AFRICAN URBANIZATION:
SOME KEY ISSUES

Patricia Jones
University of Oxford
IGC Conference, Dar es Salaam
25th February 2015
Introduction

- **New project on urbanization in Africa.**
  - World Bank funded—but independent research agenda.
  - Led by joint research team from Oxford University & London School of Economics.

- **Project leaders:**
  - Paul Collier (Oxford)
  - Tony Venables (Oxford)
  - Vernon Henderson (LSE)
Some Aims of the Project

- To better understand the spatial development of African cities and the scope for public policy to improve it.
  - We will be examining the patterns, causes, consequences and policy implications of urban development across Sub-Saharan Africa.

- To compile a comprehensive dataset on African urbanization.
  - Satellite data
  - Historical aerial photos & maps
  - Geo-referenced firm & household data
  - Census data
  - Cadastral surveys, etc.
Spatial Analysis

- **Within-cities:** to understand the spatial patterns of development within cities and its determinants and implications.

- **Across-cities:** to understand how systems of cities have evolved over time.
Within-city Analysis

- We want to know how both populations and capital (buildings and roads) are:
  - Distributed within cities
  - Their evolution over time
    - What drives conversion of rural land to urban use?
    - What about conversion of informal to formal land?
      - Under what circumstances (e.g. economic growth, institutional settings, policy initiatives, etc.) do we see conversion?
    - What drives conversion at fringe (formal vs informal)
    - Densification
      - In-filling vs higher buildings (what would be most efficient)
Initially, we will focus on six priority cities (Dar es Salaam, Nairobi, Addis, Kampala, Kigali & Accra)

- Right now, we have population data, night lights data and low resolution ground cover data (“built” or impermeable surface).
- Have just gotten high resolution (1.5 to 2.5 meter) satellite data
  - Early 2000s and early 2010s.
  - Measures of building density and irregularity of positioning
  - Access to roads
- Will get some building height data.
Preliminary look at Dar es Salaam

- Has some semblance of a monocentric structure as do most cities in the developing world.

- Two big differences:
  - Low average density at the center compared to other big cities in developing world especially those at its income level.
  - Extreme extent of “unplanned” [informal] settlements
    - 80+% of buildings in in unplanned sector
Preliminary look at Dar es Salaam

- **Some findings on:**
  - Population density and its evolution
  - Built cover (low resolution)
  - Ratio of population to build cover

- **Methodologies that we’re using to learn more about built cover and capital investments using high resolution data.**
Urban Density

Population Density 2012

Change in Population Density 2002 - 2012

Source: NBS Census data and DSM
Average density near center is 20-25000 per sq km. Versus, say, Jakarta 1980: 40,000+. Shanghai and many big cities even higher historically, with peaks at 100,000+ per sq km.

Density without building height
Informal settlements: low livability.
Density by distance to major roads
Population Density Gradient

Source: NBS Census data and OSM
### Population Density Levels and Changes

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance to City Centre</td>
<td>-0.137***</td>
<td>-0.0329***</td>
<td>-0.0343***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00701)</td>
<td>(0.00786)</td>
<td>(0.00792)</td>
<td></td>
</tr>
<tr>
<td>Distance to Major Roads</td>
<td></td>
<td>-0.159***</td>
<td></td>
<td>-0.0297*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0319)</td>
<td></td>
<td>(0.0164)</td>
</tr>
<tr>
<td>Log Pop. Density 2002</td>
<td></td>
<td></td>
<td>-0.262***</td>
<td>-0.307***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.0495)</td>
<td>(0.0542)</td>
</tr>
<tr>
<td>Constant</td>
<td>10.21***</td>
<td>10.27***</td>
<td>3.047***</td>
<td>3.496***</td>
</tr>
<tr>
<td></td>
<td>(0.130)</td>
<td>(0.119)</td>
<td>(0.508)</td>
<td>(0.557)</td>
</tr>
<tr>
<td>Observations</td>
<td>109</td>
<td>109</td>
<td>109</td>
<td>109</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.806</td>
<td>0.859</td>
<td>0.255</td>
<td>0.268</td>
</tr>
</tbody>
</table>

**INFRASTRUCTURE:** Usual decline in density from center but major roads play a significant role in settlement patterns.

**Future:** Effect of BRT or opening of limited access highway on settlement patterns.
Built area

• What is covered, or built?
• What is the density and irregularity of buildings
• What are their heights?
• How do these interact with public capital (roads)?
• How does this evolve over time?
  • Irregular to regular; dense to less dense;
  • Dense and irregular to even more dense; building upward in dense/irregular areas
  • Unserviced to serviced
Change at pixel level (30m x 30m); must be one use or another
% changes also similar in pattern
Is the “frontier” the neighborhoods where there is height?
• Areas of greatest increases
  • Tandale, Manzese, Tandika, & Mwananyamala informal settlements to the West.
  • Kigamboni (ward connected by ferry to CBD across creek),
  • Kariakoo and CBD, plus wards just to the south of here.
  • Wards just to NE of airport, and spreading across to Tandika.
• Suggestive that the informal settlements and densest original places are seeing increased density despite lack of space to develop more land.
• Interesting to see population spreading north faster than build up increasing
  • This is an area where we are seeing high numbers of formal firms.
  • Also on major road towards Bagamoyo new port
Land cover was derived from classified VHR imagery.

Dar es Salaam 2010/12 land cover
Percent of Class by Distance from CBD in K

Commercial

Residential

Ratio Comm/Res

Barren
But 80% of buildings are in unplanned Settlements. UN Habitat (2010) based on government census of buildings.

What is the problem:
• Lots of formal sector land but not buildings?
• Misclassification

Need information about Buildings!

The problem of strict classification
Focus on two key functions of the city:

- **Livability**
  - housing quality, especially floor space & height
  - Access to public services
  - Security of tenure

- **Productivity**
  - Scale
  - Complementarities
Next Step

- Three complementary spatially specific investment processes:
  - public infrastructure
  - household residential
  - commercial.

- Timing issues
- Path dependence
- Role of public policy
THE END!