

Where Is Poverty Concentrated?

New Evidence Based on Internationally Consistent Urban and Poverty Measurements

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BACKGROUND

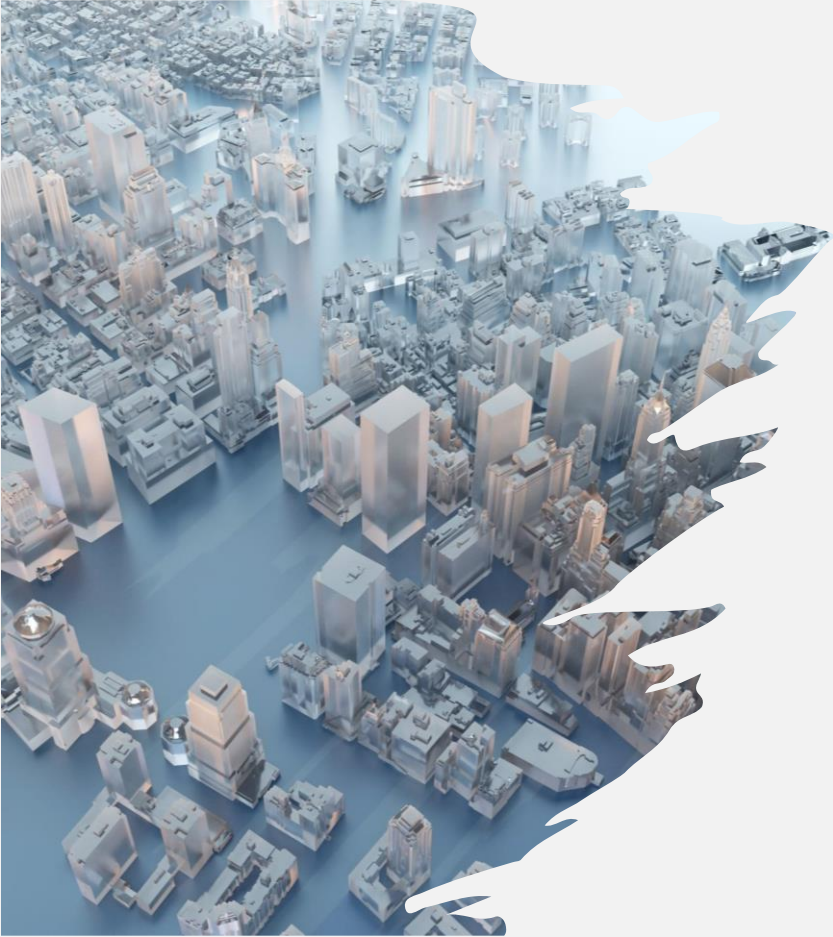


APPROACH



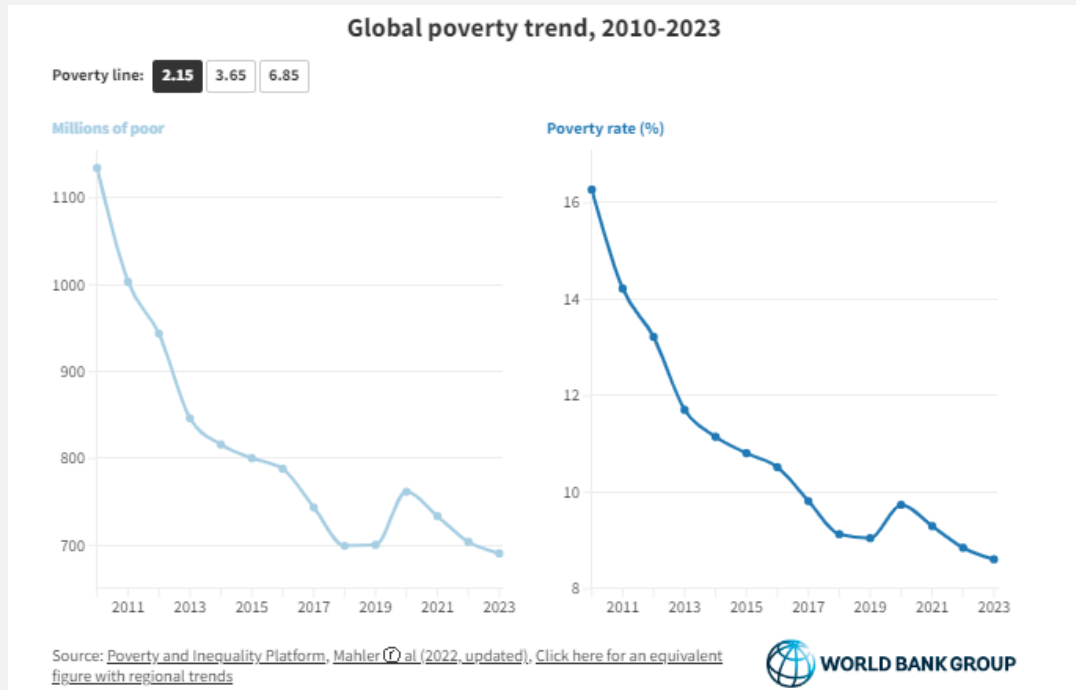
KEY FINDINGS

The urban definition problem



- **Varying definitions \Rightarrow 2 problems:**
 - Hard to understand urbanization patterns (Duranton 2021; Roberts et al. 2017)
 - Hard to disaggregate poverty into urban & rural areas in a comparable manner
- **2 WB Policy Research Working Papers:**
 1. An Anatomy of Urbanization in Sub-Saharan Africa (Combes et al. 2023)
 2. Where is Poverty Concentrated? New Evidence Based on Internationally Consistent Urban and Poverty Measurements (Nakamura et al. 2023)

Global poverty measurement



- Global poverty is measured by household consumption (income) and international poverty lines (\$2.15, \$3.65, \$6.85) based on household budget surveys.

$$P_0^C = \frac{1}{N_C} \sum_{i=1}^{N_C} I(REXP_{it,2017PPP}^C < IPL_{2017})$$

Where

P_0^C indicates *poverty rate*, the percentage of the population living in poverty in country C;

$REXP_{it,2017PPP}^C$ is the real per capita consumption expenditures adjusted by temporal and spatial deflators, as well as 2017 PPP;

IPL_{2017} is an international poverty line expressed in USD (2017 PPP terms)

<https://blogs.worldbank.org/opendata/poverty-back-pre-covid-levels-globally-not-low-income-countries>

Disaggregating global poverty into urban/rural areas

- What is the poverty rate in urban/rural areas? How many of the poor population live in urban/rural areas? –Answering these questions is not straightforward because of the varying urban definitions used in household budget surveys.

