

Opportunities and Challenges of Urbanization

Planning for an Unprecedented Future

DEC Policy Research Talk
September 25, 2017

Harris SELOD

Outline

Preliminary remarks on the measurement of urbanization and trends about urbanization

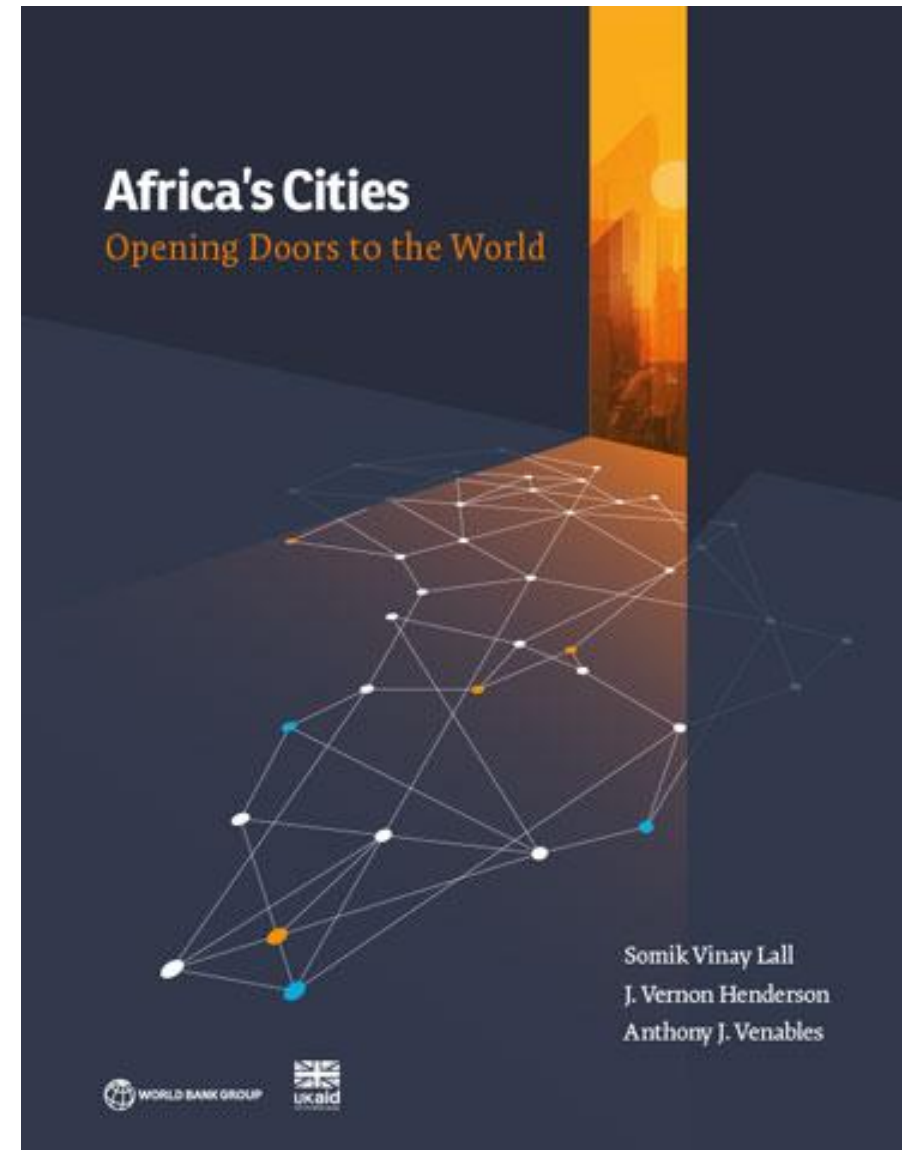
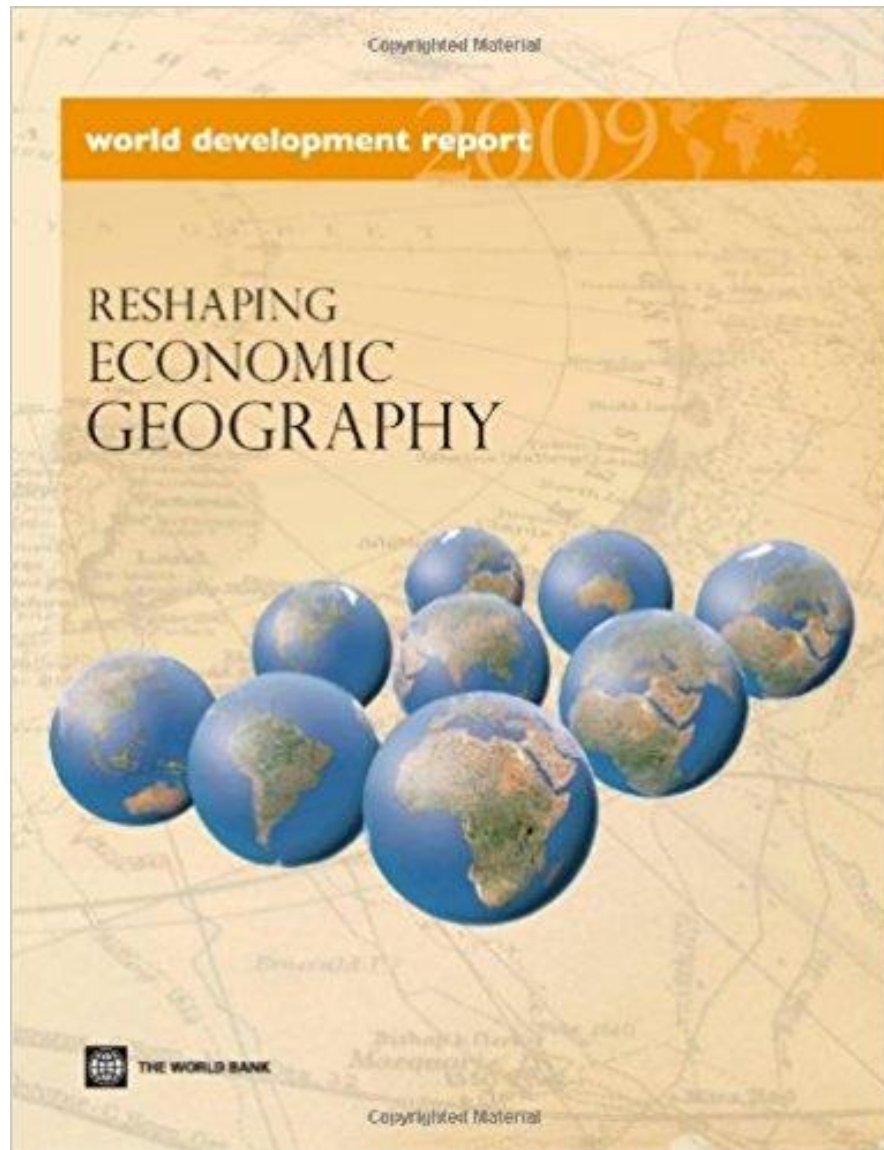
Urbanization and economic development usually go hand in hand but some developing countries face strong challenges

Anticipating rapid urban population growth, can we “get cities right”?

- Land and transport play a critical role

- What can we learn from research to guide policy?

See Uwe Deichmann's previous DEC Policy and Research Talk
"Revisiting Economic Geography", December 19, 2016



See the Urbanization's conference website for videos, presentations and papers



**4th Urbanization and Poverty
Reduction Research Conference**

BUILDING OR REBUILDING CITIES FOR GROWTH

#UrbanizationConf

8 Friday, September 8, 2017

9:00 AM – 5:30 PM | Preston Auditorium



Elliott School of
International Affairs
THE GEORGE WASHINGTON UNIVERSITY

INSTITUTE FOR
INTERNATIONAL
ECONOMIC POLICY
ELLIOTT SCHOOL OF INTERNATIONAL AFFAIRS



Later this week!

Space & Productivity Conference

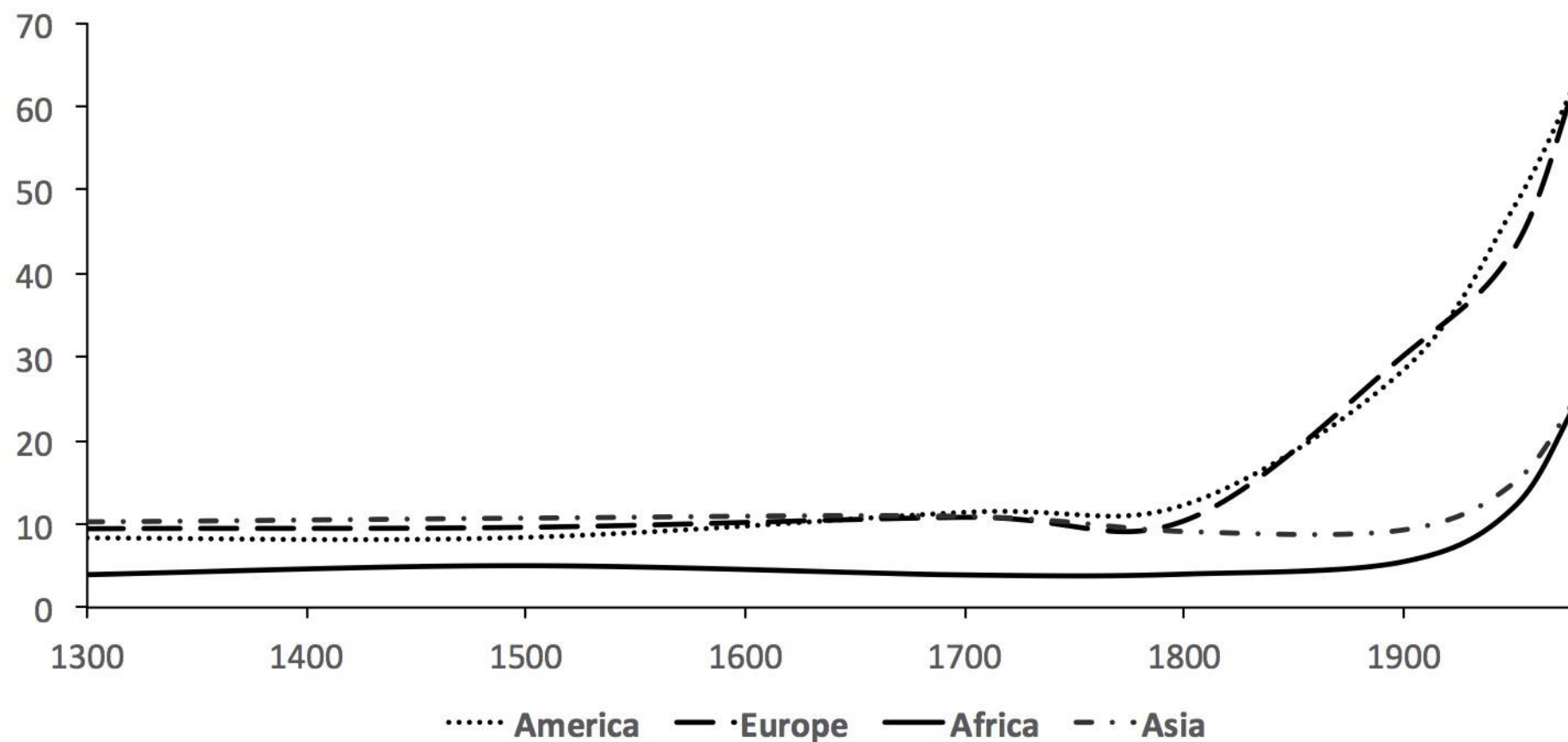
Sep 28-29, 2017
Washington D.C.



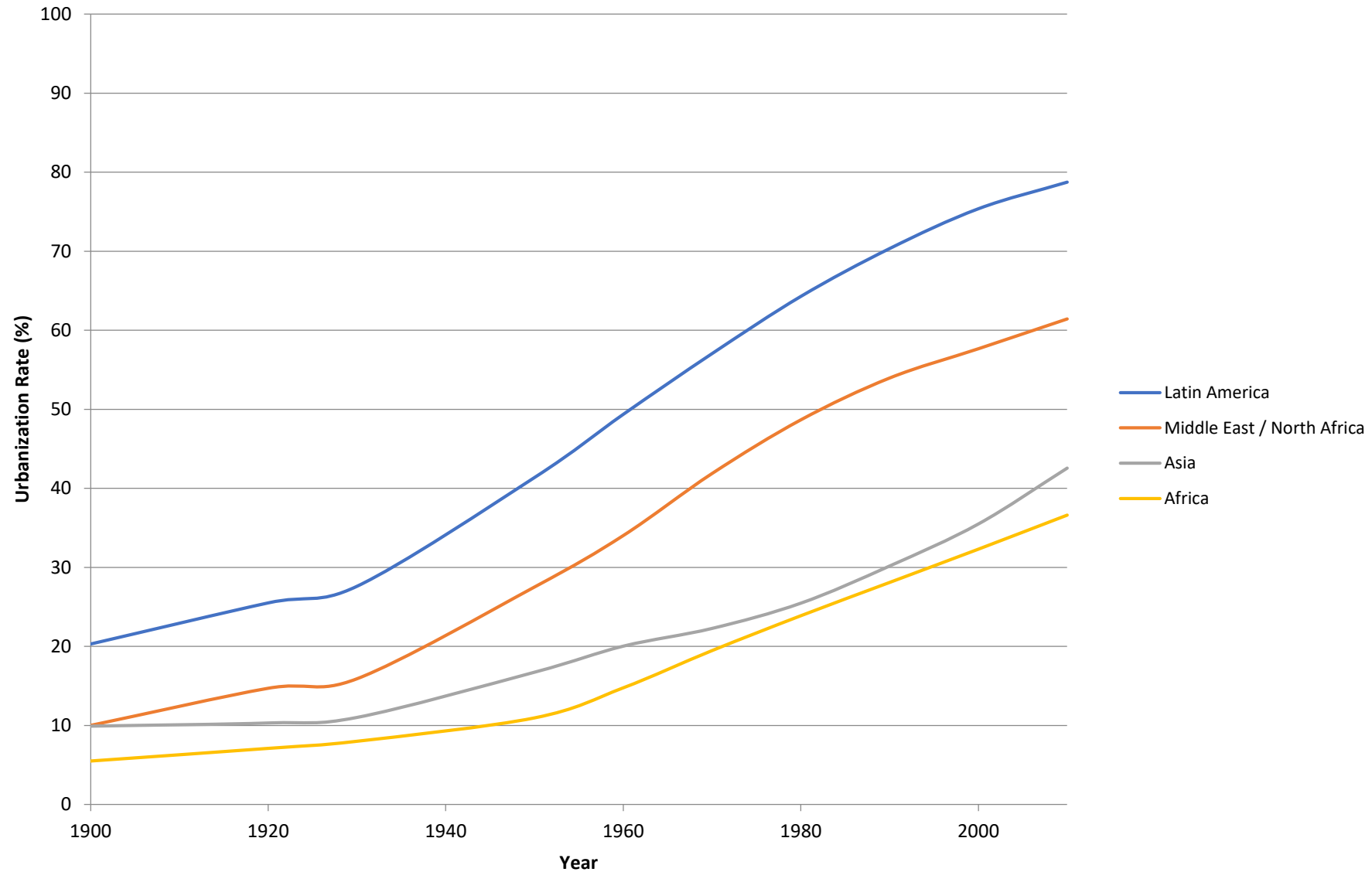
Measuring urbanization

Historical trends

Historical rates of urbanization (1300-1980, four regions)



Urbanization Rates (%) for the Developing World (1900-2010)



Measuring urbanization

City level measures

How are cities defined?

