Evaluating Urban Planning: Evidence from Dar es Salaam

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Challenge: urban planning in LMICs

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  - Public use (esp. roads) 40-50% of developed land; private land zoned or regulated

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- Cities in HICs: urban planning plays central role
  - Public use (esp. roads) 40-50% of developed land; private land zoned or regulated
- Cities in LIC/LMICs: planning often absent or ineffective
  - Informality may lower private investments and inhibit public service provision
  - These cities are growing fast and face proliferation of slums

Response: 'De novo' (greenfield) urban planning

- 'De novo' urban planning is important policy tool to address informality problem
  - Purchase cheap agricultural land on urban fringe
  - Partition into formal plots with minimal services - mostly unpaved roads
  - People buy plots and build their own homes

- World Bank financed such 'Sites & Services' in many countries (1970s & 80s)
  - Policy stopped in 80s: low repayment rates and exclusion of poorest
  - But cost effective in long-run: raises land values, attracts private investment, prevents deterioration of public services (Michaels et al. 2021, Owens et al. 2018).
  - Recently, some African governments picked it up (e.g. Ethiopia, Rwanda, Tanzania)

- So, de novo planning important for urban development, but:
  - Scant evidence on **how best to do it!**

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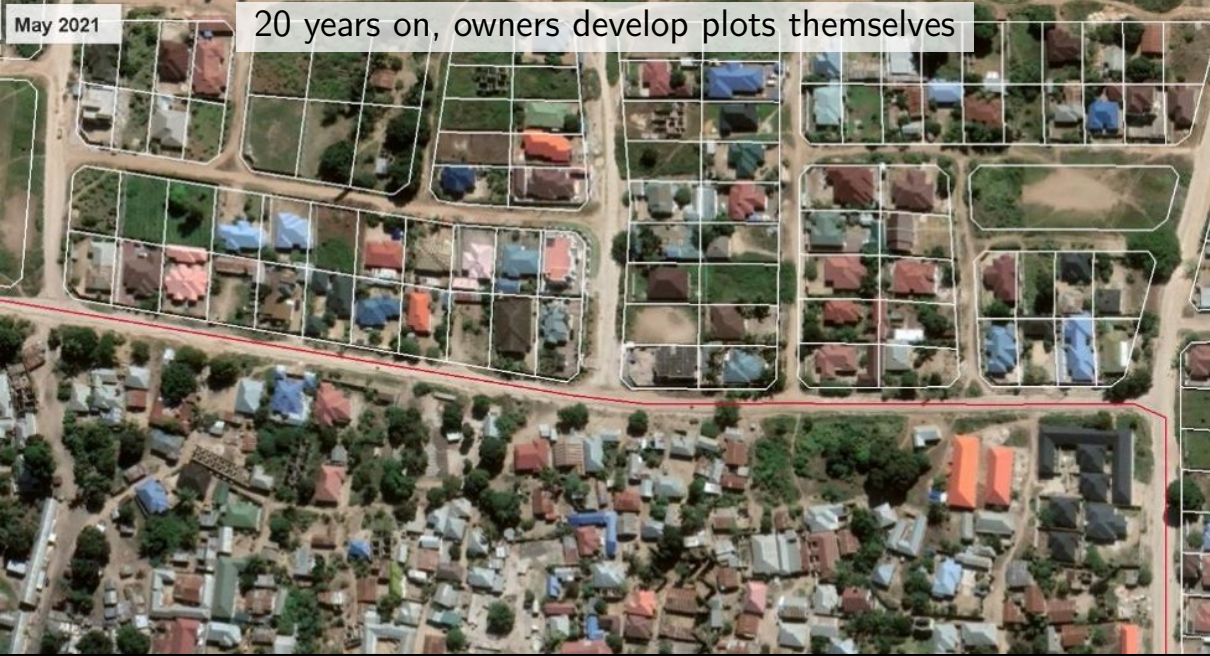
How do planning choices within neighbourhoods affect outcomes?

