

Advancing Poverty Mapping – Applications and Validations Using Modern Methods

International Association of Survey Statisticians – Webinar
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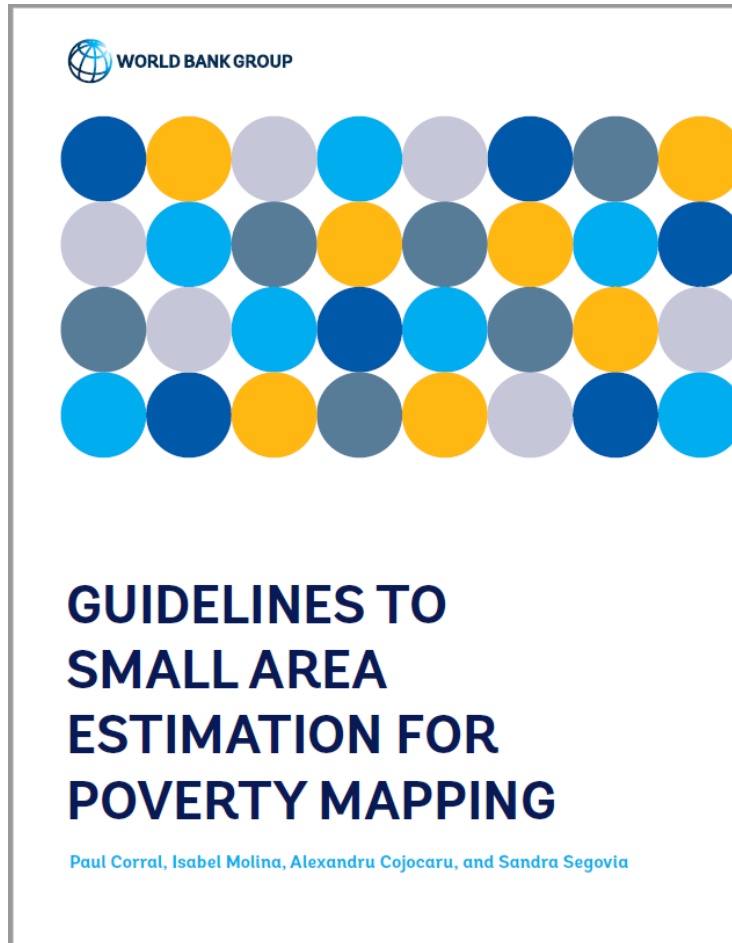


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Poverty and Equity Global Practice

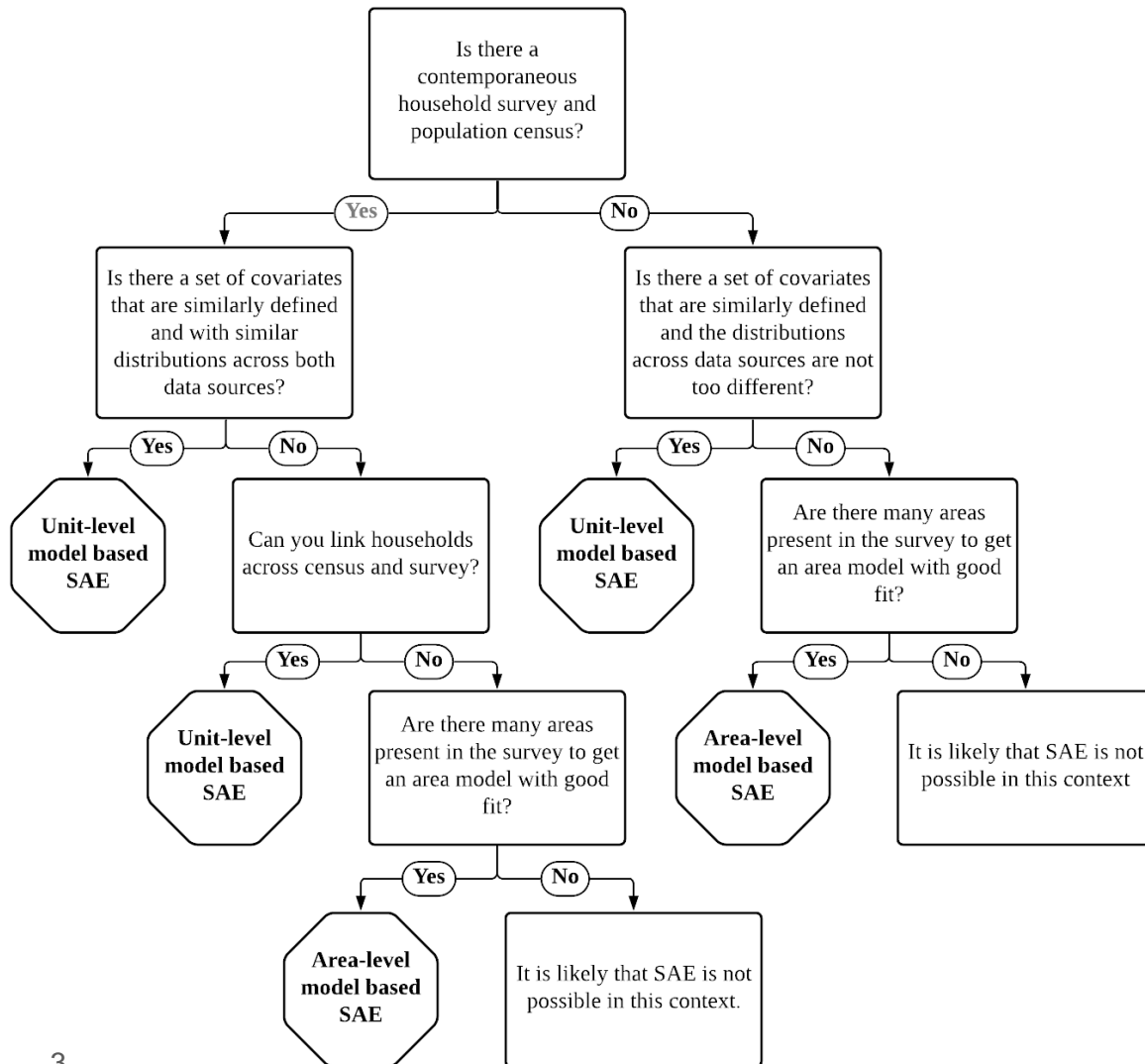
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In 2022 the Poverty and Equity Global Practice released the Guidelines to Small Area Estimation for Poverty Mapping