UN World Population Prospects is the standard source

However, there are country-specific definitions according to various criteria (designation, minimum population, minimum density, non-agricultural activities, infrastructure and services, commuting-to-work patterns,...)

Ongoing initiatives try to compile city level population for the whole world using comparable criteria. The main challenge is to aggregate information (often available at a jurisdictional level) for an economically relevant definition of cities

Density and contiguity

Example 1: Reconstructing urban extent and aggregating census population data

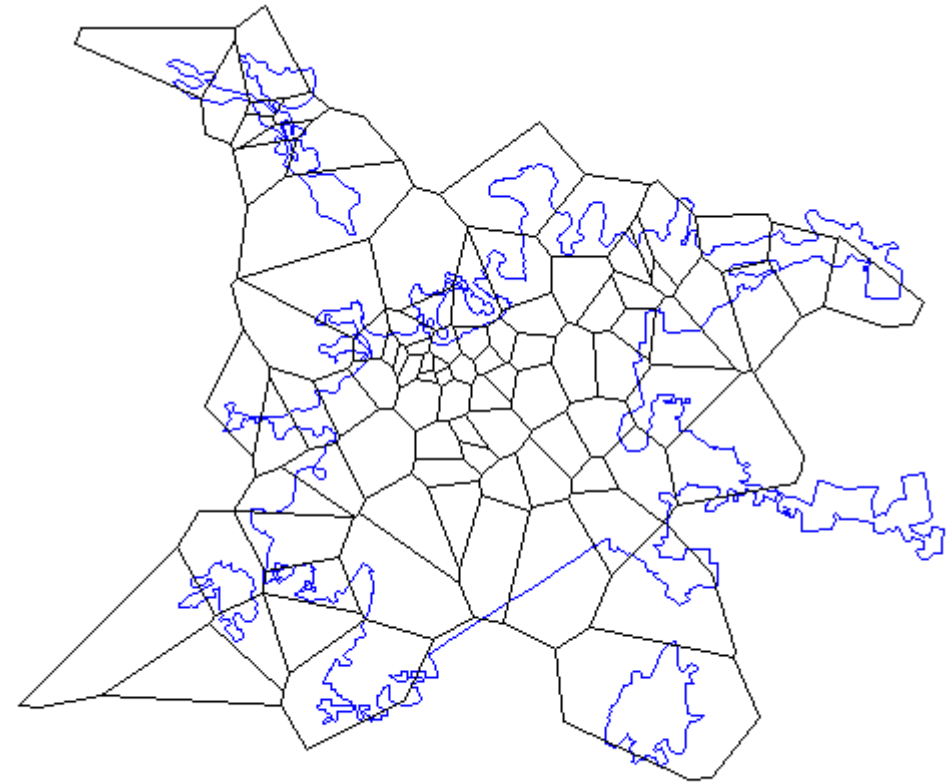
Start from a geo-referenced set of points with associated population

Approximate locality shapes with Voronoi polygons and calculate locality densities

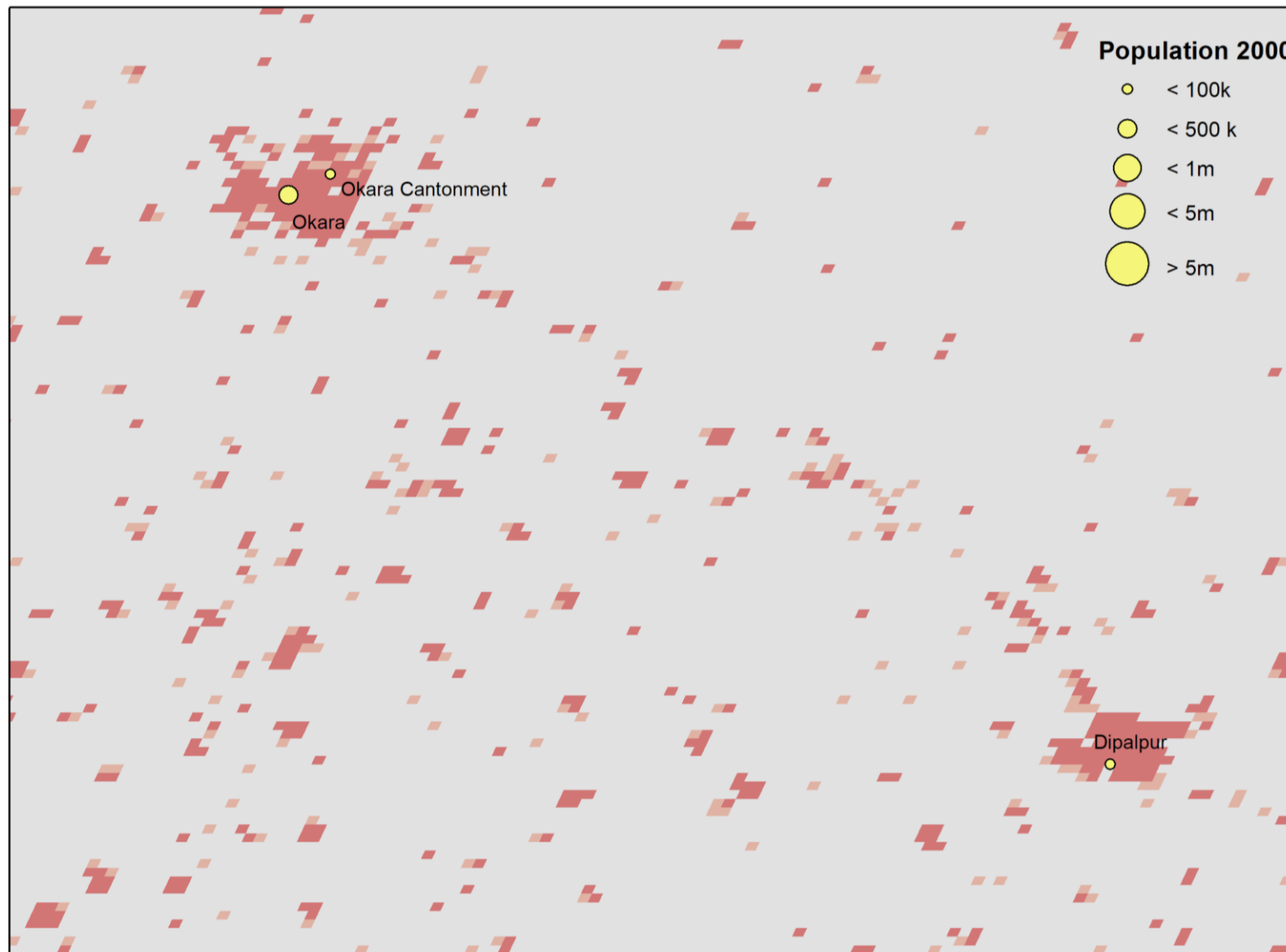
Aggregate localities using a density threshold and proximity or contiguity

