densities

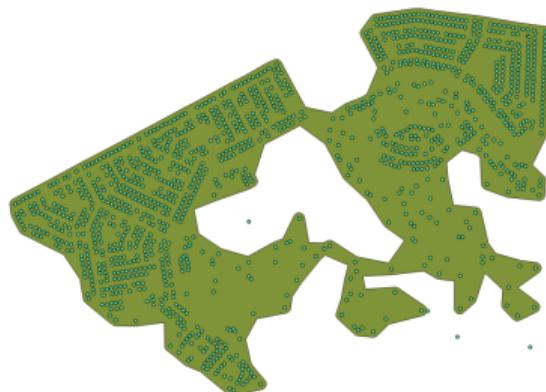


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- ④ **Spatial Clustering:** collect nearby houses into projects with density-based clustering algorithm



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 - ④ **Spatial Clustering:** collect nearby houses into projects with density-based clustering algorithm
 - ⑤ **Temporal Clustering:** include clusters with >50% of transactions during modal year
- ▶ Overlaps well with completed projects from admin. data

Identifying Planned but Unconstructed Projects

- ① Admin. data have “planned,” “proposed,” “implementing” projects
 - ▶ Exclude projects with identified project transactions
- ② Assign projects an expected completion date
 - ▶ Fuzzy-string match budget data (with start-dates) on project names
 - ▶ Add avg. diff. between transaction-date and start-date for completed projects
- ▶ Why are projects canceled/delayed?
 - ▶ Legal disputes, service delivery backlogs, funding complications
 - ▶ Delays often exceed 12 years

Housing Projects

Table: Housing Projects and Building Growth

	Completed	Uncompleted
Formal Density: 2001	242.5	293.1
Formal Density: 2011	1,321.2	880.1
Informal Density: 2001	387.3	1,720.1
Informal Density: 2011	875.9	2,437.7
Median Year (est.)	2006	2006
Total Projects	80	159

Density is building number per square kilometer.

Housing Price Descriptives

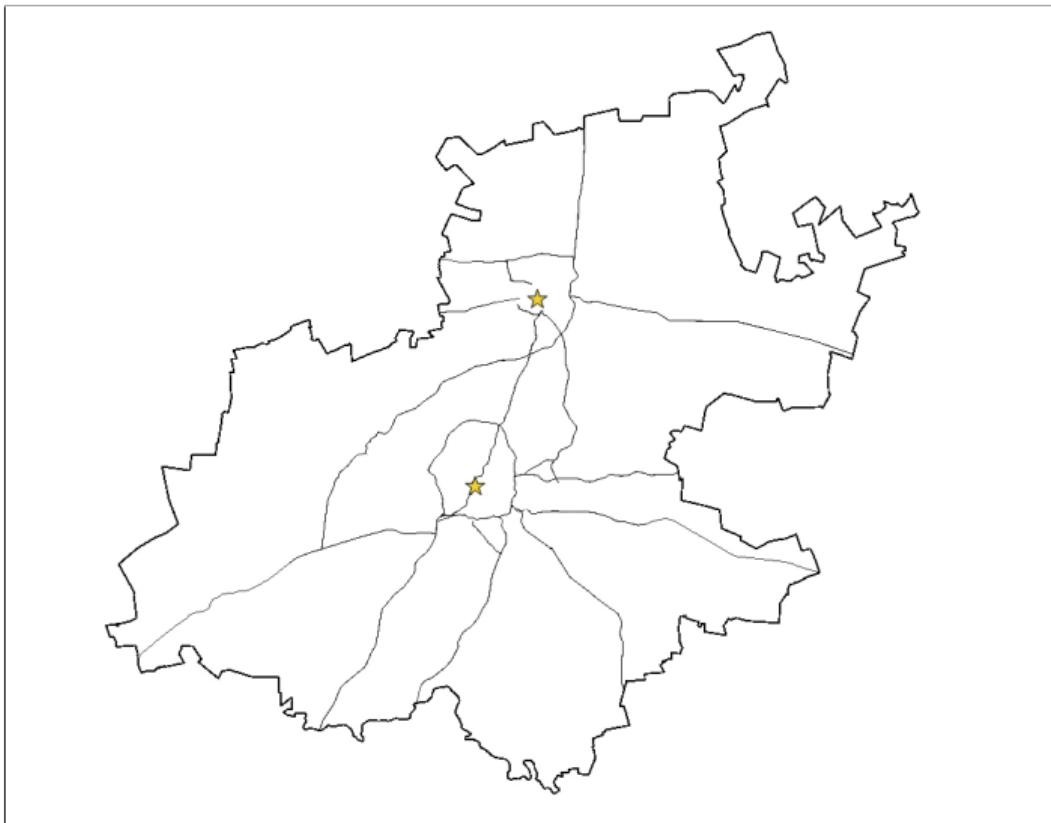
Table: Price Descriptives

	Completed Project	Completed Buffer (<1.2 km)	Uncompleted Project	Uncompleted Buffer (<1.2 km)	Other
Purchase Price (Rand)	24,421.2 [21,999.5]	181,435.7 [149,871.1]	164,106.1 [113,829.7]	164,700.8 [147,593.1]	168,848.8 [169,768.3]
Plot Size (m ³)	280.9 [127.7]	389.7 [1,019.8]	299.4 [592.2]	469.0 [1,136.7]	772.0 [2,606.0]
Sold At Least Once	0.136	0.413	0.582	0.537	0.319
Median Purchase Year	2005	2006	2007	2006	2006
Observations	39,048	113,223	11,288	99,745	138,567

Census Descriptives

	In Buffer but No Overlap		0% < Overlap ≤ 50%		50% < Overlap	
	Completed	Uncompleted	Completed	Uncompleted	Completed	Uncompleted
Flush Toilet: 2001	0.78	0.84	0.74	0.66	0.69	0.16
Flush Toilet: 2011	0.79	0.90	0.86	0.74	0.93	0.23
Piped Water: 2001	0.39	0.36	0.38	0.31	0.23	0.09
Piped Water: 2011	0.52	0.54	0.57	0.47	0.52	0.17
Owner: 2001	0.48	0.52	0.51	0.41	0.44	0.39
Owner: 2011	0.73	0.78	0.76	0.63	0.73	0.56
House: 2001	0.50	0.56	0.52	0.41	0.35	0.32
House: 2011	0.52	0.63	0.61	0.54	0.64	0.32
Rooms: 2001	3.30	3.39	3.16	3.14	2.85	3.01
Rooms: 2011	3.44	3.57	3.49	3.49	3.32	3.12
Observations	1,196,080	996,443	356,975	131,708	567,633	225,675