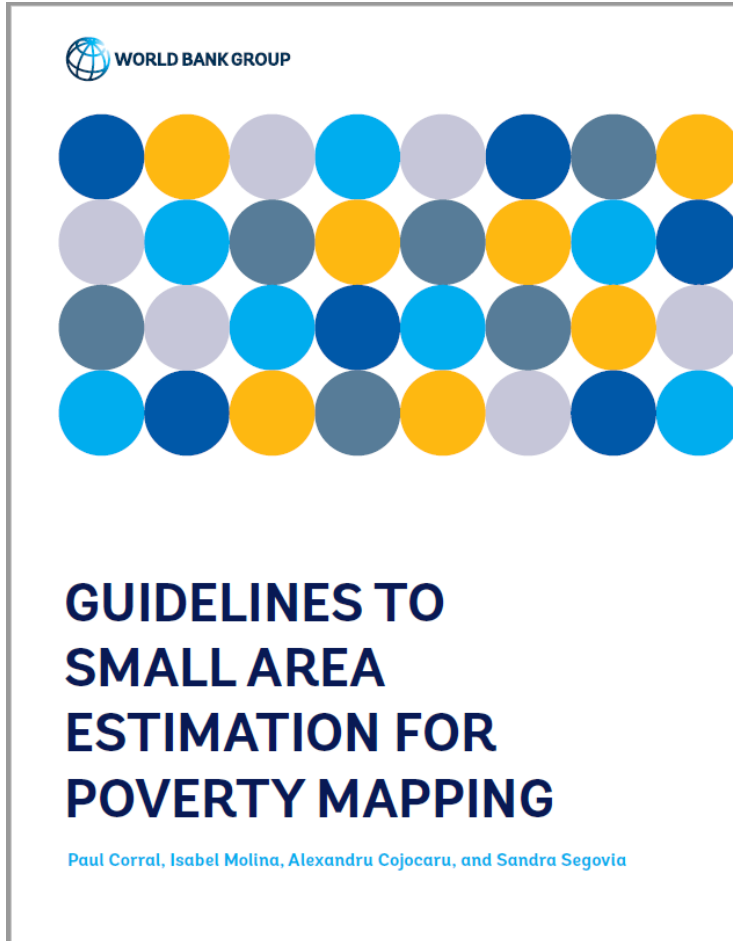
- Since the early work of Elbers, Lanjouw and Lanjouw the World Bank has assisted countries produce poverty maps (~2000)
- The World Bank's poverty maps are more than a pretty picture – these are essential instruments to policy making and poverty reduction
- For this reason, the Guidelines seek to advise teams within the World Bank on the pros and cons of different methods for SAE
 - Decisions are driven by these estimates, and we prefer teams use vetted methods before choosing more experimental approaches – those not ready for prime time