Key studies

- Ravallion et al. (2007) examined urbanization of global poverty using 200+ household surveys in 90+ countries between 1993 and 2002.
 - Ferré et al. (2012) investigated poverty (measured by each country's national poverty) and city size in 8 low- and middle-income countries.
- Both studies did not address the urban definition problem.



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Our approach

1. Preparing gridded layers with DOU/DB urban classifications
 2. Overlaying the layer with household budget survey data
 3. Updating urban classifications in the HBS data based on the overlaid layer.
 4. Updating the spatial price deflator based on the new urban classifications and deflating the welfare aggregate.
 5. Estimate global poverty (\$1.9, \$3.2, \$5.5 PLs) at the national and subnational levels.
- * Henderson et al. (2019) overlaid DOU grids (GHSPOP) with DHS data (40+ countries).

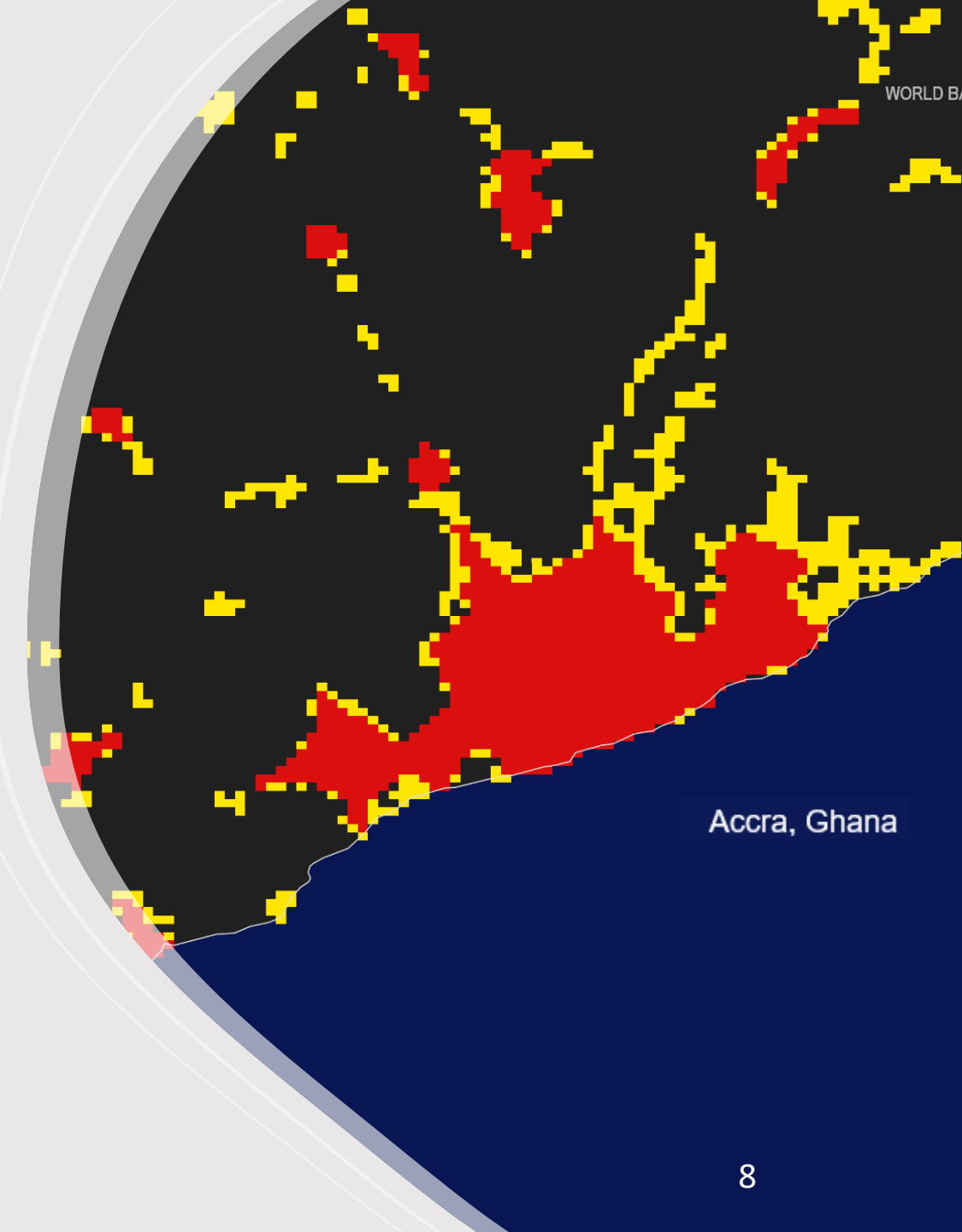
- **List of countries:**

- **Sub-Saharan Africa (16):** Angola, Burkina Faso, Chad, Cote d'Ivoire, Ethiopia, Gabon, Ghana, Guinea, Guinea Bissau, Lesotho, Mauritania, Malawi, Niger, Senegal, Tanzania, and Uganda
- **Other regions:** Egypt (MENA), Bangladesh (SAR), Vietnam (EAP), and Colombia (LAC)

Degree of Urbanization (Dijkstra et al. 2021)