This requires access to relatively disaggregated census data

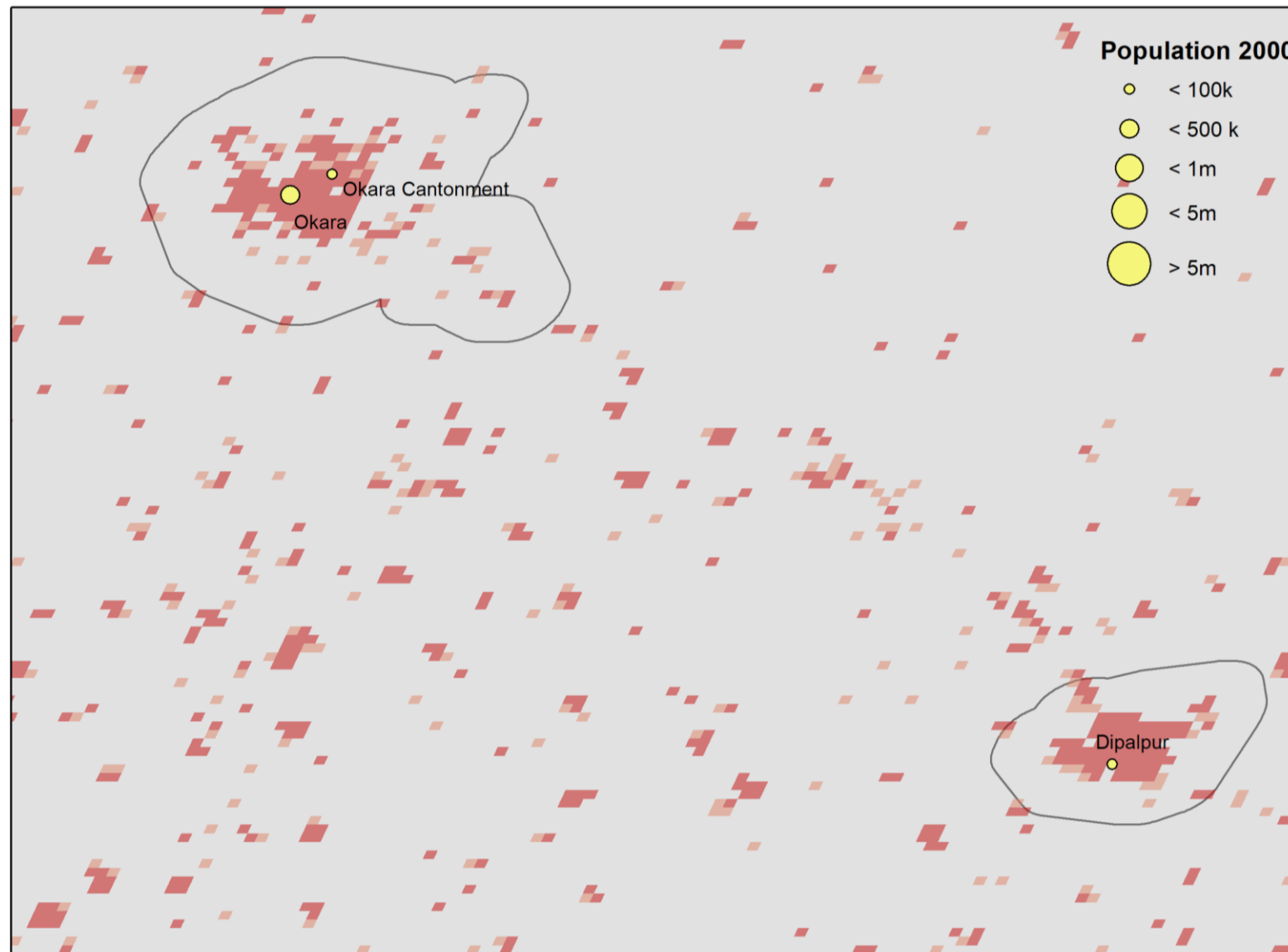
Figure: The urban area of Bamako, Mali



Example 2: Consolidating jurisdictional population data within an urban extent



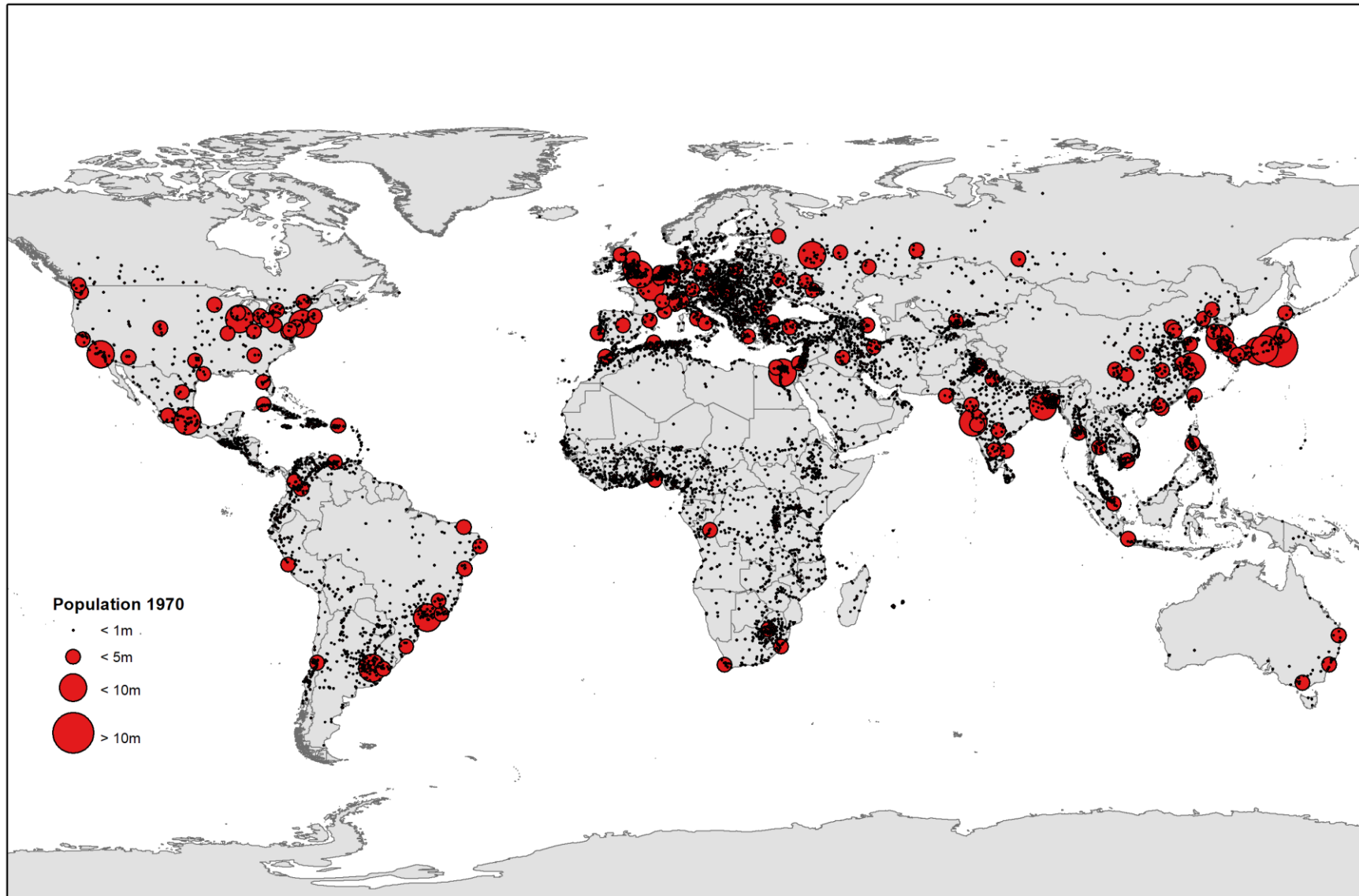
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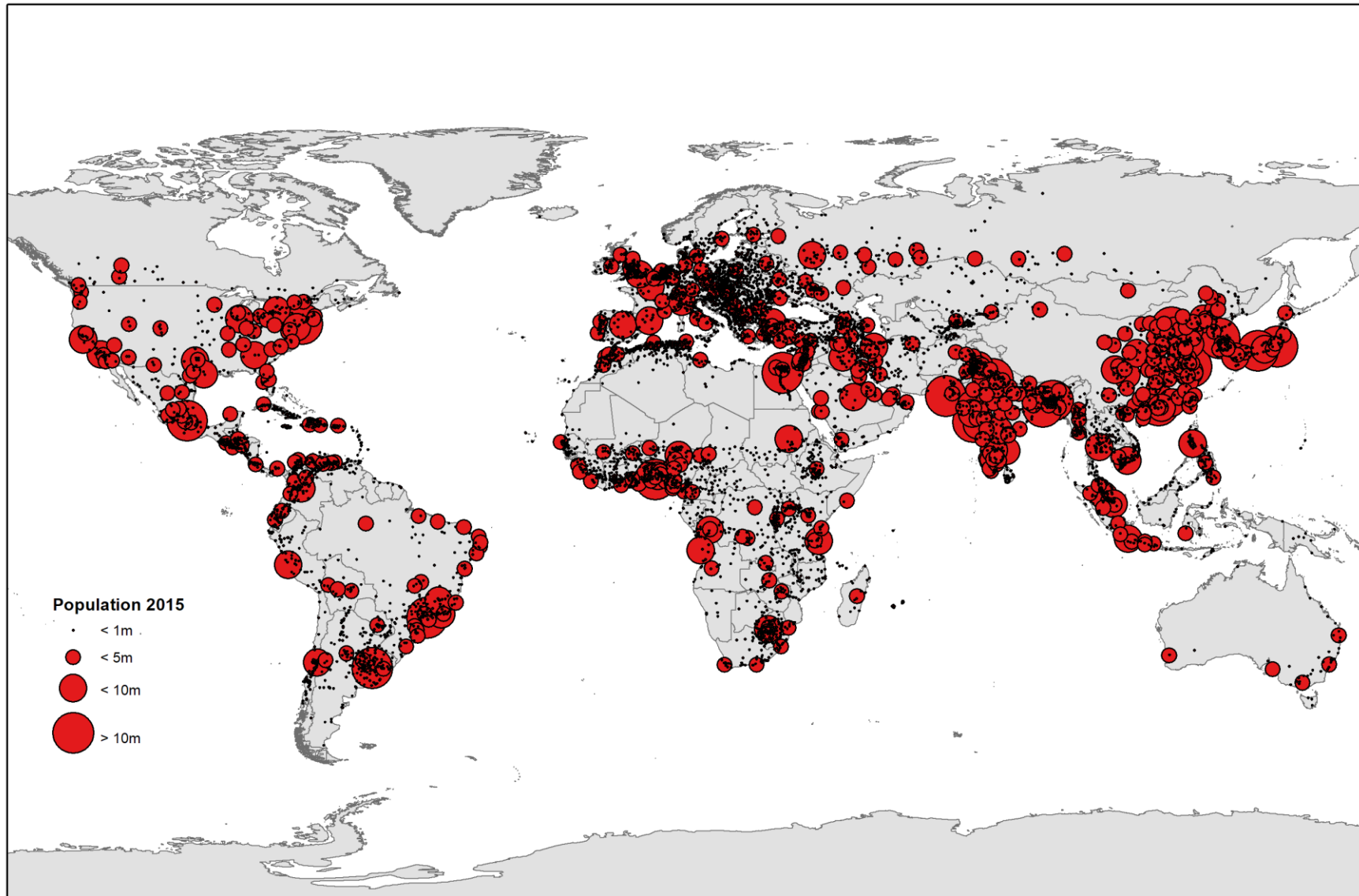
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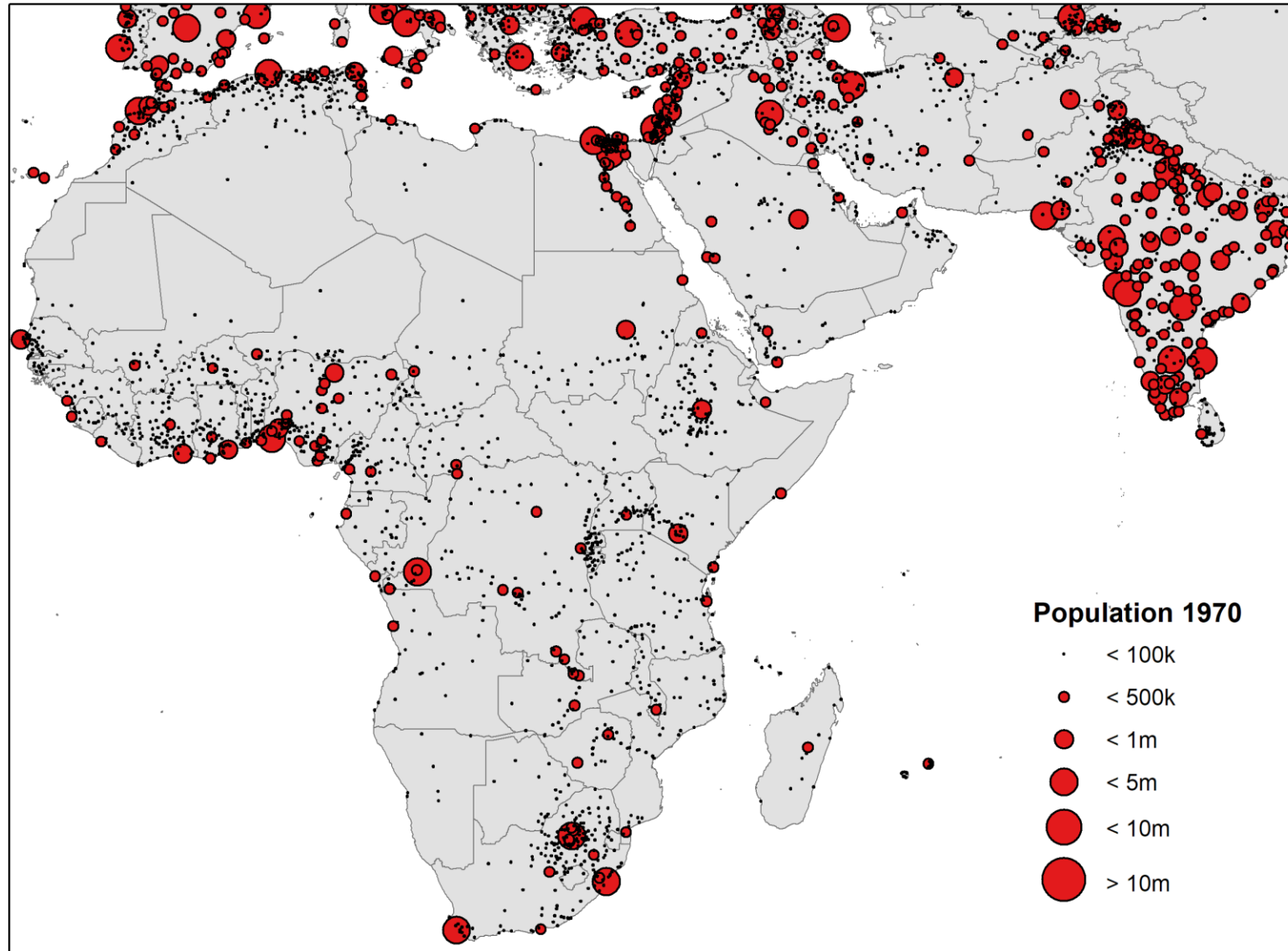
Urban population growth



Urban population growth

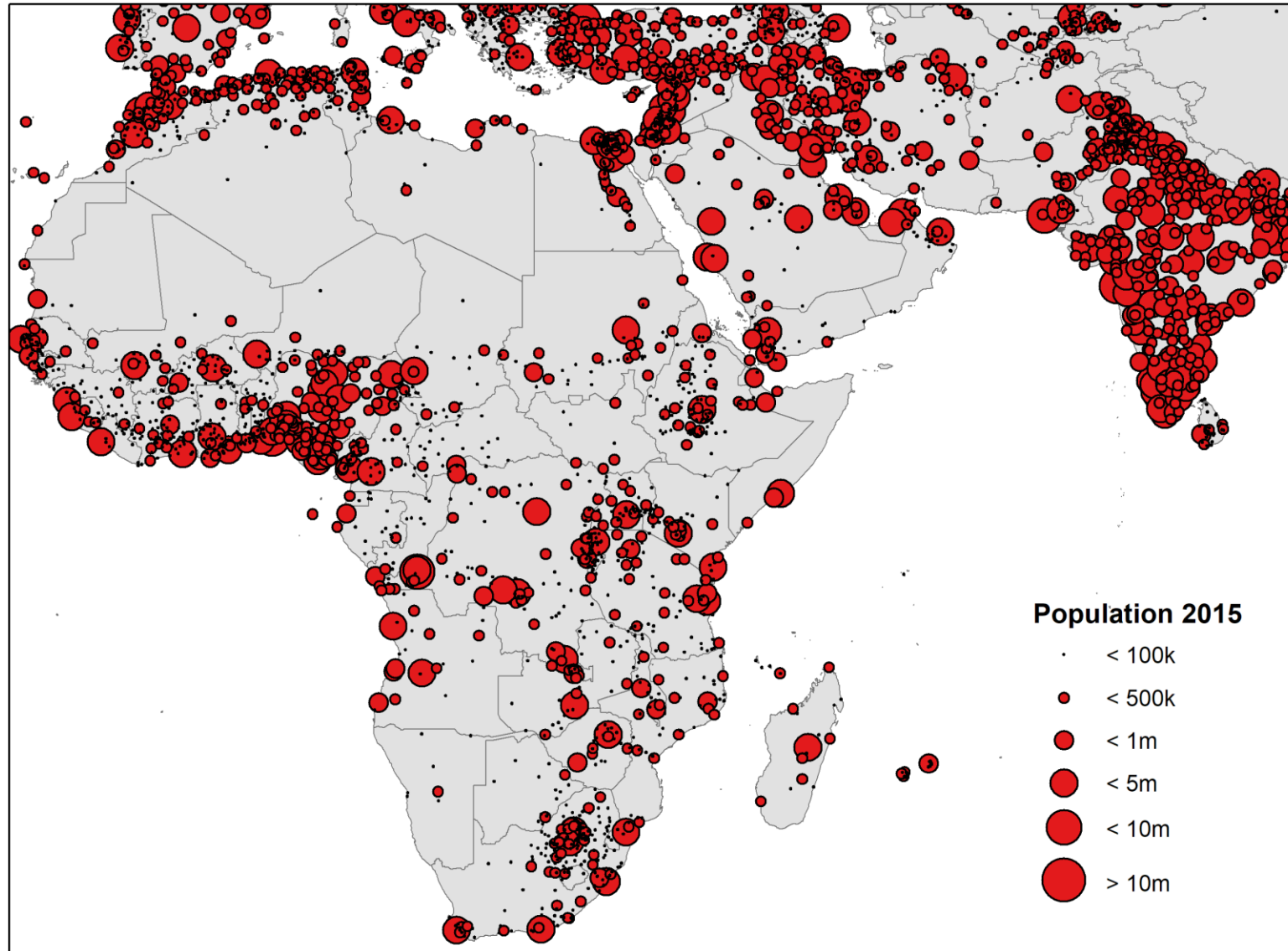


Urban population growth (Africa only)

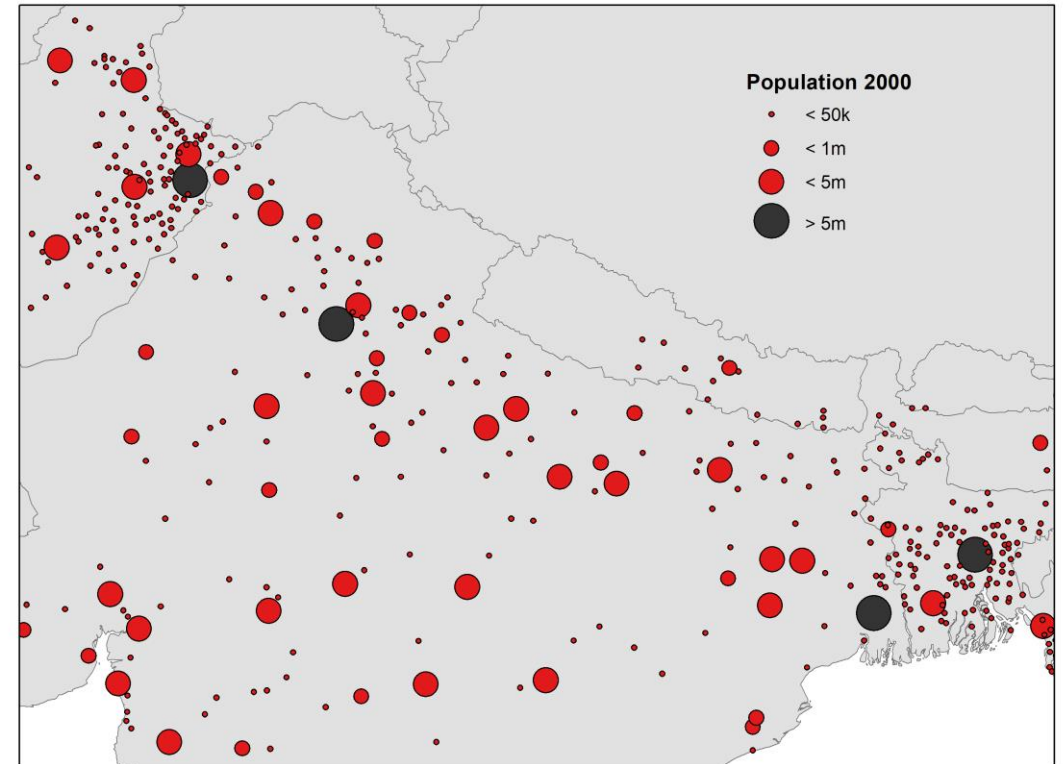
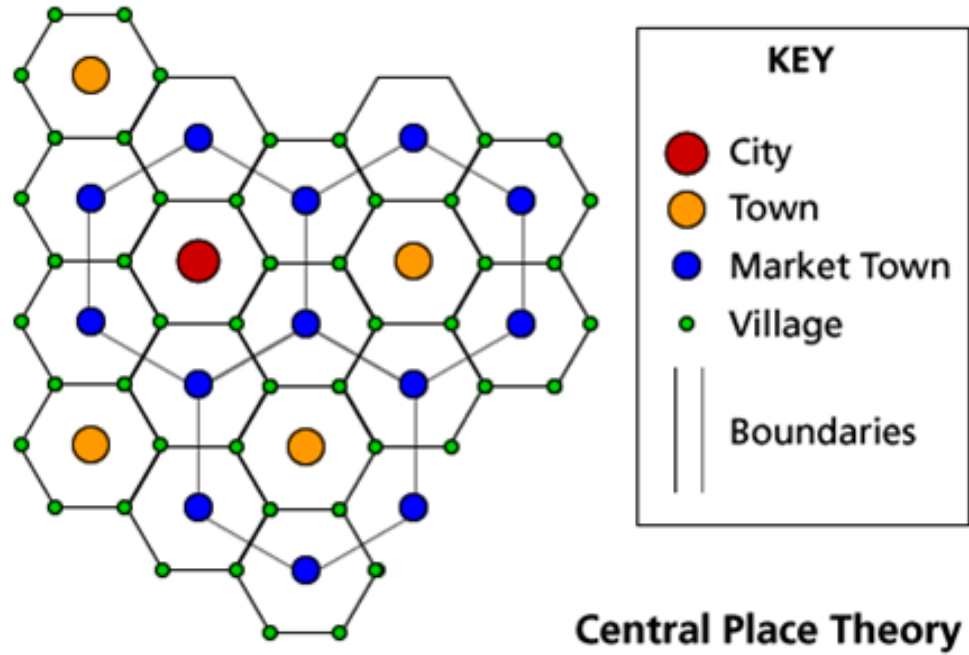