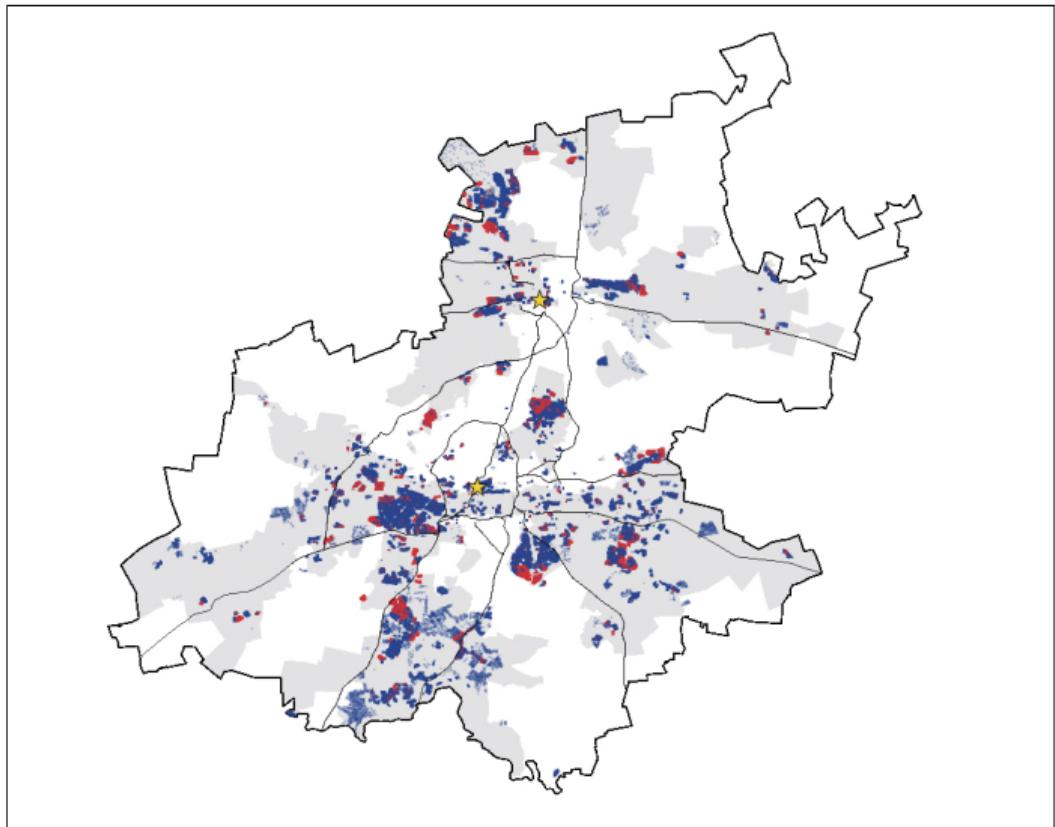
Census Areas Exposure Measures



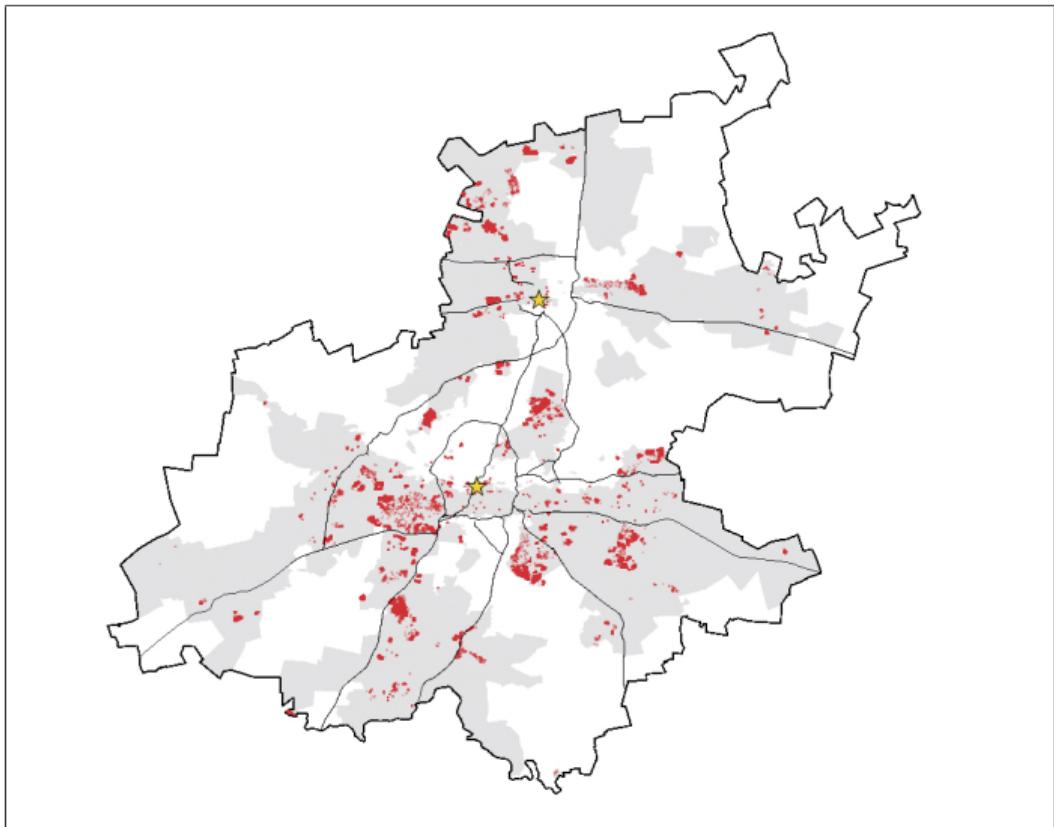
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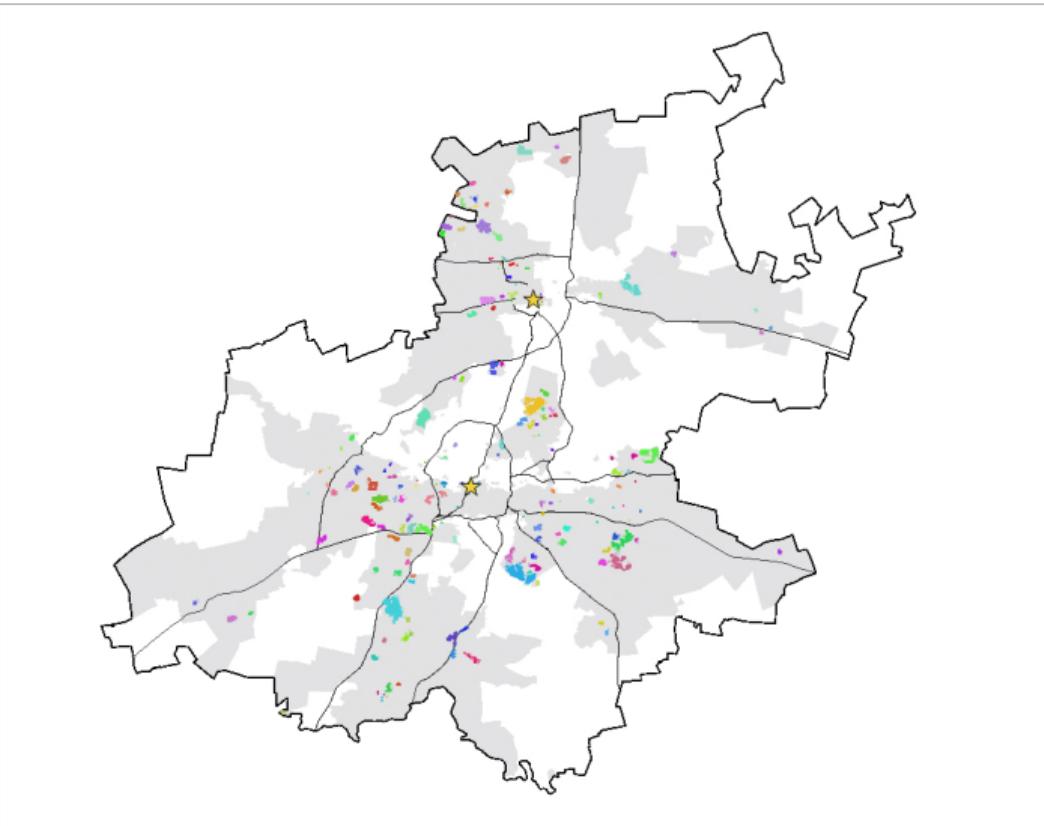
