Public Housing Spillovers in a Developing Country

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Public Housing in Developing Countries

❶ Direct Impacts

- ▶ Recipients' Health, Well-Being:
  Cattaneo et al. [2009], Galiani et al. [2017]

- ▶ Recipients' Employment, Income:
  Barnhardt et al. [2015], Picarelli [2017], Franklin [2018]

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❶ Direct Impacts

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❷ Indirect Impacts

- *"combating crime, promoting social cohesion and spatial restructuring..."* – SA Dept. of Human Settlements

- Amenity value to neighboring areas:
  Diamond & McQuade [2015], Baum-Snow & Marion [2008]

- Housing supply shock

This Paper

- **Question**: What are the indirect impacts of public housing?

- **Approach:** Differences-in-differences using ~65 projects in Gauteng province

    - Close/far from projects (granular spatial data)
    - Constructed/unconstructed projects (planned/delayed/cancelled)

- **Findings:**

    - Positive direct impacts (access to water, sanitation, housing quality)
    - No indirect impacts (nearby services, housing quality, house prices)

Public Housing in South Africa

- 3 million houses delivered since 1994
    - free-standing, single-story, two-bedrooms dwellings
    - Undeveloped private or government-owned land
    - ∼200 houses per project
- Eligibility: citizen, married or with dependents, monthly income < R3,500, on waiting list
    - Weakly enforced in practice
- No Resale within 7 years
    - Also weakly enforced
- Projects are often canceled/delayed
   - Miscommunication between agencies, disputes with subcontractors, failed environmental impact assessments, etc.

Data Sources

- ▶ Gauteng Province (includes Johannesburg and Pretoria)
    1. Administrative map of project boundaries (2008)
    2. Property Deeds Records (GPS: 2000 - 2012)
    3. Census of Population (Block-level: 2001 and 2011)
    4. Informal/Formal Housing (GPS: 2001 and 2011)
- ▶ 65 Constructed projects: contain deeds from govt sellers
    - ▶ Assign construction date as modal transaction date
- ▶ 68 Unconstructed projects: zero deeds from govt sellers
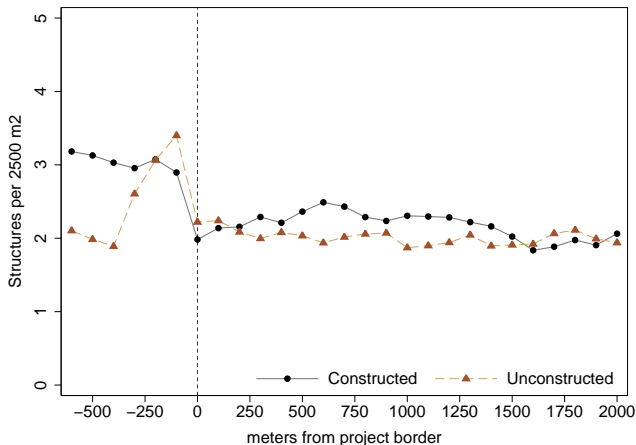   - ▶ Assign predicted construction date from budget records

Housing Project Map
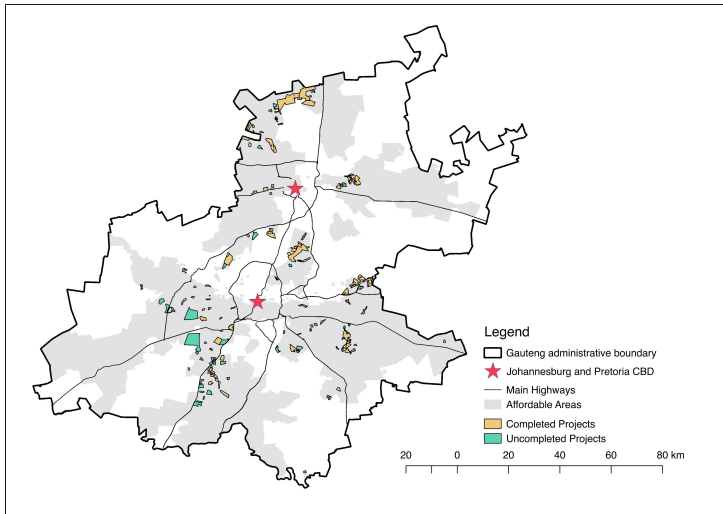
Formal Housing Density in 2001

