Urbanisation in Developing Countries

Tony Venables

Dept of Economics

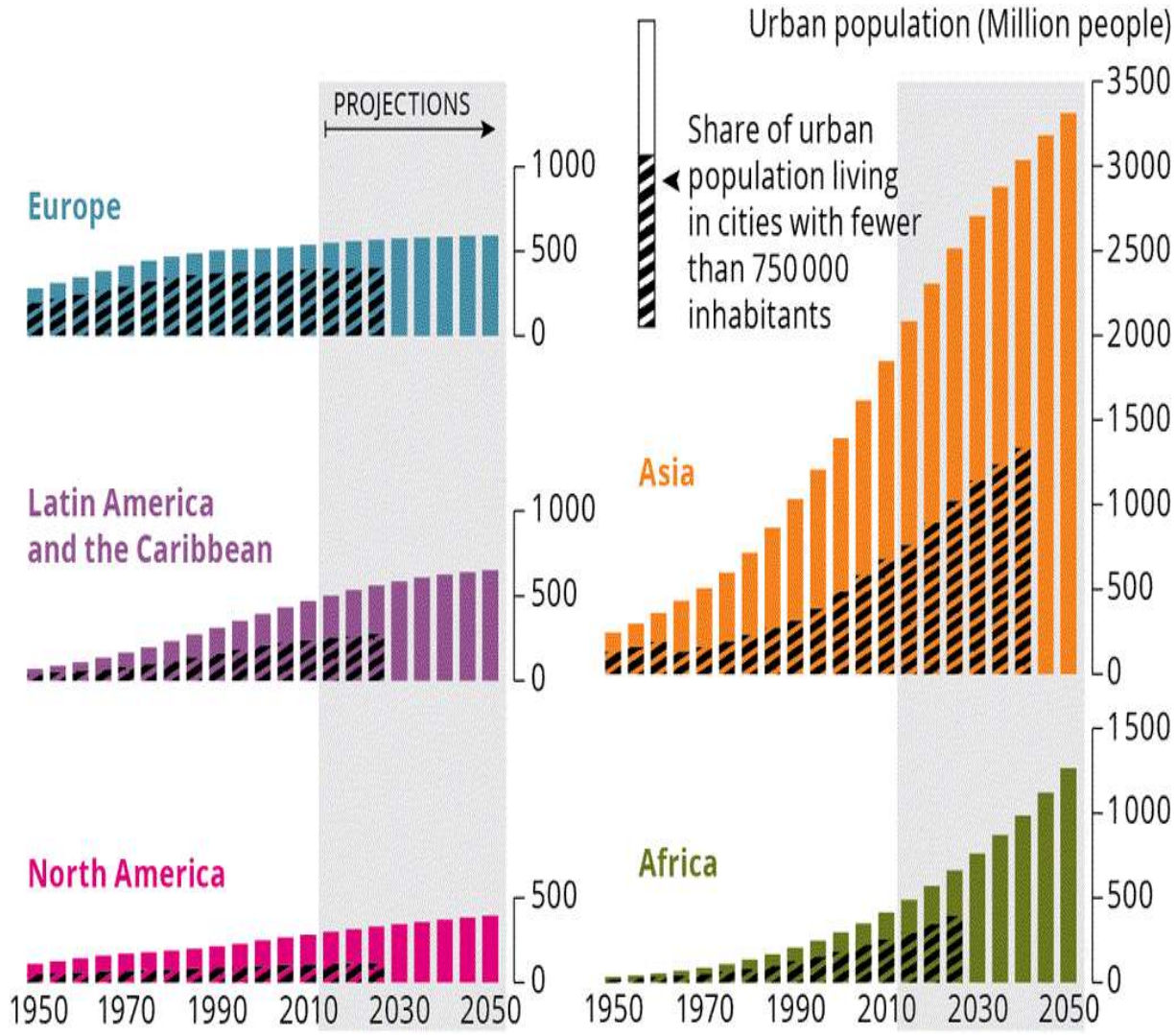
University of Oxford

CEPR & International Growth Centre

Urbanisation: looking forwards

By 2050:

- Worldwide: 2.7 bn new urban dwellers: 1.4 mn per week
- India, 200k per week 2001-11
- Africa, 350k per week projected
- African urban popn will treble… adding 500-600mn
- Increase in African urban popn ≈ total urban population of Europe + North America.



Introduction

This talk:

- Focus on Africa
  - Proportionately much the largest increase to come
  - Not going well so far
- Focus on intra-city
  - 'The Triumph of the City'
  - Functional vs dysfunctional cities
  - What goes wrong and what can be done about it?

Set stage with some 'stylised facts':

Then discuss some recent research by LSE/Oxford/WB project.

End with policy messages

Stylised facts:

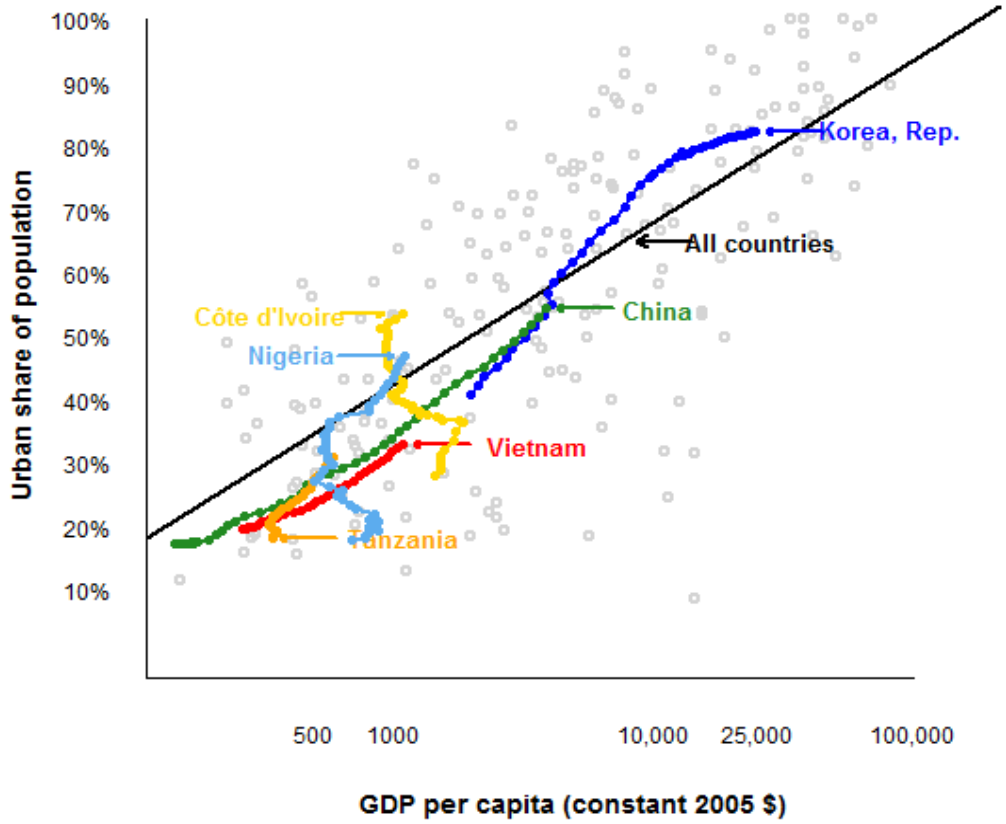
1) **Population and migration**:

- Developing country urbanization faster than historical European:
  Urban population doubling every 18 years as compared to every 35.

- African rate of urban population increase:
  6% (1970s), 4% (2000s)
  ≈ 2%-points higher than Asia

- Africa's urban population:
  Natural increase > migration
  Urban demographic transition delayed?