- Focus on “Level 1” of DoU \Rightarrow 2 types of urban area:
- **Urban centers:** Spatially contiguous sets of 1 km² cells for which:
 - Density of each cell \geq 1,500 people per km²
 - Aggregate population \geq 50,000
- **Urban clusters:** Spatially contiguous sets of 1 km² cells for which:
 - Density of each cell \geq 300 people per km²
 - Aggregate population \geq 5,000
 - Include suburbs of urban centers & towns

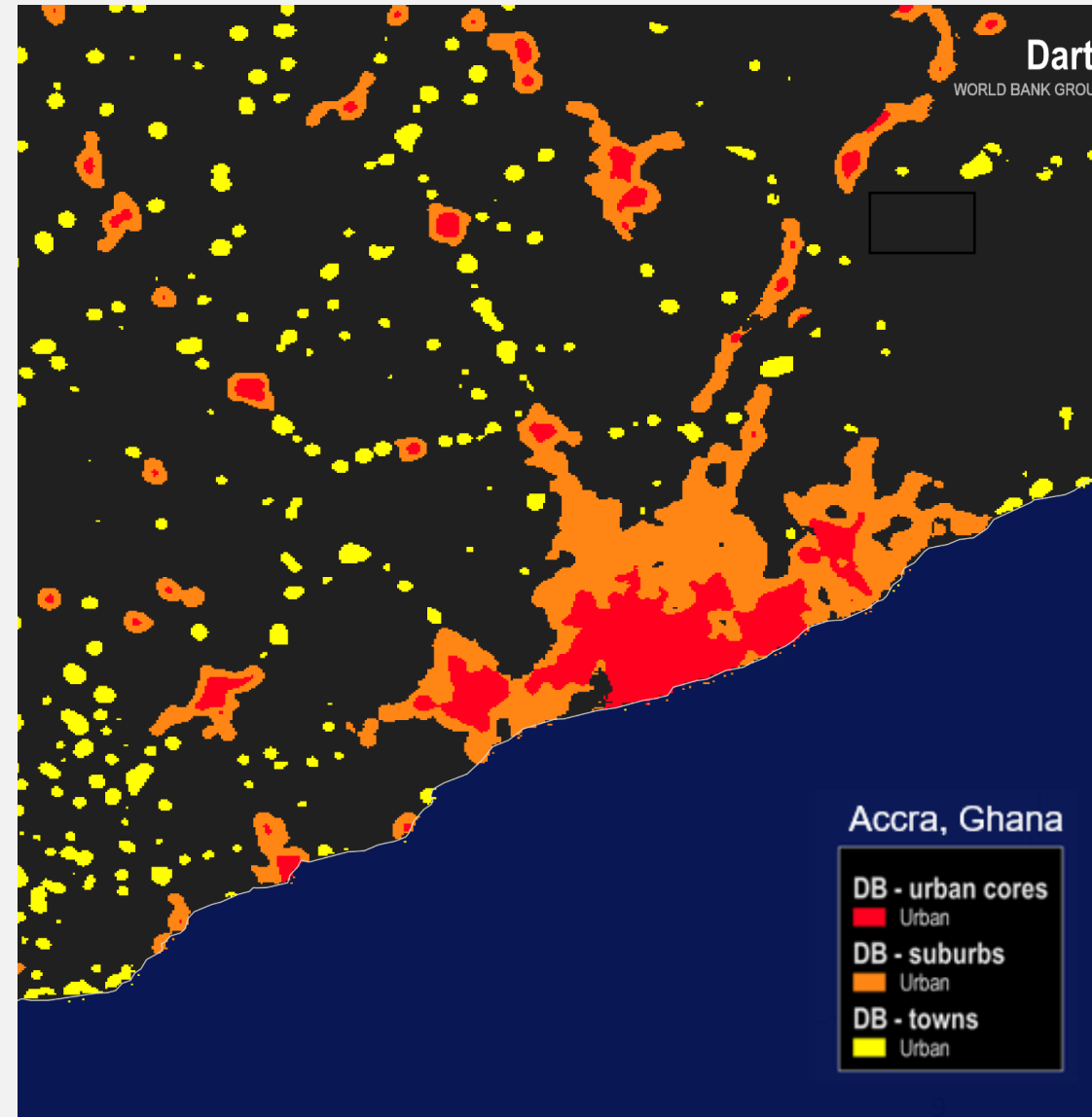
An **absolute** approach to urban area detection & delineation – absolute density matters