Urban population growth (Africa only)

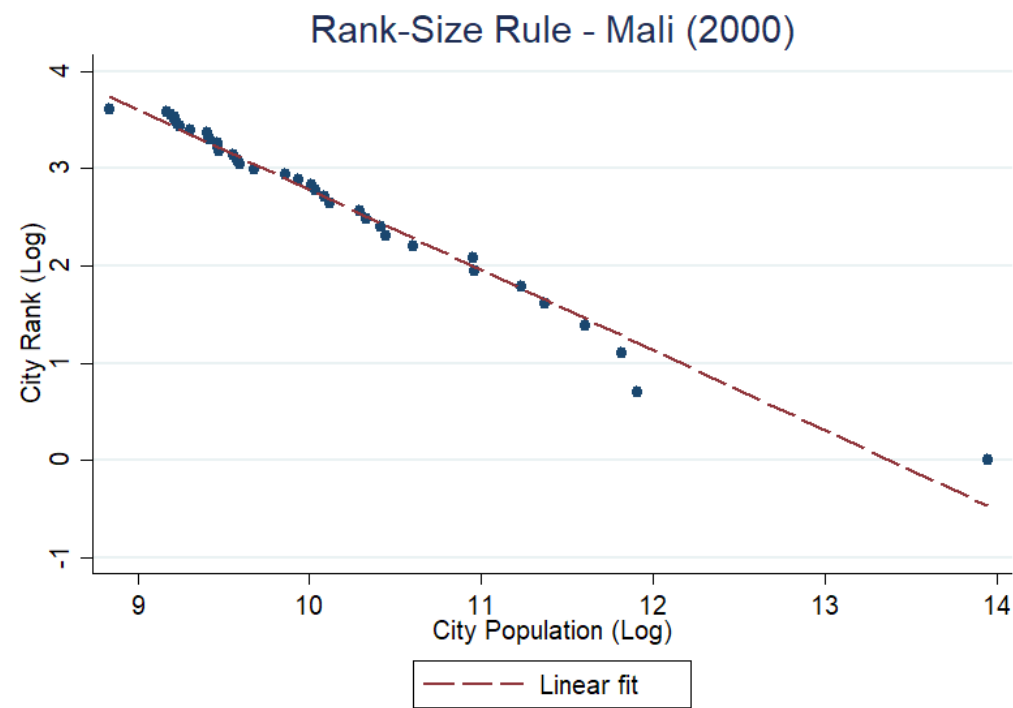
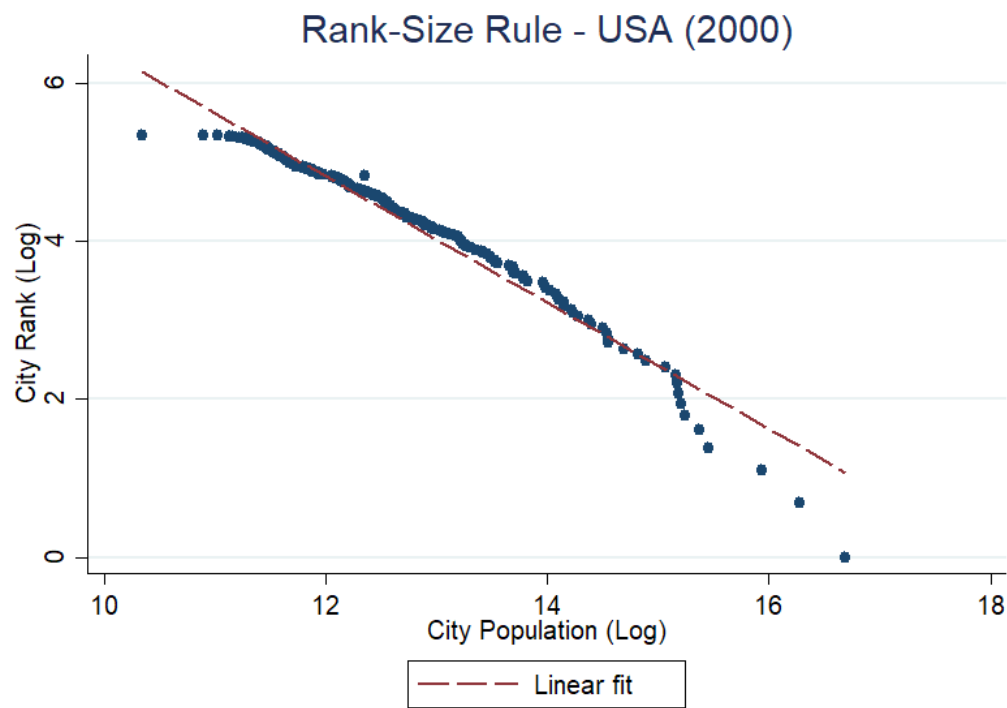
Growth of
cities of all
sizes



Example of analysis: the spatial distribution of cities



Example of analysis: the rank size rule (Zipf's law)



Policy research priority: data

Improve measures of urbanization

Build consistent geo-referenced panel databases of urban areas, consolidating population *and economic census* information (city level)

Measure city specialization and productivity in cities (see forthcoming flagship on urbanization and productivity in LAC)

Measure the internal spatial organization of cities (density gradient, unbuilt-areas, density of transport, city shape)

Link up data to other geospatial information

- Inter-city transport networks

- Climate risks (exposure to natural disasters)

Leverage advances in satellite imagery analysis (nighttime lights)

Urbanization and economic development

The benefits and costs of urbanization

Urbanization and Income (2016)



The benefits of urbanization ("The gods of density")

Structural transformation, specialization and trade

Increasing returns to scale

Innovation & dynamic human capital accumulation in cities (endogenous growth)

"Agglomeration effects" (as highlighted by Economic Geography)

10 % increase in population increases wages or productivity by 0.2- 1 %

Effects could be large (x4) in developing countries (see Duranton 2015)

Mechanisms:

Sharing: e.g. sharing suppliers of specialized inputs, lowering input costs

Matching: e.g. labor market pooling, reducing search costs

Learning: e.g. knowledge spillovers

The costs of urbanization

(“The demons of density” 1/2)

Cities can be “crowded, disconnected and costly” (Lall, Henderson, Venables 2017)

Externalities from density

- Transport congestion

- Health and educational impact of poor housing conditions

- Air, water and soil pollution

- Crime

High costs

- Cost of living in cities (housing, transport, other consumption goods)

- Labor costs (compensating wages, not higher productivity)

The costs of urbanization

(“The demons of density” 2/2)

Remarks

- Population density does not entail “economic” density (in cities that are costly, crowded and disconnected) (Lall, Henderson and Venables 2017)
- Weak land property rights systems and poor transport connectivity (from lack of planning of transport investment) can result in a suboptimal spatial organization of cities that increases costs
See e.g. the disconnection between jobs and residence known as “spatial mismatch” (Gobillon, Selod and Zenou 2007)
- Benefits and costs are affected by distortions

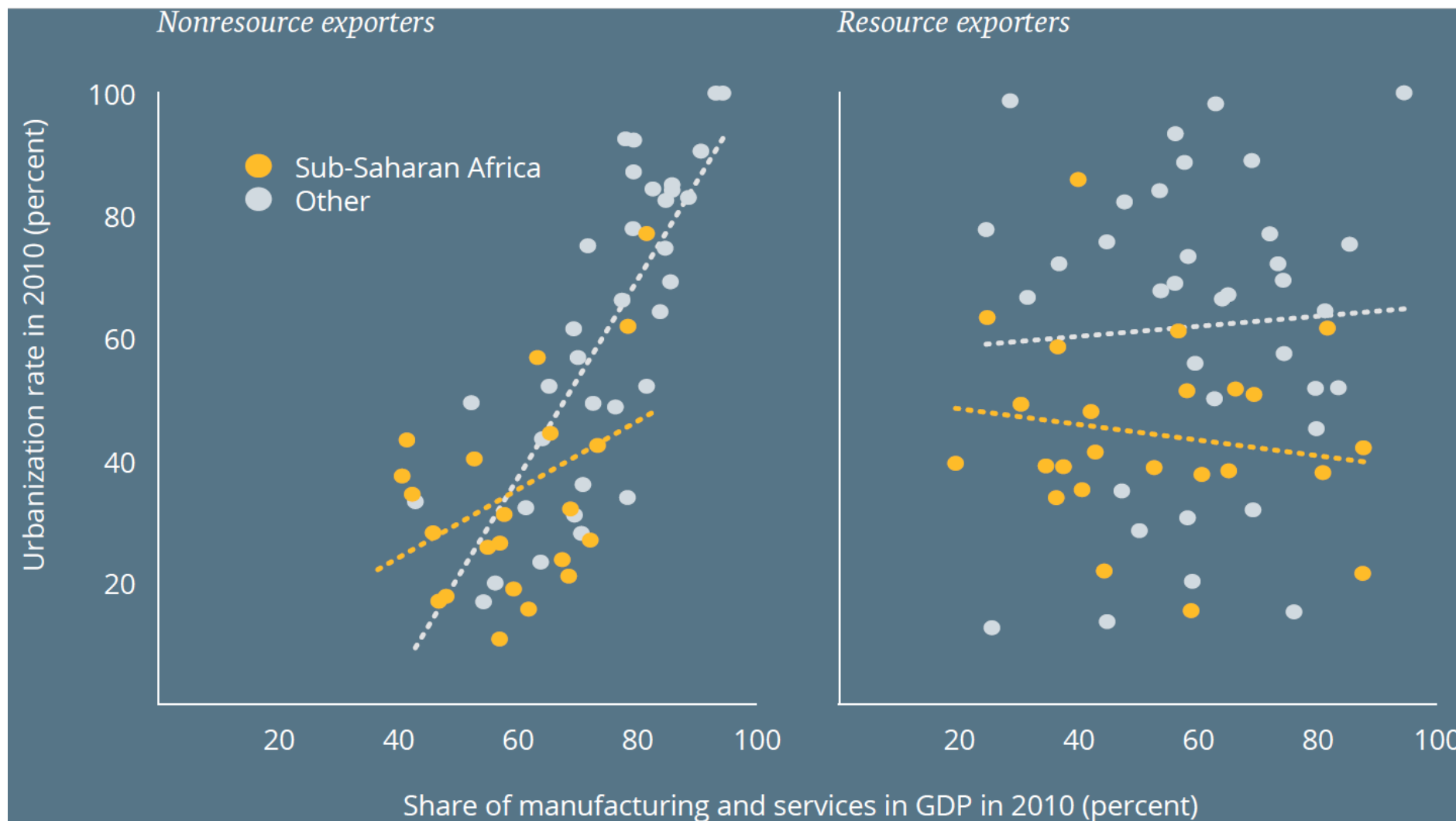
Urbanization without growth

Eponymous seminal study by Fay and Opal (2000)

Explanations

1. Consumption cities fueled by natural resource rents, which mainly produce non-tradables (Gollin, Jedwab and Vollarath 2016)

In resource exporting countries, urbanization is not accompanied by the development of manufacturing and services



Urbanization without growth

Eponymous seminal study by Fay and Opal (2000)

Explanations

- 1 .Consumption cities fueled by natural resource rents (Gollin, Jedwab and Vollrath 2016)
2. Cities are not organized in productive ways; structural regulatory and institutional constraints hinder productivity and prevent specialization and trade (Lall, Henderson and Venables 2017)

Policy research priority: Study agglomeration in developing country contexts

Measure gains from density

The need to replicate studies faces data challenges!

Measure costs associated with density

e.g., congestion in cities

Identify the enabling environment for cities to be productive

Special focus on infrastructure and institutions

What can policies do to make cities productive?

Anticipating urban population growth

Can we get “cities right”?

The unprecedented challenge of rapid urban population growth

425 million sub-Saharan Africans reside in cities (40% urbanization rate)

The population in some cities grows at 4-5 percent a year

Doubling of population is expected over the next three decades (and tripling of built-up area)

Compare with *current* urban population of the E.U.: 382 million...

Immense pressure on land and transport infrastructure

Land

Five (ideal) principles about land for urban development

P1. Land is available for urban expansion (formal response to demand)

P2. The land market functions (tradability)

Land is efficiently used (Coase Theorem)

P3. Appropriate instruments are used to plan for urban expansion and address land-use externalities (sustainable planning and management)

P4. Land can be taxed (Henry George)

Land Value Capture principles can be implemented to fund infrastructure

P5. Good land governance supports P1-P4 (Deininger, Burns and Selod 2012)

The real world (e.g., West African cities)...

R1/R2. Scarcity of formally supplied land and distorted land market

Limited formal market segment with unaffordable land prices;

Large informal market segment (which is a response to unaffordability of formal land, inadequate legal framework, excessive regulations and costly process of formalization); Informality is the norm, not the exception

Barriers to tradability and insecure land tenure leading to...

...underinvestment in land and land misallocation (inefficiency)

R3. Absence of effective urban planning

Unplanned urban expansion

Suboptimal land use patterns and costly ex-post regularizations

R4. Lost opportunity of land taxation

Infrastructure unable to respond to rapid urban expansion

R5. Poor land governance (the core problem?)

Policy research priority: Understand land tenure informality

How to think about informality in economic terms?

To what extent is (or is not) informality a problem?

Is formalization of land tenure/slum upgrading the right approach?

Data issues:

- Measuring land tenure insecurity (UN) is difficult (impossible?)

- More effort is needed to measure informality (typologies, HH survey, VHR satellite imagery analysis,...)

How do formal and informal land uses coexist?