- Urbanisation occurring at lower income levels

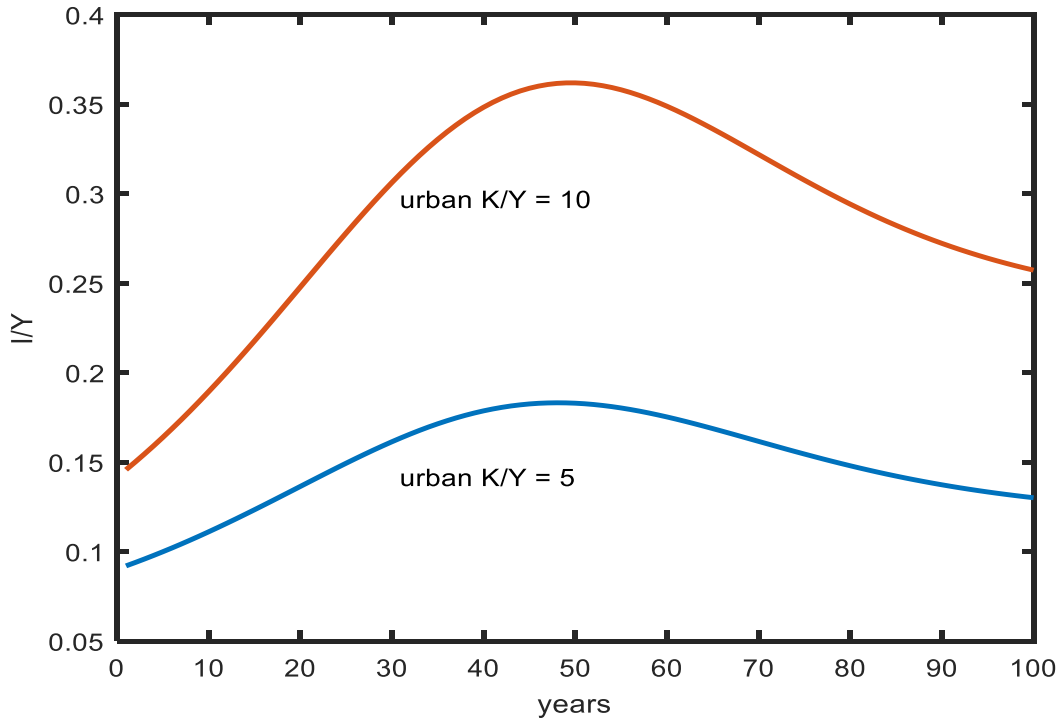


(Jedwab et al. JUE 2017)

Stylised facts:

2) Capital accumulation:

- Africa's capital investment % GDP ≈ 20%, half that of East Asia
- Urban element?
- Back of envelope calculations of investment required by expanding urban population:
  - Given natural growth rates and migration rate;
  - Zero depreciation (i.e. net investment)
  - Capital-output ratios urban and rural.
  - Horizontal axis, years from urb = 10% to urb = 80%
  - Vertical I/Y:
    - Upper, if urban K/Y = 10
      Peak at 35%
    - Lower, if urban K/Y = 5
      Peak at 18%.



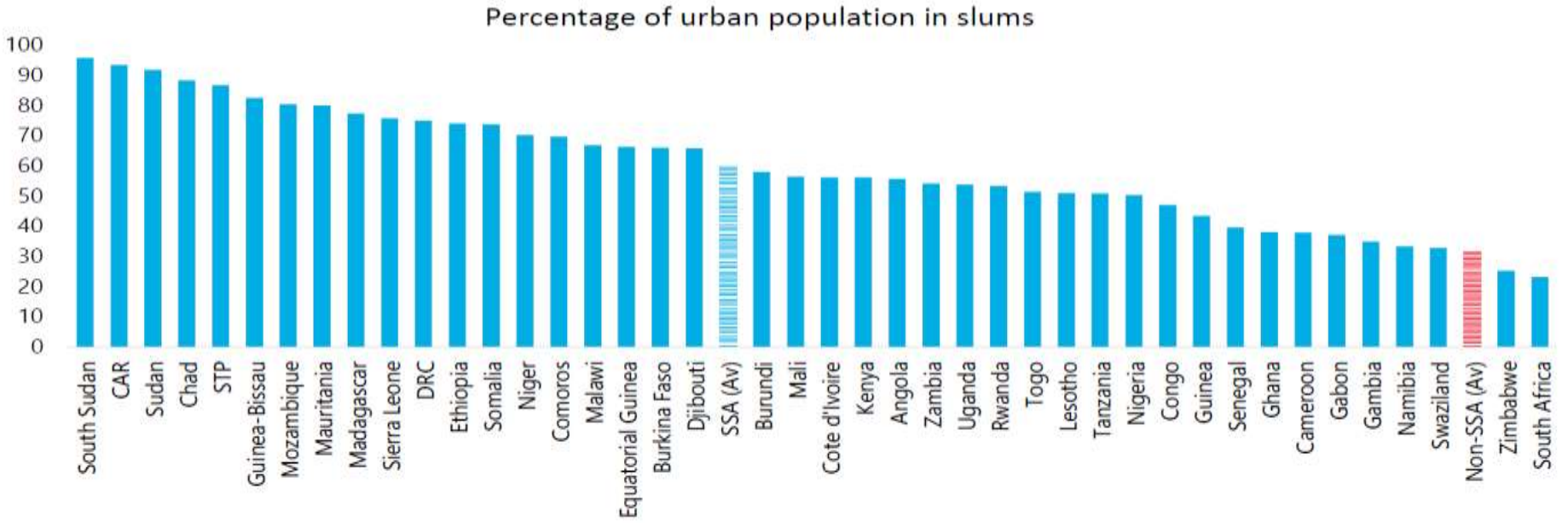
- Break investment into 3 elements:

Residential/ business/ infrastructure

Stylised facts:

3) Residential investment:

- Formal low-income housing is largely absent



Source: United Nations 2015.

Multiple reasons:

- Land tenure: lack of clarity and competing claims.
- Inappropriate regulation: bifurcation of standards
- Failure in capital/ mortgage markets
- Affordability: what is the cheapest 'formal-sector' house that can be built?

Luanda housing:

Sprawl: low density, low connectivity

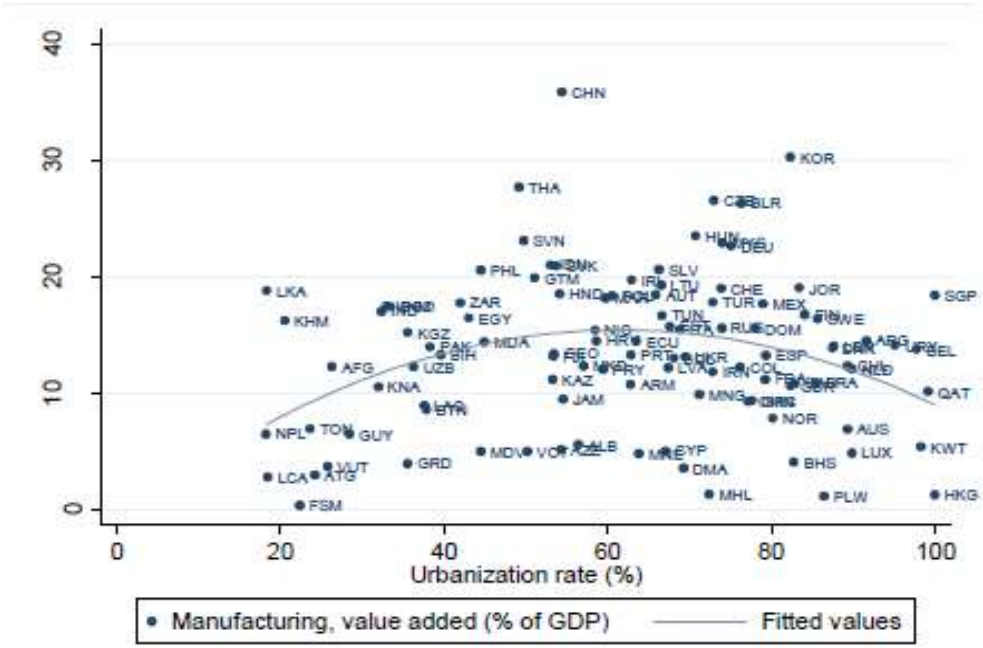
Stylised facts:

4) Firms and jobs: 'urbanisation without industrialization'