Formal Housing Density in 2001
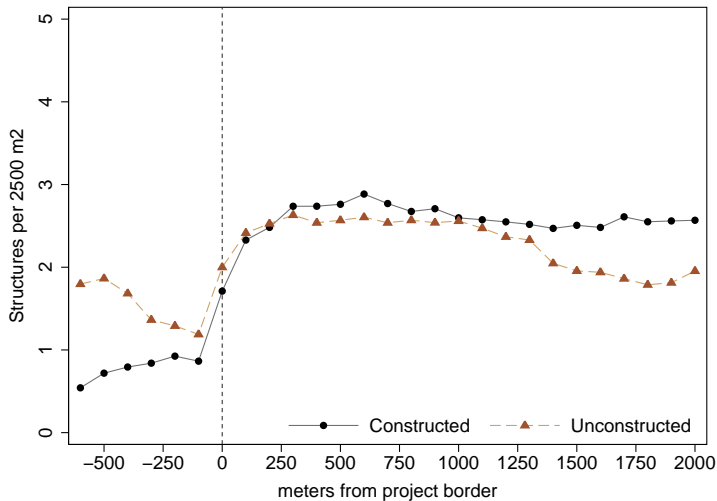
Formal Housing Density in 2001

Informal Housing Density in 2001

- ▶ Unconstructed projects → lower access to services at baseline (census data)

Housing Density

$$y_{ipt} = \lambda_i + \sum_d I_{ipt}^d \left(\alpha^d D_t C_p + \beta^d D_t \right) + \varepsilon_{ipt}$$

with:

- y_{itdp}: housing density for cell i in vicinity of project p observed in year t.
- $I_{ip}^d = 1$ if cell i is at distance d of project p's border.
- $D_t = 1$ if year t is 2011 (post period).
- $C_p = 1$ if project p has been constructed.
- λ_i: cell fixed-effect.
- ε_{itp}: error term

Formal Housing Density
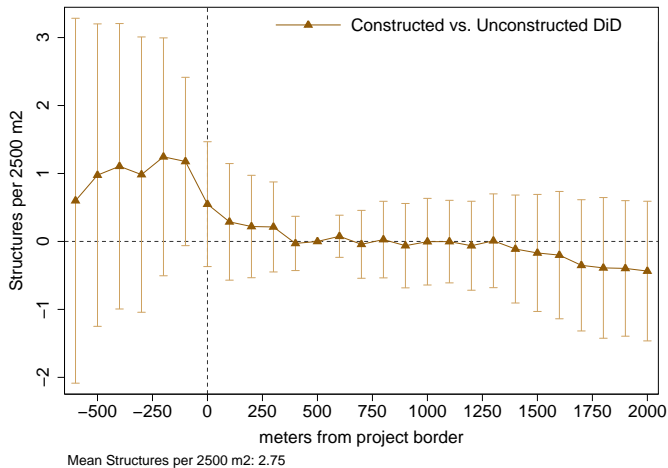
Figure: formal structures