- Planning choices:
  - Residential: size of own plot and neighbouring plots
  - Non-residential: planned public and commercial uses, local access roads
- Outcomes:
  - Bare-land transaction values
  - Housing investment and timing (developed or not by ∼2020)
  - Educational attainment (landowning residents)

20k areas in Dar es Salaam

- thin lines: 20k areas (labelled)
- bold lines: pre-existing major paved roads
- dashed lines: city edge


June 2001
Greenfield Site, land is parcelled and sold


May 2021
20 years on, owners develop plots themselves

Descriptive: prices in and outside of 20K areas

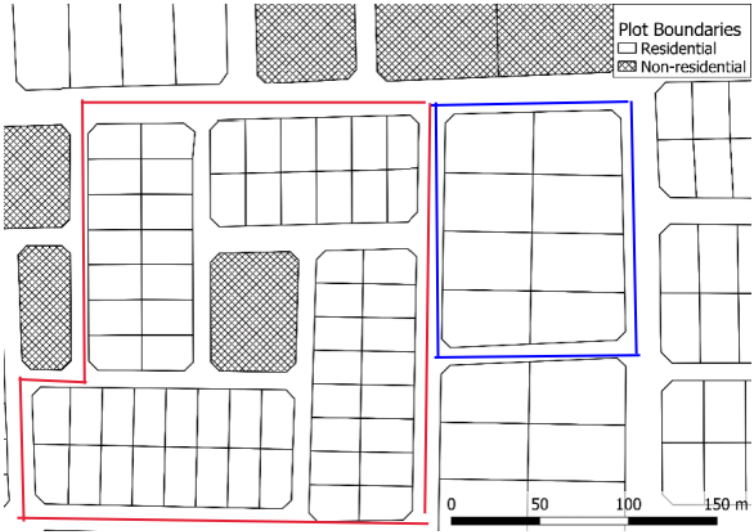
$$\text{ln price}_{p,t} = \beta \text{ ln size}_p + \gamma \text{Non20kS}_p + \delta \text{Non20kU}_p + \eta_t + \mu_{l(p)} + \varepsilon_{p,t}$$

Note: plot p sold at time period t in neighborhood $l(p)$

	(1) Ln Price	(2) Ln Price
Ln plot size	0.71	0.69
	(0.054)	(0.041)
Non-20K Surveyed	-0.23	-0.27
	(0.16)	(0.12)
Non-20K Unsurveyed	-0.70	-0.71
	(0.099)	(0.079)
Mean Outcome	17	17
20K or Nearest FE		✓
N	2074	2074

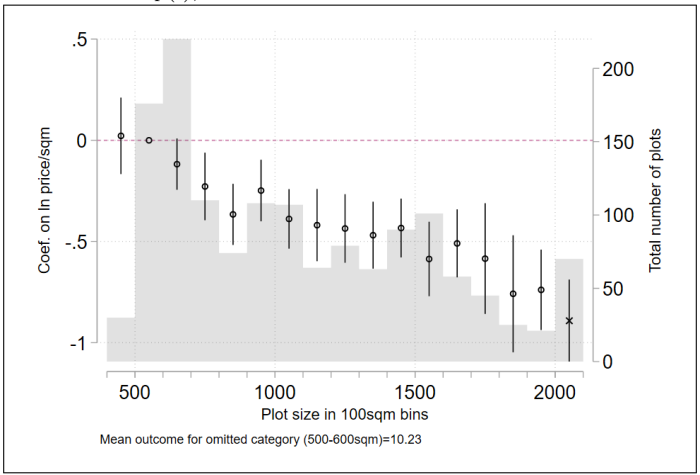
- 20k +100% vs informal blue
  - 31% town planning red
  - 69% property rights (title and boundaries) blue - red

