On the Determinants of Slum Formation

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Motivation

• Slums represent a large portion of housing markets in developing countries
  • Hundreds of millions live in slums
  • UN-Habitat (2003): In 2001 more than 30% of the world’s urban population lived in slums
  • Several different types of informal housing: slums (favelas, barriadas, villa), irregular plots, etc
  • Informal housing $\equiv$ no affordability
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  - Informal housing $\equiv$ no affordability
  
  - Affordability measures to overcome housing costs:
    - **Tenure**: no land title (Invasion or no right to occupy land)
    - **Infrastructure**: no utilities (several times the cost of raw land)
    - **Regulation**: outside building codes (Home self-building)
Title

Introduction

Model

Quantitative Analysis

Conclusion

Source: Tuca Vieira
Motivation

• In Economics, scarce literature on informal housing:
  
  • Qualitative and **partial equilibrium models** (Jimenez, 1984, 1985, Friedman et al, 1988, Kapoor and le Blanc, 2008, Brueckner and Selod, 2009, Brueckner, 2013);
  
This Paper

1. Questions:
   - What are the determinants of slum formation?
   - How much of slum growth is explained by poverty, inequality and rural-urban migration?
   - How policies can influence slum formation?
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2. How we address these questions:
   - Show correlations using Brazilian data
   - Build a model of a city with heterogeneous agents and slums
   - Calibrate and estimate the model for São Paulo
   - Perform counterfactual exercises to study the effects of each factor on slum growth in this city
   - Perform *ex-ante* policy simulations (e.g. land titling)
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Questions:

- How policies can influence slum formation?
  - We simulate the effects of four welfare-enhancing policies
  - Removing barriers to formalization has a strong impact on slum reduction
  - 10% decrease in regulation bundle has same effect as a 50% reduction in taxation and other costs of formalization
  - Average welfare effects are mainly driven by the subpopulation directly affected by the simulated policies
  - Welfare-increasing interventions can have unintended effects
  - Important to differentiate groups of policies
The Model in a Nutshell

- General Equilibrium Model: Households, Firms, Developers and Government
- Simplest model of slum formation
- Caju slum dataset and anecdotal evidence to justify the “structure” of the model
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- Caju slum dataset and anecdotal evidence to justify the “structure” of the model
- Households: Heterogenous labor productivity
- Two housing tenure types: formal and informal housing
  - Costs of Formality: Compliance with taxes and building regulations; Benefits of Formality: Well-defined property rights and infrastructure
  - Costs of informality: Protection costs (against eviction) and utility costs (lack of public infrastructure); Benefits of informality: avoid property taxes and building regulations;
The Model in a Nutshell: Households

- The basic mechanism generates two income thresholds, separating formal and informal housing agents.
- The first cut-off comes from the opportunity cost of protecting the informal plot.
  - ↑ income, ↑ protection costs (forgone labour income)
- The second cut-off is generated by zoning constraints that interfere with decisions
  - Households unable to comply with several building constraints are bound to live in informal settlements.
- The model thus points out two reasons why for poor households the (only) feasible option is living in slums
The Model in a Nutshell: Other Agents

- Firms: demand labor and capital to produce goods

\[ N^d = \left( \frac{Bv}{w} \right)^{\frac{1}{1-v}} \]
The Model in a Nutshell: Other Agents

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- Developers: demand land and capital to produce housing units

\[ p_L = \gamma \left( \frac{A_j p_j}{L_j^{1-\gamma-\beta}} \right)^{\frac{1}{1-\beta}} \left( \frac{\beta}{r} \right)^{\frac{\beta}{1-\beta}} , \ j \in \{F, I\} \]
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- **Government:** labor tax and property tax to provide public goods

\[ g = \int_{E^F} \eta R_H h_F(\lambda) d\Upsilon(\lambda) + \int_0^\infty \tau w \lambda d\Upsilon(\lambda) \]
The Model in a Nutshell

• The model indicates how several factors influence slum formation

• Policies have direct and indirect effects on the city’s economy

• Our simulations quantify the influence of these factors

• Calibration and Estimation: replicate relevant data of the city of São Paulo in 2000.
Policy Simulations

- We simulate the effects of four policies:
  - Property tax and formalizations costs: Reduction by half
  - Regulation relaxation by 10%
  - Infrastructure upgrading
  - Titling

- Four simulated policy are welfare-enhancing (even considering general equilibrium effects)
Policy Simulations

- **Reduction in property tax and formalization costs:**
  - Makes formal housing more affordable, so reduces informality
  - ↓ 50% reduces slums by 15%
  - Welfare increasing: ↑ housing formalization and ↑ relative prices partially compensate original revenue lost by the government

- **Relaxation in regulation:**
  - Makes formal housing more affordable, so reduces informality
  - ↓ 10% reduces slums by 15%
  - Welfare increasing because induces housing formalization with no revenue lost
Policy Simulation

- **Infrastructure upgrading** ("incomplete" slum upgrading)
  - Welfare-enhancing because of strong welfare gains from the households directly affected by the policy
  - However, informal housing becomes more attractive
  - As if it is a new type of informal housing, but still informal
  - Migrants enter the city and the share of informal housing increases

- Similar results for **titling programs**
Concluding Remarks

- Scarce literature on informal housing

- The results show that urban poverty, inequality and rural-urban migration explain much of the variation in slum growth during 1980-2000 in São Paulo

- Ex-ante policy evaluation points out that (i) decreasing barriers to formalization has a strong impact on slum reduction; while (ii) welfare-enhance interventions can have unintended adverse impacts

- Next project: 3,000 Housing Lotteries