The Guidelines present a decision tree to assist practitioners choose the preferred method for each scenario



- We focus on methods that have been extensively evaluated and have been shown to yield unbiased estimates with improved precision
- The Guidelines present many examples and codes so practitioners can replicate simulations using real and simulated data

Today's gameplan



- We'll present an **application in Ghana** that sought to advise on how to improve geographic targeting of a proxy means test formula used for cash transfer programs
- We'll present an **application in Senegal** where a vulnerability map was relied on to provide quotas for the expansion of the social security registry
- We'll present a **design-based validation of machine learning** based poverty estimates compared to CensusEB and Fay-Herriot based poverty estimates

Improved Geographical Targeting in Ghana



Paul Corral, Sarika Gupta, Cornelia Tesliuc,
Mitja del Bono and Ghana Statistical Service

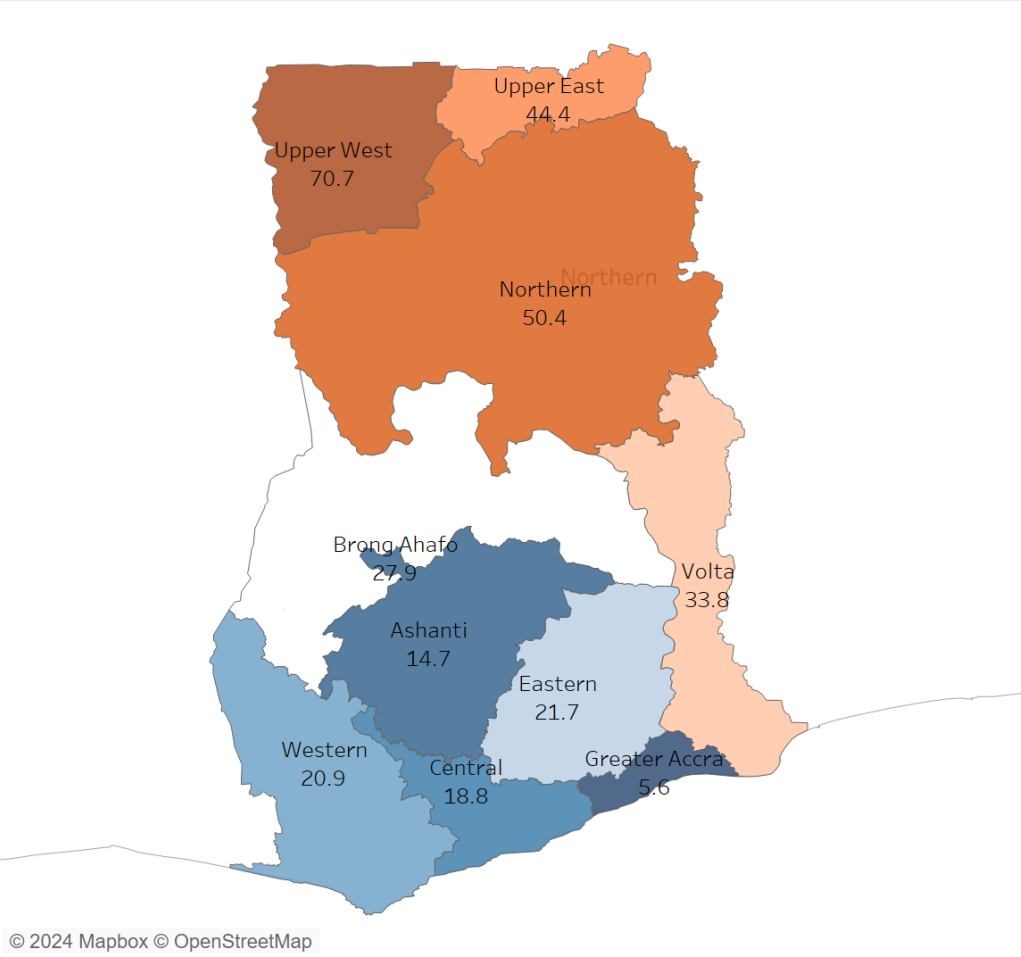
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Ghana's PMT is based on a model at the national level and was formulated around 2020