Example: plots of different sizes in Tuangoma with insula and superinsula

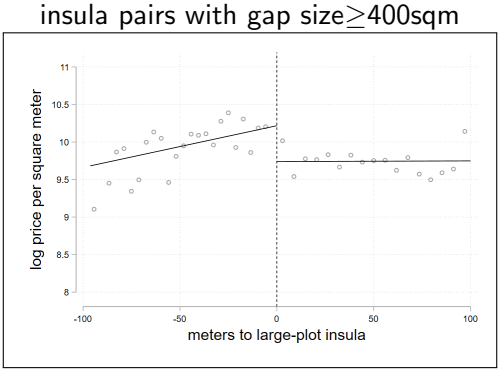


Finding 1: price of land (per sqm) falls with plot size

$$\ln \text{price/sqm}_{p(i),t} = \sum_b \beta_b I(\text{size}_{p(i)} \in b) + \eta_t + \mu_{l(i)} + \varepsilon_{i,t}$$



Spatial RD: at same location, large plots valued less



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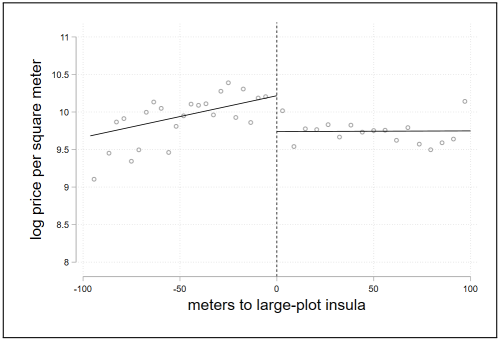
insula pairs with gap size$\geq$400sqm



Price per square metre difference suggests misallocation, back-of-envelope:

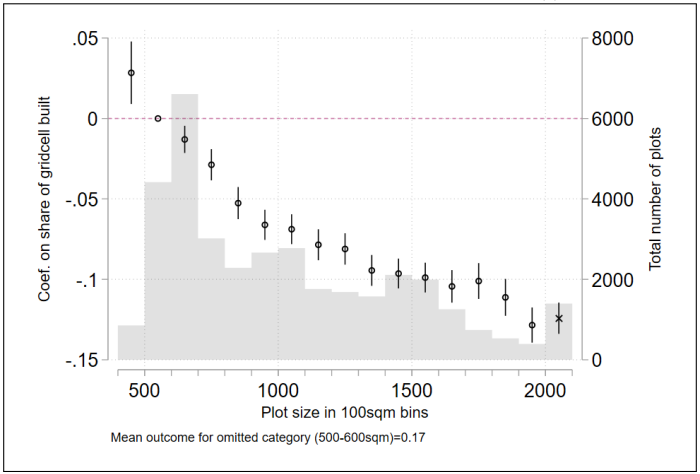
split one 1600sqm (US$16.7k) into **four 400sqm plots** (US$6.4k) $\rightarrow$ **gains** (US$7.8k, or $\sim$47%)

accounts for per plot costs at time of planning (US$375)

but nowadays splitting plots is difficult (legal and procedural barriers)

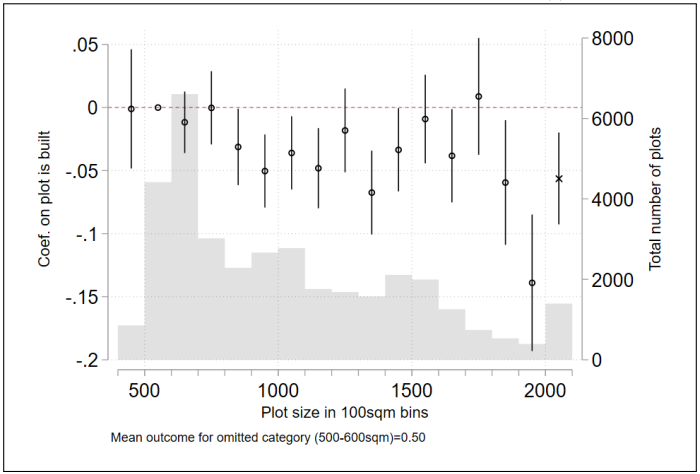
Finding 2: small plots are much more densely developed by 2020

$$\text{Share Built}_i = \sum_b \beta_b \mathbb{1}(\text{size}_i \in b) + \mu_{l(i)} + \varepsilon_i$$



but, large plots similarly built-upon by 2020

$$\text{Plot is Built}_i = \sum_b \beta_b \mathbb{1}(\text{size}_i \in b) + \mu_{l(i)} + \varepsilon_i$$



