

Contributions to a panel on

Harmonization of spatial and temporal data and models to advance an Earth Systems Science Approach to Modeling Climate- Migration

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Certainties in an uncertain time

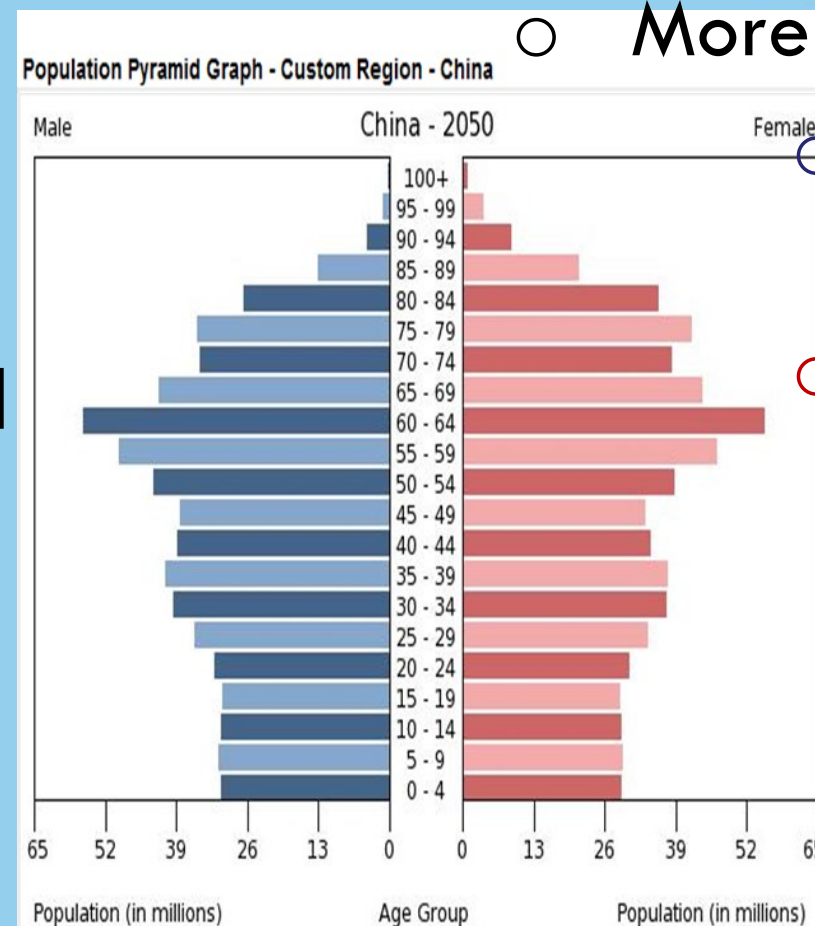
Demographically

- The future world is urban
 - The bulk of future population growth will take place in the cities and towns of Asia, Africa, and LAC
 - Up or out?
- The future world is increasingly aging
 - Greater % old

Climate-wise

- Hotter
- Stormier (frequency and intensity)
- Sea-level rise + flooding
- More drought-prone

Geography of exposure to change;
Impacts to depend in part of the demography of place



Data collection

Demographic data

- Types:
 - Censuses
 - Surveys
 - Census substitutes
 - Deep thematic inquiry
 - Administrative data
 - Vital registrations
 - Many other types (IRS)
- Spatial:
 - Resolution: coarse to moderate
 - Format: Tables, polygons or points
- Temporal resolution:
 - Annual to decadal
- Aim for representativeness

Climate Data

- Types:
 - Modelled
 - Satellite
 - Station observations
- Spatial:
 - Resolution: fine to coarse
 - Format: Raster or points (sometimes table)
- Temporal resolution:
 - Hourly to Annual
- Aim for spatial completeness

Internal Migration

International migration may grab all the headlines but internal migration is way more common....

And a necessary ingredient in understanding city-growth
(which is where much of demographic 'action' is at)

Migration Measurement

- Many standards
 - No official standard on how internal migration should be measured
 - Limited studies on comparison of prevalence of internal urban in-migration across a large scale of countries
- Causes of variation in migration measures
 - Lots of “ordinary” migration and mobility - multifaceted in nature
 - Varied data sources of migration
 - Different migration questions asked across data sources and countries (or times)

What can censuses and DHS each contribute to understanding (internal) migration?

