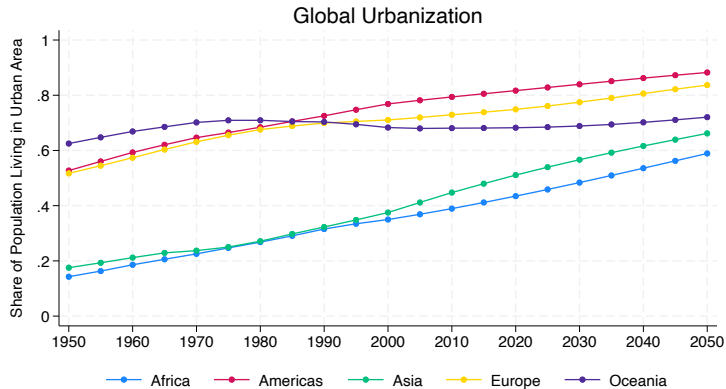# Urban economics for low- and middle-income countries

Melanie Morten (Stanford and NBER)
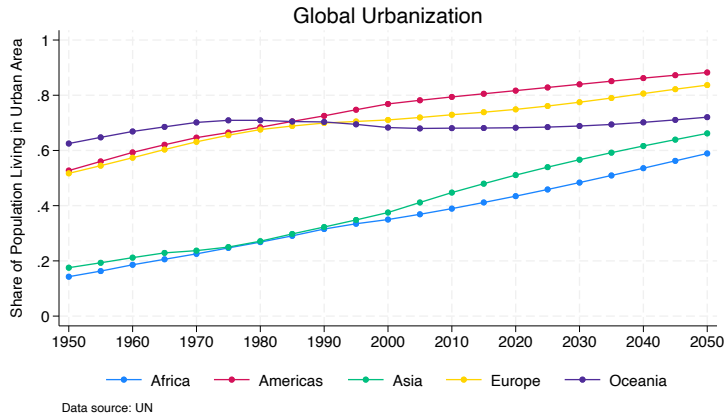
UEA Summer School 2025

Future in many LMIC: increasingly urban

Global Urbanization

Data source: UN

Future in many LMIC: increasingly urban

Global Urbanization

Data source: UN

Note: urbanization rates are sensitive to definition used; see Bryan et al. (2025) for a discussion.

How do we understand income differences *within* a country?

▶ Economic framework to understand within-country differences
▶ Policy implications

(a) Jakarta

(b) Rural Java

Outline

1. Motivation to study cities and space in low income countries

2. Basic spatial framework

3. Spatial economics through the lens of development economics

4. Concluding throughts

Based on forthcoming handbook chapter Bryan et al. (2025)

Motivation

Countries that are richer are more urbanized

Urbanization and GDP in 2015

Slope: 0.1495; SE: 0.0098
Data source: UN and World Bank
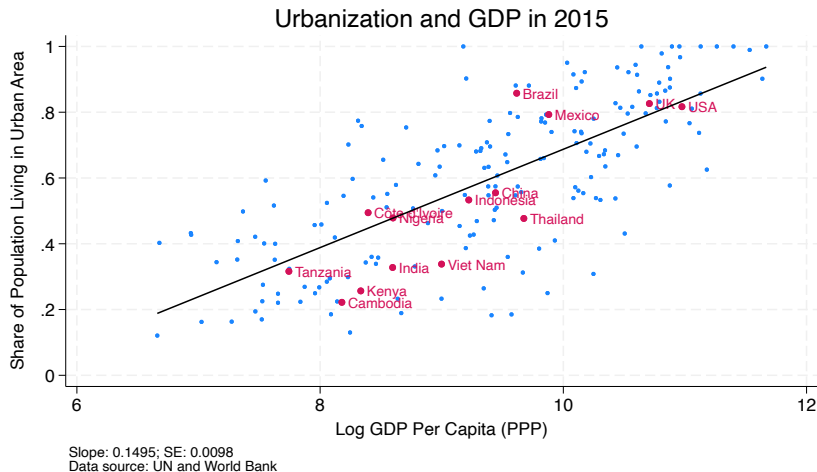
Countries that are more urbanized have fewer working in ag