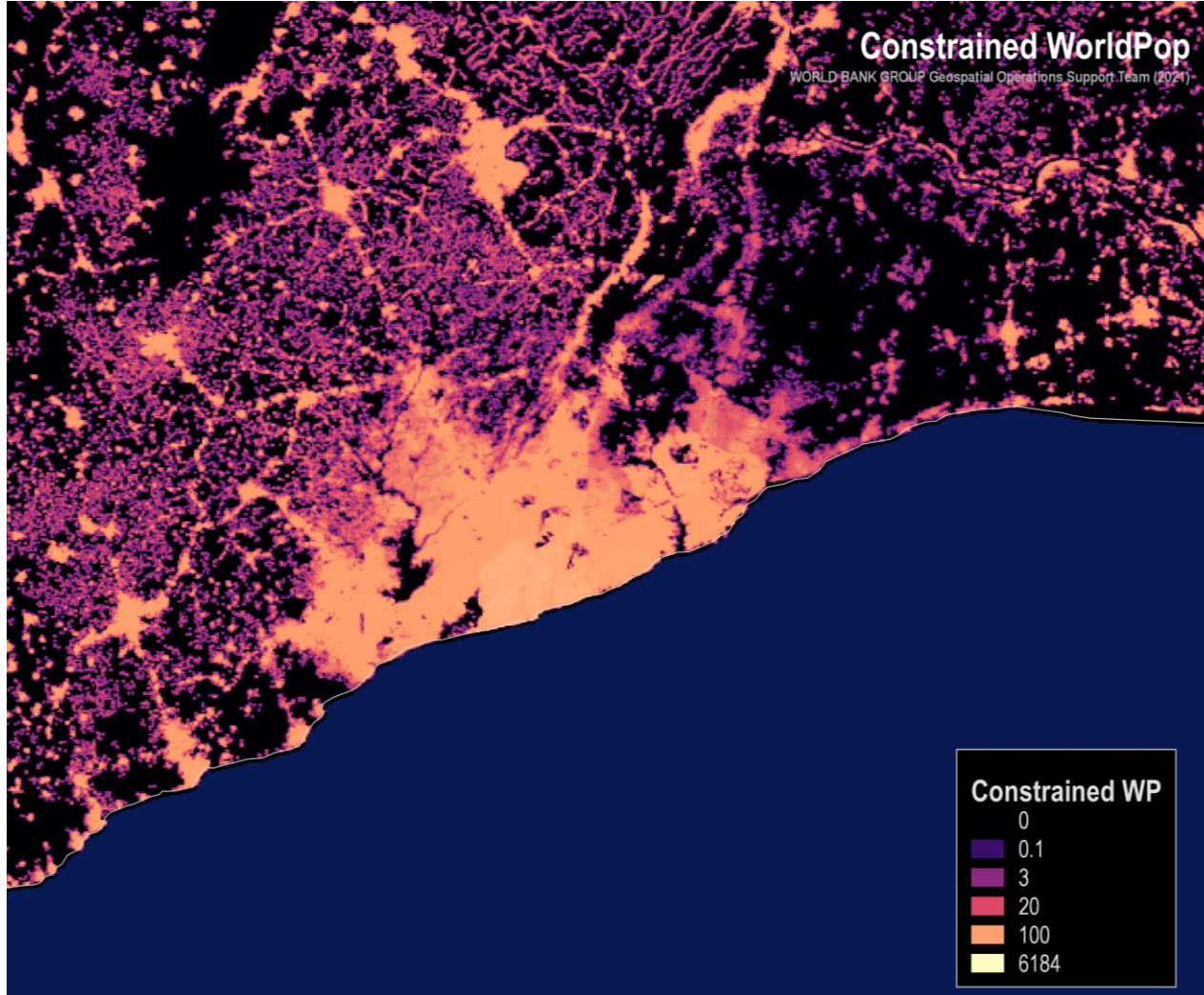
Dartboard approach (de Bellefon et al. 2021)

- Identifies significant population density peaks
- 3,000 random reshuffles of all populated cells over all “livable” cells \Rightarrow counterfactual density distribution under randomness
- “Livable” cells = not covered by water or desert & < 99th percentile of elevation & slope of populated cells
- **Urban cells:** actual density > 95th percentile of counterfactual density:
 - **Urban areas:** sets of contiguous urban cells
 - **Cities:** urban areas with a core:
 - **Cores:** 2nd-order urban cells based on a 2nd re-shuffling of cells, within urban areas
 - **Suburbs:** non-core parts of cities
 - **Towns:** urban areas without a core = “gray” areas of urbanization that also have rural characteristics

A **relative** approach to urban area delineation



Input gridded population data



- Primary population data source = **constrained WorldPop** for 2015
- Restricts allocation of population to built-up area
- Built-up area identified based on detailed map of **all** building footprints in SSA *circa* 2015
- Map derived from 50 cm resolution satellite imagery

- For non-SSA countries, rely on unconstrained WorldPop data



BACKGROUND



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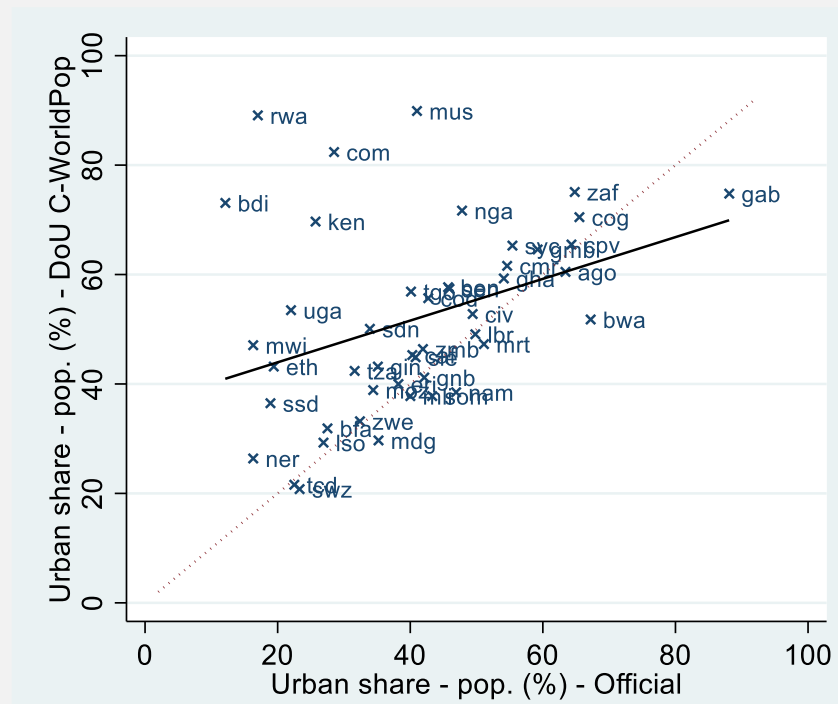
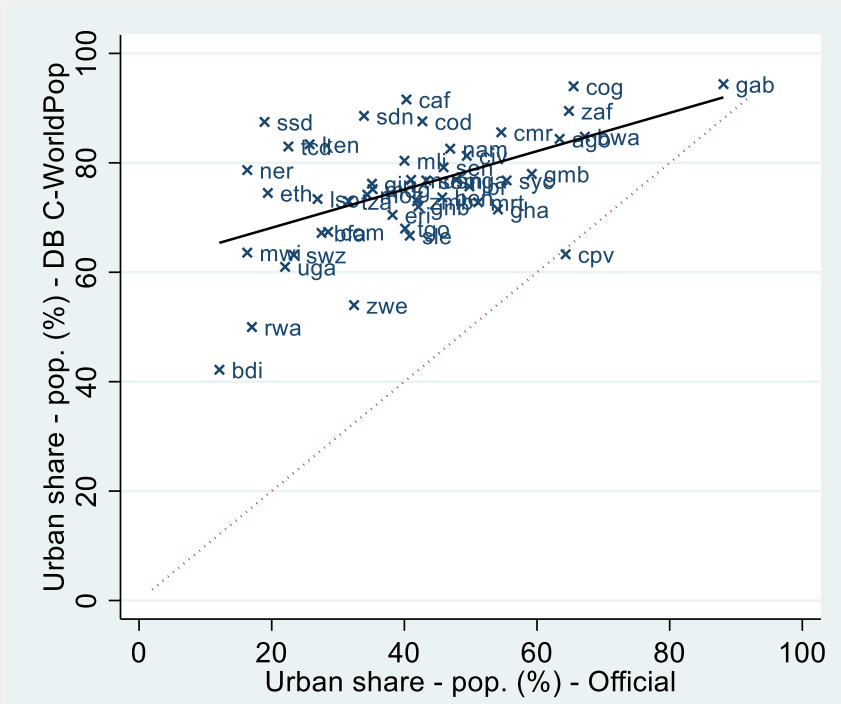