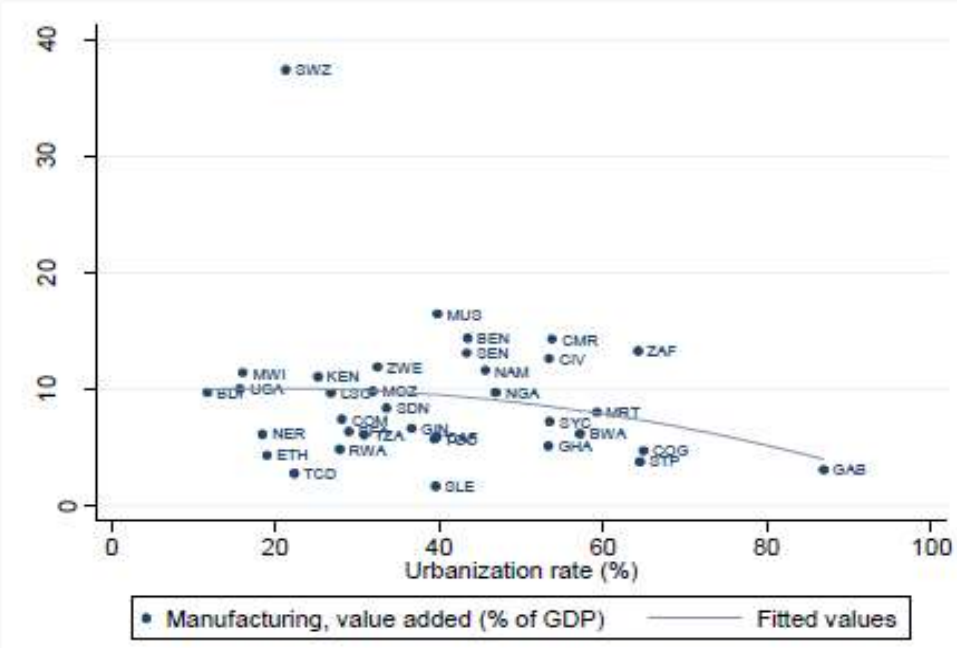
- Tradable manufacturing production is largely absent
  - Share of emplt in manuf: large Asian cities, 25-30%
    selected African cities, 5-15% (having fallen)
  - Informal employment up to 80% non-agric labour force

- Failure to create jobs or achieve high productivity/ agglomeration economies

Urbanisation and manuf share of GDP: Non-Africa



Urbanisation and manuf share of GDP: Africa



Stylised facts:

5) Infrastructure and the public sector

The infrastructure gap:

- Transport/ ICT/ Water and sanitation/ power:
- Estimated need of $90bn pa ≈ or 15% of GDP pa

Multiple reasons:

- Public finance
  - National
  - Local -- lack of local tax base (such as property tax)
- Poor experience with private utilities (eg power theft)
- Governance and the 'authorizing environment':

Research agenda?

Research agenda:

- Three elements: firms and jobs /residential/ infrastructure & public /
- Need to build in depth knowledge on each
- Need conceptual framework for whole

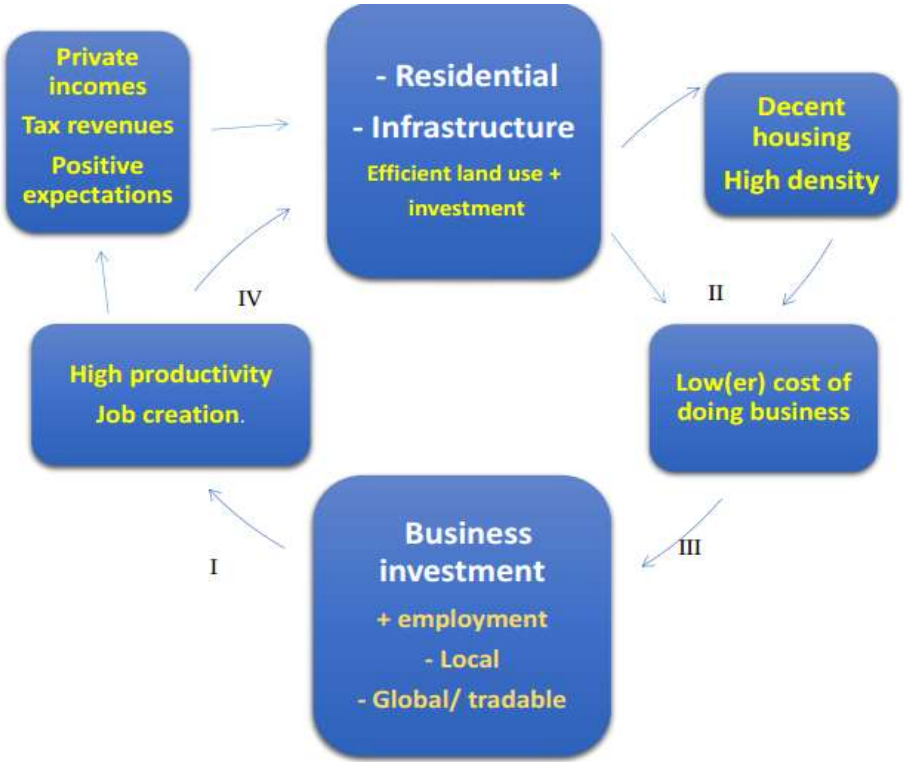
Point of departure is standard urban model (AMM) ++

- MARKET FAILURES & FRICTIONS: Land, regulation, labour and capital markets
- DYNAMICS: Growth and investment with sunk costs ➔ expectations matter
- COMPLEMENTARITIES: Interactions and positive feedback
  - Firm ↔ firm: agglomeration etc.
  - Firm ↔ household: access to markets: access to workers/ jobs:
  - Infrastructure ↔ economic activity:
    - Connectivity
    - Shaping expectations
    - Public finance and source of funds

Collectively ➔ cumulative causation & multiple equilibria

Research agenda?

- Vicious and virtuous circles



- LSE/ Oxford/ WB project
  - Empirics
  - Spatial computable equilibrium modelling
  - Two following papers:
    - 'Breaking into tradables' : theory framework for thinking about complementarities and multiple equilibria
    - 'Building the city': theory, detailed Nairobi study, calibration

Breaking into tradables; urban form and urban function

Questions:

- What are the interactions between urban form and urban function?
- Do complementarities between the two create a potential low-level trap?
- Motivated by observations:
  - Dichotomous pattern of tradable goods production across developing cities
    - East Asia
    - Africa – 'urbanisation without industrialisation'
  - African cities are low real income *and* high cost and high nominal wage.

Figure 8 Nominal manufacturing wages in African cities are higher than in other developing country cities