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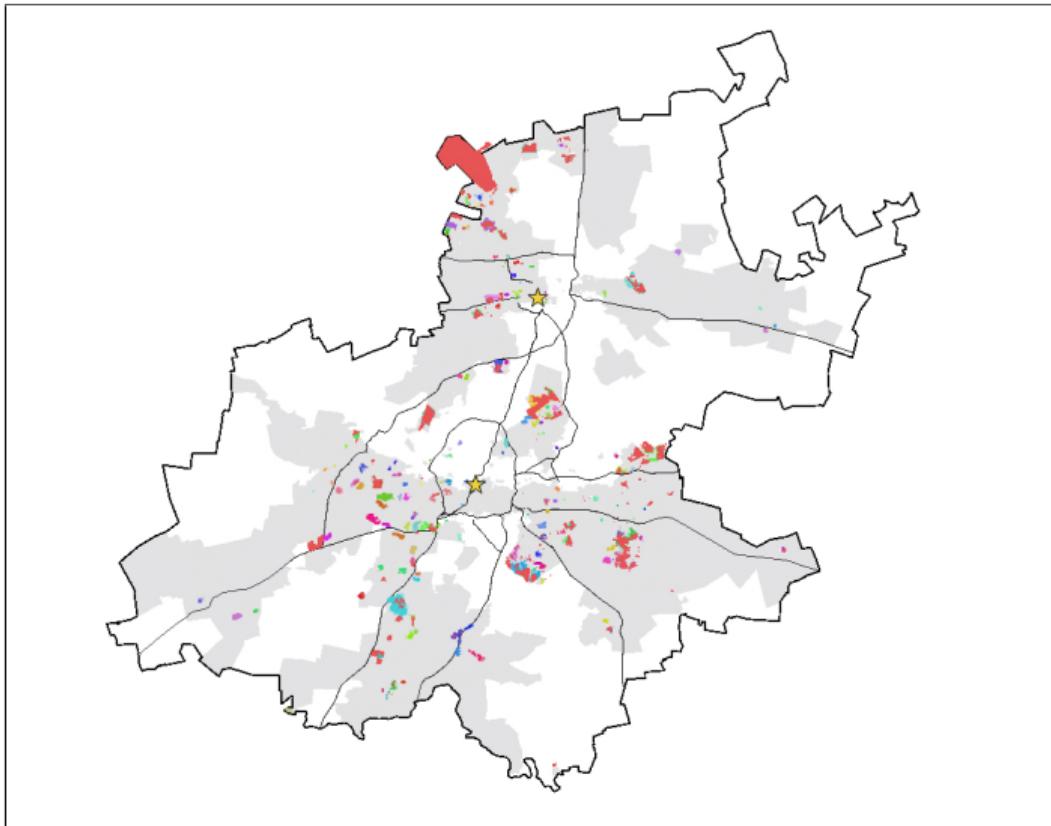
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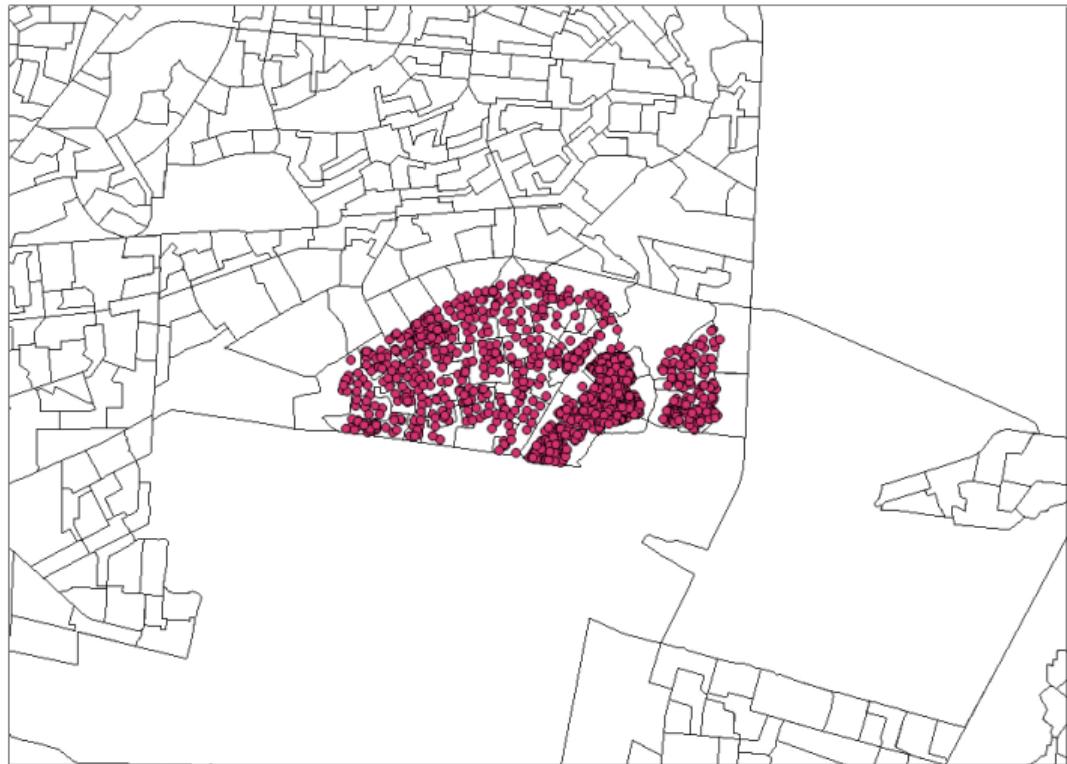
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