Censuses

- Reliable estimates for population projection
 - Full enumeration of the population
- Migration flows between specific administrative units
 - Geographic detail on residence change
- Historical trends of internal migration
 - Usually fixed intervals between censuses and longer periods of data

DHS

- Captures more population dynamics
 - More local movements are reported
- Provide information for understanding migration flows between rural and urban areas
- Available for African countries where (historical) censuses data are largely absent

Prior expectations

- **Most migration is in within rather than between countries**
- **Who migrates?**
 - Those who are able
 - **Those who are better off**
 - **Young adults**
 - Part of a household not necessarily all of a household
 - **Rural dwellers** seeking urban opportunities
- But it may depend on
 - Seasonal vs. permanent migration
 - Change with climate change and population aging
- Bold face indicates what we can examine with our data.

Migration estimation based on these questions in censuses and surveys

- **Migration Status Measure**

- Q: “Where did you live 1 year (or 5 or 10 years) ago?”
 - Huge variation in range of responses:
 - Specific locations:
 - Place or province names
 - Classifications:
 - Within this province, from another province, abroad
 - Another city, town, countryside (DHS)
 - Urban or Rural
- Q: “How long have you lived without interruption in this locality?”
 - Followed by “Where did you before coming here?”
 - As with above, huge range of responses