KEY FINDINGS

Most SSA countries are more urbanized than previously thought

(a) Dartboard

(b) DoU



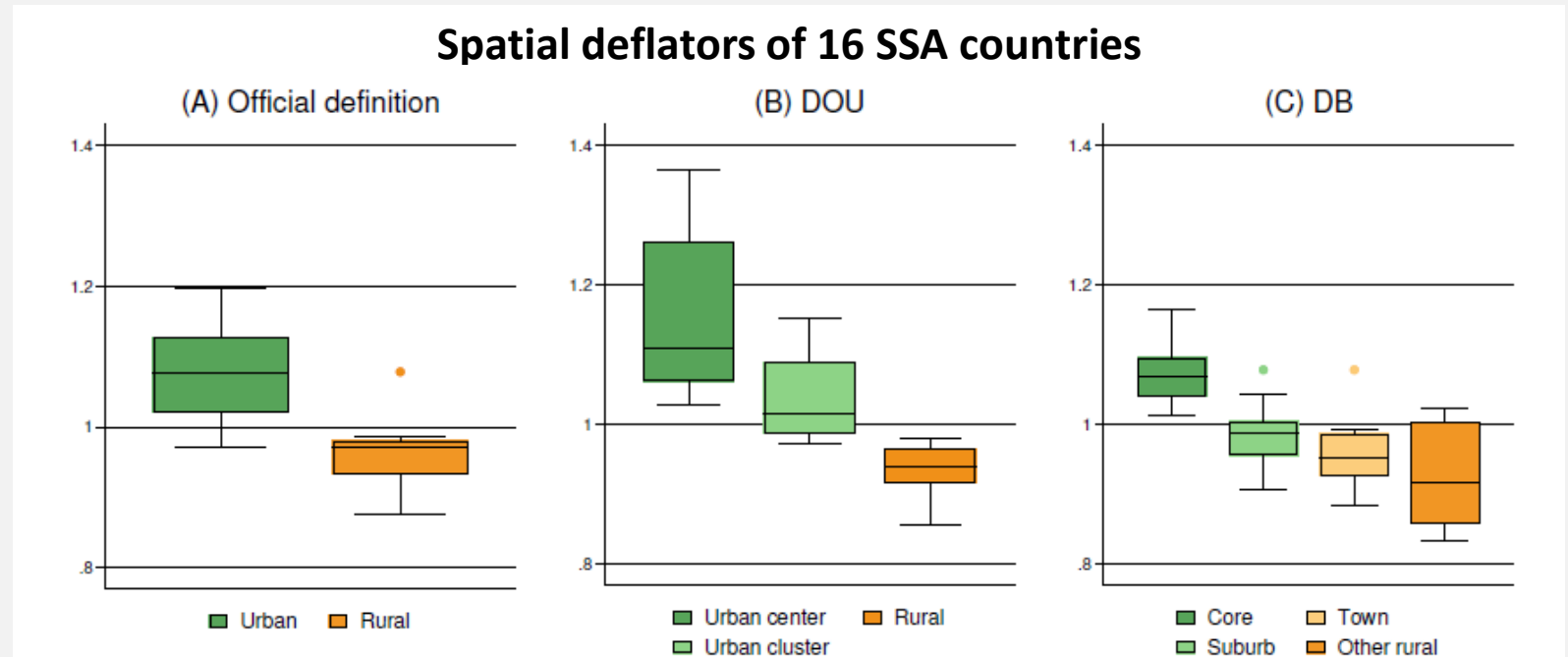
of countries
(out of 46) for
which estimate >
official:

- Dartboard: 45
- DoU: 33

Note: Both graphs based on constrained WorldPop data for 2015

Cost of living higher in denser areas...