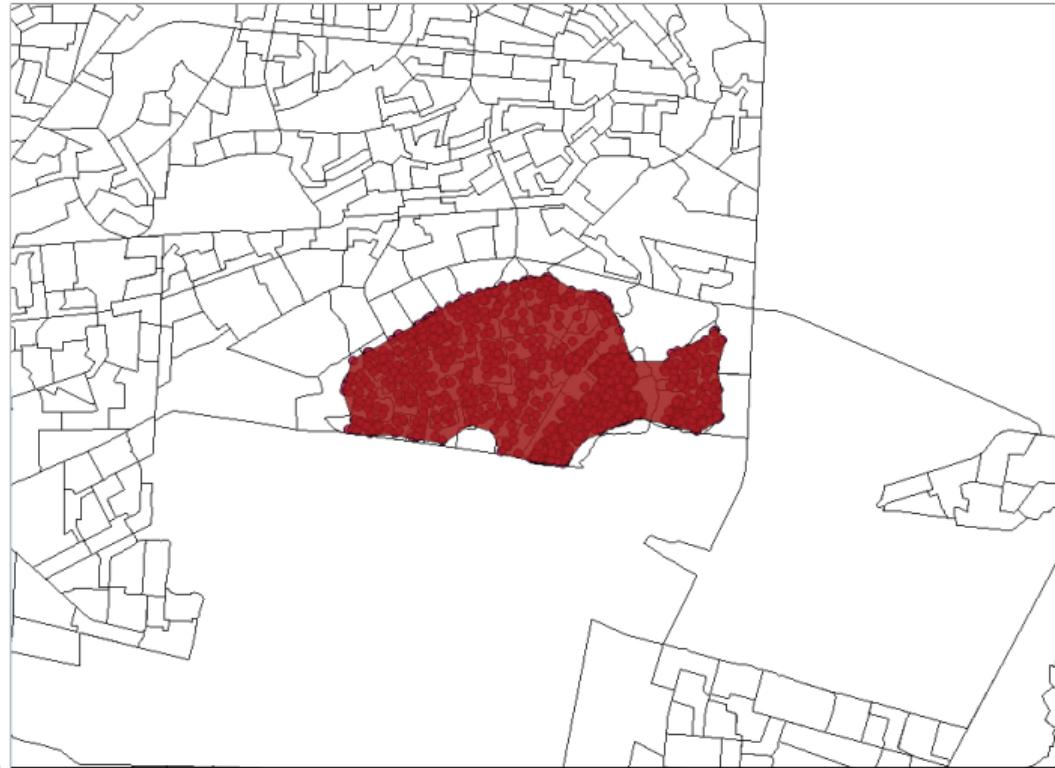
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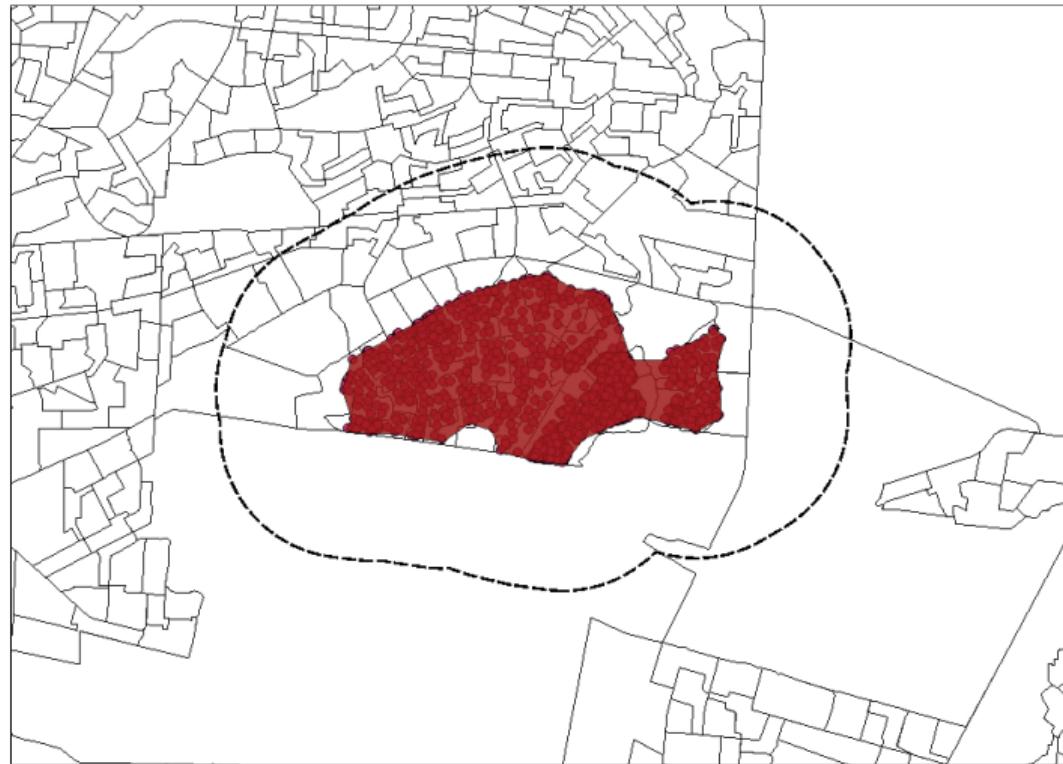
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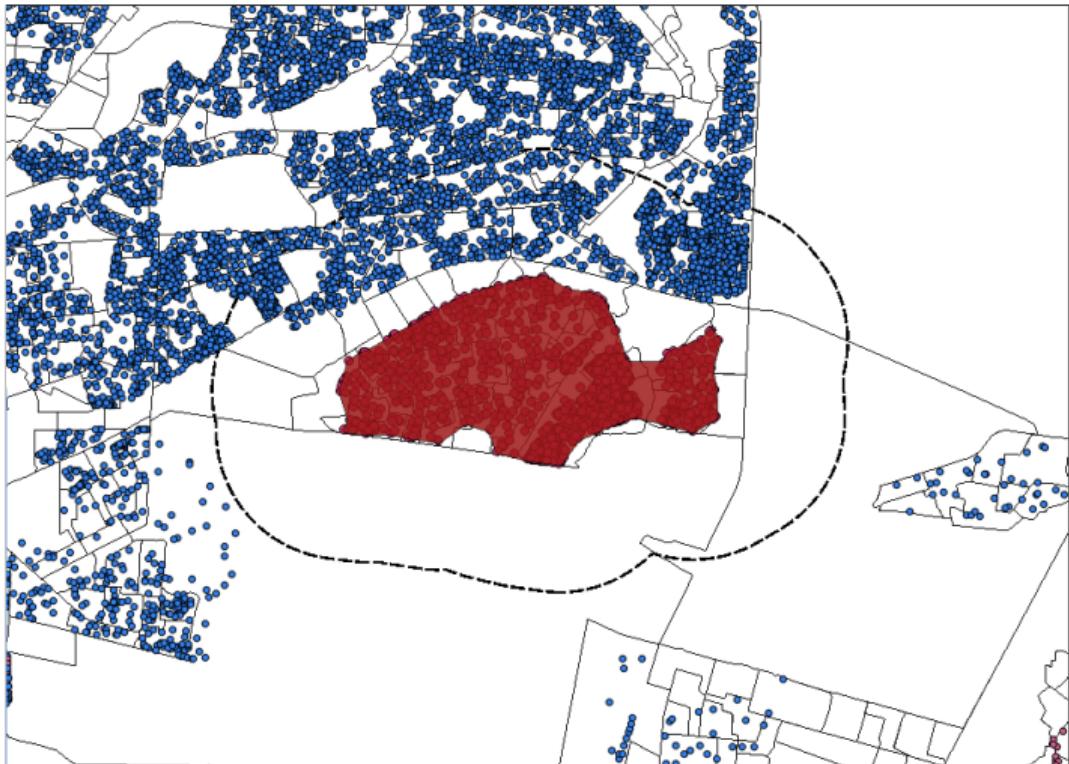