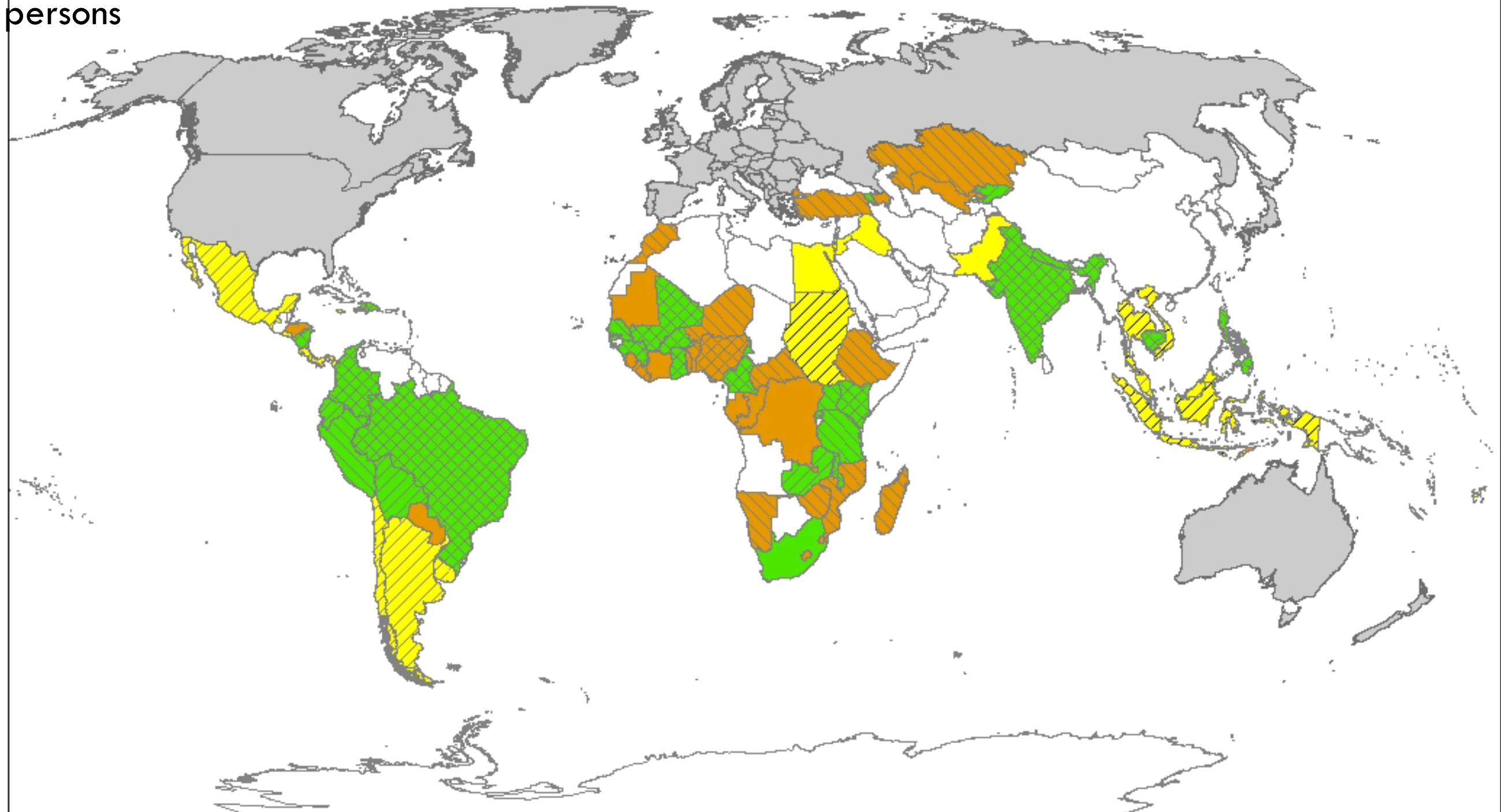
- **Previous Residence Measure**

- Q: “Where was your previous residence?”
 - Sometimes this question followed by, “When did you live there?”
 - If it is not, we cannot measure migration

Migration measures

	Census	DHS
Question asked	Where was your place of residence in 2000 (a specific time, often 5 years before the current census)? How long/the year since which you permanently started living here?	How long have you been living continuously in (name of village, town, and city)?
Time interval	Mostly 5-year; some 1-year, 10 year; any year is possible for some countries	any year
Boundaries	Major admin units (e.g., region, state, province); minor admin units (e.g., district)	cities, towns, villages

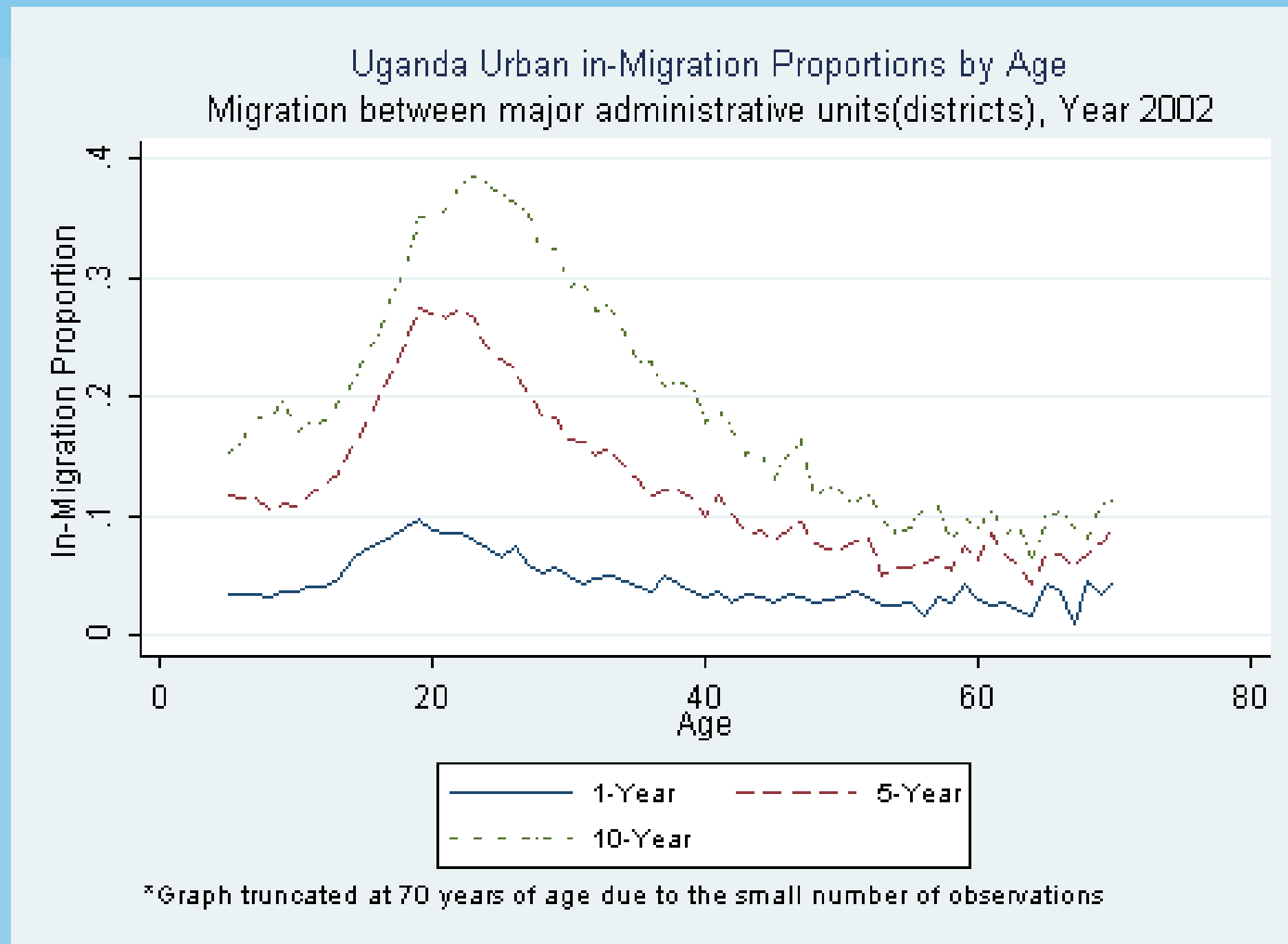
Countries for which subnational Urban In-Migration can be estimated for all women (15-49) or persons