Urbanization and Ag. Employment in 2015

Slope: -0.7742; SE: 0.0517
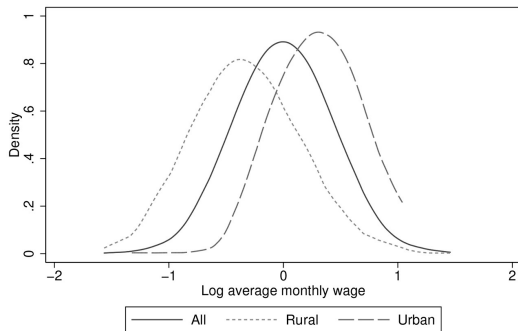Data source: UN and ILO
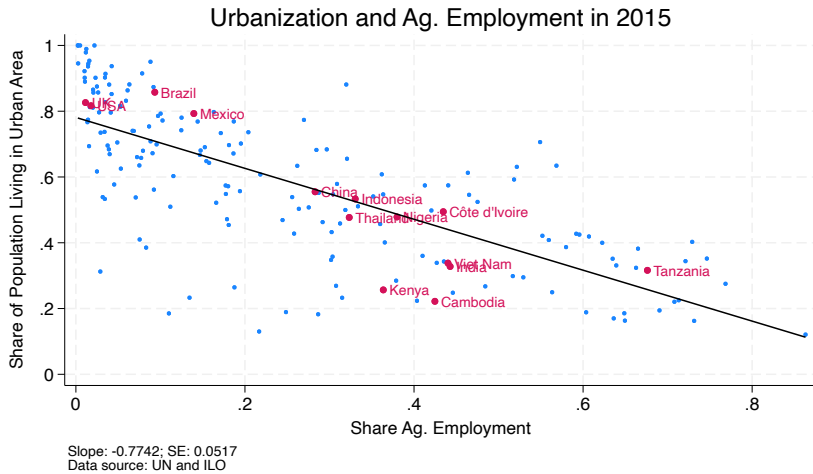
Spatial gaps are bigger in developing countries

- ▶ Spatial gaps exist everywhere, but p.c. GDP (ppp) in Ethiopia is only $2,400
- ▶ Removing within-country gaps: 90% of way to across-country gaps Caselli (2005)
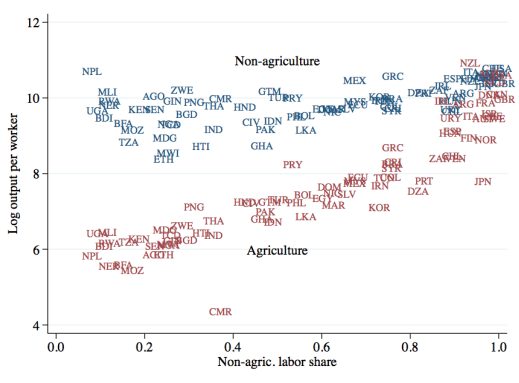
Source: Vollrath from Caselli (2005)

Source: Bryan and Morten 2019

Living conditions are better in urban than rural areas

Table 1

Real Urban and Rural Living Standards in India and Nigeria

	Urban	Rural
Percent with finished floors		
India:	70.4	40.3
Nigeria:	88.1	60.8
Percent with toilet facility		
India:	89.5	45.9
Nigeria:	84.6	67.5
Percent with electricity		
India:	97.5	83.2
Nigeria:	82.7	38.9
Percent owning a television		
India:	87.0	53.5
Nigeria:	70.7	30.0
Under-five mortality (per 1,000 births)		
India:	36	59
Nigeria:	86	155
Percent with BMI below 18.5		
India:	15.5	26.8
Nigeria:	9.6	14.4

Note: Compiled from the Demographic and Health Surveys, funded by the US Association for International Development and publicly available at https://dhsprogram.com/. The statistics are calculated in the most recent year available, which is most commonly 2018.

Table from Lagakos (2020)

People earn more in urban than rural areas (non-RCT evidence)

Table 1: Rural-Urban Wage Gaps in India in 2004

Sector:	wage		
	nominal	PPP-adjusted (rural consumption)	PPP-adjusted (urban consumption)
	(1)	(2)	(3)
Urban	62.66	54.05	57.58
Rural	42.54	42.54	42.54
% gain	47.30	27.06	35.35

Source: National Sample Survey.
Wages are measured as daily wages for individuals with less than primary education.
PPP-adjustment is based on rural and urban consumption bundles, respectively, for those individuals.