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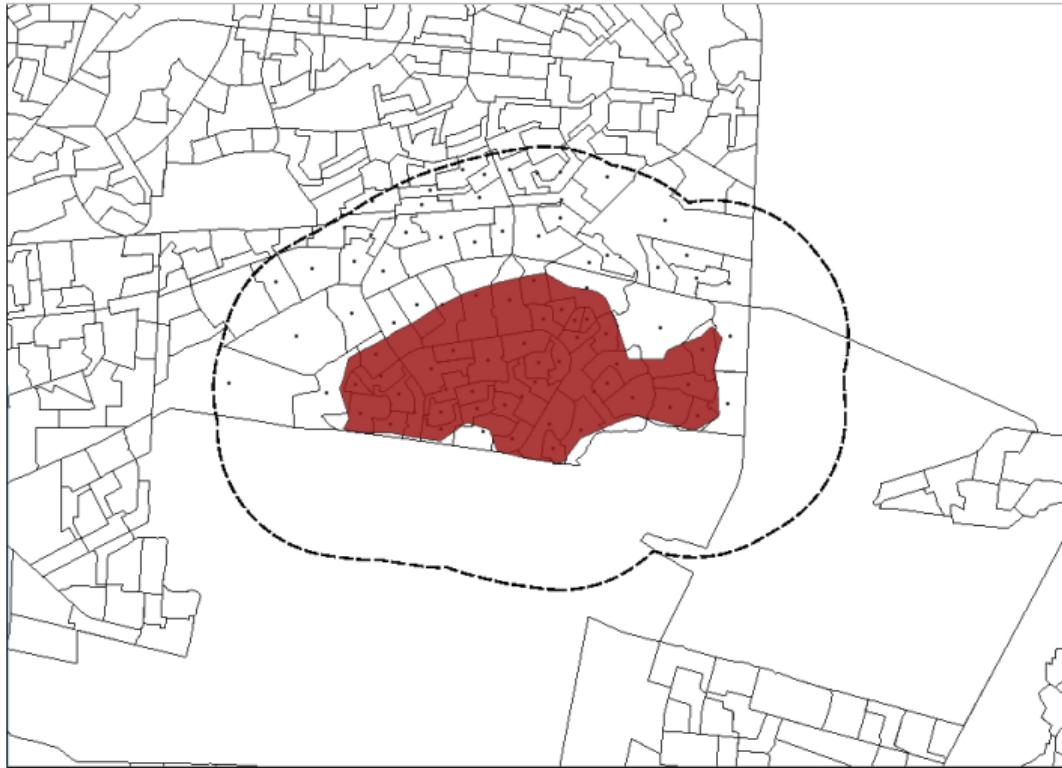
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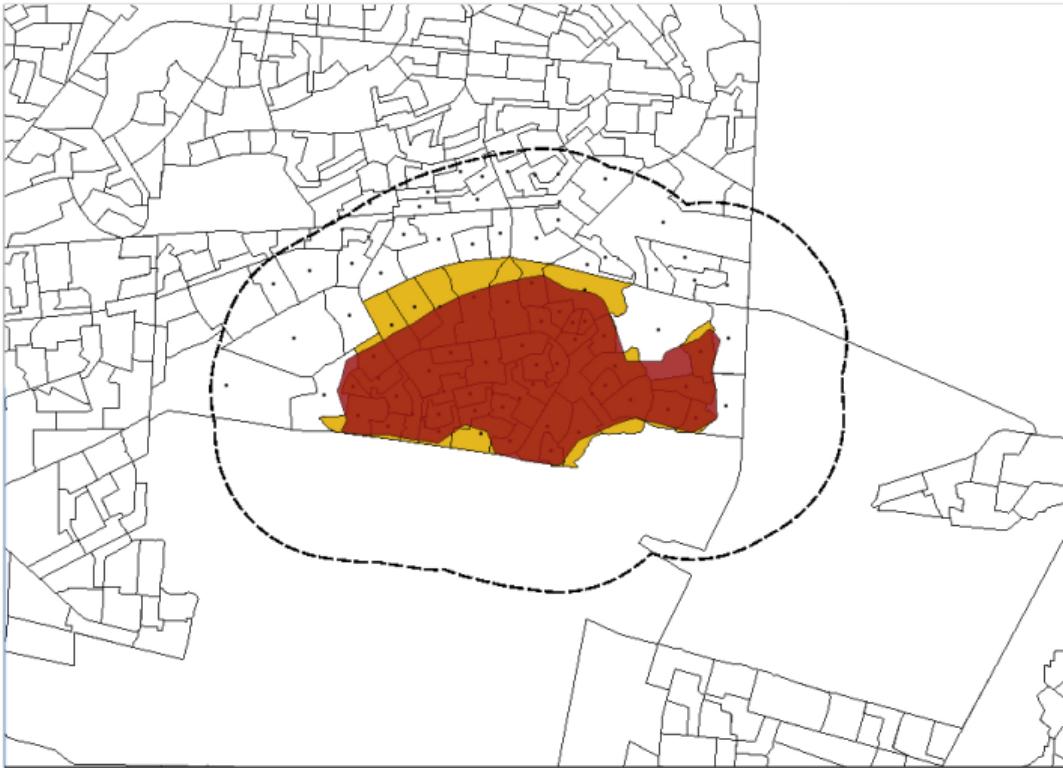
Census Areas Exposure Measures