IPUMS & DHS--In Migration Estimates Available Excluding Ever Married Women



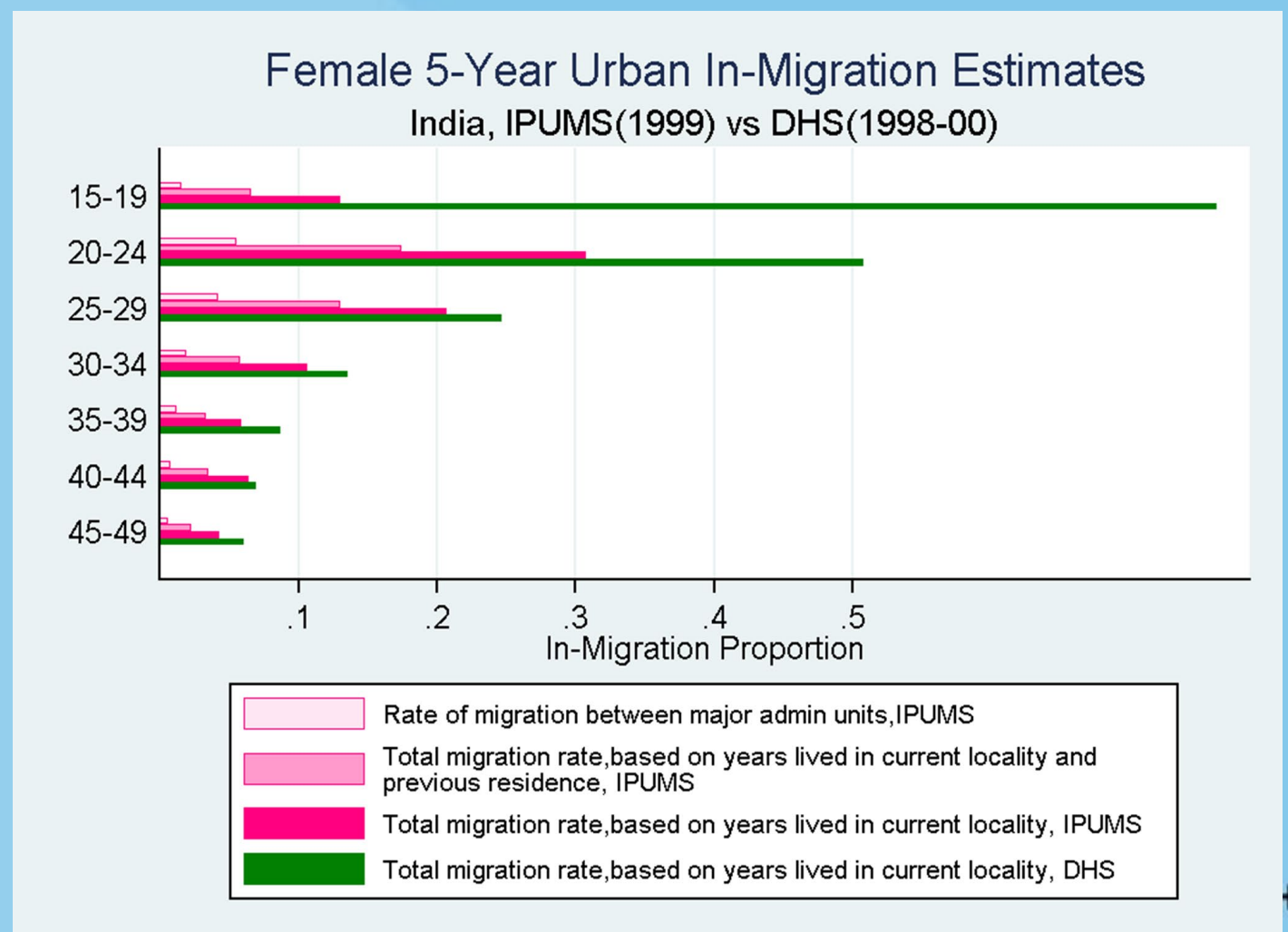
How to measure migration? Duration!