Informal Housing Density
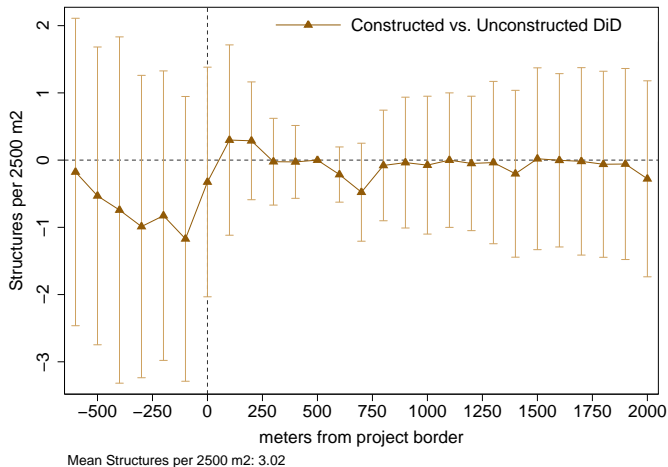

Mean Structures per 2500 m2: 3.02

Figure: informal structures

Total Housing Density
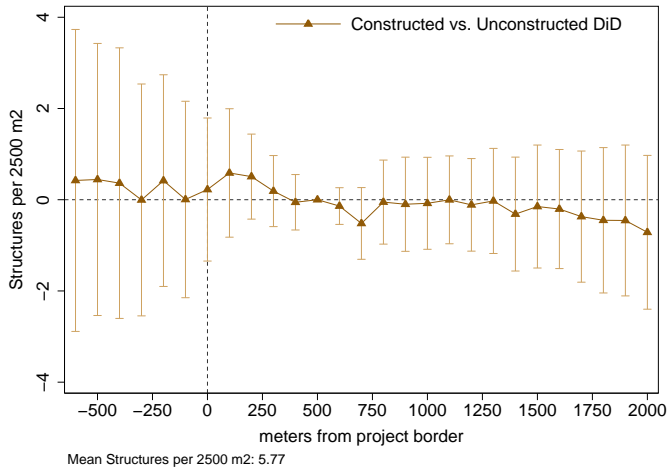
Figure: total structures

Triple Differences Tests

	total	formal	informal	backyrd	non-bckyrd
inside	0.185	1.125*	-0.940	1.076	-2.016**
	(1.045)	(0.658)	(1.022)	(0.726)	(0.839)
within 500m	0.264	0.195	0.068	0.247	-0.179
	(0.423)	(0.358)	(0.475)	(0.389)	(0.412)
N	399,406	399,406	399,406	399,406	399,406
R^2	0.818	0.828	0.785	0.741	0.774

All specifications include project Fixed Effects. Standard errors clustered at the project level.

Dwelling Characteristics (with Census Data)

$$y_{hpt} = \lambda_p + \sum_e I_{hpt}^e \Big(\alpha^e D_t C_p + \beta^e D_t + \gamma^e C_p \Big) + \varepsilon_{hpt}$$

with:

- ▶ e: **project** ($>$30% area overlap), **spillover** ($\leq$30% area overlap but within 1.5 km)
- ▶ y_{htp}: Outcome for household h living in vicinity of project p, observed in census year $t \in \{2001, 2011\}$.
- ▶ $I_{hpt}^e{=}1$ if household h is in exposure area e of project p.
- ▶ $D_t = 1$ if year t is census year 2011 (post period).
- ▶ $C_p = 1$ if project p has been constructed.
- ▶ λ_p: project fixed-effect.
- ▶ ε_{itp}: error term.

Effect On Dwelling Characteristics

	Flush Toilet	Water Inside	Water Utility	Own House	Single House
Proj Post Con	0.121*	0.136***	0.035	-0.085	0.142***
	(0.063)	(0.050)	(0.039)	(0.074)	(0.053)
Spill Post Con	0.037	0.031	-0.012	-0.008	0.015
	(0.035)	(0.033)	(0.012)	(0.028)	(0.029)
N	2,020,549	2,020,549	2,020,549	1,958,335	1,936,911
Mean2001	0.699	0.300	0.947	0.507	0.535
Mean2011	0.807	0.481	0.941	0.442	0.622

Standard errors clustered at the project-level in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Effect On Dwelling Characteristics

	Elec. Cooking	HH Density	Pop Density
Proj Post Const	0.290***	24.9	43.5
	(0.069)	(784)	(1,466)
Spill Post Const	0.042	294.7	442.2
	(0.033)	(206)	(469)
N	2,020,549	9,669	9,669
Mean2001	0.570	2,230	7,365
Mean2011	0.811	3,188	9,162

Standard errors clustered at the project-level in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Price Effects

$$P_{ipt} = \sum_d I_{ipt}^d \Big(\alpha^d D_t^1 C_p^1 + \beta^d D_t^1 C_p^0 + \gamma^d D_t^0 C_p^1 + \theta^d D_t^0 C_p^0 \Big)$$
$$+ \lambda_p + \eta_t + X_i^{'} \phi + \varepsilon_{ipt}$$