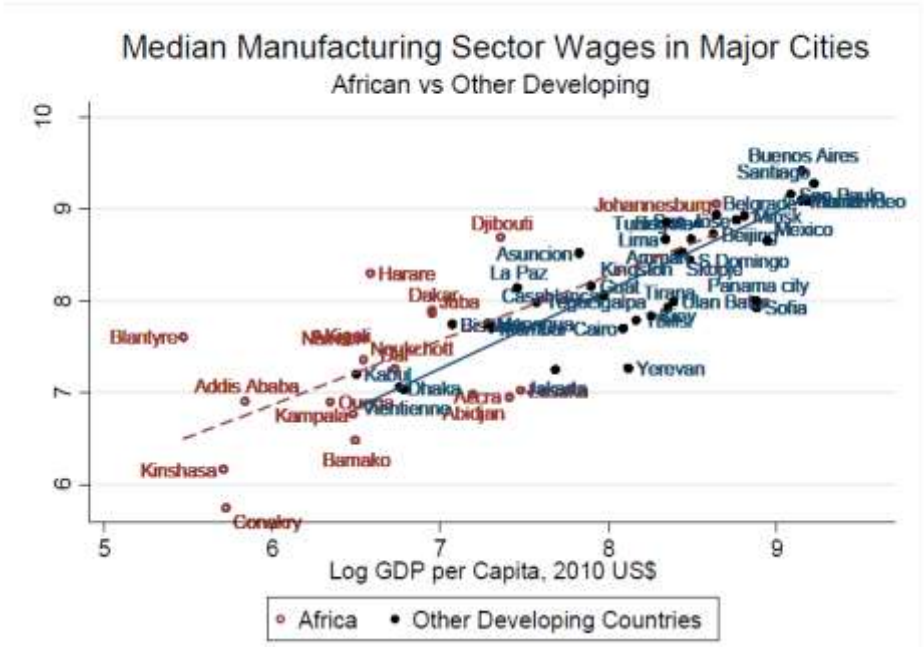
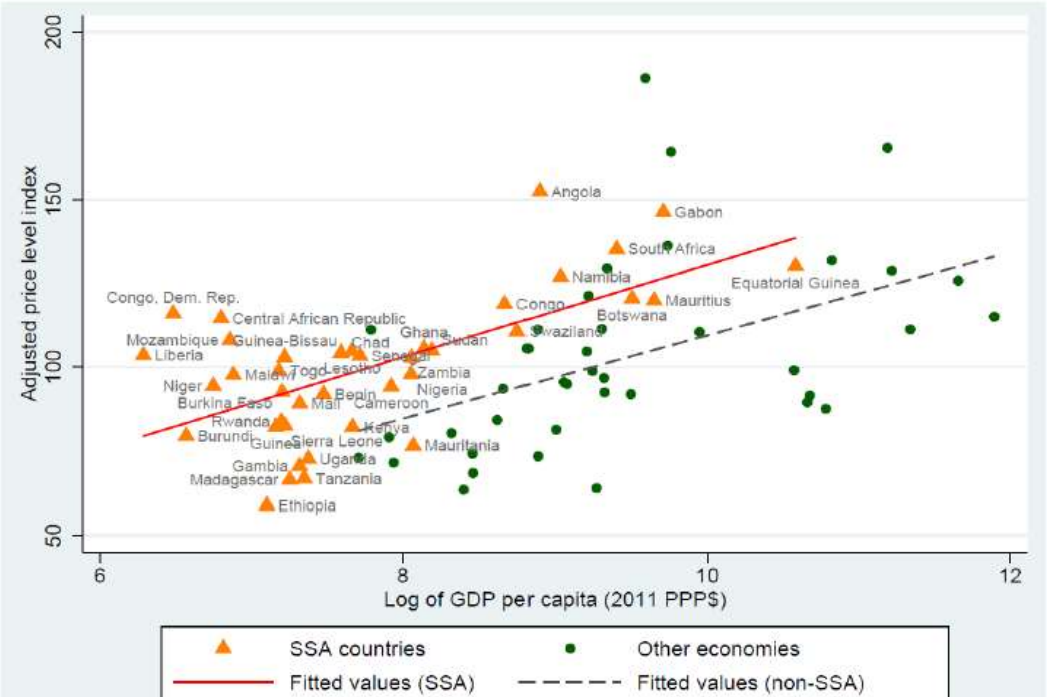


Figure 6 Urban living costs in Sub-Saharan African countries in 2011 exceeded costs elsewhere relative to Africans' lower per capita GDP



Breaking into tradables; urban form and urban function

Model ingredients:

- Labour demand from
  - Non-tradables: diminishing returns to expanding the sector (price falls)
  - Tradables: increasing returns – agglomeration and fixed world price

- Labour supply from
  - Immigration at fixed real wage PLUS urban costs that increase with city size.
  - Urban costs: commuting, congestion, rent (transfer payment)

Outcomes:

- Depend on position/ shape of these supply and demand schedules
- Equilibrium with or without tradable production
- Low-level trap and multiple equilibria due to coordination failure between firms
- Low-level trap due to expectations of land-developers: city is built 'the wrong way'.

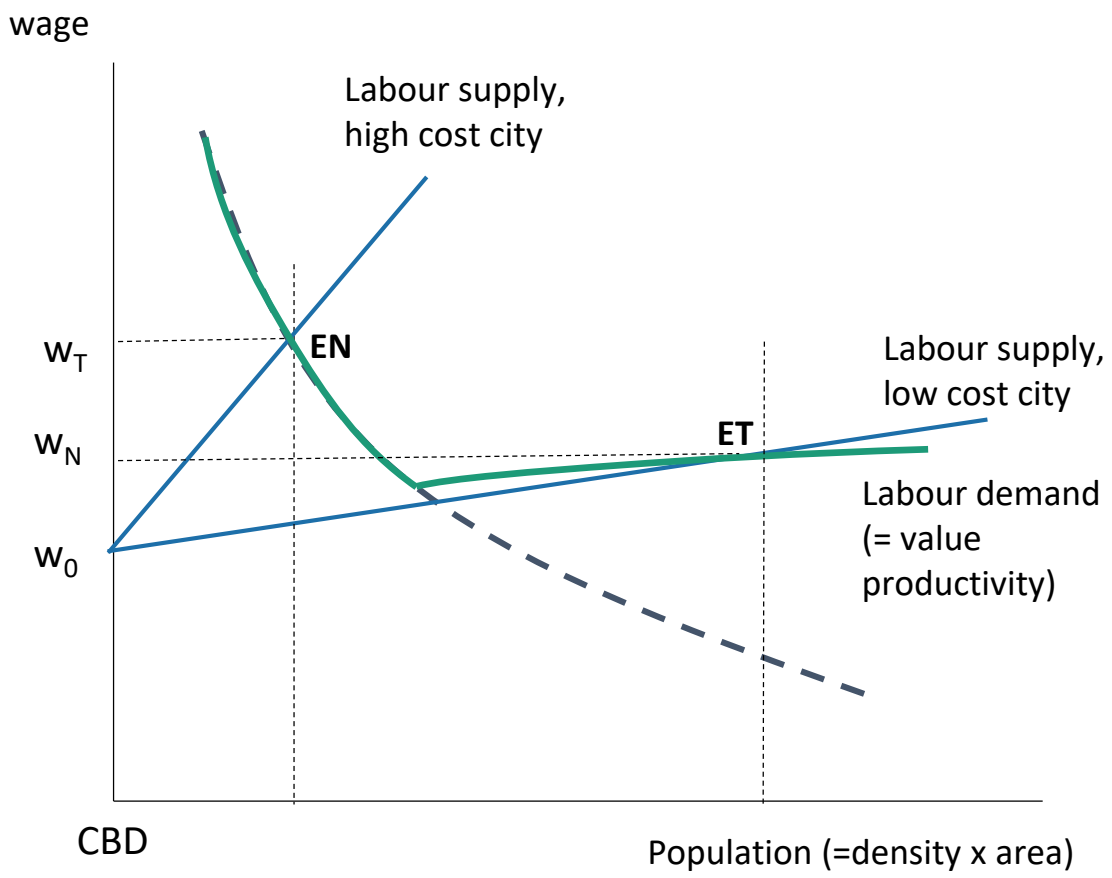
Breaking into tradables; urban form and urban function

- *Labour demand*
  - Non-tradables – price falls
  - Tradables – productivity (weakly) increasing
- *Labour supply:* outside wage w_0 + urban costs (commuting, rent etc)

- *Outcomes:*

  EN: city with high costs and/or income from resources/ hinterland
  - stuck with low real wages, high nominal wages,
  - unable to attract tradable production.

  ET: Low cost city:
  - both tradable and non-tradable sectors;
  - urban costs offset by high productivity