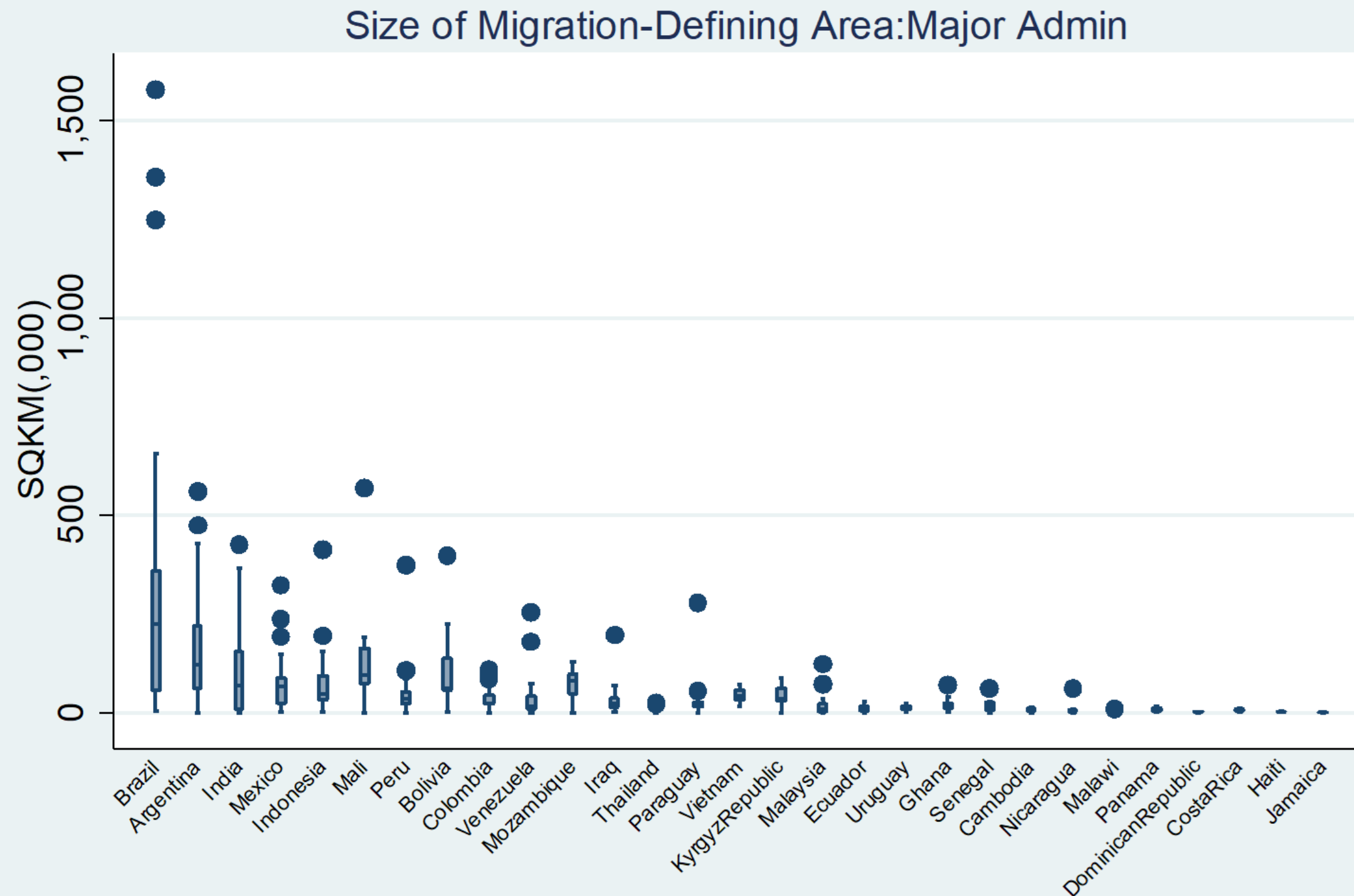
- We estimate the *proportion of the current urban population who has migrated to their current residence within the past 1-, 5- and 10-years.*