Table from Munshi and Rosenzweig (2015)

People earn more in urban than rural areas (RCT evidence)

- ▶ RCT subsidizing rural-urban migration during lean season before crop harvest
- ▶ Money covered return bus fare and a few days' food
- ▶ Key results
  1. Migration increased during subsidy
     - ▶ Year 1 (subsidies paid): 22%
  2. Migration continued after subsidy stopped
     - ▶ Year 2 (no subsidies paid): 9.2%
     - ▶ Year 4 (no subsidies paid): 7%
  3. Consumption increases,
     - ▶ Year 1 (subsidies paid): ITT: 7% increase; ToT: 30-35% gain
     - ▶ Shows positive returns to migrating

Bryan et al. (2014)

Practical problems: demons of density

Accra, Ghana GDP/cap 2000 USD

Practical problems: changing climate

Queliamane, Mozambique GDP/cap 550 USD

Basic spatial model

Urbanization through the lens of a spatial model

- ▶ Economists think about spatial equilibrium

- ▶ People choose where to live based on returns and costs
  - ▶ Not just wages: amenities, cost of living, cost of moving...

- ▶ Spatial equilibrium adjusts through endogenous wages, house prices

- ▶ Natural starting point for analyzing process of urbanization

Why do we need a model?

- Complicated spillover effects
  - If more people move into Abidjan, house prices, traffic increase

- Model helps to think about policy
  - What would happen if Côte D'Ivoire built more roads? Would migration increase?
  - What would happen to urbanization if productivity in agriculture slowed down?

- However: makes a lot of simplifications. We'll come back to these later.

Simple example: 2 locations, exogenous prices

- ▶ Simple case: assume
  - ▶ Wages, rents, amenities are exogenous
  - ▶ No migration costs

- ▶ Person i's indirect utility of being in A:

$$V_A^i = \underbrace{\mathbf{w}age_A - \mathbf{r}ent_A + \mathbf{A}menities_A}_{\text{common to A }(V_A)} + \epsilon_A^i$$

- ▶ Person i's indirect utility of being in B:

$$V_B^i = \underbrace{\mathbf{w}age_B - \mathbf{r}ent_B + \mathbf{A}menities_B}_{\text{common to B }(V_B)} + \epsilon_B^i$$

Migration decision: choose location that maximizes utility

Value of shock A (ϵ_A)

Value of shock B (ϵ_B)
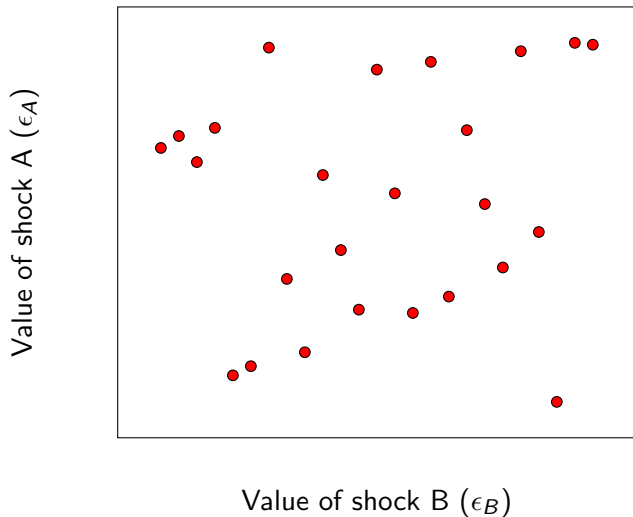
Live in A if:

$$V_A + \epsilon_A > V_B + \epsilon_B$$
$$\epsilon_A > \epsilon_B + (V_B - V_A)$$

Migration decision: choose location that maximizes utility

Value of shock A (ϵ_A)

Value of shock B (ϵ_B)
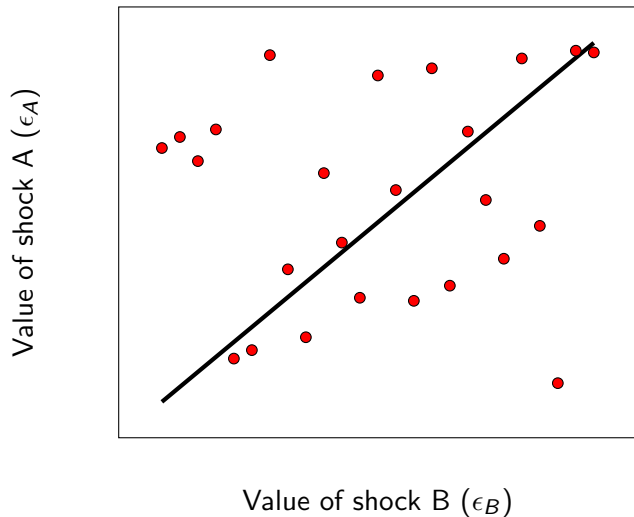
Live in A if:

$$V_A + \epsilon_A > V_B + \epsilon_B$$
$$\epsilon_A > \epsilon_B + (V_B - V_A)$$

Spatial equilibrium: what share of people live in each location?