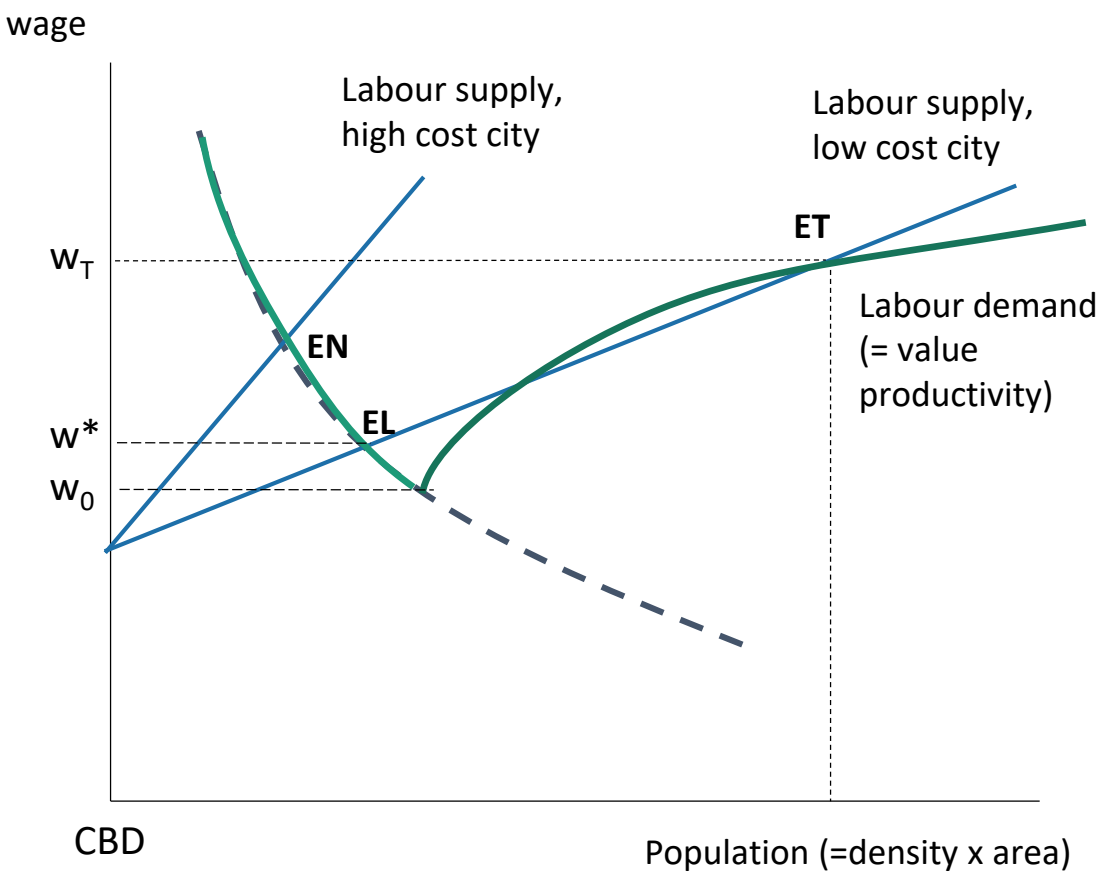
The non-tradables trap: increasing returns & multiple equilibria

- *Labour demand*
  - Tradables – agglomeration economies are large:
- *Outcomes:*

  EN: city with high costs and/or income from resources/ hinterland

  ET: Low cost city:
  - both tradable and non-tradable sectors;
  - urban costs offset by high productivity

  EL: Low cost city but coordination failure:
  - w* is trigger wage for starting tradable production
  - w > w*, so need other policy to start tradable sector production



- Multiple equilibria and low level trap
- Dichotomy E. Asia / Africa

The non-tradables trap: increasing returns & multiple equilibria

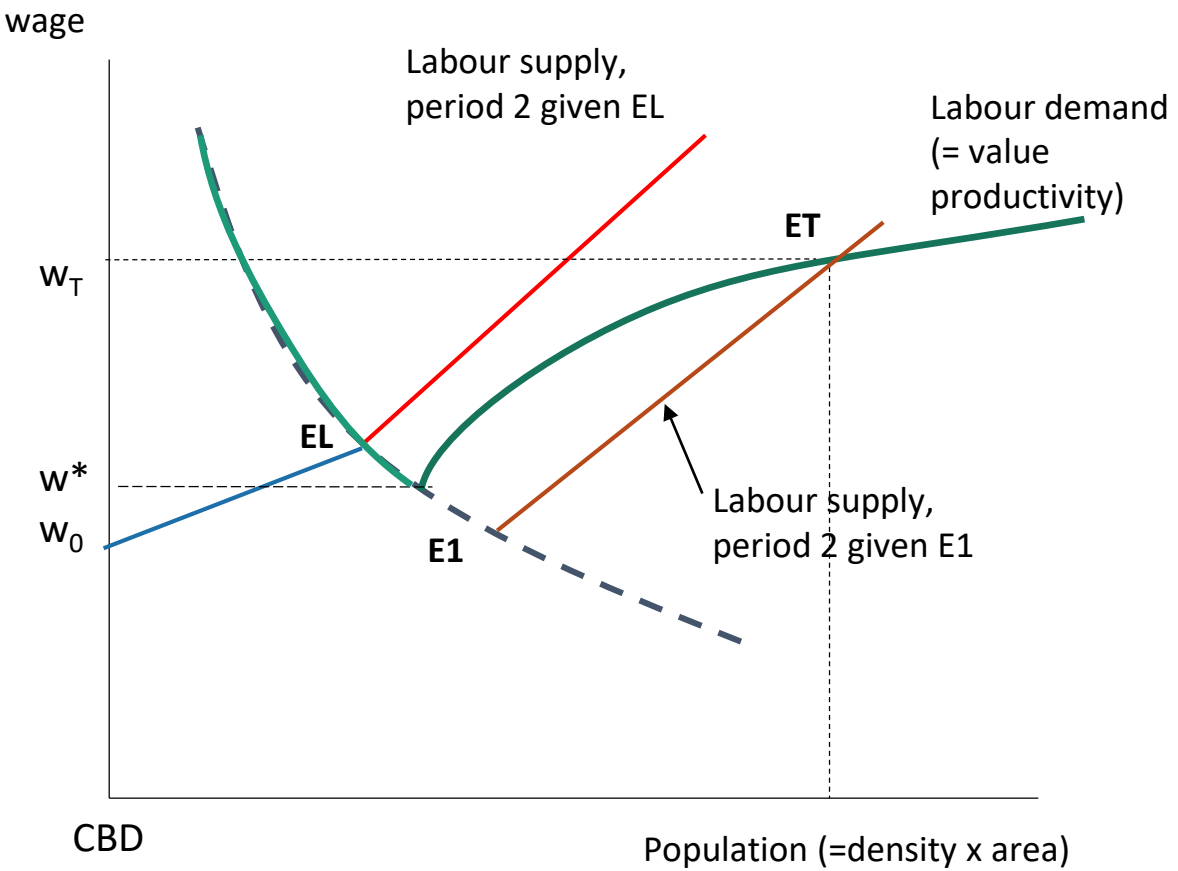
- *Two-period model:*
  - Period 1: tradable production impossible
  - Period 2: tradables become *possible*
  - Building decision both periods.
- *Outcomes:*

I: Builders in I expect to stay stationary at EL, low rent, build low height, density.

- Period I: EL
- Period II: *Unable* to reach ET

II: Builders in I expect tradables boom, high rents, build tall/ dense:

- Period I: E1
  - 'Overbuild' ➔ low nominal wage
  - Wage < w* attracts entry
- Period II: Build to ET



Message:

- Coordination failure across producers and developers
- Possible to build the wrong sort of city – if designed for N, then land-use is inefficient (high cost) for T.

Building the city: sunk capital, sequencing and institutional frictions

Building the city (with Vernon Henderson and Tanner Regan)

Questions:

- In a growing city, what gets built where and when?
- Distinguish formal/ informal – where are the slums?
- The cost of inefficient land-use?

The paper:

Theory:	Characterise a growing city
Data:	Descriptives
	Calibration of model
Application:	What is the cost of inefficient land use?

Building the city: sunk capital, sequencing and institutional frictions

Theory:

City has places, x (= distance from CBD), at dates t.

Price of housing (quality adjusted): increasing with t at rate $p^{\wedge}$,
diminishing with x at rate θ.

Two types of buildings:

Informal (slum):

- Single story, constant unit construction cost but crowding reduces value.
- malleable (lego)

Formal:

- Can build tall, with increasing unit construction cost.
- Putty-clay ➔ sunk costs, and expectations.

Private investors

- choose which to build at each $\{x,t\}$
- choose volume (floor-space) = cover $_{x}$ height.