- Not surprisingly, cost of living higher in denser urban areas
- \Rightarrow purchasing power of urban residents is discounted

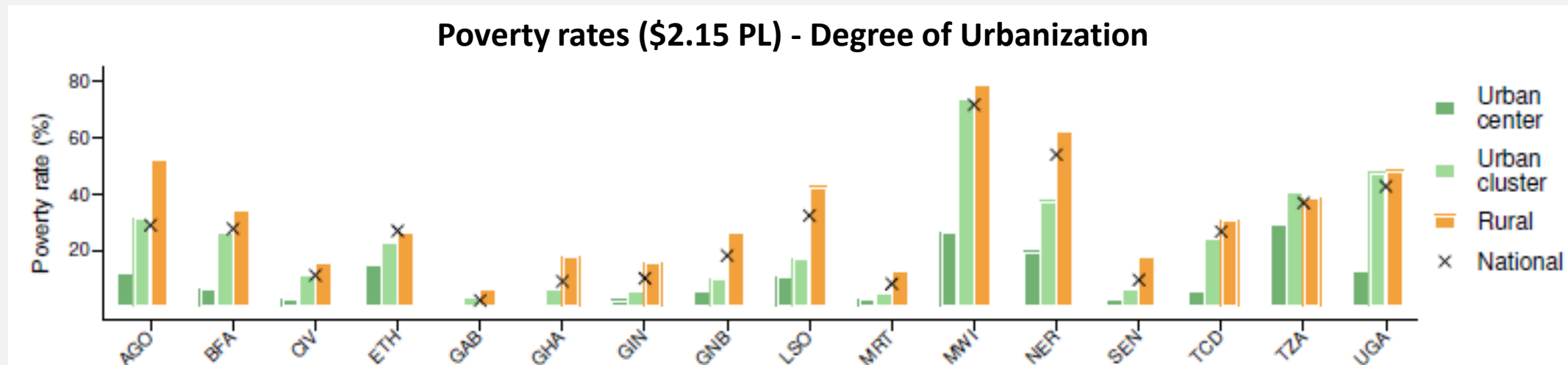


Source: International Urban Poverty Database.

Note: DOU: Degree of urbanization. DB: Dartboard. The cost-of-living index is prepared as a spatial deflator for each country. It is normalized to 1 for each country overall. WorldPop 250m is used for both the DOU and DB methods.

...But poverty incidence lowest in dense urban areas

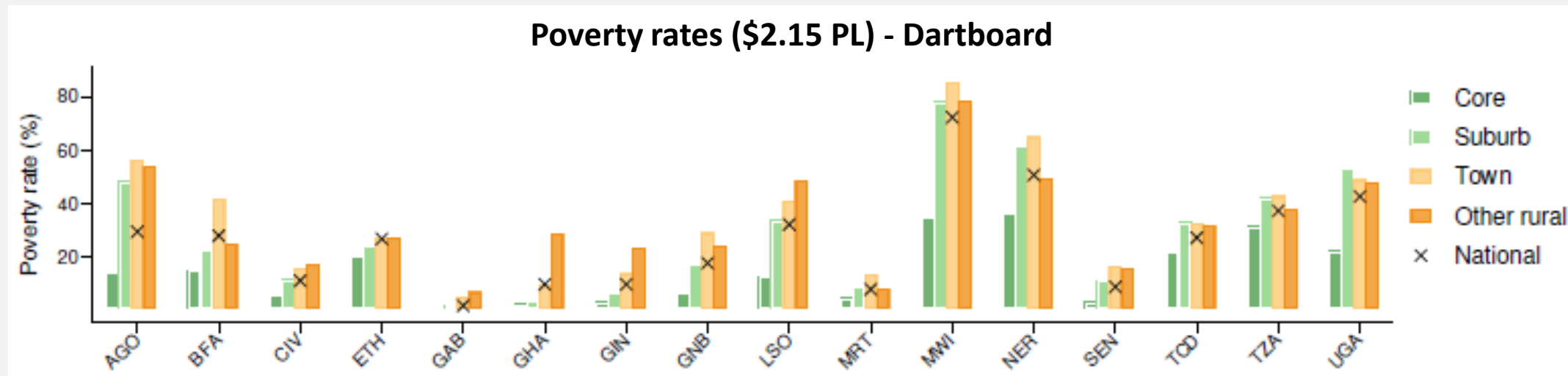
- In each country, extreme poverty rates (\$2.15 per day in 2017 PPP) are lower in urban areas—particularly dense urban areas—than rural areas when globally consistent urban definitions (Degree of Urbanization and Dartboard) used



Source: International Urban Poverty Database.
Note: For the DOU and DB methods, WorldPop 250m is used.

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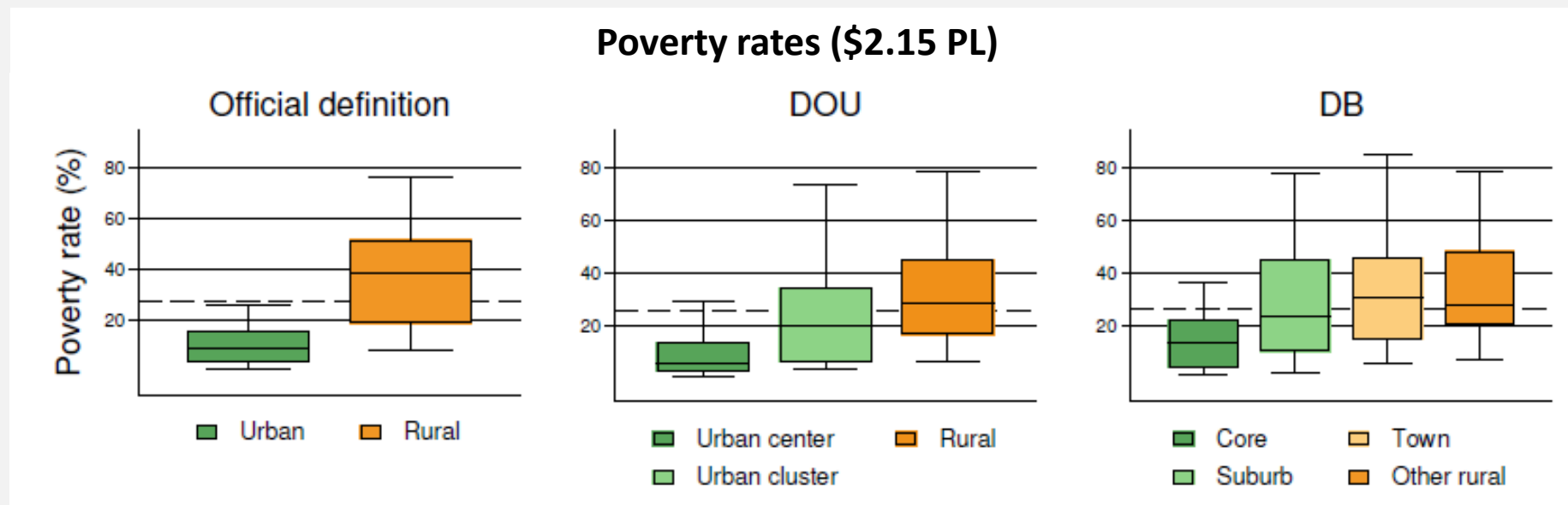
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'Poverty gradient' observed even after controlling for household characteristics