Implications of varied migration measures

- **Disagreement between census and DHS**
 - DHS reports much higher levels of urban in-migration ... probably because it relies on an 'any migration' measure
- **Agreement between census and DHS**
 - Both censuses and DHS show the same age pattern of urban in-migration
- **Concerns:**
 - Selection bias (surveys)
 - Sampling universe
 - Census non-response
 - “Any” vs. admin1
 - Size of bounding unit



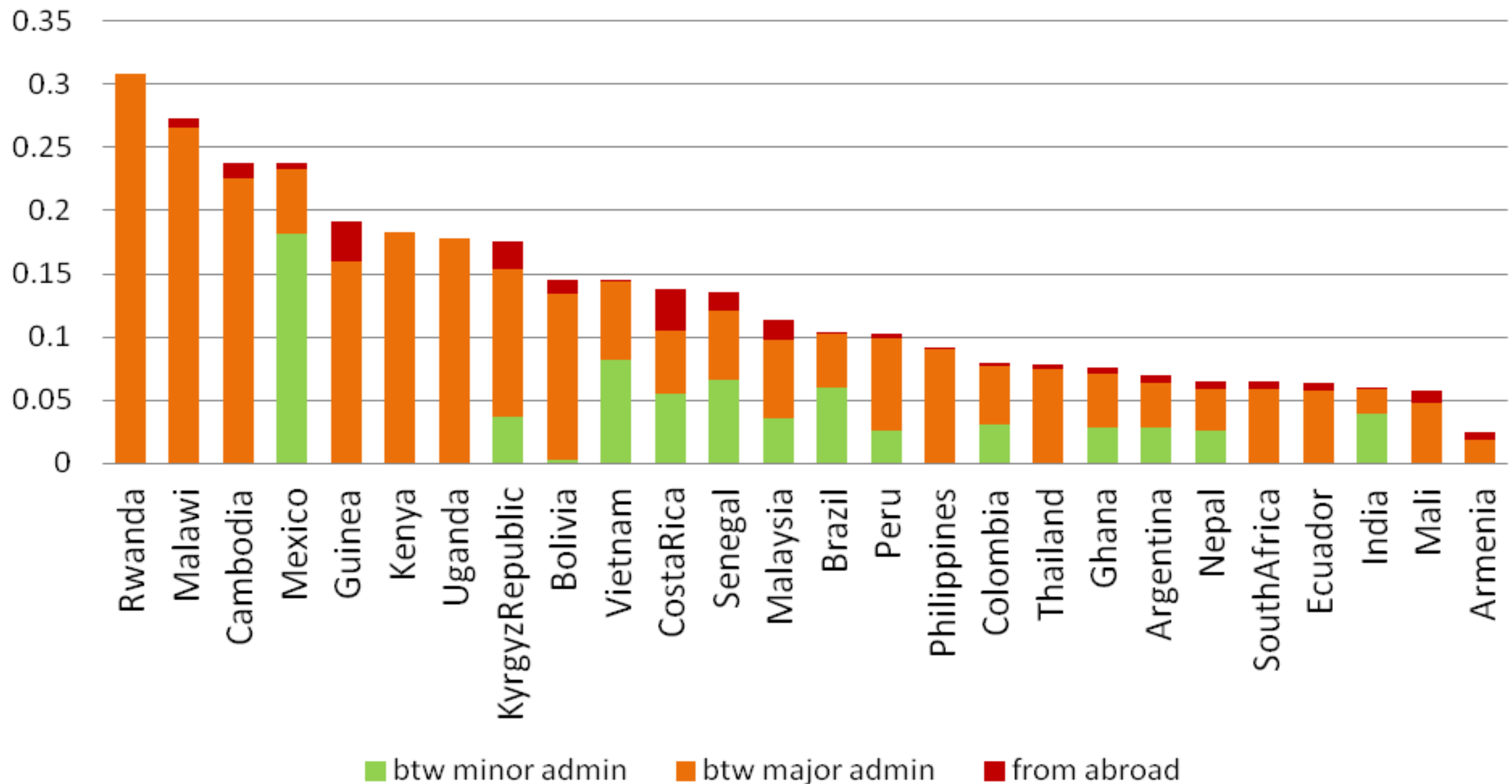
Why might DHS report higher estimates of urban in-migration rates?