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Empirical Methodology

DID model:

$$P_{itp} = \alpha D_{tp} T_{ip} + \theta_1 D_{tp} + \theta_2 T_{ip} + X_i' \beta + \lambda_p + \eta_t + \varepsilon_{itp},$$

with:

- ▶ P_{itp} : log-price of property i sold at time t , in vicinity of project p .
- ▶ $D_{tp} = 1$ if date t is after modal construction month.
- ▶ $T_{ip} = 1$ if property i within 400m of project border.
- ▶ X_i : quadratic in lot size of property i .
- ▶ λ_p : project fixed-effect.
- ▶ η_t : time (year \times month) fixed-effect.
- ▶ ε_{itp} : error term

Empirical Methodology

Identification:

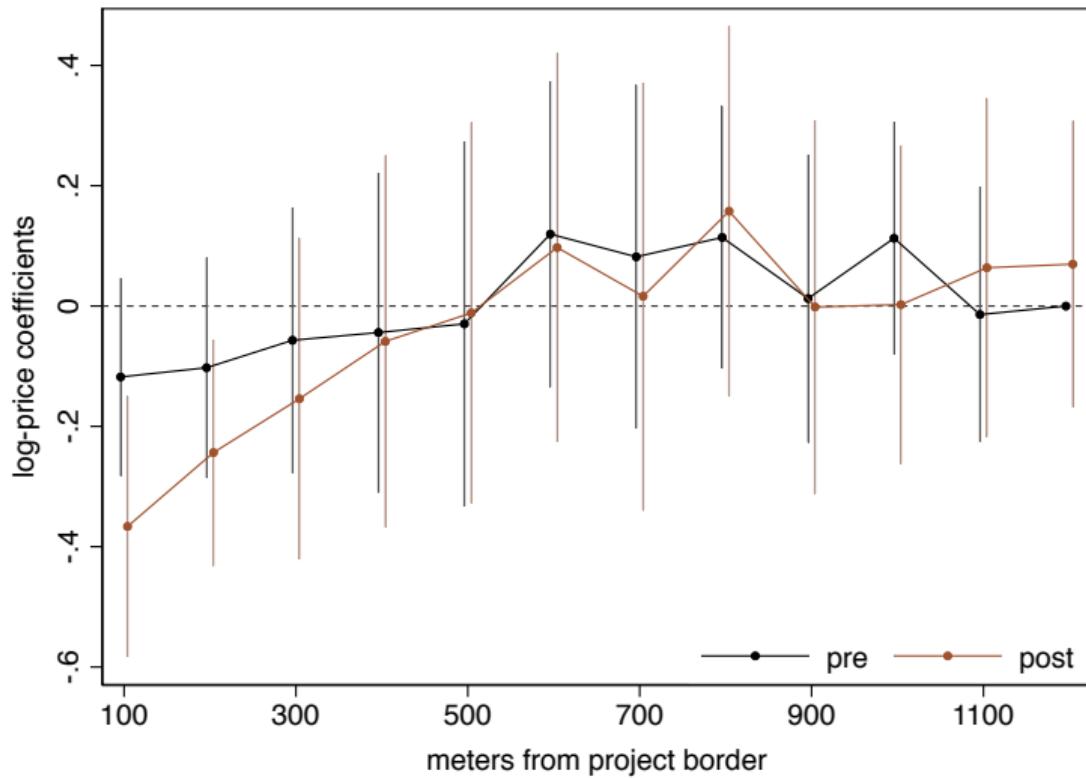
$$E[\varepsilon_{itp}|X_i, T_{ip}, D_{tp}, \lambda_p, \eta_t] = 0$$

- ▶ Identify off “sharp” amenity changes created by calming projects
- ▶ Use within group variation to limit OVB - assuming that control and treatment houses are exposed to same unobservable shocks.

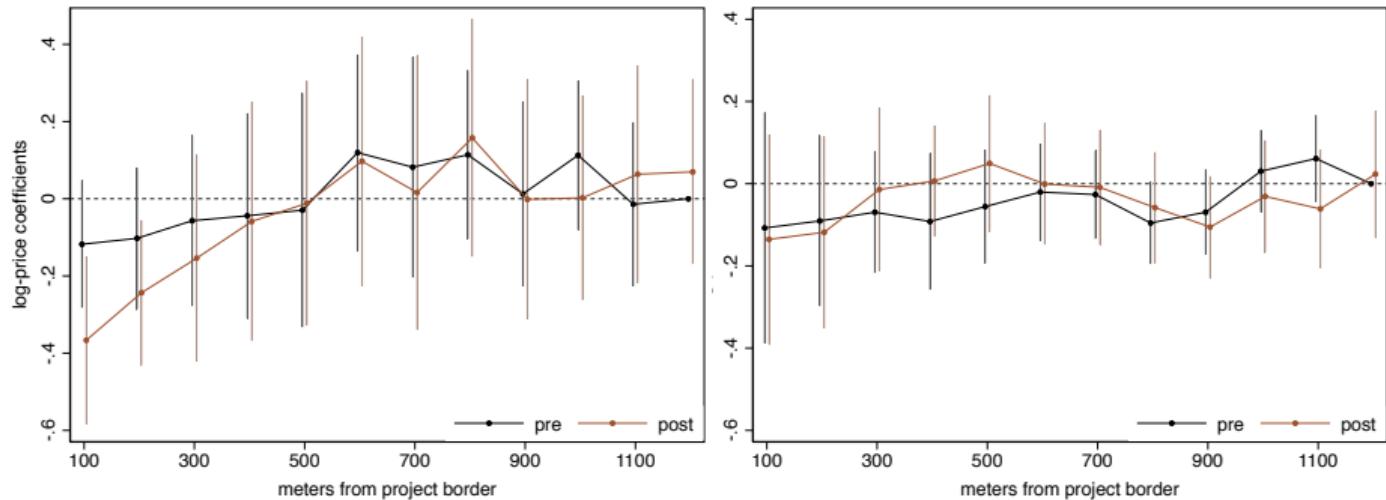
Concerns:

- ▶ negative/positive spillovers - not clear that control transactions are not affected.
- ▶ sorting.