Small plots provide more housing and have higher population density

	Mean pop. per built res. plot	Share of Plots Built	Mean plot size (sqm)	Pop. dens residential (ppl/sqkm)
Small Plots ($\leq$800sqm)	5.3	0.50	629	4166
Medium Plots (800-1600sqm)	5.4	0.49	1179	2232
Large Plots ($\geq$1600sqm)	5.6	0.49	1961	1392
All Plots	5.4	0.49	1040	2552

Finding 3: small plots have positive externality on built development

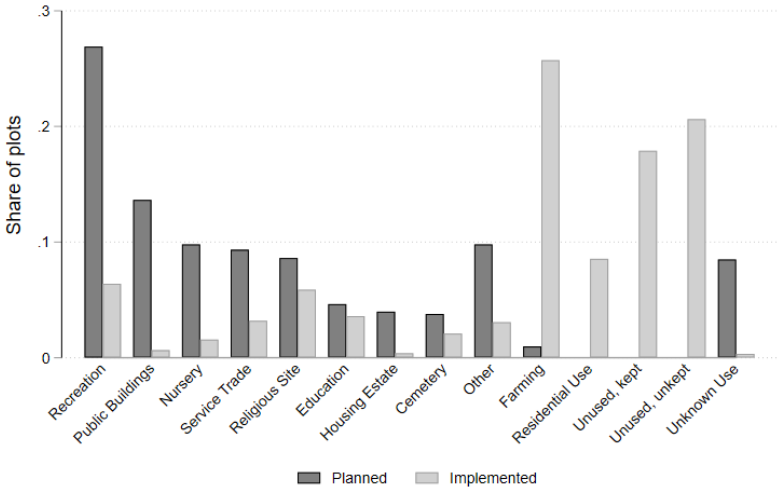
$$y_i = \beta L_{SI(i)} + \delta_0 \text{dist}_i * L_{SI(i)} + \delta_1 \text{dist}_i * (1 - L)_{SI(i)} + \mu_{SP(i)} + \mathbf{x}_i'\gamma + \varepsilon_i$$

Note: cell i in super-insula SI, paired SP, with i's nearest other super-insula.

- Super-insula:
  - contiguous S, M, or L insula
- Moving 'deeper' into small-plot area:
  - More dense development
  - More likely plot is built upon
- Deeper into large plots not much

	(1) Share gridcell built	(2) Plot is built
Own Larger	-0.0013	-0.00053
	(0.0026)	(0.011)
Own Smaller × Dist. (km)	0.053	0.21
	(0.017)	(0.066)
Own Larger × Dist. (km)	-0.029	0.030
	(0.018)	(0.070)
Ln plot size	-0.066	0.026
	(0.0032)	(0.013)
Mean Outcome	0.11	0.49
N (gridcells)	92753	92753
N (plots)	35525	35525

Finding 4: non-res uses were often **planned** but not **implemented**



Finding 5: wealthy households sort into project, and within project

- 20k projects attract relatively wealthy residents
  - average HoH years schooling
    - Dar es Salaam: 8.7 years (LSMS Dar es Salaam 2014)
    - 20k resident: 11.5 years (our survey, N=3230)
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- Access for poor limited (despite low gov't sale price, ∼$1 per sqm) because:
  - Minimum plot size (colonial legacy) was large (∼400sqm)
    - only recently lowered to 300sqm nationally (Kironde 2006)
  - Process of plot sale was rushed to repay internal gov't loan
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- within project, resident-owners sort onto plots by size
  - yrs school ↑ 0.65 for 2x in plot size

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2. Smaller plots provide more housing
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   - Also $\sim 1/3$ population density

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5. Sorting of wealthy resident-owners into the program (and within)
   - +4 yrs vs. avg HoH in Dar, and yrs school $\uparrow$ 0.65 for 2x in plot size

Thank you!

- Feedback very welcome after the talk or over email
- Tanner Regan (tanner_regan@gwu.edu)

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