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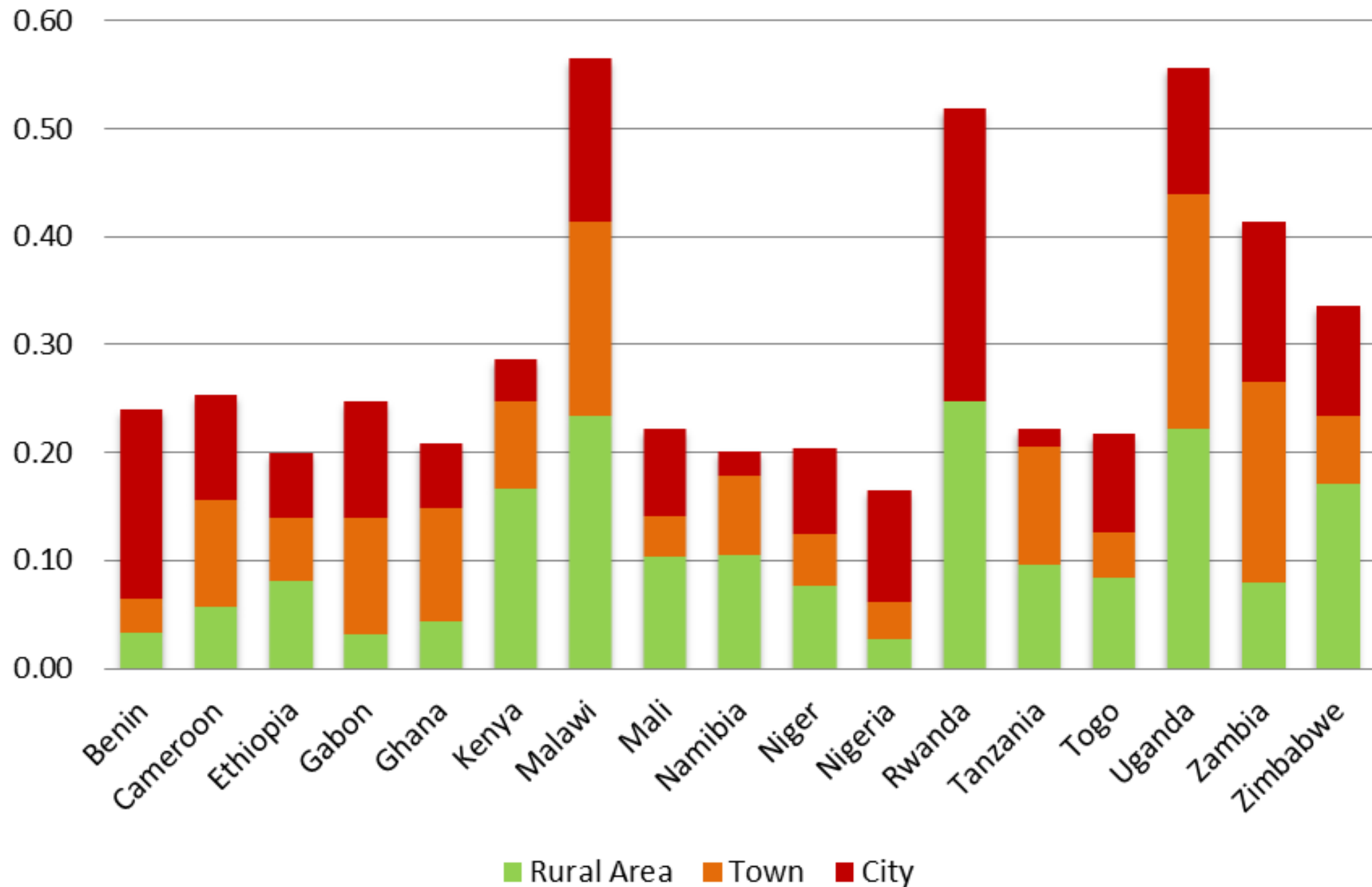
How “far” is the migration?