- Person i will choose to live in A if:

$$V_A + \epsilon_A^i > V_B + \epsilon_B^i$$
$$\rightarrow \epsilon_B - \epsilon_A < V_A - V_B$$

- Assume $\epsilon_B - \epsilon_A$ is uniform on $[-S, S]$[1]
- Overall share of the population who live in A

$$P(\epsilon_B - \epsilon_A < V_A - V_B) = \frac{V_A - V_B + s}{2s}$$
$$= \frac{1}{2} + \frac{V_A - V_B}{2s}$$

- If it's costly to move from b to a: return is $V_A - V_B - \tau$

$$P(\text{move to A if start in B}) = \frac{1}{2} + \frac{V_A - V_B - \tau}{2s}$$

How to extend to more than 2 locations?

▶ Can easily extend to whole country / whole world

▶ Very convenient to assume that the ϵ are distributed extreme-value:

$$\text{Gumbel: } p(\text{choose d} \mid \text{live in } o) = \frac{e^{v_{od}}}{\sum_{d'} e^{v_{od'}}}$$

$$\text{Fréchet: } p(\text{choose } d \mid \text{live in } o) = \frac{v_{od}^{\theta}}{\sum_{d'} v_{od'}^{\theta}}$$

▶ Can make predictions about how people will move, how welfare will change

▶ But the economics is the same as the simple case

Endogenous prices (wages, housing, goods price)

- ▶ First model with endogenous prices: Rosen-Roback (endogenous cost of living)
    - ▶ Easy to extend to endogenous wages, trade model for prices

- ▶ Consider a productivity shock in A
    - ▶ Wages increase in A
    - ▶ Holding prices constant, more people want to live there
    - ▶ If more people move, rents increase
        - ▶ Could easily add other spillovers e.g., congestion, agglomeration
    - ▶ So, not all people would move

- ▶ End up with new equilibrium where noone wants to change location

See Moretti (2011) and Redding and Rossi-Hansberg (2017) for overviews of spatial models

Spatial adjustment after a productivity shock

Labor Market

Wage

L^s

W_0

L^d

L_0 Labor

Housing Market

Price

H^s

P_0

H^d

H_0 Housing

Spatial adjustment after a productivity shock

Labor Market

Wage

W_1
W_0

L^s

L^d $L^{d'}$

$L_0 L_1$ Labor

Housing Market

Price

P_1
P_0

H^s

H^d $H^{d'}$

$H_0 H_1$ Housing
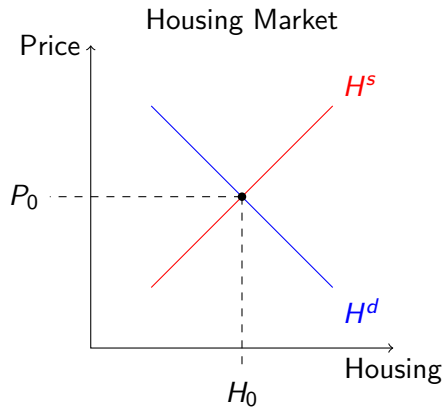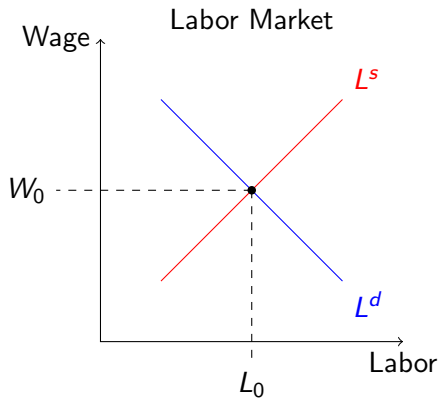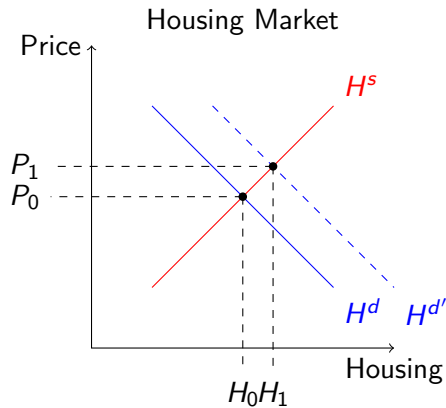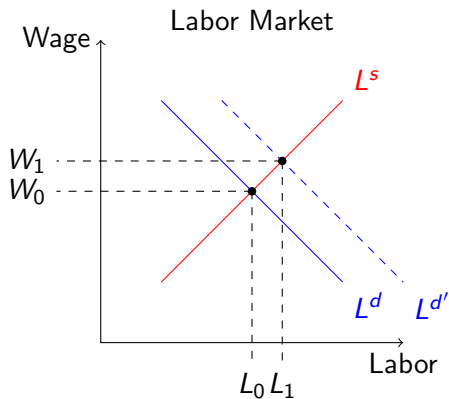
Spatial model through development
economics lens