Building the city: sunk capital, sequencing and institutional frictions

Theory:

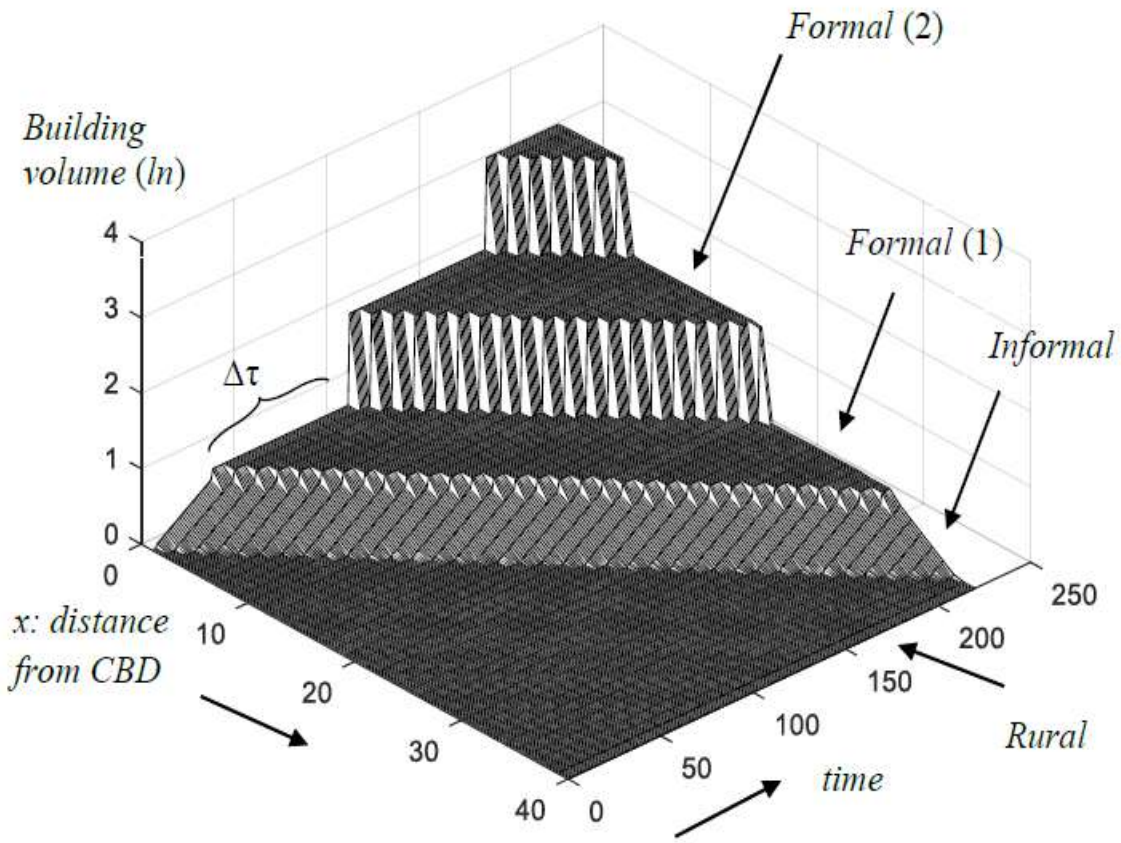
Outcomes, Fig 1:

- Each place goes through phases of development

- Rural:
- Slums:
  - On edge of city (if share of construction in slum rent < share in formal rent):
  - Become more crowded through time/ closer to centre
- Formal:
  - periodic demolition and reconstruction

- At each date, city cross-section

Figure 1: Urban development with perfect foresight



Building the city: sunk capital, sequencing and institutional frictions

Theory:

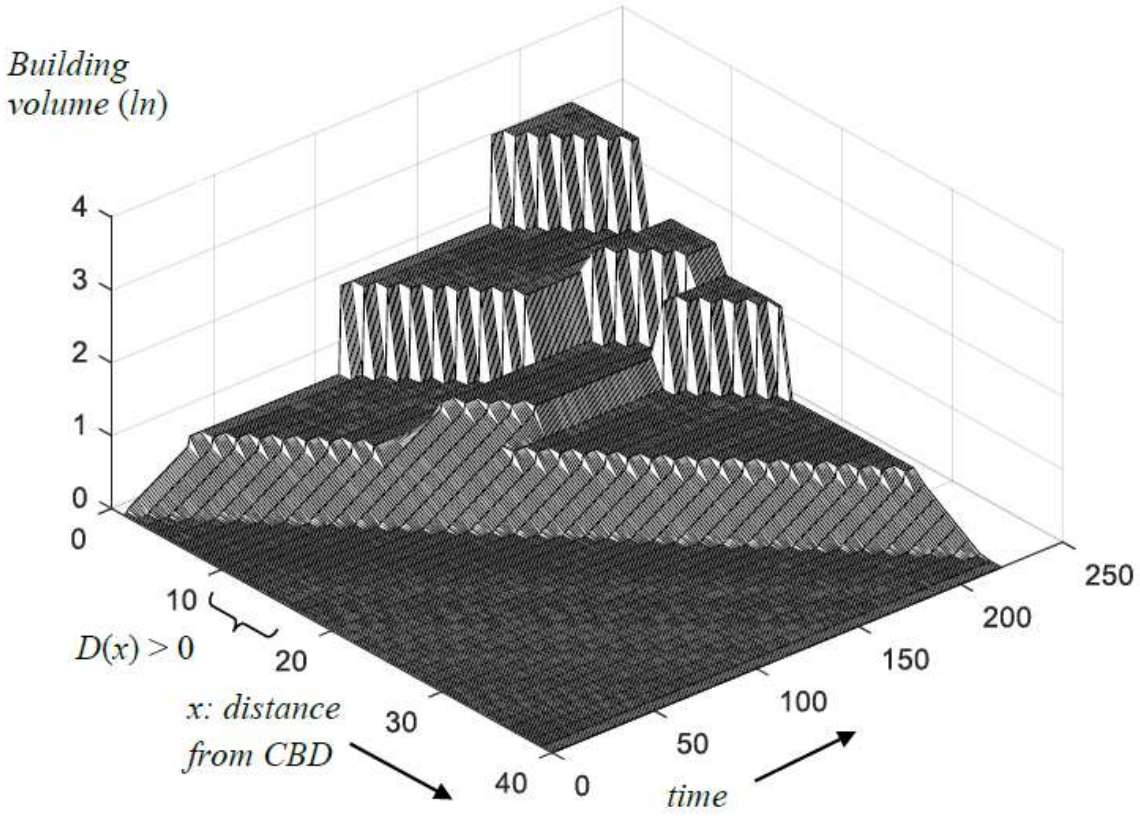
Outcomes, Fig 2:

- Obstacle D(x) to conversion from informal to formal
- Formalisation costs:
  - Land rights
  - Political economy

- Slums persist in central areas.
- Subsequent phases of construction delayed

- At each date, city cross-section -- 'Hodgepodge'

Figure 2: Formalisation costs



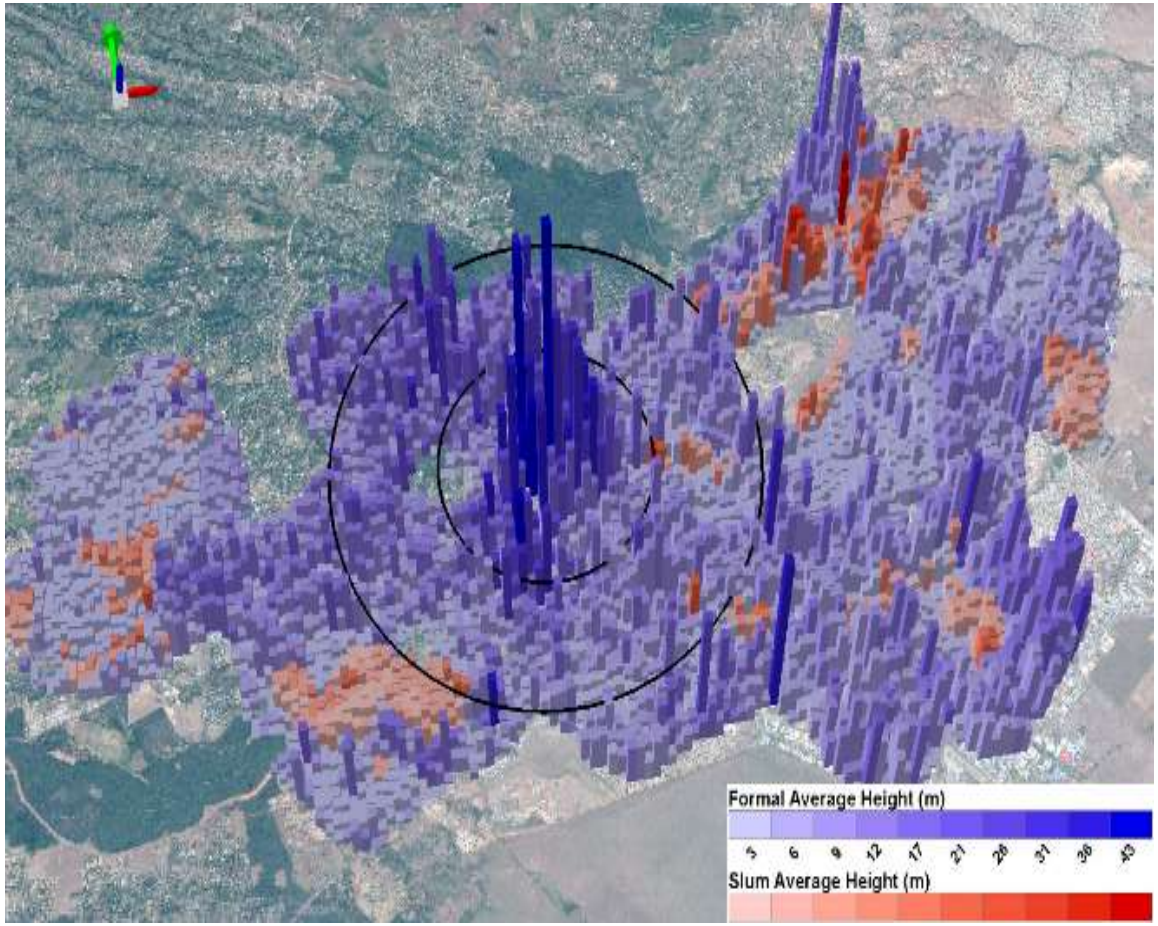
Building the city: sunk capital, sequencing and institutional frictions