**Five-year Total Urban in-Migration Proportions
by migration distance
(based on censuses around 2000)**

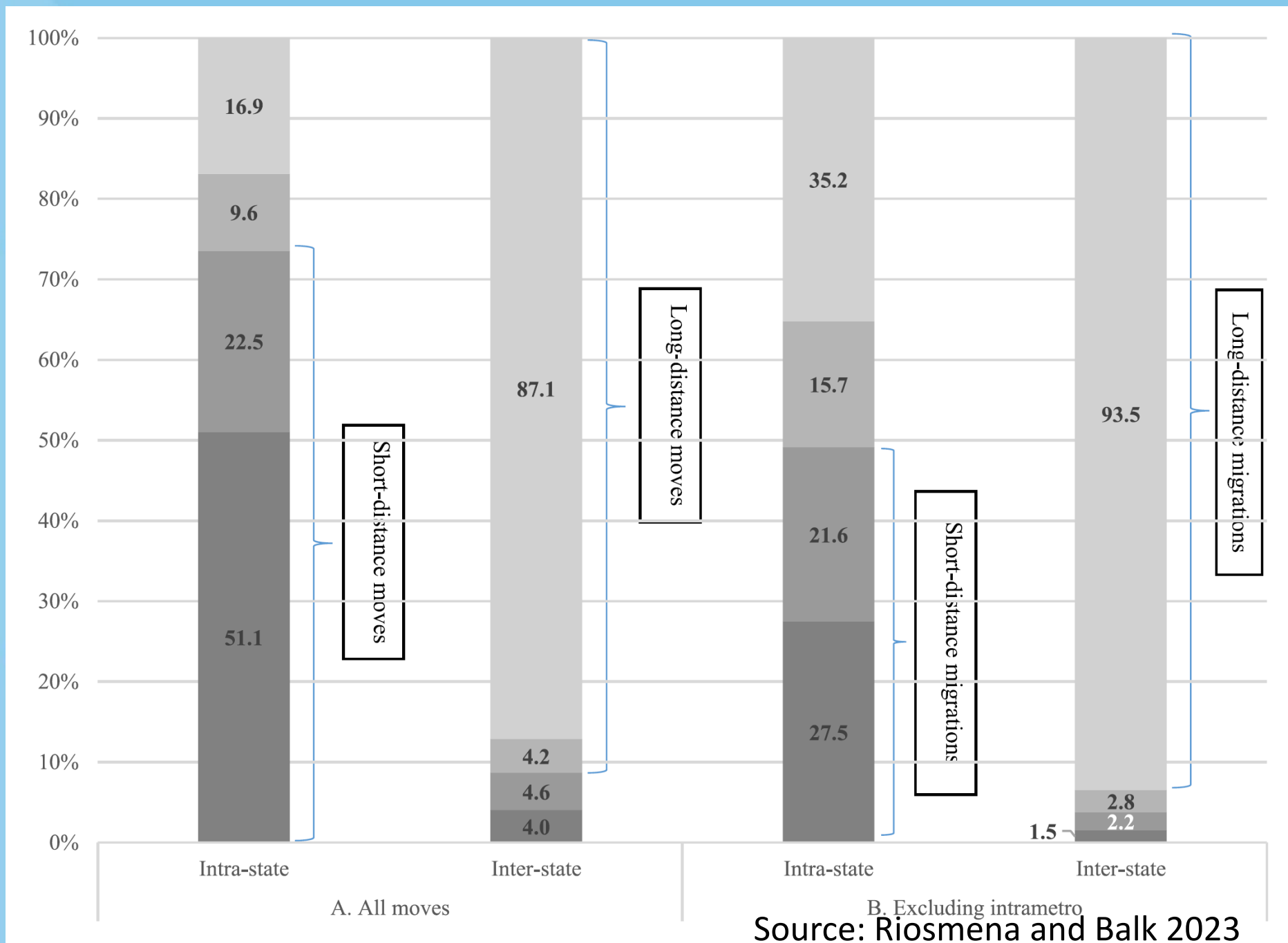


Migration to cities from where?

**Five-year Total Urban In-Migration Proportions
for African Countries, by previous residence
(15-49 year-olds), c. 2000**



Use Distance!



<< In Mexico, moves between major administrative areas miss lots of moves within and to urban areas

(This is known because distances btw municipalities of origin and destination can be calculated.)

Disaster-response migration (increasing evidence):

- moves are near (with equity implications)
- Administrative and event-specific data tend to be used

New and Big Data

- New and big data
 - Cell phones
 - Facebook
 - Facebook advertising data
- Administrative data
 - Tax-based data (IRS filings in US)
 - Vital registration

- Universe
 - Who do these data represent?
 - Those with cell phones or who use facebook?
 - Tax filers (not the very poor or undocumented?)
- Use in context
 - Before-After studies
 - Ideally coupled with anchored data

Improve national statistics

- Migration measurement is more delicate and more complex than other demographic events
- Even apart from climate change, future demographic shifts will be oriented around migration so national statistical infrastructures have an incentive to think hard about better measurement
 - New data is great but needs validation. Partnerships?
- Engagement with those NSOs is important
 - They need and want to hear from a wide range of stakeholders (like us!)