Both devo and urban have things they bring to the table

The Ethiopian government wonders if a workfare program is a good idea

- ▶ Development economist:
    - ▶ Great, I'll randomize and compare T and C
    - ▶ Problem: if people withdraw from private labor market, violates SUTVA ("spillover")
    - ▶ Policy-maker actual cares about program rolled out everywhere ("scale-up")

- ▶ Urban economist:
    - ▶ No problem, I have exactly the model for you, I just need 5 elasticities
    - ▶ Where can I get the admin data to estimate them?

- ▶ Development economist:
    - ▶ Great you have a model, how do you capture that 60% of people are self-employed?
    - ▶ Also, did you know the main form of transit is informal minibus?

Franklin et al. (2024)

Spatial model through the lens of development economics

- ▶ Migration depends on both returns and costs

- ▶ Returns
  - ▶ Development "facts" for modeling market frictions

- ▶ Costs
  - ▶ Data exercise: are costs larger in LMIC?

- ▶ Putting together: argue work to do on modeling side

Returns to migrating: development facts for each market

- Indirect utility:

$$V_d = A_d w_d r_d P_d$$

- Components: amenities, wages, rents, prices, (commuting costs)

- Development economics: averages conceal heterogeneity
  - Missing markets
  - Credit constraints
  - Heterogeneity
  - Lack of data

- Let's look at components in turn

Taking model to data: need to estimate elasticities

▶ In order to use the model to make predictions, need to estimate elasticities
  ▶ What happens if cities are more productive?
    ▶ Elasticity of migration to productivity change
  ▶ What happens to urban productivity when migrants arrive?
    ▶ Elasticity of productivity to population
  ▶ How many people start working with new metro line?
    ▶ Elasticity of commuting costs to transport

▶ May be especially important to get context-specific amenities
  ▶ e.g., Are people differentially sensitive to commuting costs in different settings?

Amenities

Development facts:

- Urban tends to have higher amenities than rural (Gollin et al., 2021; Henderson and Turner, 2020)
- But also has higher wages

Urban model:

- Urban should have lower amenities (compensating differentials)
- High movement costs to rationalize?

Amenities: across Africa, amenities increase with density

▶ Crime as exception

Table: Consumption, Public goods, Crime, and Pollution By Density

	Q1	Q2	Q3	Q4
Private consumption				
Finished roof	0.41	0.5	0.67	0.88
Child stunted (low height for age)	0.4	0.4	0.38	0.29
Public goods				
Electricity grid	0.39	0.42	0.48	0.72
Health clinic	0.59	0.58	0.62	0.73
Electricity grid	0.39	0.42	0.48	0.72
Health clinic	0.59	0.58	0.62	0.73
Crime				
Property crime	0.28	0.31	0.31	0.33
Feel unsafe	0.37	0.39	0.38	0.45
Air pollution				
PM2.5	19.45	20.24	18.55	18.15

Source: Gollin et al. (2021)

Wages/labor market

Development facts (Nigeria LSS 2019):

- ▶ In rural areas, subsistence agriculture important
  - ▶ And in suburban areas (see also Udry et al., 2024)
- ▶ Informal employment (e.g., small-scale retail) is high, in both rural and urban
- ▶ High churn: even if in labor force, don't work consistently
- ▶ Productivity and wage not always linked, especially in rural areas (Breza et al., 2021)