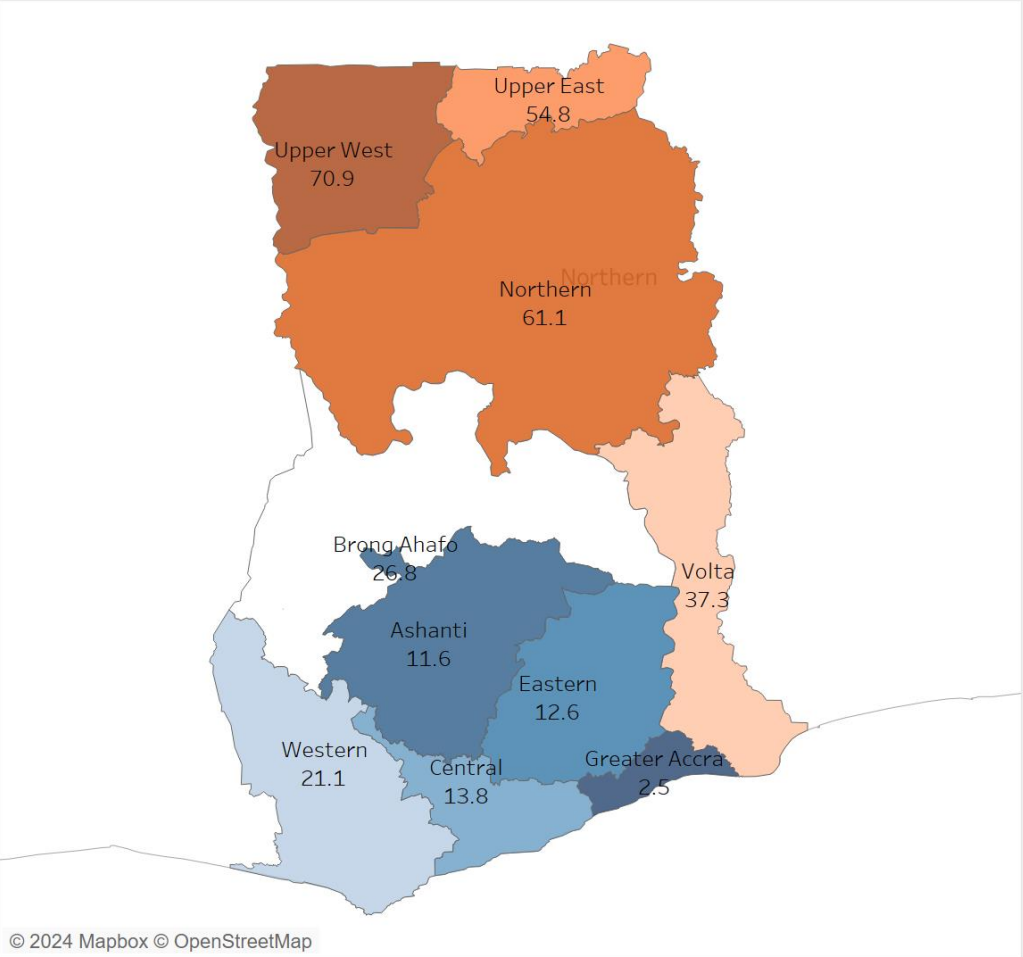
- The proxy means test (PMT) formula was derived from a national level model using Ghana's Living Standards Survey for 2016/17. The survey is still the most-up-to-date regionally representative data on living standards for the country.
- The goal of the PMT is to classify extreme poor individuals in the country
- While the GLSS7 is only representative at the regional level
- To improve the geographical targeting of the PMT we propose combining the PMT with Small Area Estimates at the district level
 - PMT formula could not be updated since it already informed data collection for registry
 - Instead, thresholds at the district level are derived from SAE