- Poverty (or household consumption) negatively correlated with density, even after controlling for household characteristics
- DB approach: poverty rates in rural towns & other rural areas similar

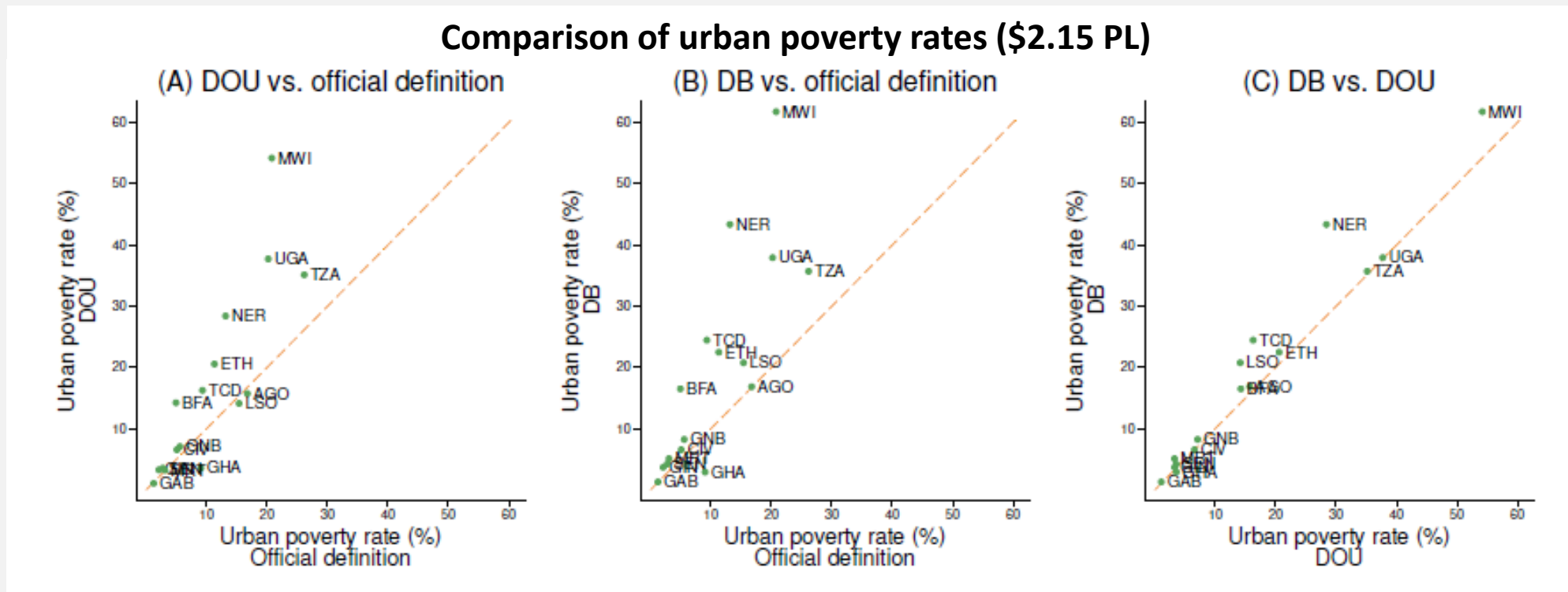


Source: International Urban Poverty Database.

Note: Each boxplot shows the distributions of poverty rates over different geographic areas in 16 SSA countries. WorldPop 250m is used for the DOU and DB methods. The dashed lines represent the average national poverty rate in the sample.

Adopting internationally consistent urban measures results in higher poverty rates...

- ...though the choice of absolute (DOU) or relative (DB) measures does not matter much