Urban model:

- ▶ Average wage in destination
- ▶ Labor paid marginal product (used for GE spillovers)

Self-employment much higher in poor countries
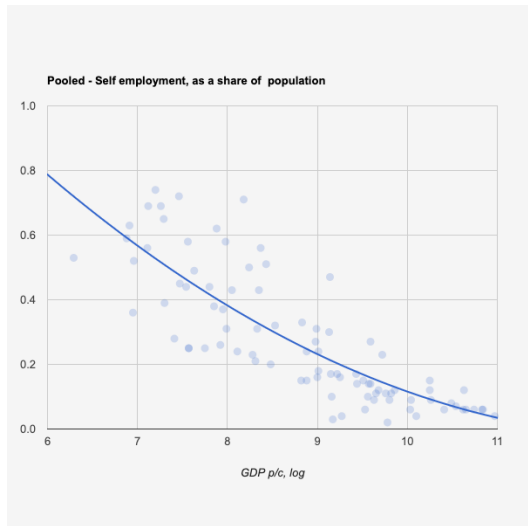
Source: Bandiera et al. (2022)

Nigeria Data: Employment and Education by Urban/Rural

Table: Individual-level Characteristics

	Urban	Rural
Labor Force Including Subsistence Ag.	0.74	0.78
Labor Force Not Including Subsistence Ag.	0.70	0.58
Formal Employment	0.21	0.09
Informal Employment Including Subsistence Ag.	0.47	0.67
Informal Employment Not Including Subsistence Ag.	0.41	0.42
Worked 7 Days Including Subsistence Ag.	0.65	0.73
Worked 7 Days Not Including Subsistence Ag.	0.60	0.50
Monthly Wage (Naira)	51600.43	43030.59
N	17334	40471

Notes: Data source: Nigeria LSS Survey (2018-2019). Table sample is adults 18 years and older. Weighted at the household level.

Commuting costs

Development facts:

- ▶ High congestion
- ▶ Many people, esp. the poor, walk to work
- ▶ Liquidity constraints / budget shares
- ▶ Travel time slower in urban area less developed (not congestion) (Akbar et al., 2023)

Urban model:

- ▶ Commuting cost
  - ▶ May need to estimate it by group
- ▶ Density not effective if can't actually get there

Most trips are by foot or informal transit

Table: Share of trips by mode, 2008

Mode of transport	Share of trips
Walk	37%
Minibus	30%
Motorcycle	12%
Private car	12%
Taxi	8%
Large bus	7%
Other	4%

Notes: Data tabbed from Kumar and Barrett (2008). Data measured for 14 African Cities.

Low-income households less likely to commute, walk more
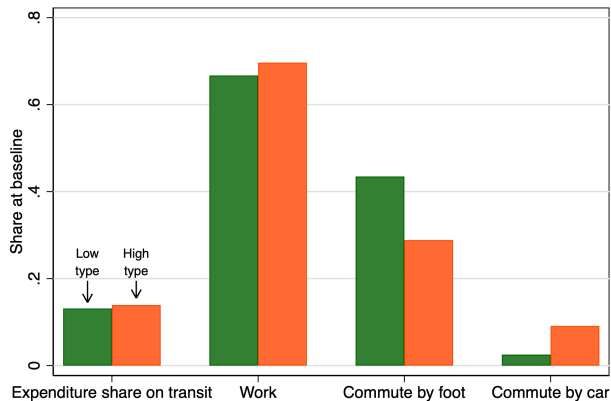
Whether someone works is determined by his/her self-reported main job. Only people who commute are included in the calculation for share of individuals who commute by foot/car.

▶ Data from Dar es Salaam (Balboni et al., 2020)

Rents/housing market

Development facts:

- ▶ High rates of informal housing (slums)
  - ▶ Slum development and impacts on city development
    (e.g., Henderson et al. (2021); Gechter and Tsivanidis (2023); Harari and Wong (2024))
- ▶ Share on housing can be non-homothetic with income
- ▶ Imperfect data on cost-of-housing, lack of transaction data
- ▶ Costs of living higher in urban area

Urban model:

- ▶ Average rent
- ▶ Non-homotheticities (e.g., Tsivanidis (2024))

Over 50% of urban SSA pop live in slums

Table

Region	Share
Global	24.8%
Sub-Saharan Africa	53.6%
Central Asia and Southern Asia	42.9%
Eastern Asia and South-Eastern Asia	24.8%
Western Asia and Northern Africa	17.8%
Latin America and the Caribbean	16.9%
Northern America and Europe	0.7%

Notes: Data for 2022, source: UN-Habitat Urban Indicators Database.