Picture: Tuca Vieira, São Paulo

There is a land market failure in the presence of squatting

Squatters do not pay the land price but defensive expenditures to avoid eviction

Under limited land supply, squatters “squeeze” the formal market, raising prices right below the level that invites eviction

Explains the coexistence of a small and expensive formal market and a large informal settlement

The market failure can be addressed through *Pareto-improving formalization* (which requires redistribution)



Picture: Tuca Vieira, São Paulo

There are spatial patterns of informality

Map: Land plots sampled in Bamako, Mali

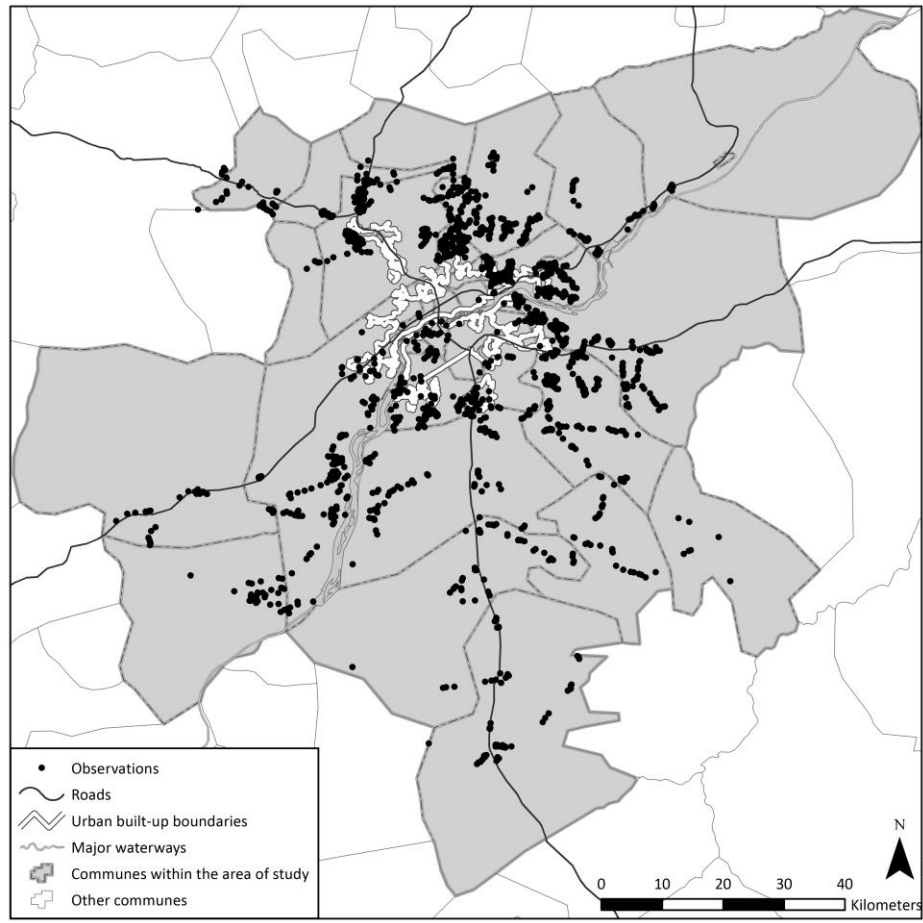
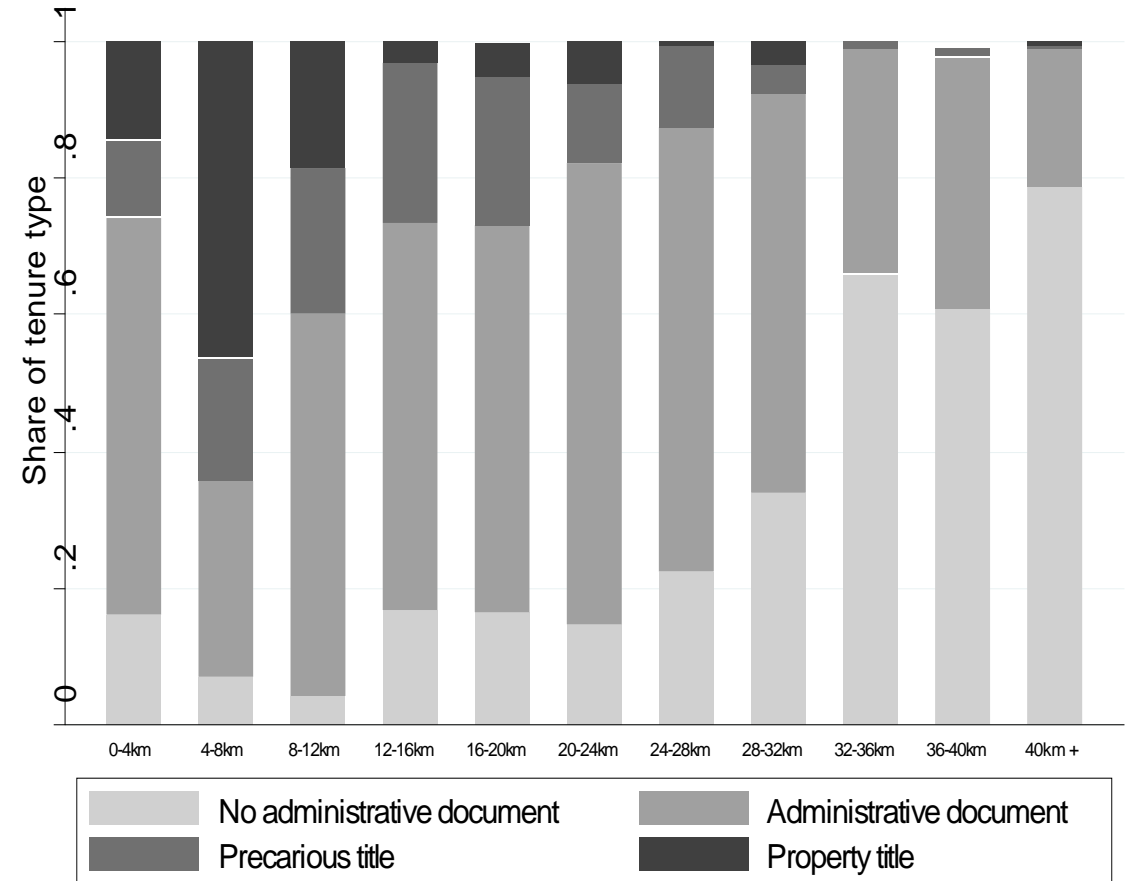


Figure: The positive informality gradient



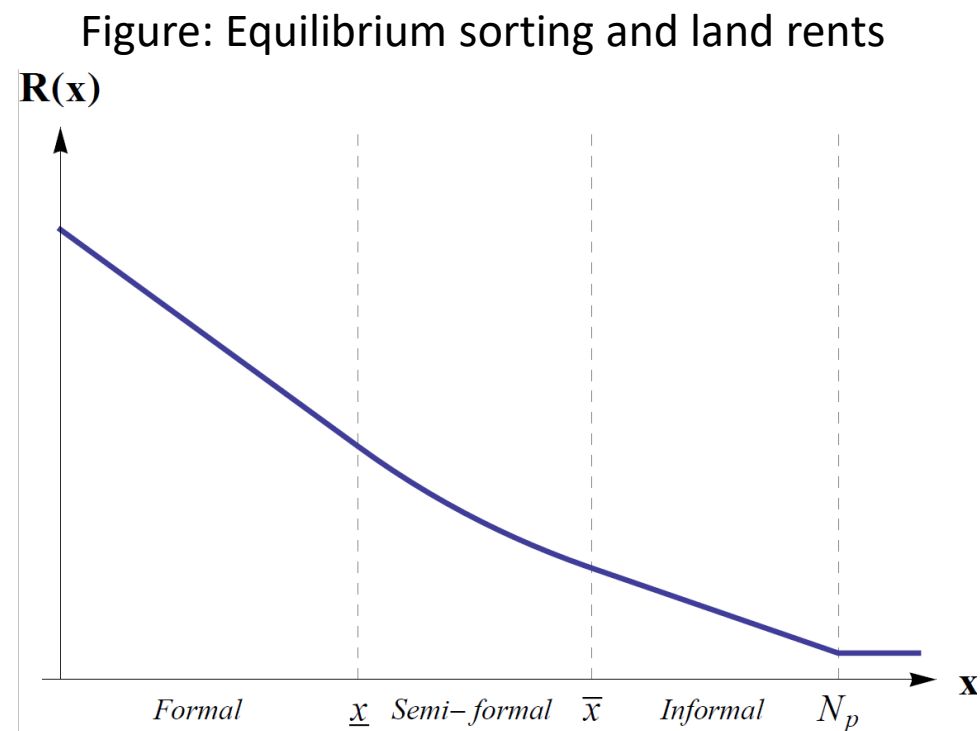
Urban economic theory can explain the geography of informality

Generalized version of the monocentric model explains the location of informal uses in a spatial urban market

Households incur costs to improve tenure (from totally informal to totally formal)

The equilibrium has *stronger property rights closer to the city center*

Political economy trap: formal dwellers have an incentive to oppose land administration reform as they would lose from intensified competition for land



How does land get converted to residential use?



Picture: The outskirts of Bamako, Mali. Copyright: H. Selod

Access to land involve incomplete strategies of tenure upgrading

Legal pluralism (cumulative history of reforms on top of one another) and *multiplicity of land tenure situations*

Urban expansion involves *transitions* from customary allocation of land to formal and mainly informal markets

Rent seeking behavior of the many stakeholders involved in the many formal/informal steps along this process (including local authorities)

Table: Land tenure upgrades in a Bamako sample of plots 2009-2012
(transition matrix, in percent of sample)

Tenure at time of survey \ Tenure at time of transfer		No administrative document	Administrative document	Precarious title	Ownership title	Unknown	Total
No administrative document	7.6	7.0	1.0	0.2	0.4	16.1	
Administrative document	0.0	54.0	8.1	0.5	0.0	62.5	
Precarious title			14.9	0.5	0.1	15.6	
Ownership title				5.7	0.0	5.7	
Unknown				0.0	0.1	0.1	
Total	7.6	61.0	24.0	6.9	0.5	100.0	

Will informality simply disappear over time?

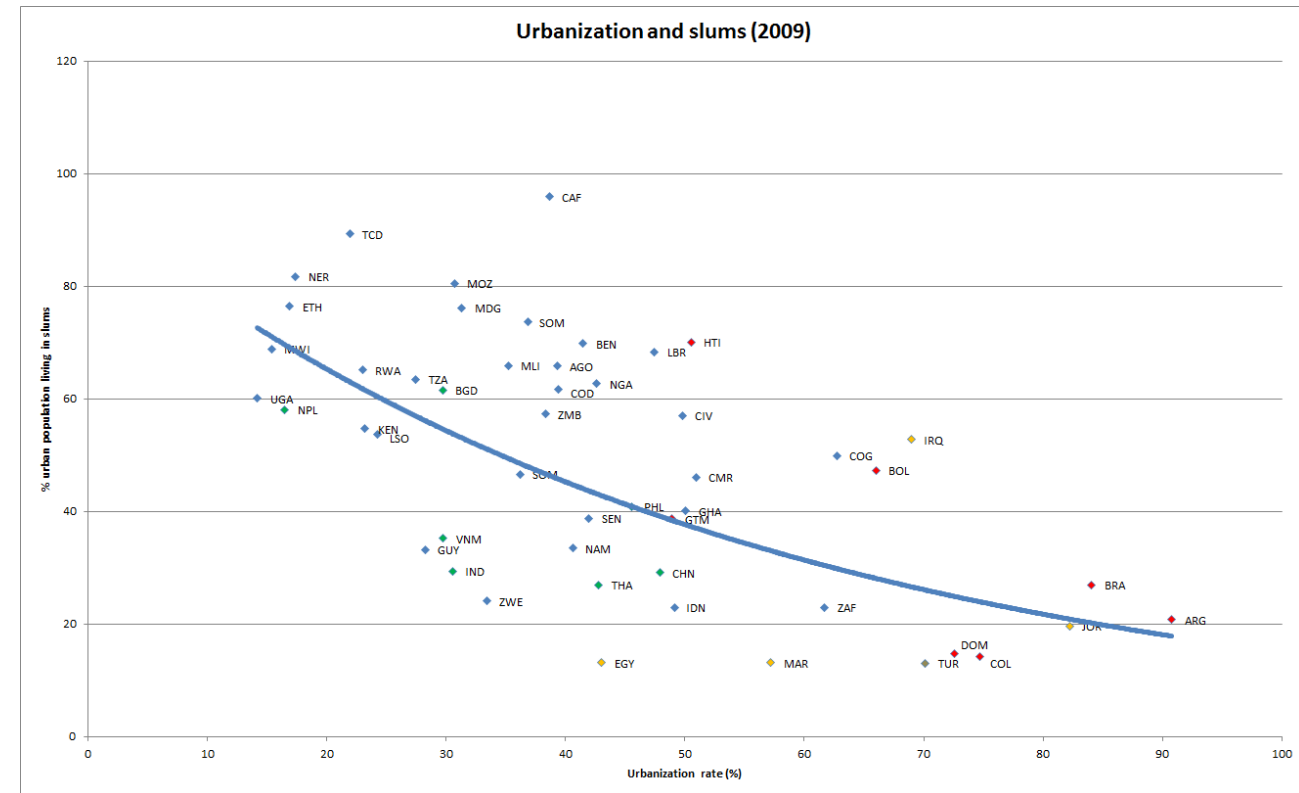
Optimistic view

Economic development will pull the system towards formality

This can be enhanced by endogenous improvement in land institutions

Pessimistic view

Insufficient wealth creation (weak agglomeration effects) and no improvement in institutions

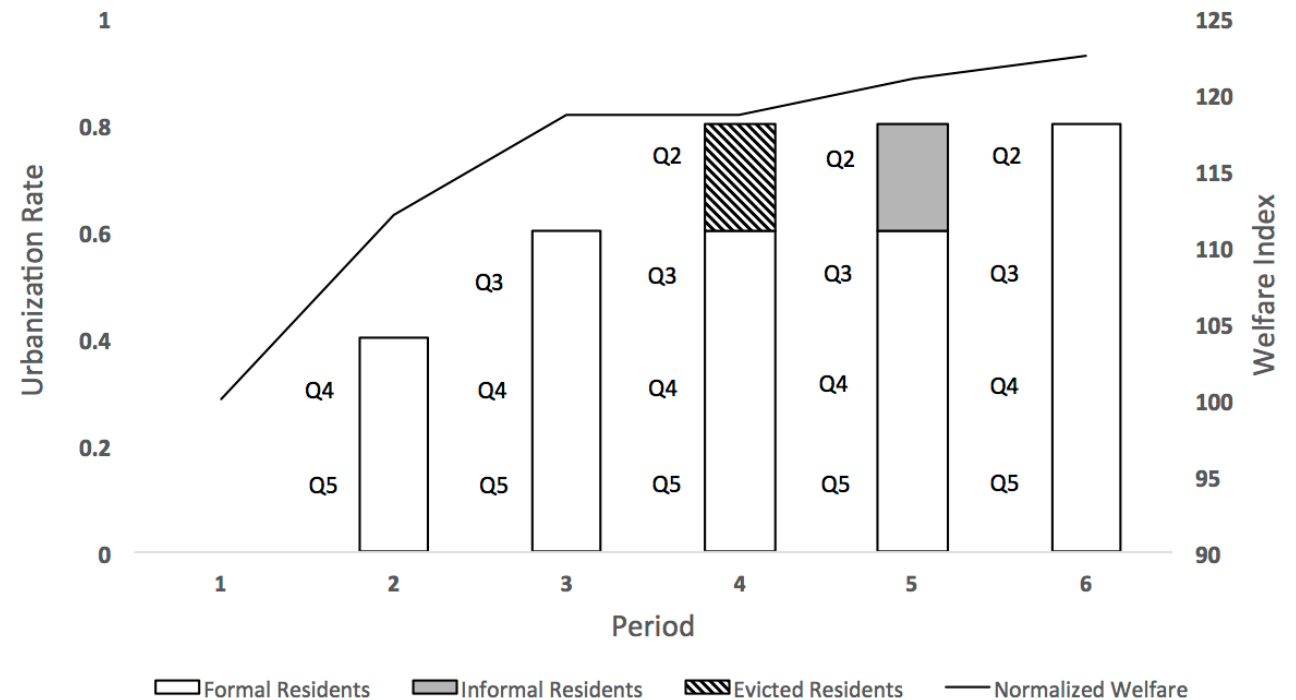


Will informality simply disappear over time?