Nairobi: Data and facts

Sources:

- Aerial photo (10-40 cm resolution) & LIDAR (0.3-1m resolution)
- Gives building footprints for 2003/4 and 2015 and heights for 2015.
- Definition at 3mx3m pixels: aggregated to a grid with 6470 cells of 150m by 150
- Land price: scraping web for advertised prices of vacant lots
- House-rent: House-rent per m^2, formal and informal (2012, NORC)
- Other city data, slum area mappings.

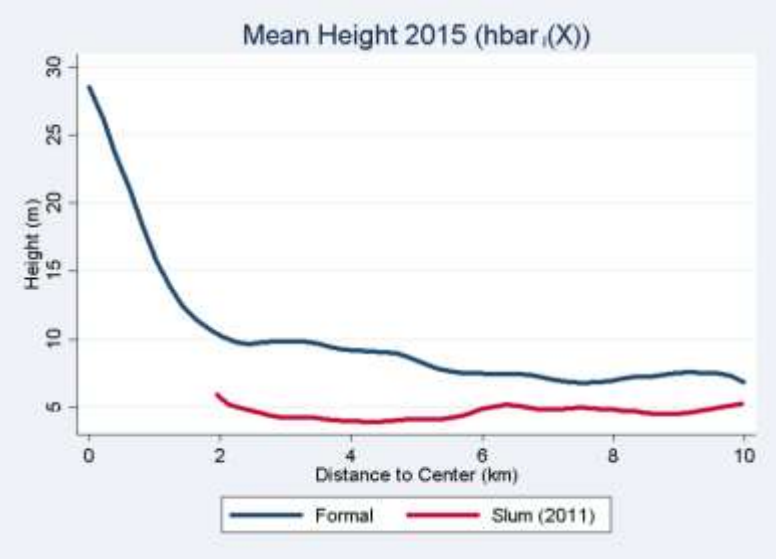
Nairobi: 2015, building height 150-150m grid square



Empirics: cross-section

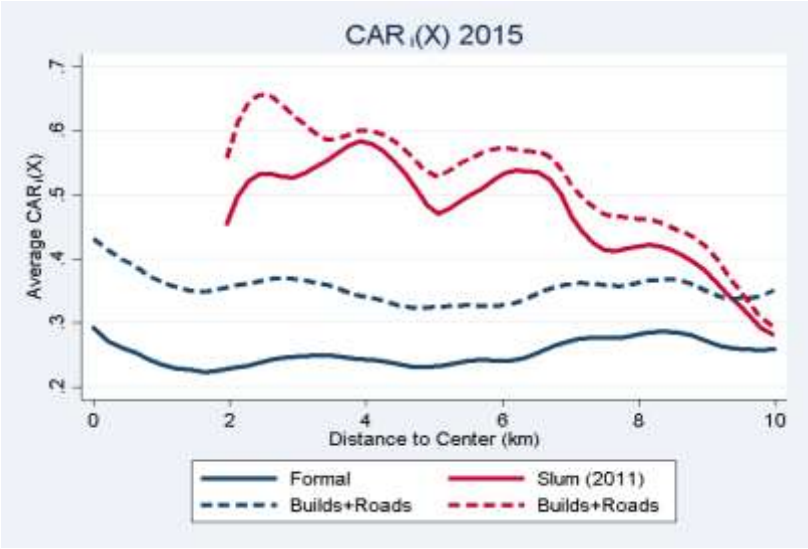
Building height by distance from centre:

- Formal: tall and gradient
- Slum: uniformly low



Building cover-to-area ratio by distance from centre:

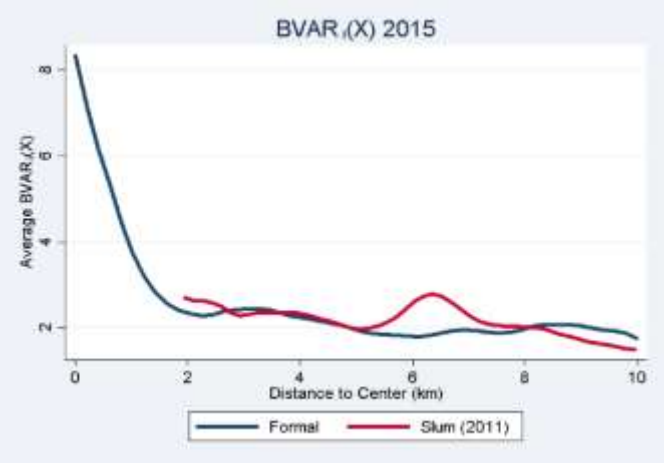
- Formal: low and constant
- Slum: Up to 60%, declining with distance



Empirics: cross-section

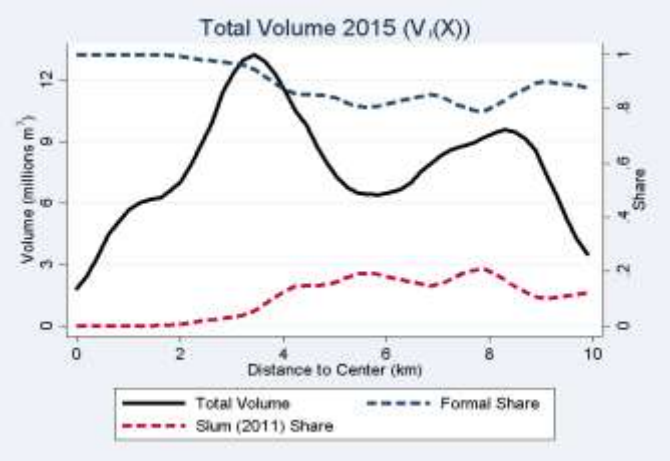
Volume per unit land area: by type

- Slum and formal areas provide about equal building volume per unit area



Total volume by distance

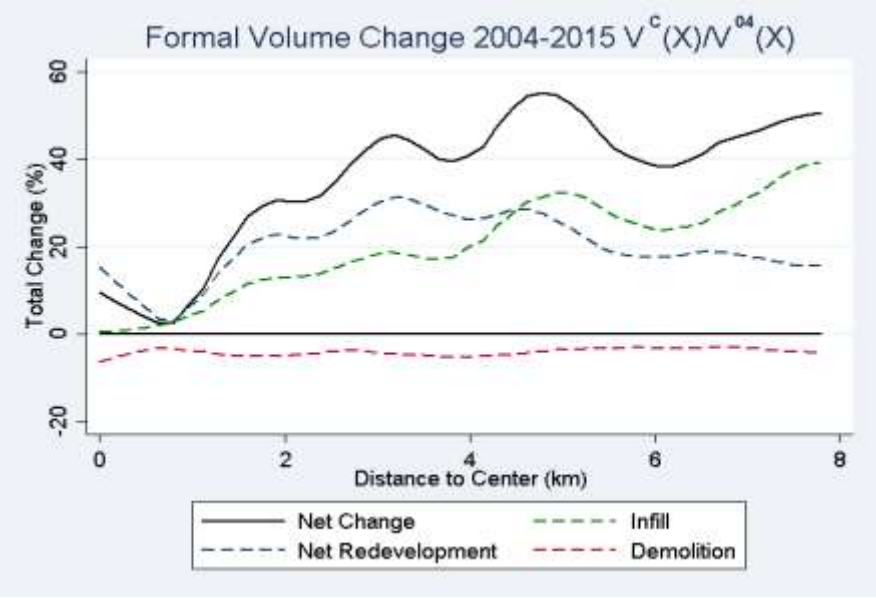
- Total volume provided
- slum greatest share 20% at 5-8kms