Nigeria Data: Household

Table: Household-level Characteristics

	Urban	Rural
No. in HH	4.53	5.44
Slum	0.39	0.77
Own Residence	0.33	0.68
Imputed Monthly Rent (Naira)	7137.3	3057.5
Share Consumption on Food	0.55	0.64
Share Consumption on Rent	0.067	0.052
N	6808	15302

Notes: Data source: Nigeria LSS Survey (2018-2019).
Weighted at the household level.

Are migration costs larger in low-income countries?

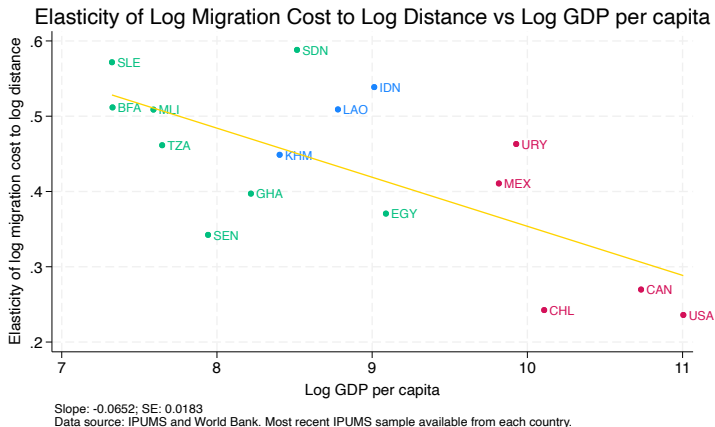▶ Spatial arbitrage: people can move to higher-wage (amenity) locations

$$V_{od} = f(V_d, c_{od})$$

▶ Ask: do migration costs differ by GDP?

▶ Use observed flows to back out implied migration costs (wedges)

▶ Note: observed migration a combination of choices and constraints
  ▶ Choices: costs high, choose not to migrate
  ▶ Constraints: costs exist, credit constrained and can't pay them
  ▶ Will affect interpretation of costs

Back out costs using observed region-region migration flows

▶ Non-parametric costs: ratio of migration rates (Head-Reis index)

  ▶ $c_{od} = \left(\frac{\pi_{od}}{\pi_{oo}} \times \frac{\pi_{do}}{\pi_{dd}} \right)^{\frac{-1}{2\theta}}$
  ▶ Once have it, correlate with distance

▶ Ask: does the elasticity of costs to distance increase with GDP
  ▶ i.e., is it relatively more costly to travel the same distance in low-income countries?
  ▶ Consistent with e.g., Bryan and Morten (2019) for Indonesia vs. US.

▶ Data: SSA sample from IPUMS where we observe migration (region-of-birth)

Richer countries have lower migration costs

Elasticity of Log Migration Cost to Log Distance vs Log GDP per capita

Slope: -0.0652; SE: 0.0183
Data source: IPUMS and World Bank. Most recent IPUMS sample available from each country.

▶ Keep most recent survey for each country
▶ Note: drop South Africa as only 4 sub-regions

Migration frictions may hinder the productive matching of people to place

- ▶ Role of migration to arbitrage income gaps across space limited

- ▶ Potential role of mismatch of people to place

- ▶ Where are migration costs coming from?
  - ▶ Credit constraints
  - ▶ Infrastructure
  - ▶ Land markets
  - ▶ Risk
  - ▶ Information
  - ▶ Urban-bias policy (e.g., China's hukou)

Concluding thoughts

Concluding thoughts: urbanization, migration, and productivity

▶ Baseline spatial model rich tool for studying urbanization

▶ Basic spatial model can't capture many of the informal/missing markets
  ▶ To be useful, needs to capture relevant market environment
  ▶ "Call to arms": many productive research possibilities

▶ We argue for three areas for more research
  ▶ Integration of key market imperfections into urban models
  ▶ Cleaner context-specific identification of model elasticities
  ▶ Finding and identifying novel data sources (e.g., cellphone data, remote sensing, google maps)

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