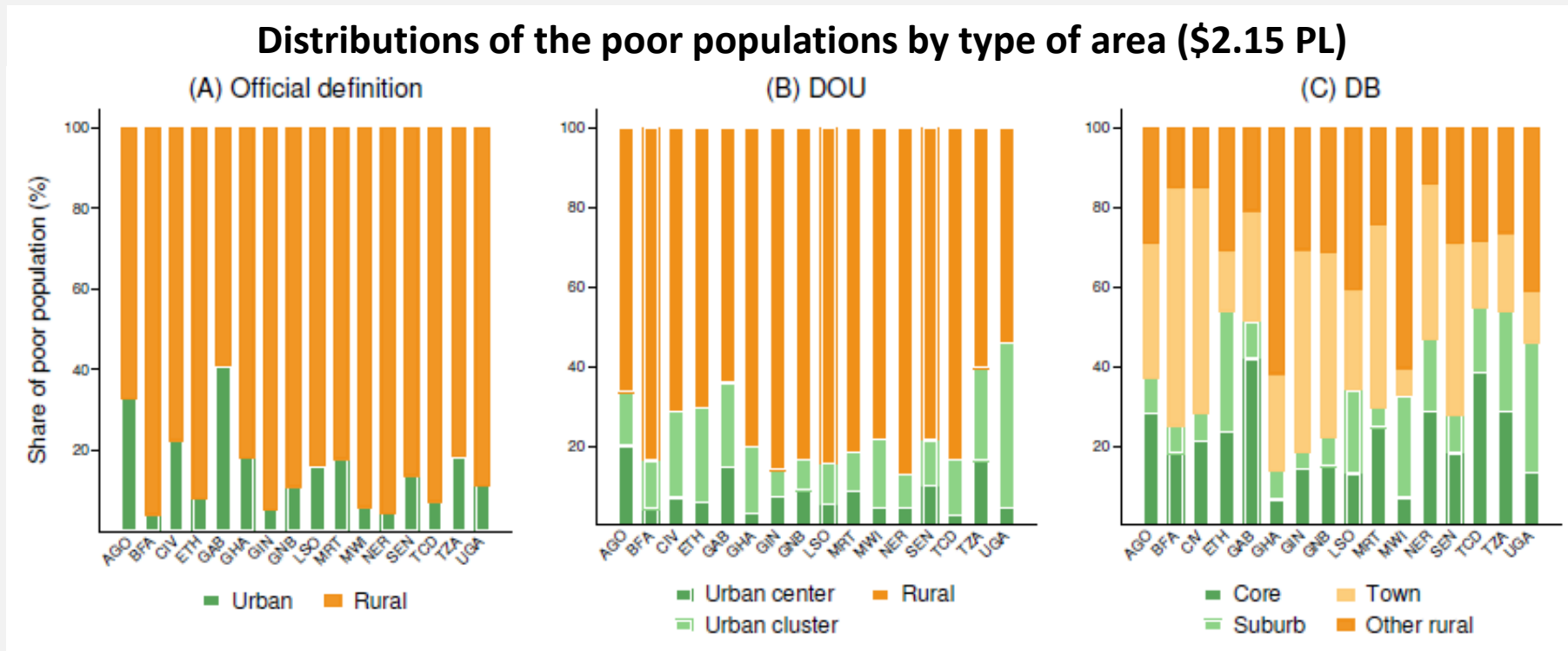


Source: International Urban Poverty Database.

Note: WorldPop 250m is used for the DOU and DB methods. Urban areas include the categories “Urban center” and “Urban cluster” for the DOU method and the categories “Core” and “Suburb” for the DB method. Dashed lines are 45-degree lines. Poverty is measured using the \$2.15 poverty line.

Poverty more urban than previously thought

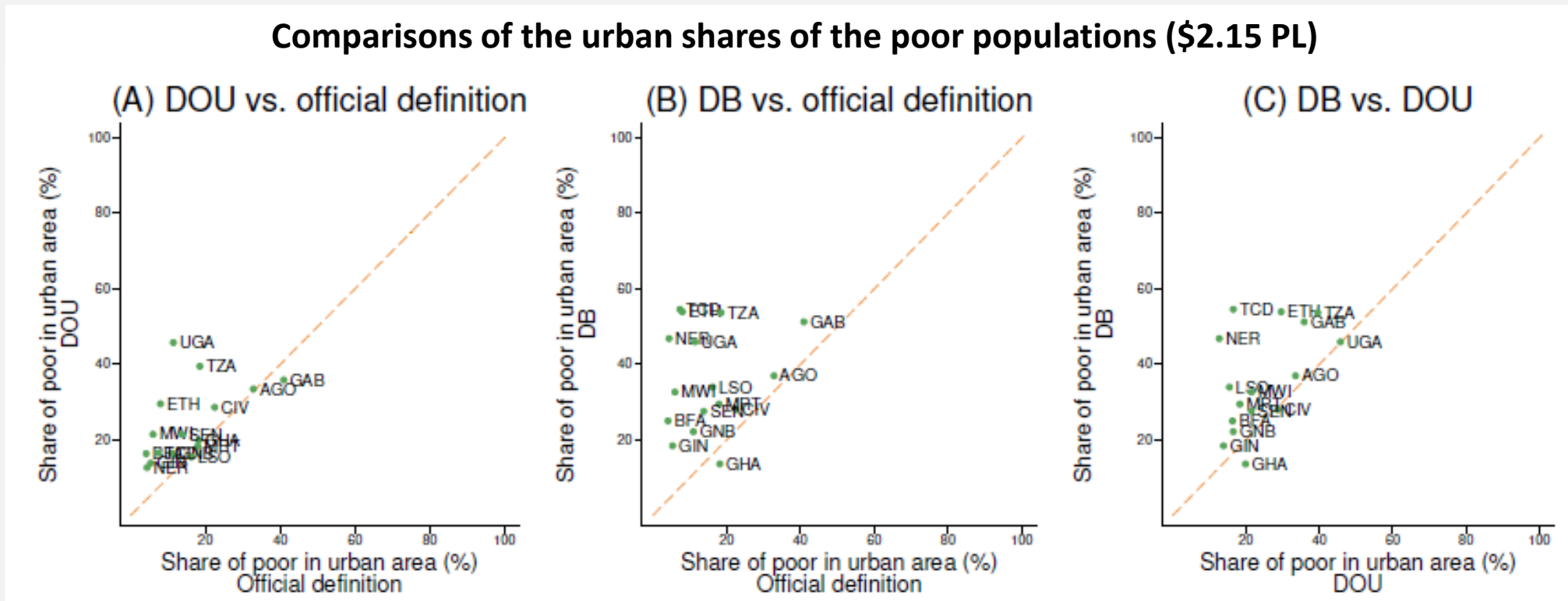
- When urban definitions change from official ones to Degree of Urbanization, median share of poor population living in urban areas in 16 SSA countries goes up from 13% to 21%
- Dartboard results → higher concentration of extreme poverty in urban areas



Source: International Urban Poverty Database.
Note: For the DOU and DB methods, WorldPop 250m is used.

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Other findings & potential applications

- Raising the poverty line (e.g., from \$2.15 to \$6.85) \Rightarrow even higher concentration of poverty in urban areas
- ‘Sorting’ is not addressed.
- Alongside poverty, various individual/household-level indicators can be analyzed, such as employment sectors (agriculture, industry, and services), access to basic services (water, sanitation, and electricity), inequality, profile of the poor, etc.
- Application of approach requires geolocation information of households, primary sampling units, or other reasonably small geographic units in a household budget survey.

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