The knowledge of the distribution of poverty using only survey data is limited

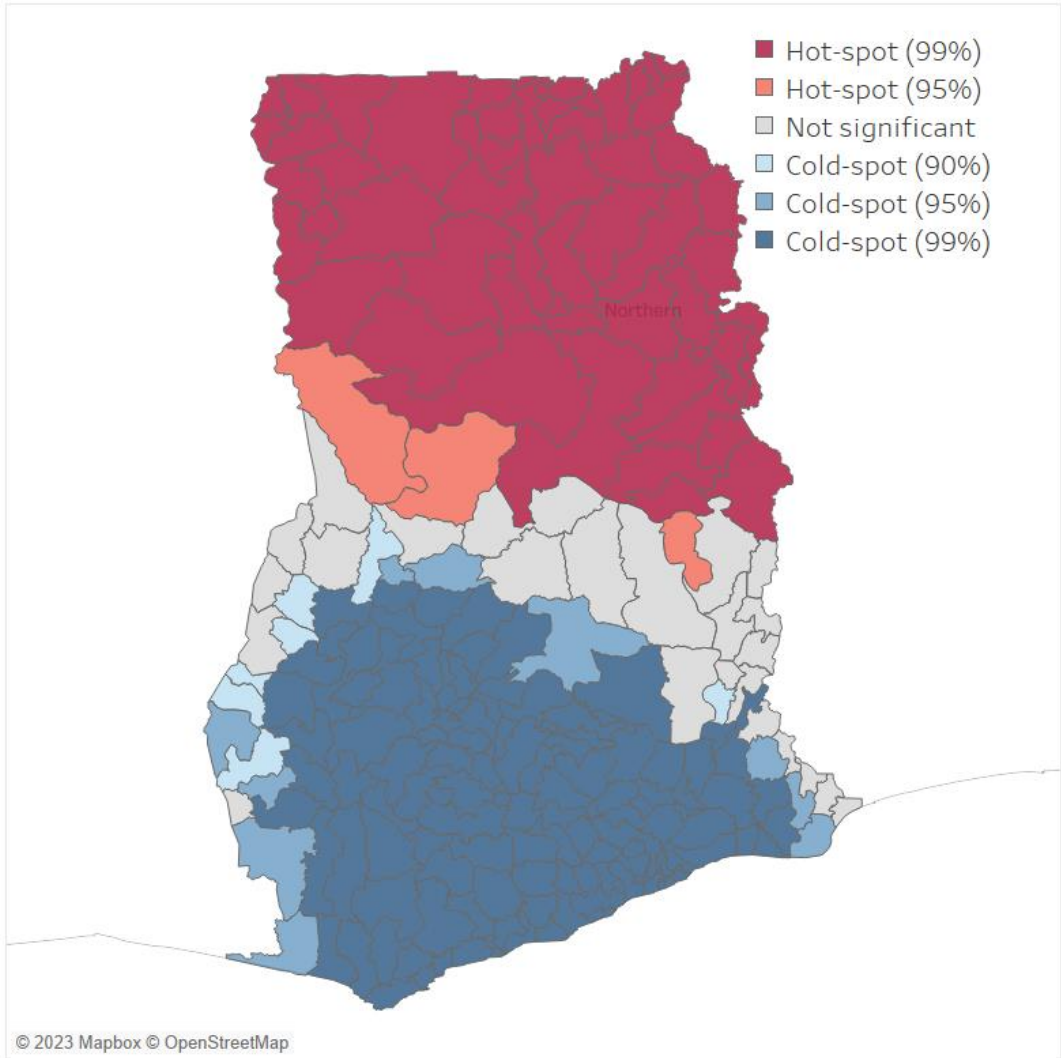
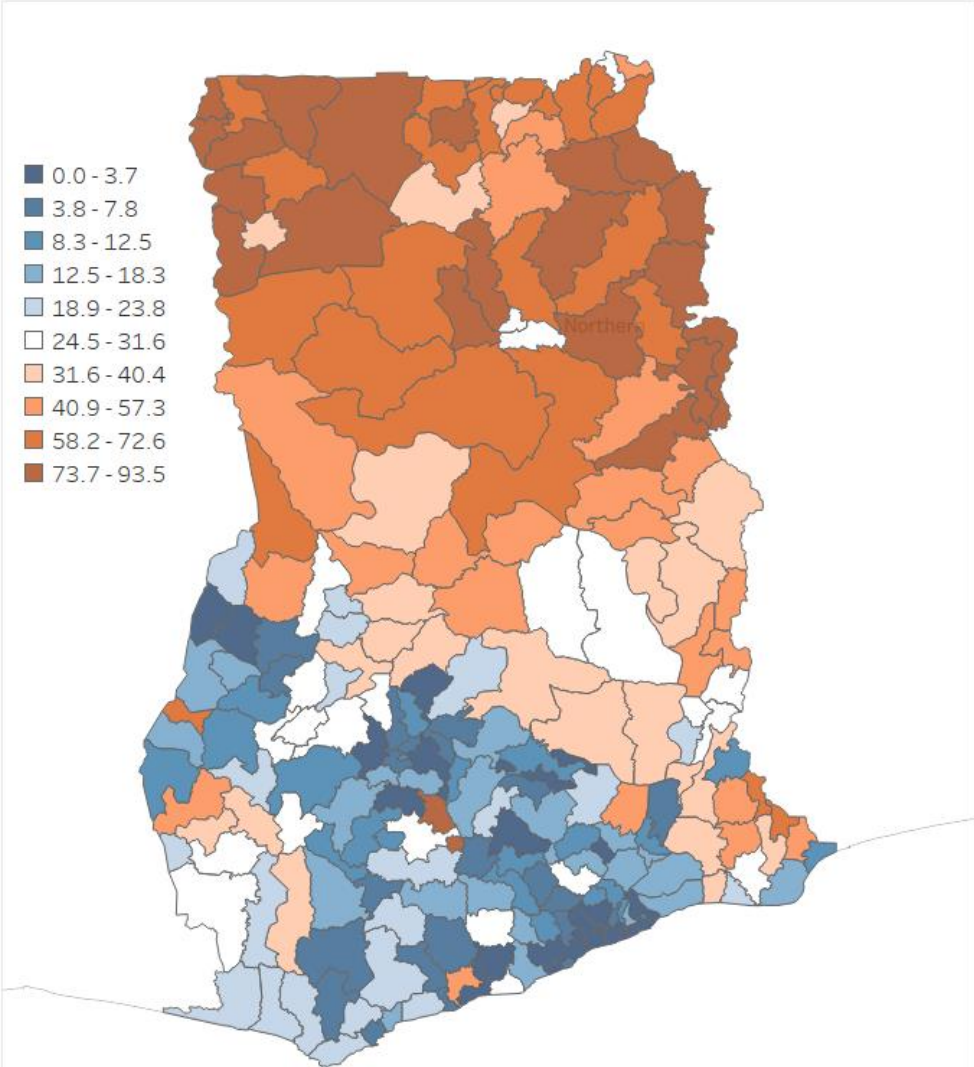
Poverty Headcount 2012