The eradication scenario (thanks to agglomeration effects)

Dynamic stochastic model of urbanization and land use with endogenous demand for property rights

Figure: Dynamics of urbanization - the disappearance of informality under strong agglomeration effects



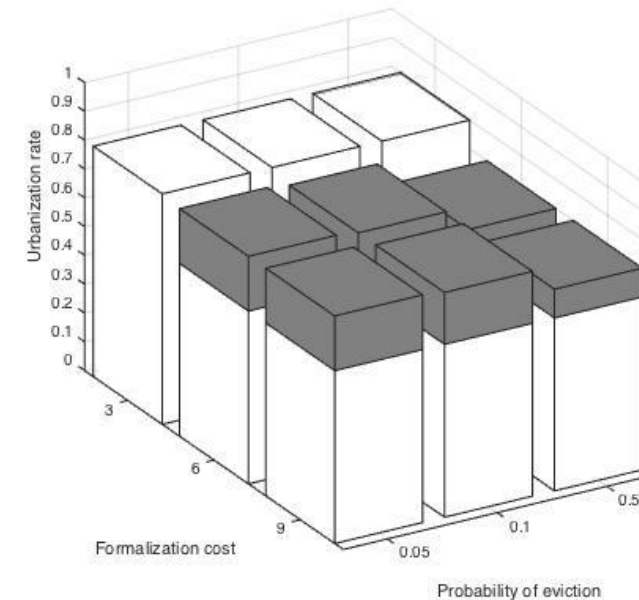
Will informality simply disappear over time?

The persistence scenario (under high formalization costs)

Suboptimal urbanization with informality can persist over time where cities are insufficiently productive

In second best setting (high costs of formalization), the eradication of informality may not be desirable

Figure: Steady states under various formalization costs and eviction probabilities



Policy research priority: Study land use and land market dysfunctions

Expand the study informality

Important changes: from informal settlements to “backyarding” (South Africa)

Better understand land use inefficiencies and measure their impact

The causes of distortions (the role of regulations)

How land distortions hinder agglomeration effects

Misallocation of land (Duranton, Ghani, Grover and Kerr 2015)

Study the dynamics of land use

Impact on growth? (Bogart and Richardson 2009)

Processes of leap frogging development / speculative land holdings

Develop dynamic models (Henderson, Reagan, Venables 2017)

Policy research priorities: Rethink land sector assessments

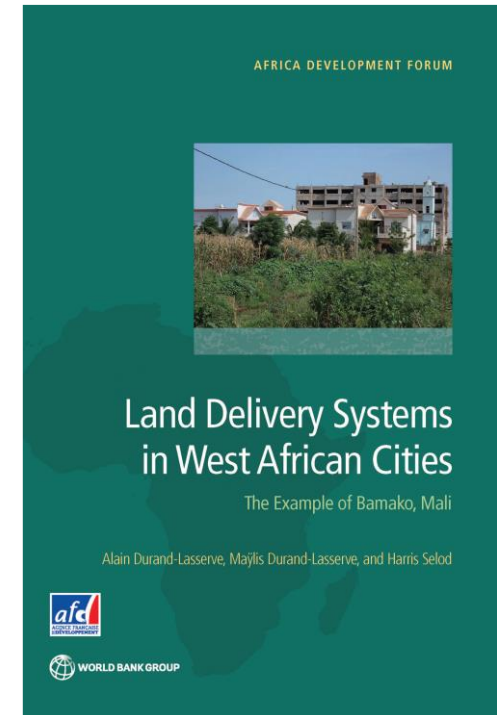
To succeed, policies need to be cognizant of context
(e.g., challenges of formalization programs in West Africa)

Develop *systemic* and *dynamic* diagnoses

- Interactions between formal and informal land markets

- Beyond land markets (understand the context of transactions)

- Understand land tenure transitions



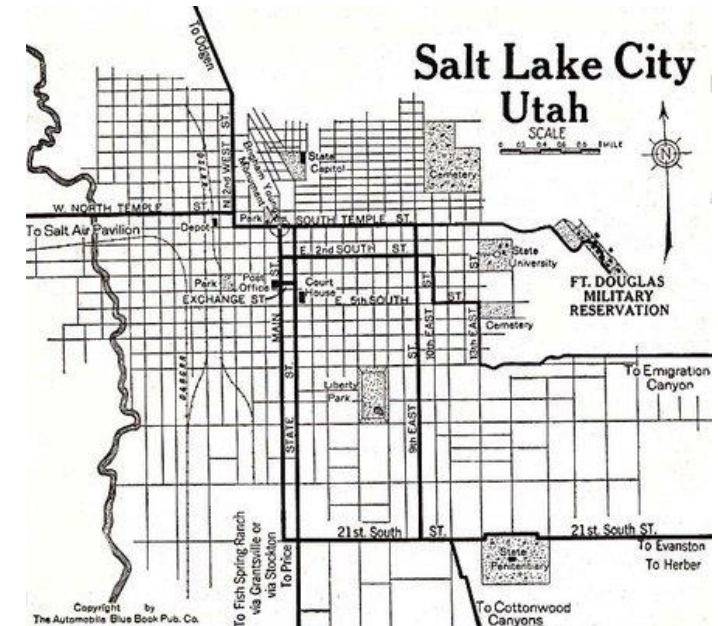
What needs to be done, *at the very minimum*, to prepare new land for urban use?

The top priority. The most feasible approach?

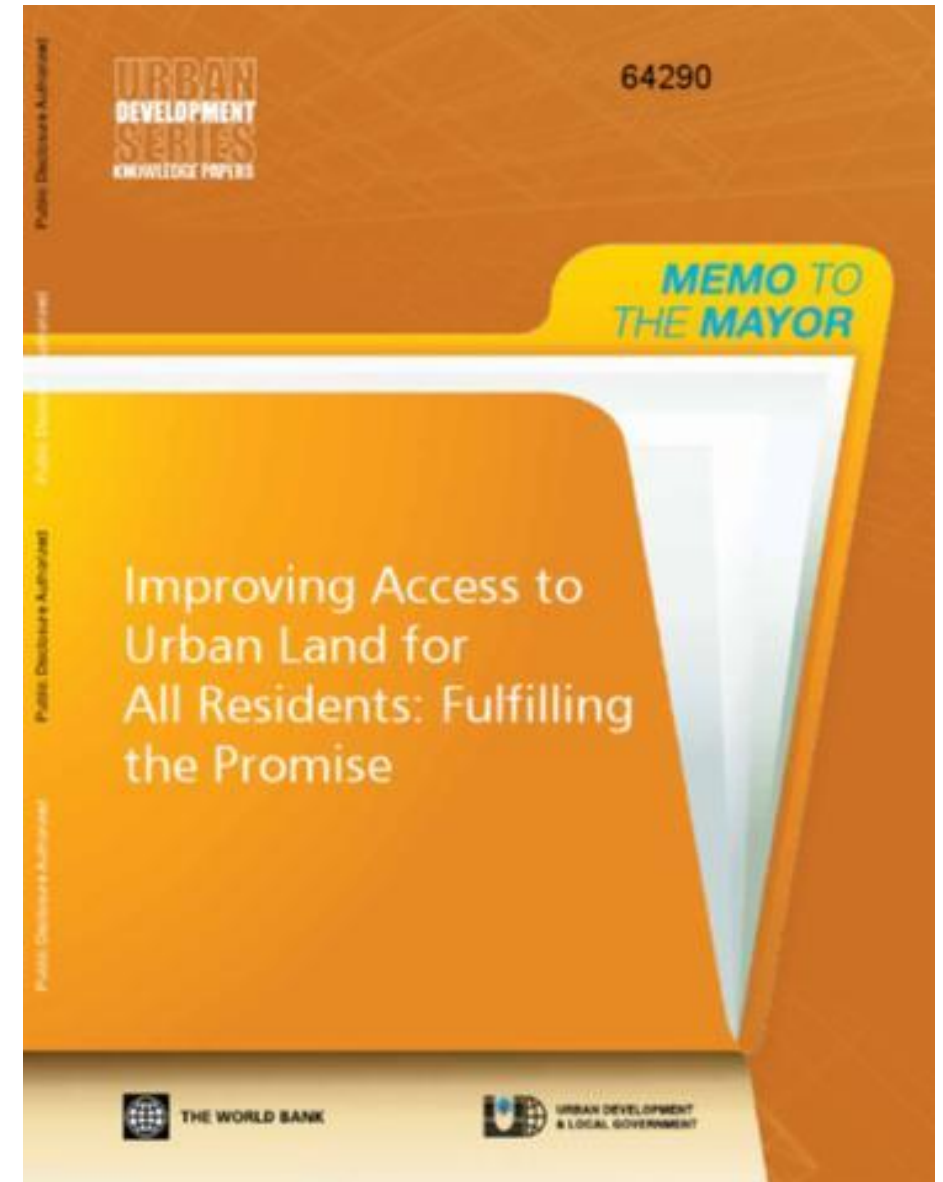
Reliance on zoning and land use regulations that will not be respected will produce little results

Instead, guide spatial expansion by ensuring that cities can *proactively* plan the *entire* arterial road network through the acquisition of the right of way for the future transport network (“arterial grid of dirt roads”)

This may however require applying *eminent domain* in contexts of *unclear property rights*, which may be very difficult to do

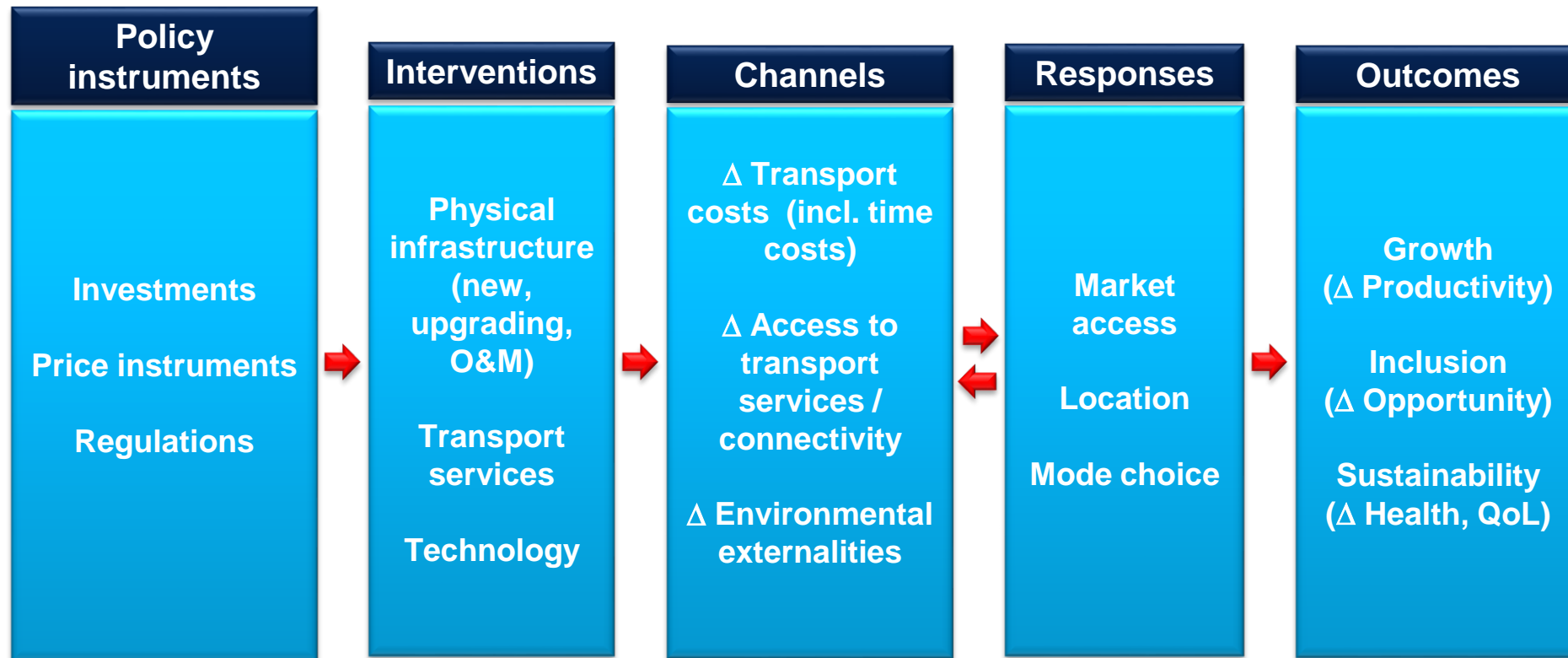


See “guided land development”
in the “Memo to the Mayor”