Empirics: changes

- Huge amount of redevelopment:
  - 3 kms from the centre, 35% of buildings replaced in the last 12 years (developed country < 10%).
  - At 3kms from the centre, demolition goes with redevelopment to much taller buildings.
  - Volume per unit area increase by 40%

Volume per unit area

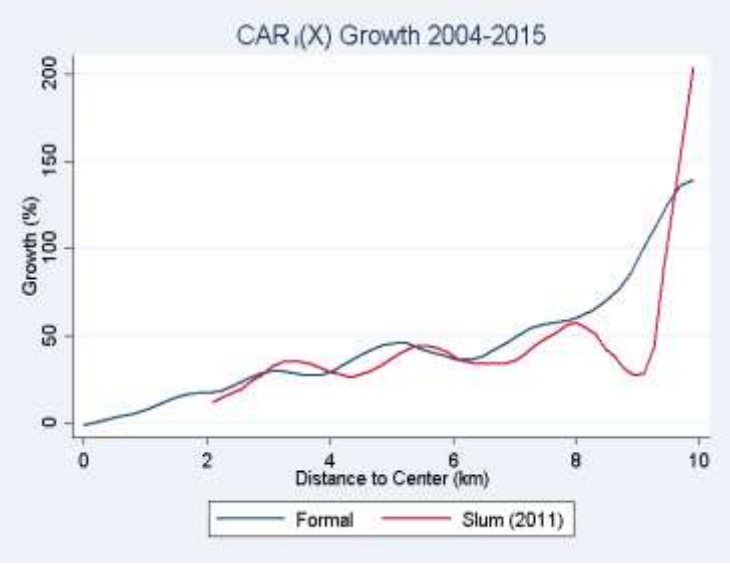


Building height

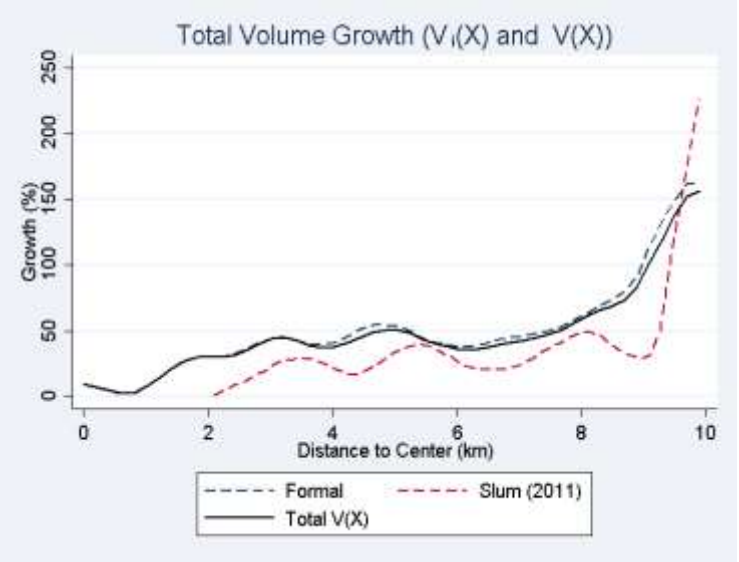
Empirics: changes

- Further out, increasing densification and volume growth in slums

Cover to area ratio



Total volume by distance and sector



Building the city: sunk capital, sequencing and institutional frictions

Calibration:

Data:

- Gradients of prices, rents, volumes w.r.t. distance from CBD
    - Eg built volume decreases 10% with each 1km from CBD
- Dynamics: discount rate, rate of price increase
- Point estimates of levels of house price, land rents m^2

Calibrate parameters that fit model to data:

- Eg: Parameters of construction technology
    - Land-rent share of revenue in formal = 44%;
      in slums = 74%
- Disamenity of informal (and crowding)

Can calculate values of all endogenous variables of the model:

- Eg: efficient formalisation and redevelopment dates
- Land rents through time

Building the city: sunk capital, sequencing and institutional frictions

Application: the cost of slums:

- Calculate the opportunity cost of high value land near CBD remaining slum
- NB: do not calculate cost of dislocation etc to do with change of use

- Present value of land rents with efficient formalisation *minus* PV land rents with perpetual delay (at 3-4kms)
    - \$790-\$409 = \$381 per m^2
    - Equivalent to ≈ \$15,000 per household
- Drops off further from CBD: at 5-6kms
    - \$284 per m^2

  Equivalent to ≈ \$12,000 per household
- Total loss up to 6kms ≈ \$1.3bn
- Drops off with shorter delays:
    - 25 year delay from 2015 costs \$56 per m^2 at 4-5 km.
    - Cf, annual informal land-rent at 4-5 kms ≈ \$12

Message: - Theory: thought framework

- Calibration: indicative numbers for policy making.

Research into policy

What are the important messages that research can bring policy-makers?

From the very general to the specific….. a summary of some of the most general

I) **Governance and the authorizing environment:**

- Many city authorities are weak
- Need coordination across a wide scope
  - Spatial – city expansion
  - Temporal – long time horizon
  - Functional – public services/ infrastructure/ finance/ regulations….

II) Recognition that cities are inevitable *and* good.

- Cities perceived as political threat
  - (most African cities controlled by opposition parties)
- Recognise that cities are the places where jobs will be created
  - Productivity
  - The urban surplus (probably capitalized in land values)

III) **Create a good environment for job creation**

- The business climate
- Infrastructure/ connectivity
- Skills
- Housing

Land-use and housing: alternative approaches to residential density

IV) Realistic housing:

- Luanda (Kilamba):

- South Africa, Dar es Salaam

- Addis Ababa

V) Do infrastructure early

- Direct benefits:
  - Delivery of services
  - Time savings, reduce congestion
- 'Wider benefits'
  - 'Connectivity' – scale and density – productivity
  - Reduces business costs
    - Directly
    - Raise household well-being ➔ labour supply at lower nominal wage.
- The case for doing early:
  - Expensive to retrofit
  - Shape expectations – which areas of the city will grow.
  - The city edge: 'sites and services'

VI) Capture the surplus

Public finance:

- Much of the productivity advantage of cities ends up in land values – i.e. paid over as higher rents by firms/ households that want to benefit
- This value is not created by any single investor – it is because of the overall effect of the city.
- Strong case for a land tax that transfers this value to the city
  - Ethically – value is created by the city as a whole
  - Administratively – land taxation relatively easy (given property register)
  - Economically – land tax has little 'distortionary' effect on investment decisions
  - Can fund infrastructure
  - Create a ***city level*** revenue stream, independent of central government

VII) See the city as a whole

- Land is the scarce factor: use it efficiently
  - Enable owners/ occupants of land to build durable structures
  - Enable land be transferred to those who can use it most effectively
    - Land markets

- Multiple decision takers

  Decisions of individual firms and households need to be coordinated
  - Principally markets – supply, demand and prices
  - BUT: coordination failure
  - Expectations about the future development of the city matter – the value of my investment will depend on who else invests
  - Role for local government in coordinating expectations
    - City plans
    - Infrastructure investments

Policy and conclusions

I) Use land efficiently

Density and access are important ➔ need efficient land use:

- Enable owners/ occupants of land to build durable structures
  - Security and clarity of tenure: property register
  - Appropriate building & land - use regulations
  - Supporting markets – mortgages and capital markets
- Enable land be transferred to those who can use it most effectively
  - Land markets

- The textbook model of the efficient city
  - Producers want to cluster together, so willing to pay high land rents for land in the central business district
  - Residential organized around, with higher density in centre, lower towards edge.
  - This achieved by land markets and rents