Poverty Headcount 2016



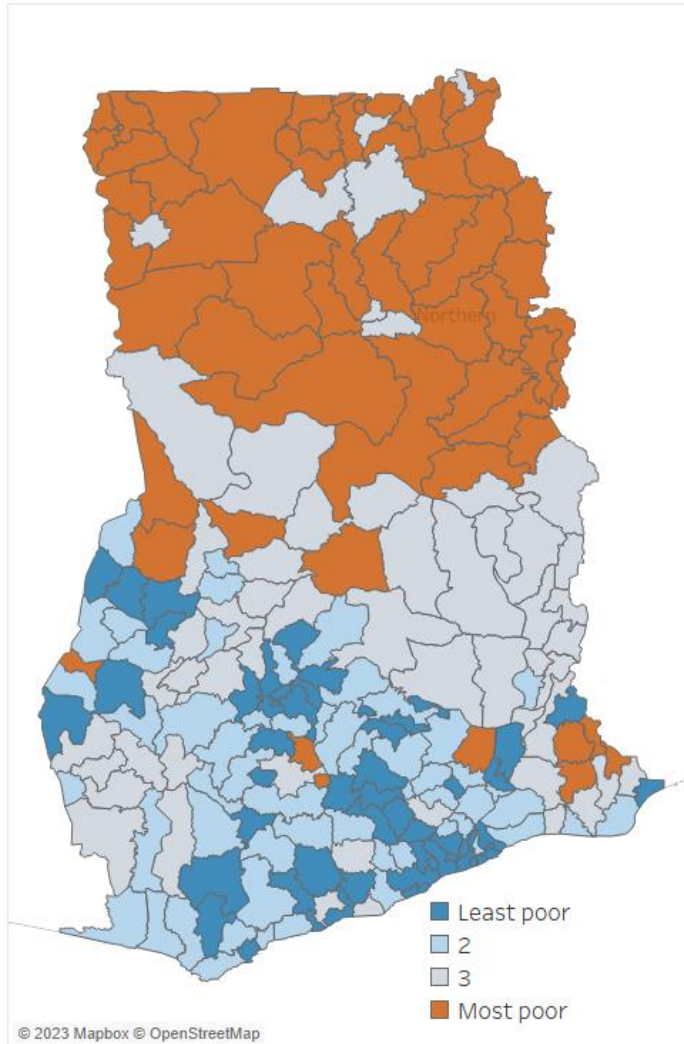
Fay Herriot Small Area Estimates of Poverty for Ghana 2017 (deciles)