Transport

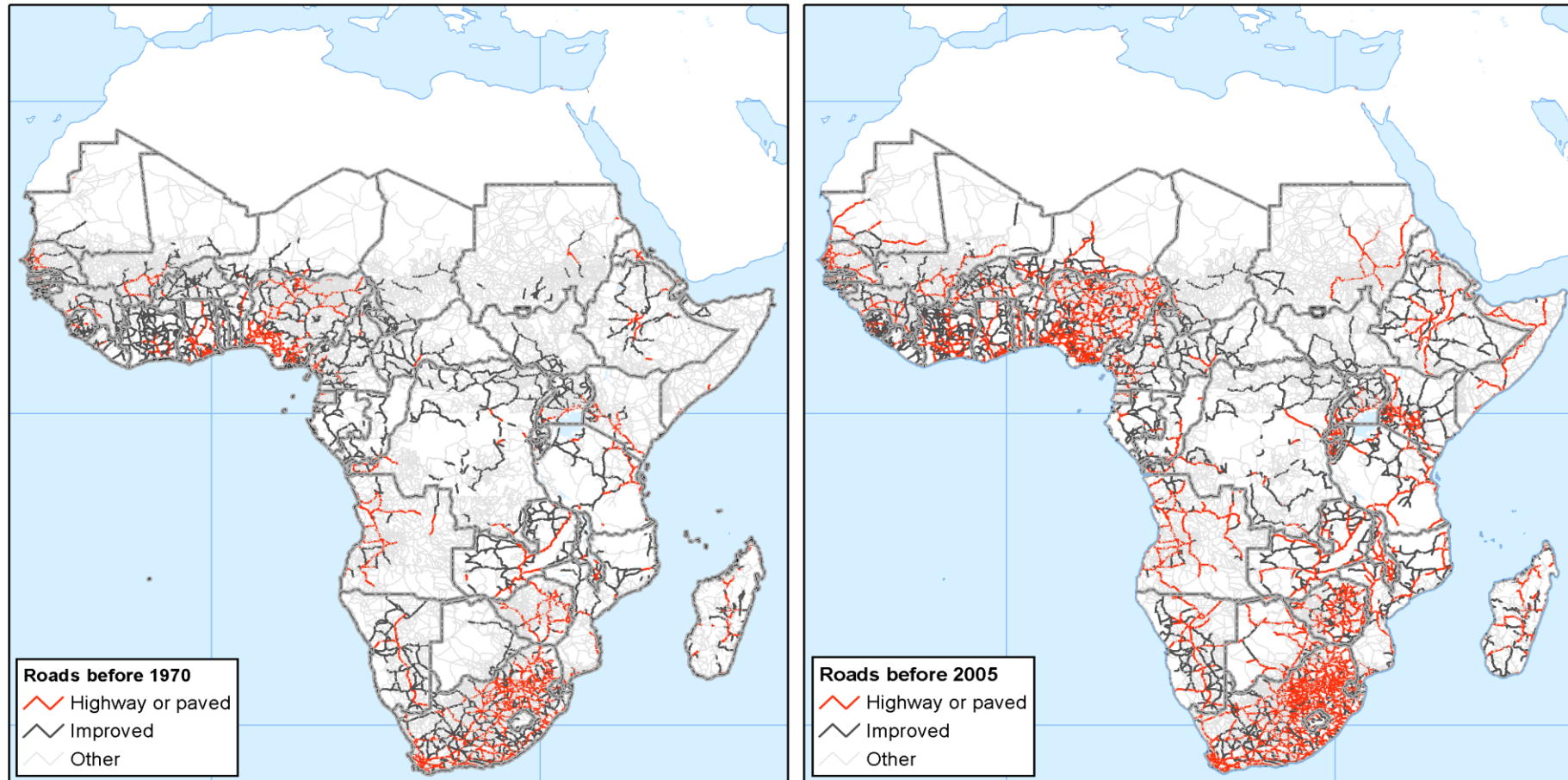
What transport can do



Transport: inter-city

Road improvements

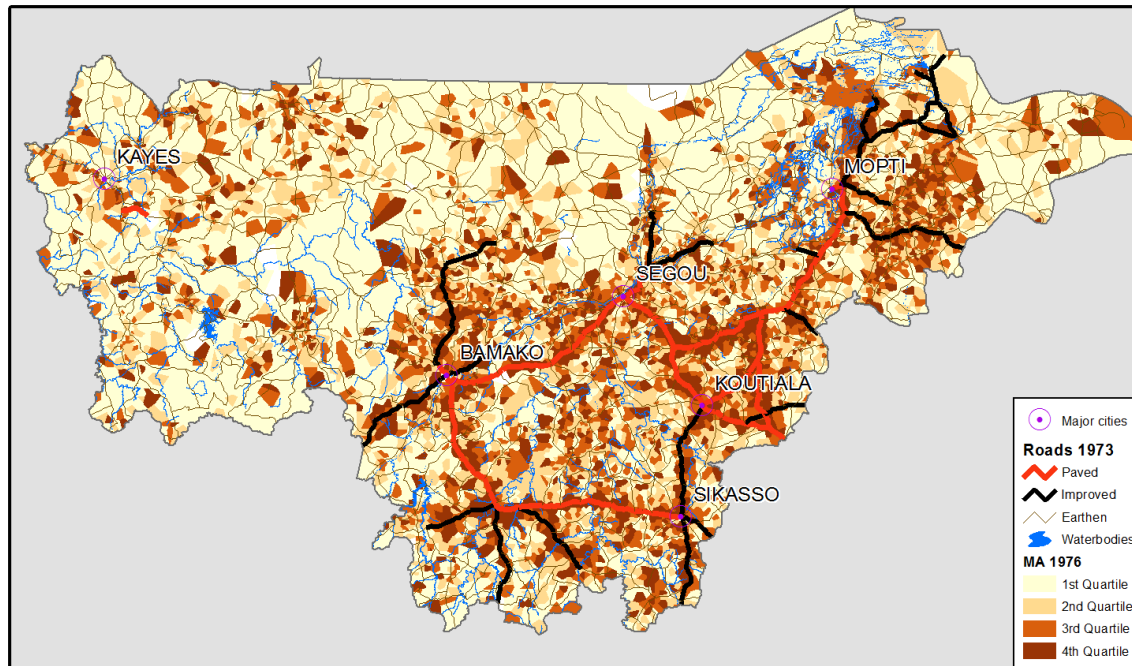
Map: The road network in SSA, 1970 and 2015



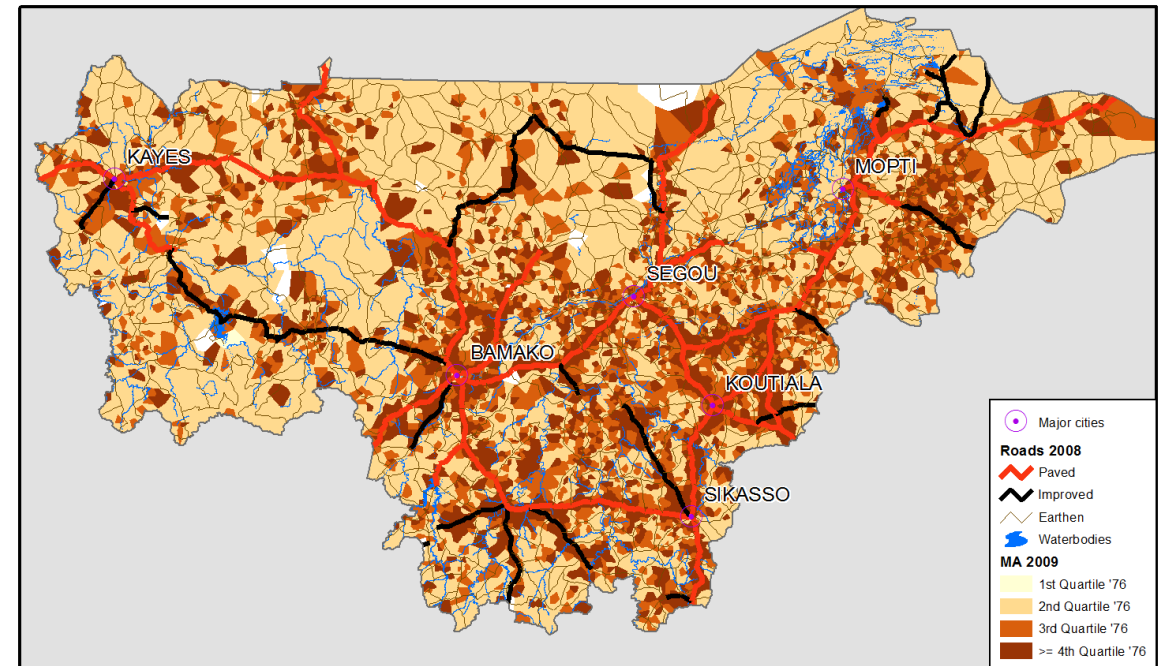
Roads are key to improve access to markets

Market Access/Marker Potential is an aggregate measure of surrounding markets and the ease to transport goods to those places (weighted sum of populations or incomes in surrounding areas discounted by travel costs)

Map: Market Access in Mali (south) 1973



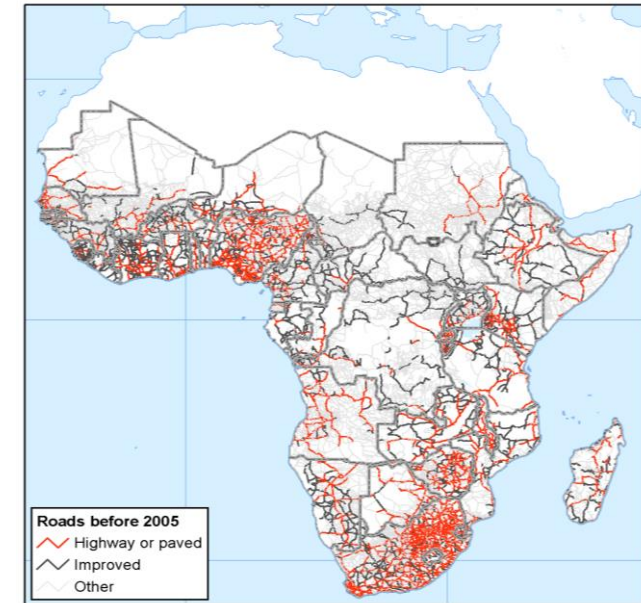
Map: Market Access in Mali (south) 2000



Impacts of road improvements on agglomeration and income

Modest long-term impact (30 years) on city population and income

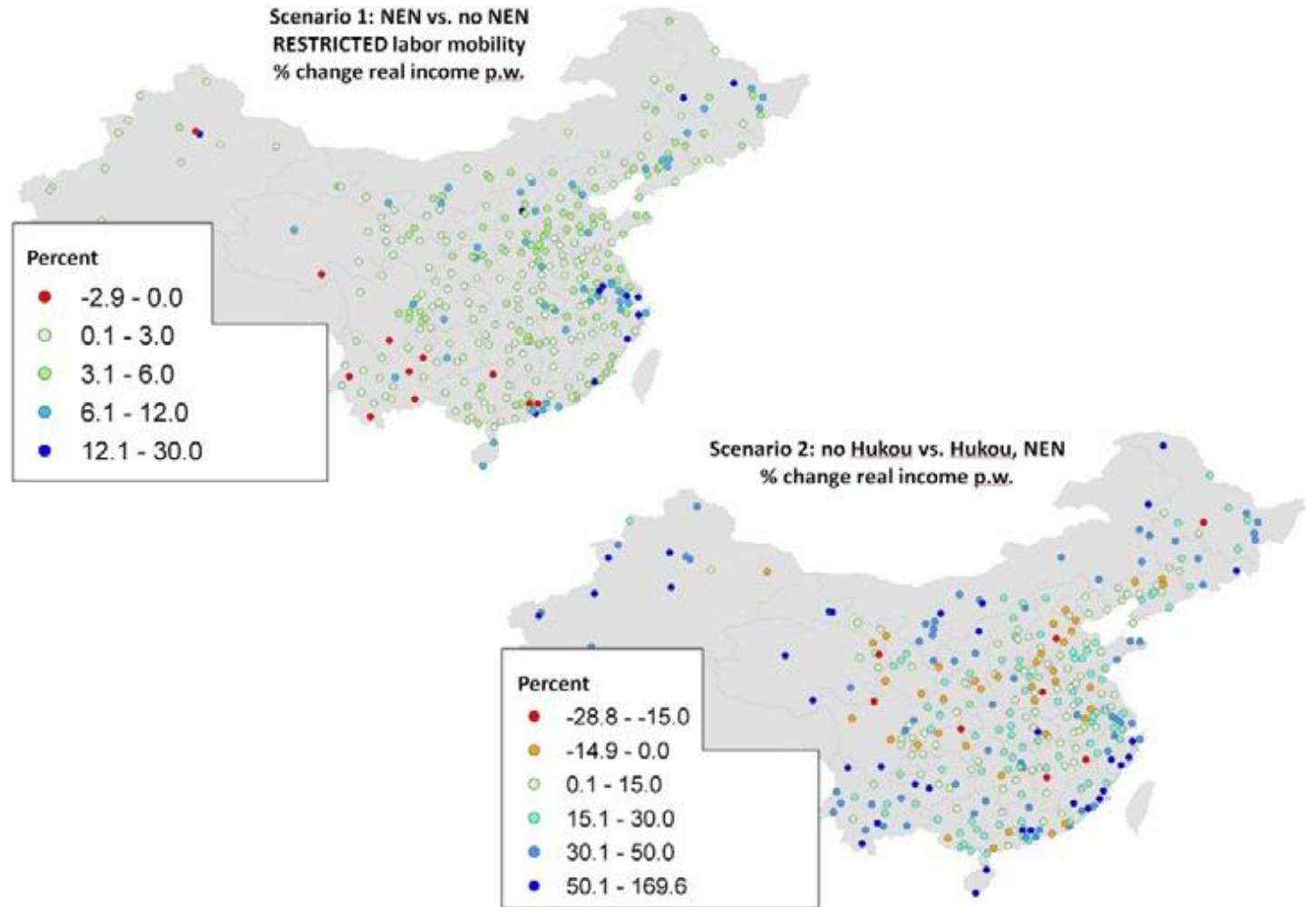
Heterogeneity: stronger effects on small and medium cities in SSA



Impacts of road improvements on agglomeration and income

Large economic benefits from new highways and abolishing migration restrictions

Spatial impacts differ:
development of the core at the
expense of the periphery



Impacts of bridge construction on structural transformation

Picture: The Jamuna bridge, Bangladesh



Increase in agricultural yield

**Long term adjustment in employment
(from agriculture to services)**

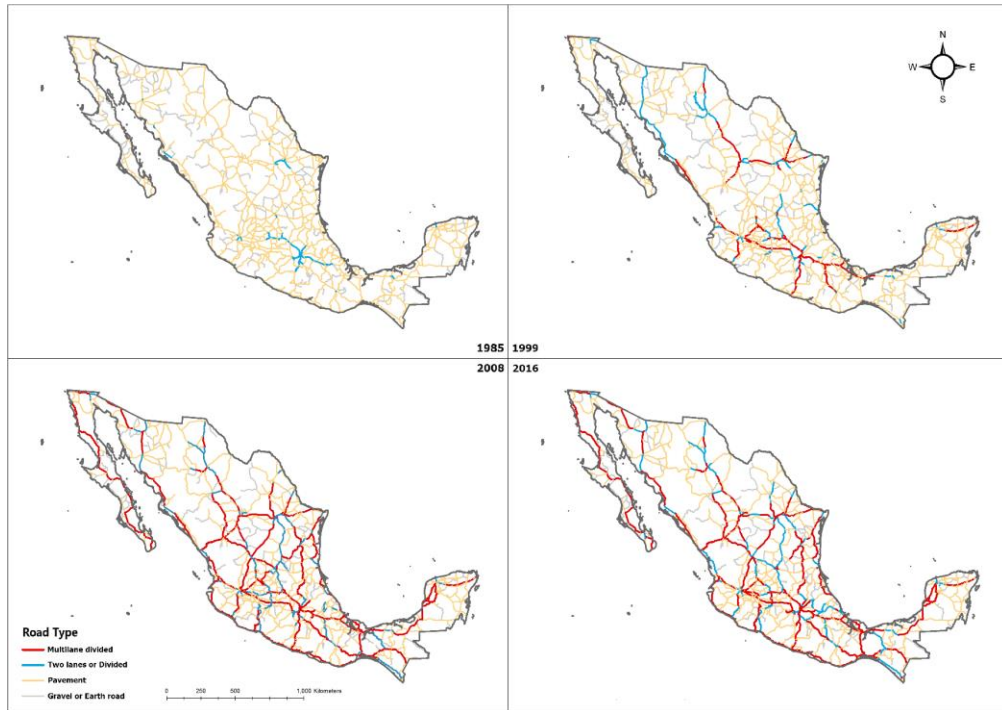
**Long term urbanization
(in larger cities)**