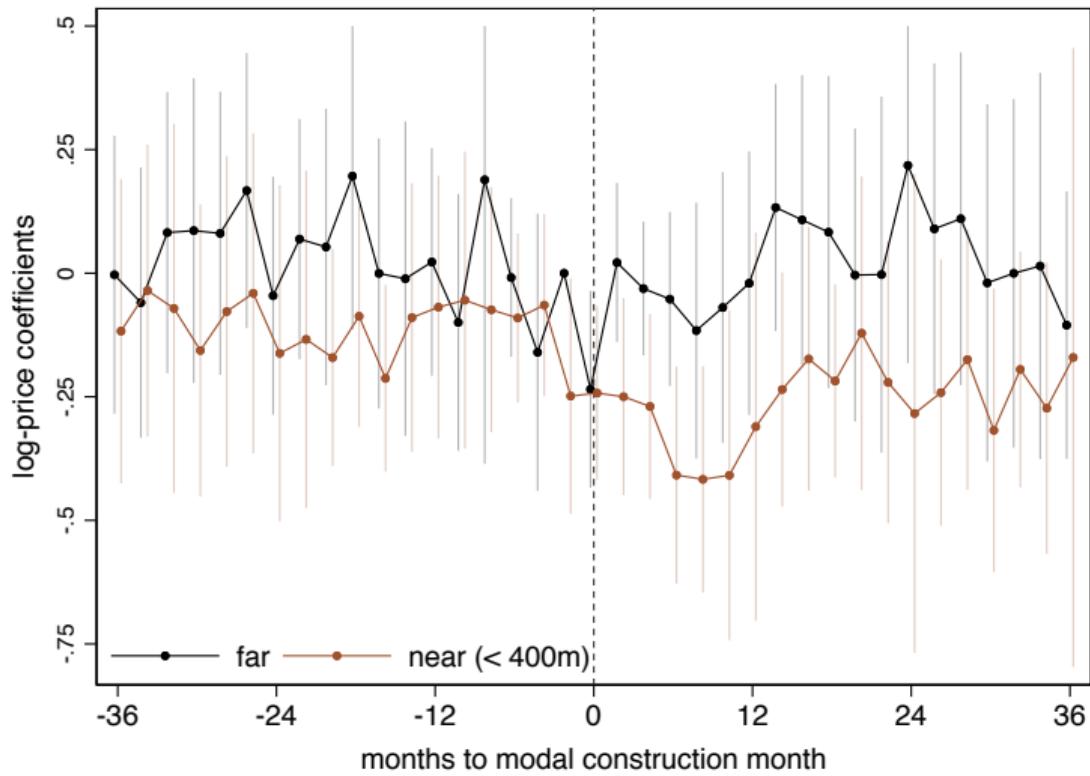
Distance Plot



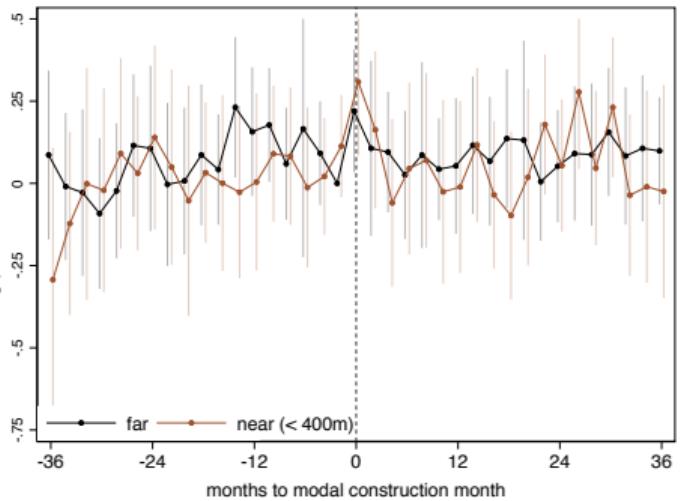
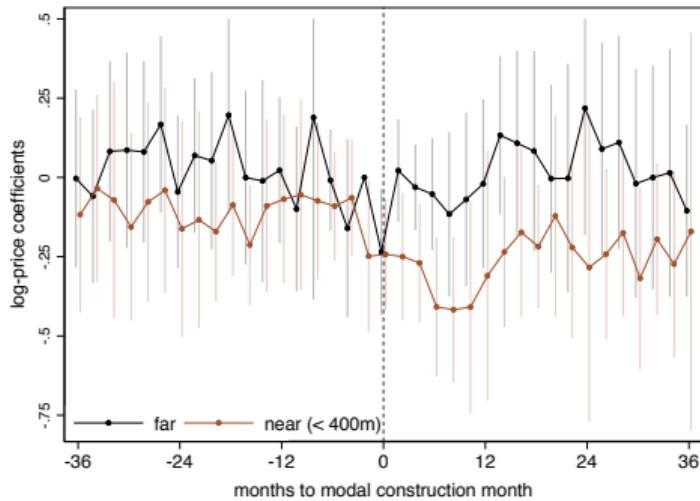
Placebo Distance Plot



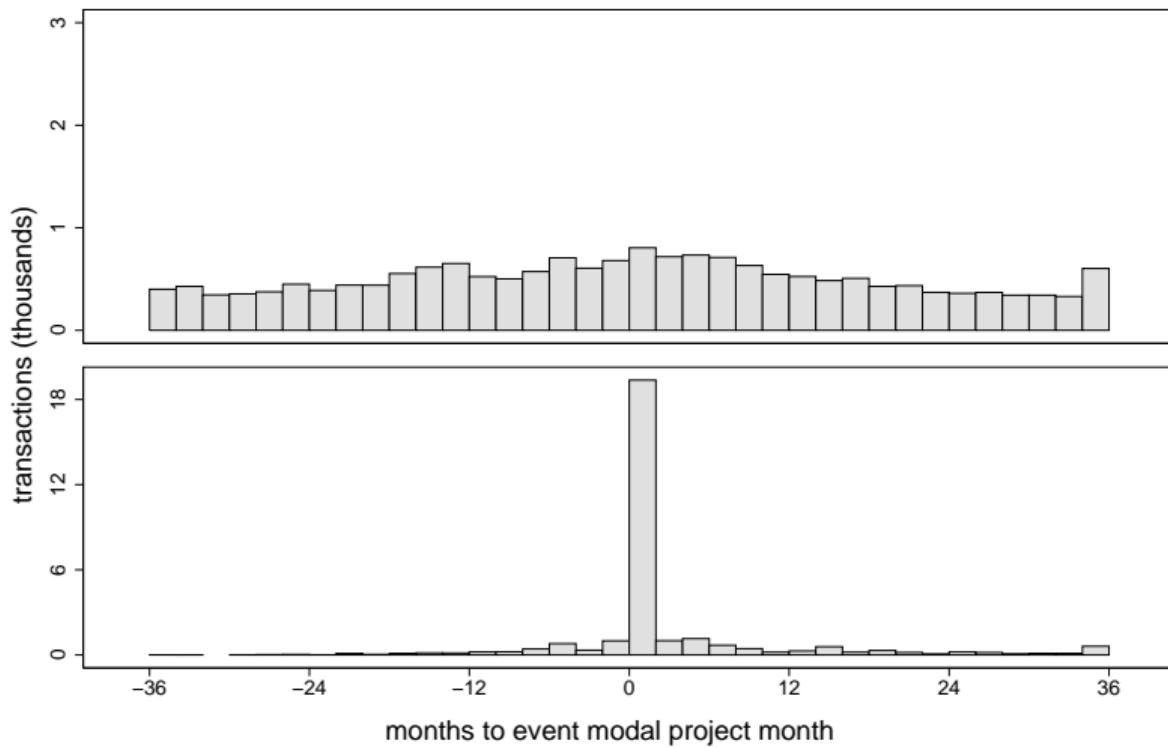
Time Plot



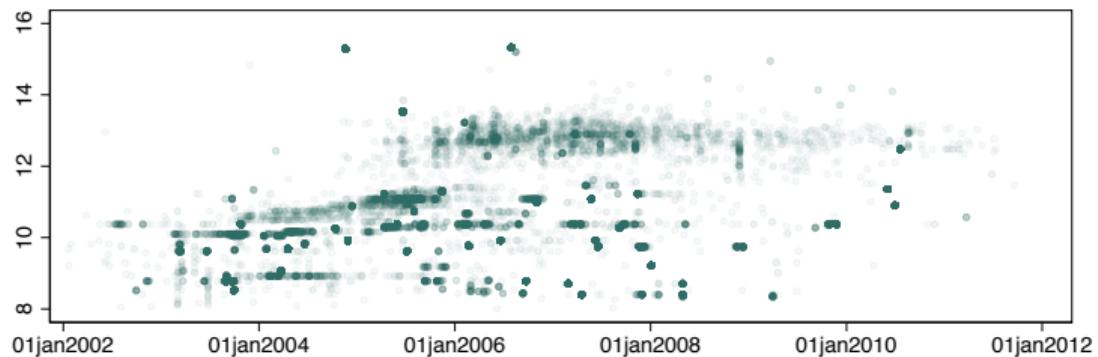
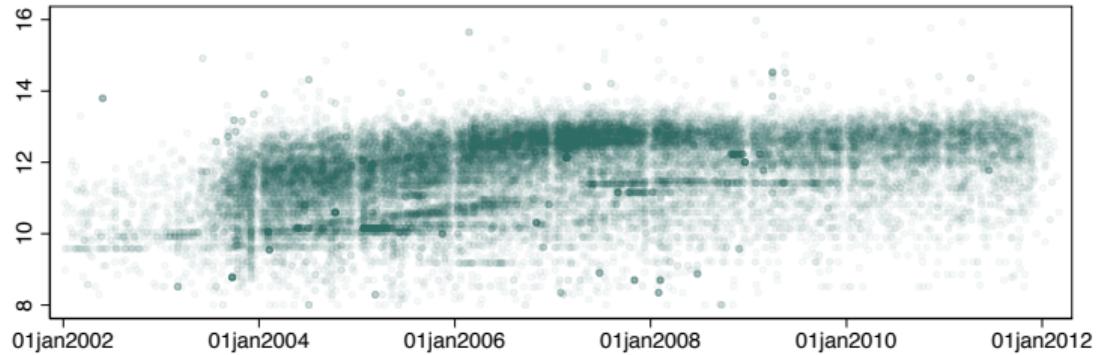
Placebo Time Plot