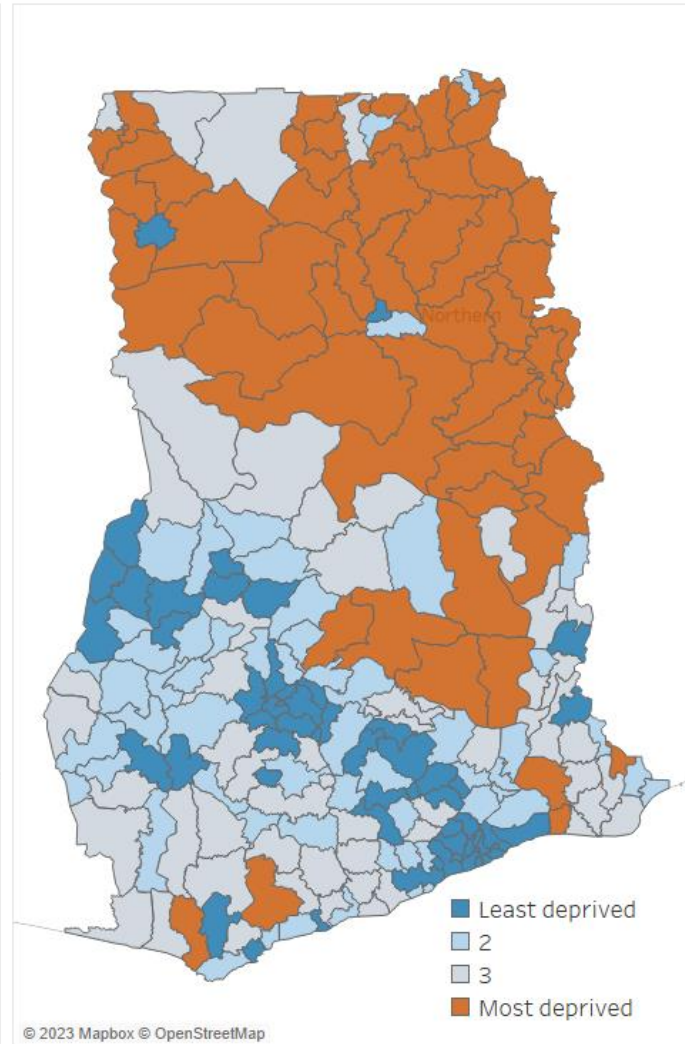
Note: Area-level small area estimates of poverty

The estimates are relatively well aligned to multidimensional poverty of 2021

Poverty incidence



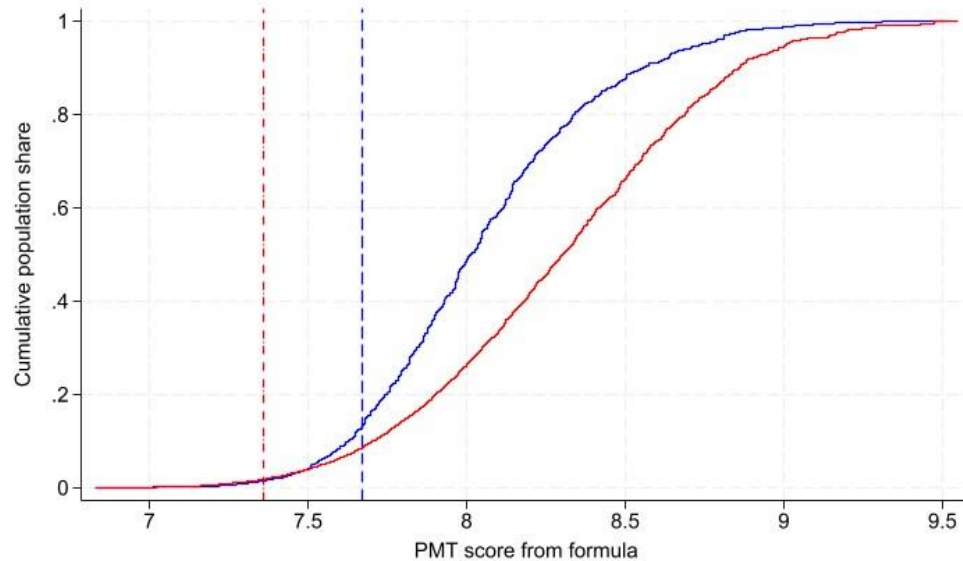
MPI Incidence



Multidimensional poverty and monetary poverty are often correlated, but differ

- Monetary poverty is an outcome and fails to capture non-monetary aspects of well-being, such as health, education, and access to other services
- Multidimensional poverty considers various factors that contribute to a person's overall well-being. It recognizes that poverty is not just about lack of income but also about deprivation in several dimensions of life.