Industry moved to center

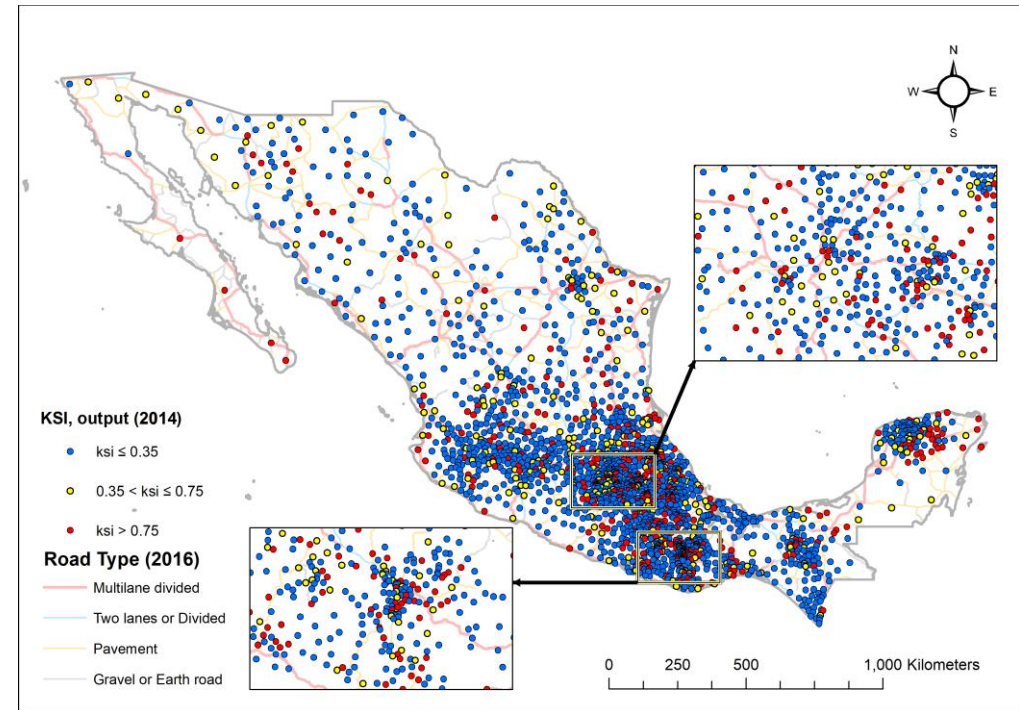
**Welfare improvements
(night light growth)**

Impacts of road improvements on specialization

Map: Road improvement in Mexico (1985-2016)



Map: Industry specialization of Mexican cities (2014)



Improved Market Access is associated with higher employment and greater specialization
Heterogeneity across sectors and regions

Policy research priorities

Data

- Produce network-enabled panel datasets of transport infrastructure (ideally with road quality information)

- Collect transport information (truck surveys, commodity flow surveys)

- Measure non-physical transport costs

Replicate intra-city transport studies in developing countries

Assess the enabling environment (i.e., complementarity of investment with trade openness)

Transport: intra-city

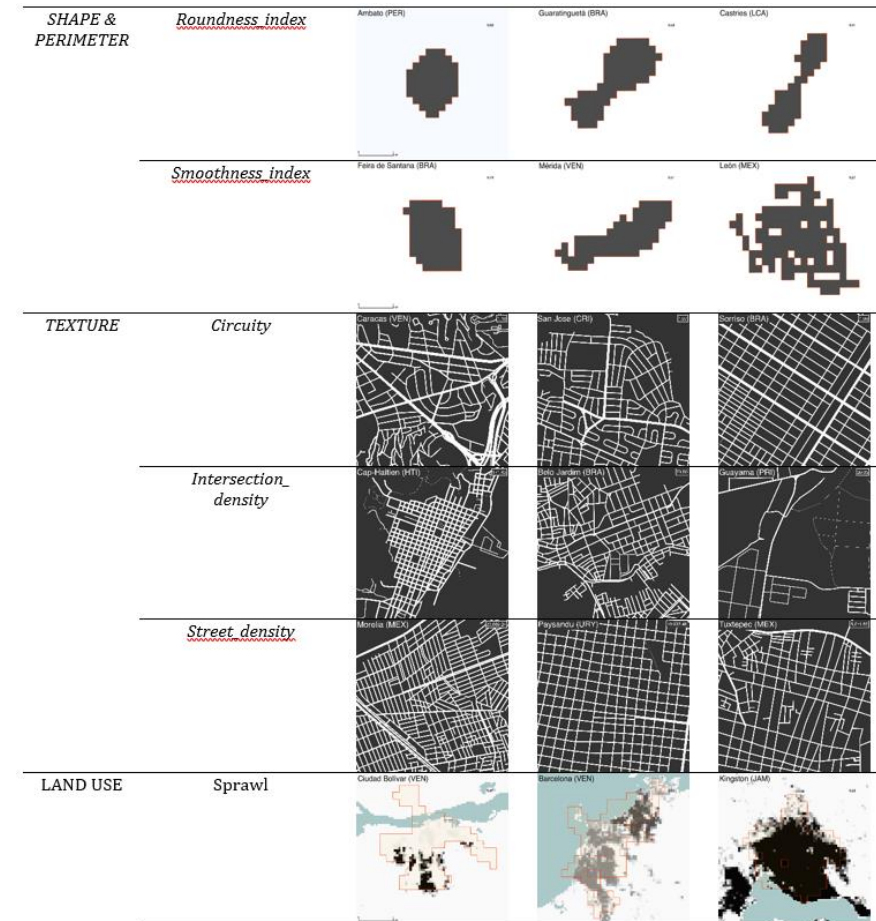
City structure can affect productivity

(Exploration of the link in the case of Latin American cities)

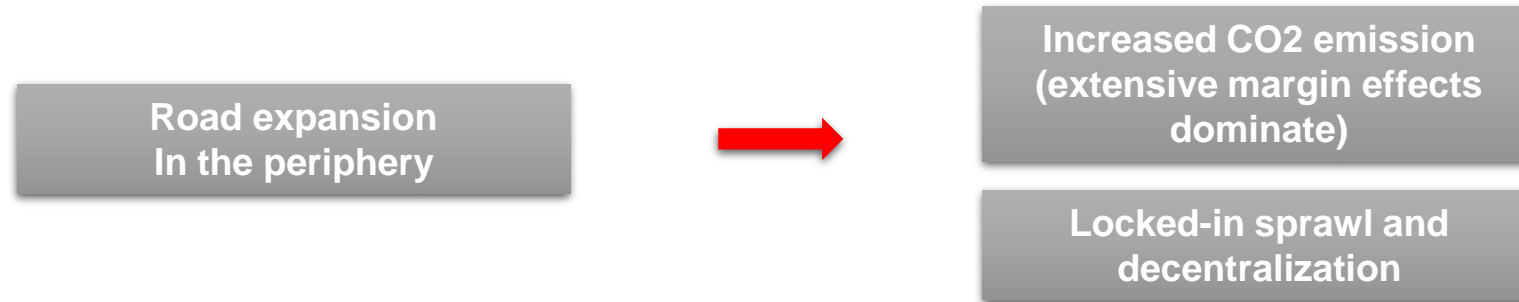
Transport investments shape cities in ways that are persistent over time (putty-clay nature)

Beyond density, productivity is correlated with urban form characteristics and transport grid layouts

Table: Urban form indexes



“Lock-in” effects of urban form (in Beijing)



Question:

What additional transport investments can reduce CO2 from the lock-in effects?

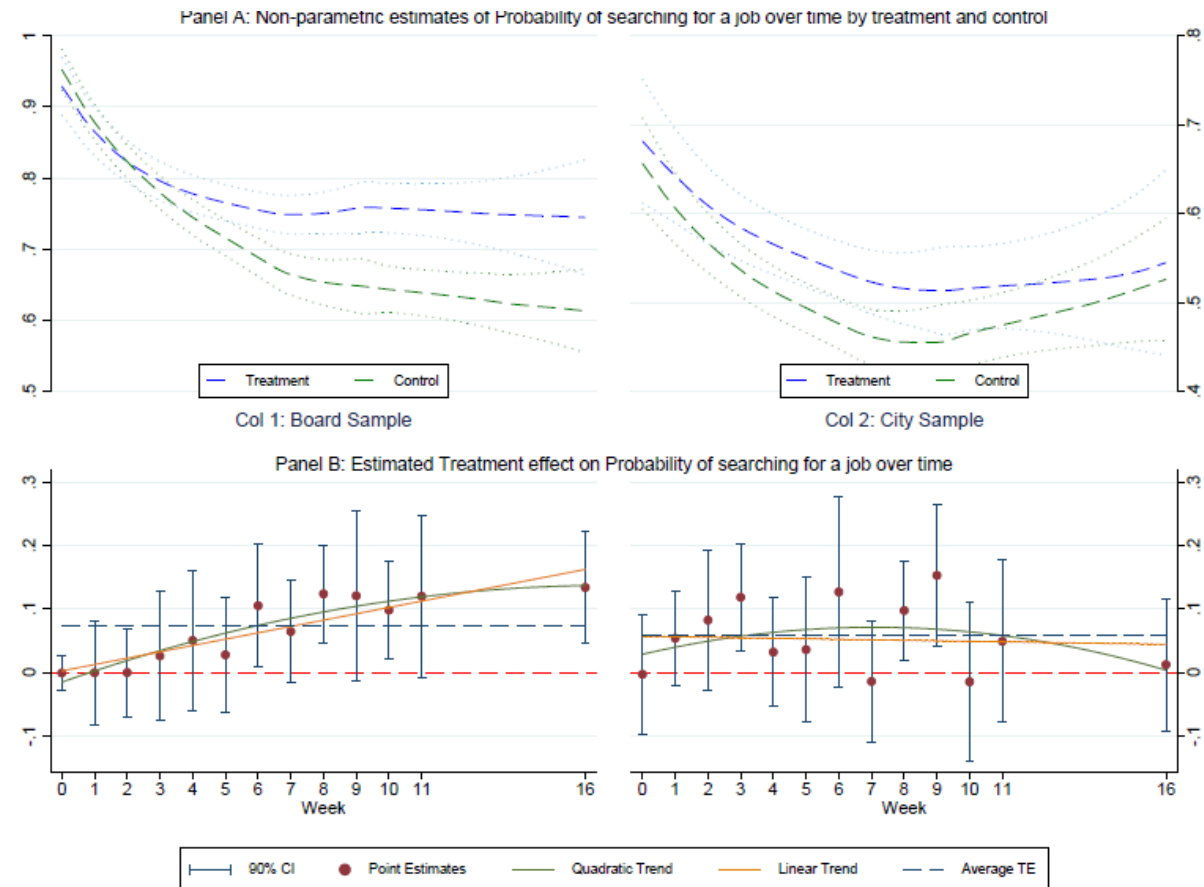


Lowering transport costs facilitates matching (spatial mismatch)

Transport costs are labor market frictions

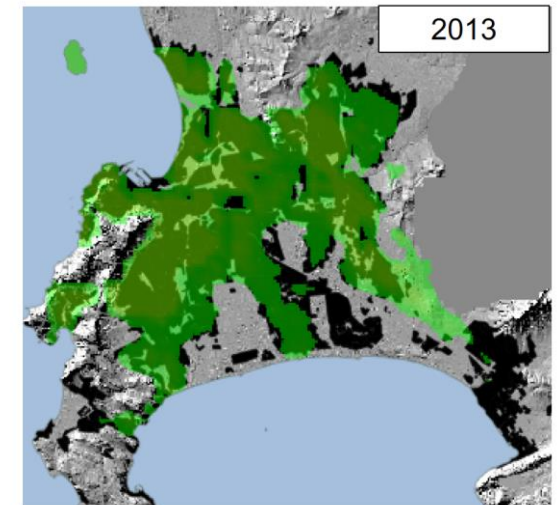
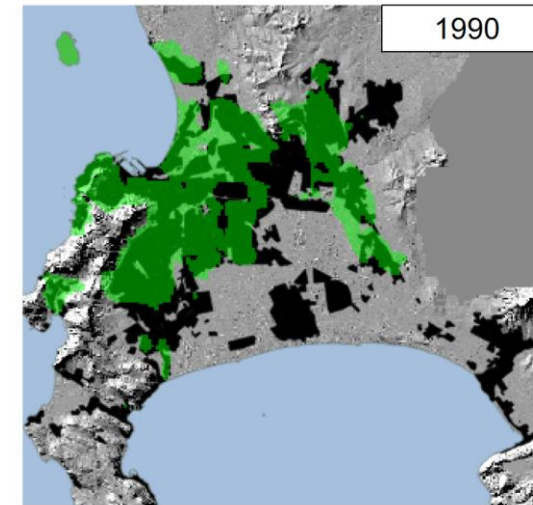
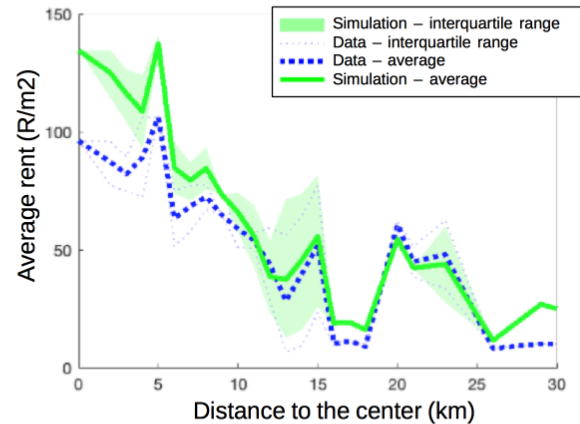
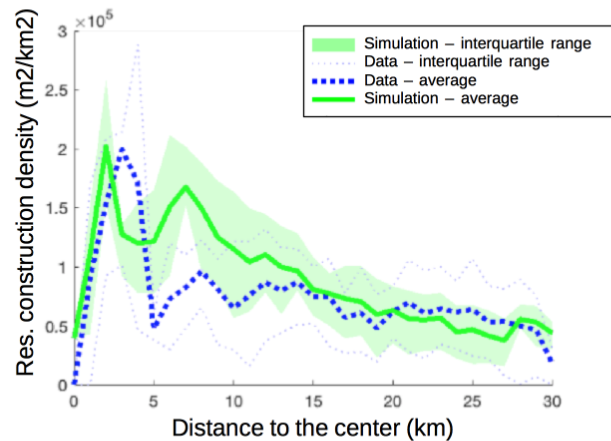
Subsidizing the transport of the unemployed increases search intensity and the likelihood of finding a permanent job

Figure: impact of transport subsidy on job search (Addis Ababa)



Policy research priorities (1/2)

How do transport investments and land use interact to affect urban form?
Develop LUTI models to plan ahead



How land form affects agglomeration effects

Policy research priorities (2/2)

Cities and climate changes

Cities are major contributors to climate change (energy consumption, CO₂)

How is this exacerbated by the spatial organization of cities?

Urbanization will be accelerated by climate change

To what extent? Where and when?

Cities are increasingly exposed to climate induced risks

What land use policies to increase resilience?

Conclusion

Take away 1: Agglomeration effects require a functional land sector and good transportation

Take away 2: Rapid urban population is likely to be met with market failures in land and inadequate transport

Take away 3: Policy interventions are required to “get cities right”

Take away 4: Because there are likely to be winners and losers, there may be strong political economy obstacles to reforms