- P_{itp}: log-price of property i sold at time t, in vicinity of project p.
- I_{ip}^d =1 if property i is at distance d of project p's border.
- D_t^j =1 if date t is before ($j=0$) or after ($j=1$) construction.
- C_p^j =1 if project p unconstructed ($j=1$) of constructed ($j=0$).
- X_i: quadratic in lot size of property i.
- λ_p: project fixed-effect.
- η_t: time (year $\times$ month) fixed-effect.
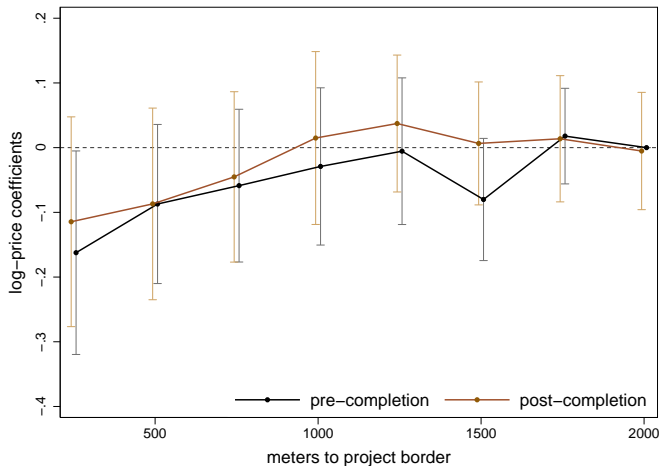- ε_{itp}: error term

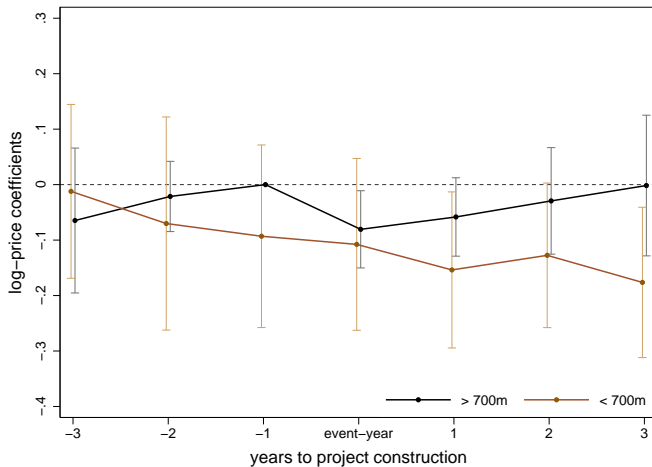# Price and Distance: Constructed Projects

Constructed Projects
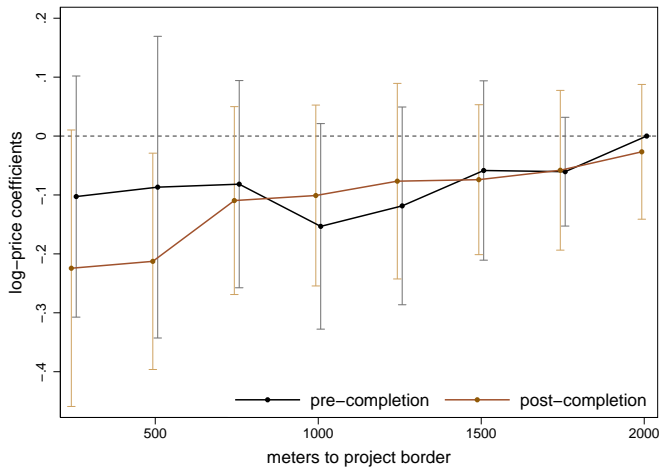
Price and Distance: Unconstructed Projects
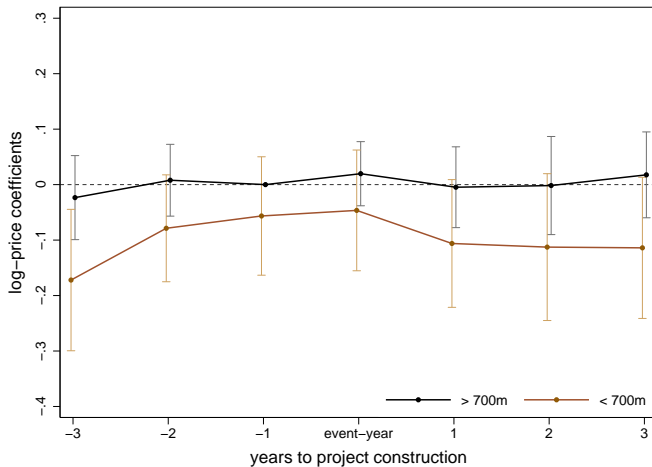

Unconstructed Projects

Price and Time: Constructed Projects

Constructed Projects

Price and Time: Unconstructed Projects

Unconstructed Projects

Summary & Conclusion

Main Takeaway:

- ▶ Public housing effective tool to crowd-out slum development, but limited spillover benefits.

Next Steps:

- ▶ Cost/Benefit calculations
- ▶ Heterogeneity
- ▶ Mechanisms

Thank You!