District level thresholds derived from SAE and applied to the PMT can help us improve geographical targeting



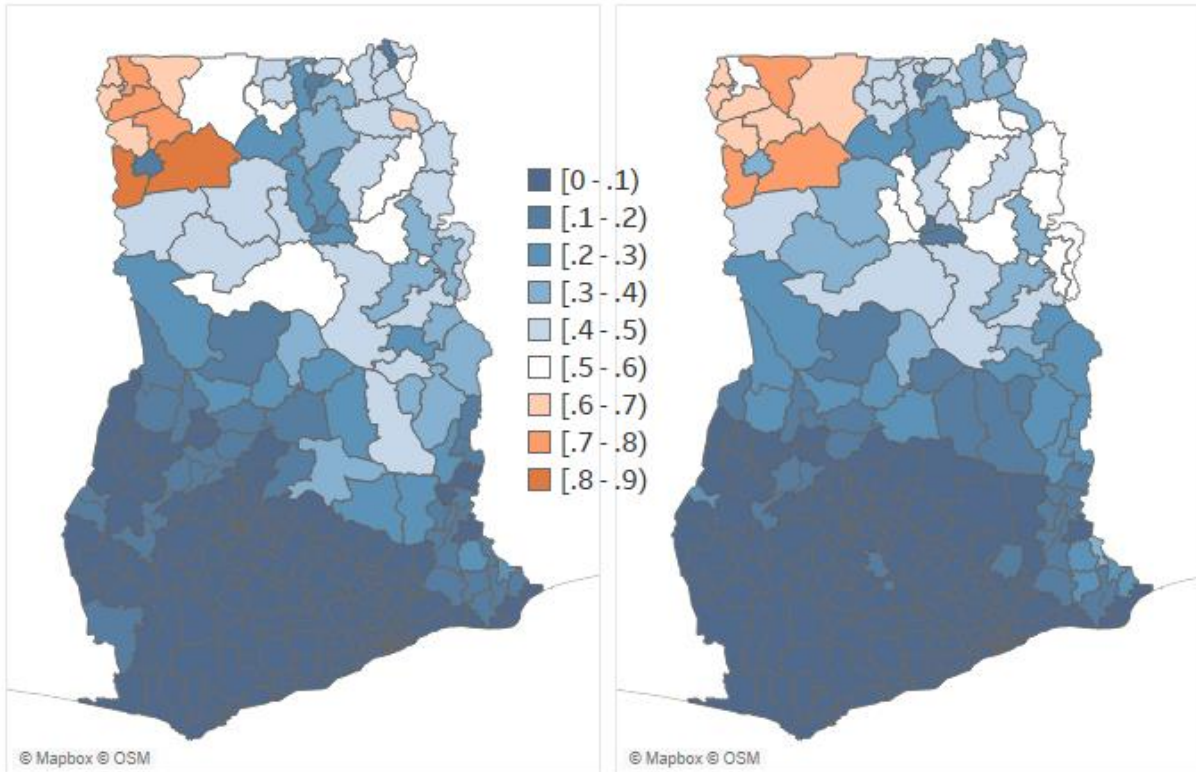
Note: The blue curve refers to the cumulative distribution of the PMT for Bosome Freho, the vertical blue dashed line is the district level threshold. The red curve refers to the cumulative distribution of the PMT for the Ashanti region, and the vertical red dotted line represents the regional level threshold.

- Ghana's PMT was estimated using the GLSS7
 - Thresholds can be calculated at the regional level – since it's representative at that level
- However, poor districts in rich regions are negatively affected.
 - The threshold could be too low since the poverty rate in the region is low
- Ideally, we'd like to use district level thresholds, but the survey is not representative at that level and doesn't cover all districts
- We use the poverty map to determine district level thresholds

The estimates are being proposed to help improve the targeting of the PMT for Ghana

Region level thresholds

District level thresholds



By design, district and regional thresholds will capture the same number of people. What will differ is how those classified as poor are distributed across the country.

Utilizing thresholds at the district level is expected to improve targeting by minimizing errors of inclusion and exclusion.

Conclusions

- Validating such results is complicated as we lack the true welfare value in the census
 - Validations were done through discrete choice models using the 2021 population census which allowed us to explore how characteristics are related to people's potential reclassification due to the determination of thresholds at the district level
 - Results suggest that households exhibiting characteristics that we associate with poverty and being well-off are significantly related to being reclassified under district level thresholds compared to regional level thresholds
- The purpose of applying district level thresholds was to give a higher likelihood of being classified as poor to those who reside in poorer districts. This recognizes that two households may present similar characteristics, but because of where they live their outcomes are considerably different.