Transaction Densities



Transaction Densities



Housing Projects

Effects:	(1)	(2)	(3)	(4)
3 yrs 0-400m	-0.235** (0.106)	-0.157* (0.083)		
1 st yr 0-400m			-0.138* (0.075)	
2 nd yr 0-400m			-0.170 (0.115)	
3 rd yr 0-400m			-0.109 (0.096)	
3 yrs 0-200m				-0.212** (0.095)
3 yrs 200-400m				-0.061 (0.067)
Project FE	no	yes	yes	yes
N	28,856	28,856	28,856	28,856
R ²	0.228	0.489	0.490	0.491

Standard errors clustered at the project level.

All specifications control for year-month FE and cubic in plot size.

Housing Projects

Effects:	(1)	(2)	(3)	(4)
3 yrs 0-400m	0.044 (0.082)	0.010 (0.070)		
1 st yr 0-400m			0.027 (0.081)	
2 nd yr 0-400m			-0.012 (0.080)	
3 rd yr 0-400m			0.004 (0.081)	
3 yrs 0-200m				-0.064 (0.093)
3 yrs 200-400m				0.067 (0.060)
Project FE	no	yes	yes	yes
N	35,096	35,096	35,096	35,096
R ²	0.276	0.430	0.430	0.430

Standard errors clustered at the project level.

All specifications control for year-month FE and cubic in plot size.

Housing Projects

	(1)	(2)	(3)	(4)	(5)
	flush toilet	water tap	elec. cooking	elec. light	house
DD >30% overlap	0.265** (0.101)	0.241*** (0.060)	0.034 (0.107)	-0.029 (0.134)	0.207*** (0.051)
DD \leq 30% overlap	-0.027 (0.037)	-0.070** (0.033)	-0.106** (0.042)	-0.016 (0.033)	-0.069** (0.032)
N	1,382,550	1,382,550	1,382,550	1,382,550	1,329,296
R ²	0.352	0.212	0.249	0.244	0.157

Standard errors clustered at the project level. All specifications control for project FE

Housing Projects

	(1)	(2)	(3)	(4)	(5)
	flush toilet	water tap	elec. cooking	elec. light	house
DD >30% overlap	0.193*** (0.062)	0.201*** (0.041)	0.156* (0.086)	0.060 (0.088)	0.235*** (0.039)
DD \leq 30% overlap	-0.027 (0.037)	-0.070** (0.033)	-0.106** (0.042)	-0.016 (0.033)	-0.069** (0.032)
N	3,488,910	3,488,910	3,488,910	3,488,910	3,322,977
R ²	0.335	0.213	0.257	0.252	0.175

Standard errors clustered at the project level. All specifications control for project FE

Housing Projects

	(1)	(2)	(3)
	high-school	monthly income	unemployed
DD >30% overlap	-0.053*** (0.013)	226.330 (372.469)	-0.008 (0.023)
DD \leq 30% overlap	-0.008 (0.012)	77.967 (428.078)	0.024 (0.016)
N	2,055,289	909,466	1,069,857
R^2	0.024	0.050	0.049

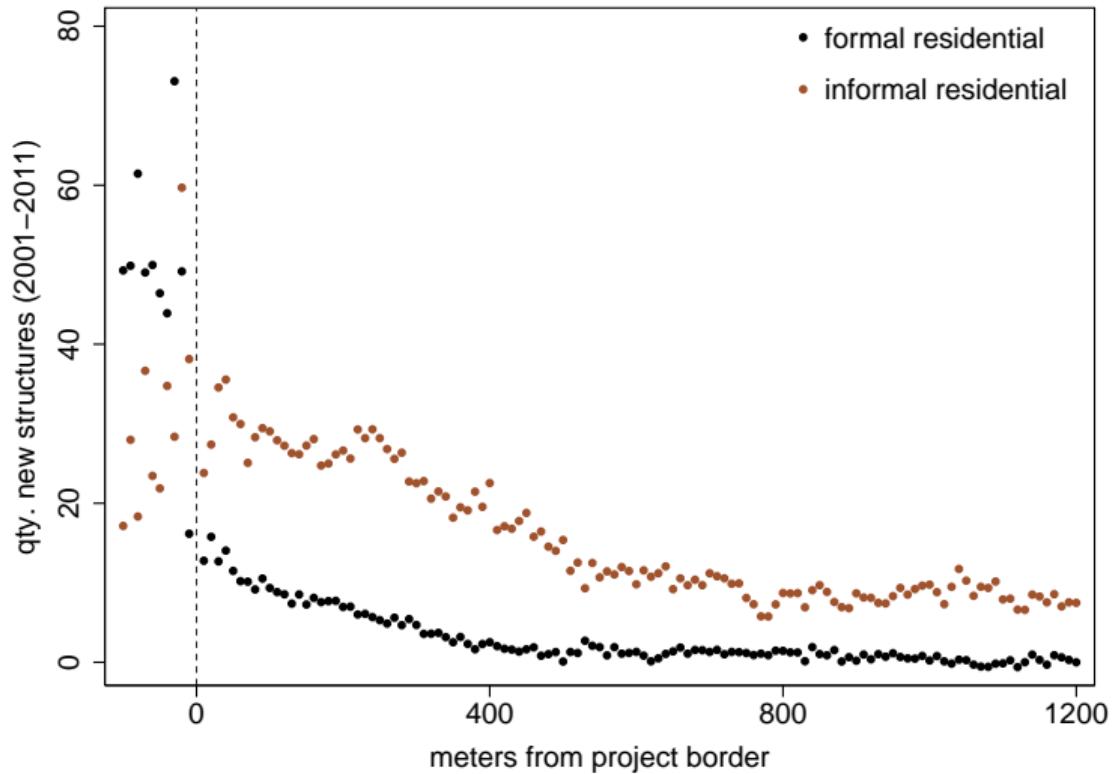
Standard errors clustered at the project level. All specifications control for project FE

Housing Projects

	(1)	(2)	(3)
	high-school	monthly income	unemployed
DD >30% overlap	-0.030*** (0.011)	341.461 (308.922)	-0.011 (0.012)
DD \leq 30% overlap	-0.006 (0.007)	273.137 (296.929)	0.009 (0.009)
N	5,103,934	2,279,500	2,734,902
R^2	0.022	0.058	0.056

Standard errors clustered at the project level. All specifications control for project FE

BBLU plot



BBLU plot placebo

