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Sensitivity Analyses in Poverty Measurement: The Case Of The Global Multidimensional Poverty

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Normative decisions are an inescapable part of any poverty measurement exercise. The present paper seeks to examine normative implications and other policy-relevant consequences of such decisions more rigorously. Assessing the sensitivity and robustness of particular results is more than a compulsory exercise. In fact, knowledge to which extent results are sensitive to decisions can actually facilitate the decision process itself, as it may be easier to agree on a reasonable range rather than a specific value for a particular parameter, like the poverty cutoff. Moreover, it is actually vital for the decision process to understand the different normative implications in the first place. Finally, a profound knowledge of policy-relevant empirical implications, may help to better appreciate and characterise alternative design options (e.g. union vs non-union approach or unequal weighting schemes).

In the measurement of multidimensional poverty two types of normative decisions received particular attention. First, the cross-dimensional poverty cutoff, introduced by Alkire and Foster (2011) offers an intermediate solution between the polar cases of union and intersection (Atkinson, 2003). For example, several scholars recently advocated a union approach (e.g., Pattanaik and Xu, 2018, Datt 2018, Dotter and Klasen2014), where a single deprivation suffices for being considered poor. Second, assigning a particular weighting scheme on a normative basis may cause uneasiness among scholars and reluctance among policy makers. Indeed, one may expect different weighting schemes to give different results. Selecting indicators, however, received less attention and is, somewhat surprisingly, less disputed.

A large share of robustness analyses seeks to ascertain robustness for the entire domain of a particular parameter. Unlike this line of research, we follow the Atkinson report (2016:171) and distinguish local and global robustness.

The present paper assesses the sensitivity parametric choices with respect to several outcomes, which may reveal critical normative implications or are particular pertinent to policy makers, or both:

the headcount ratio of a poverty measure must range in a certain interval to be useful and informative for public policy.

subnational rankings are important for the credibility of a measure as well (it should be broadly consistent with the common sense), allocating funds and targeting.

Different measures may identify different people as poor, despite similar headcount ratios. Therefore, we also examine poverty sets, and explore to which extent alternative measures identify the same people as poor.

The empirical analyses use data from latest round of the global MPI and relies on point estimates for all 101 countries and more than 1200 sub-national regions. The global MPI is based on the Alkire-Foster method and comprises ten indicators organised in three dimensions (health, education, and living standards). Our preferred specification is characterised by an equal-nested weighting scheme and a poverty cutoff of k=33%, meaning an household is considered poor if it is deprived in 33% or more of the (weighted) possible deprivations. Our analyses cover 10 different choices for the poverty cutoff (including the union and intersection approaches), 231 different weighting schemes ranging from equal-nested weights to retaining a single dimension only. We also explore six alternative indicator selections, where compared to our preferred specification one living standard indicator is dropped at a time.

Selected preliminary results

In terms of alternative indicator selections we observe that the headcount ratio of the global MPI can drop up to 10%-points if a single living standard indicator is removed, irrespective of whether the poverty cutoff is chosen as k=1% (union) or k=33%. On the other hand, we observe that drops of 10-30%-points (or even more than 50%-points in one case) only occur for k=1%.

We find sub-national rank robustness for the headcount ratio to be relatively high for relevant alternative choices of the poverty cutoff and the weighting schemes. More specifically, we find for most countries that around 70% of ordering under the original parametrization, are retained under the alternative plausible parametrizations. In general we observe lower subnational rank-robustness once we approach the boundary values of the parameter space (i.e. k close to union or intersection and weighting schemes assigning extraordinary high weights to a single dimension).

In our analyses to which extent parameter choices diverge poverty sets, we find for most countries a relatively stable identification of the poor for the relevant parameter spaces. More specifically, when comparing pairwise our preferred specification with alternative parametrizations, we find for many countries that 80% or more of those who are poor according

to one of the measures are actually poor according to both. This share is found to fall gradually with more distant, i.e. unequal weighting schemes (for any given poverty cutoff).

Preliminary conclusions

We conclude that in many instances, the empirical implications of the global MPI are locally insensitive to moderate changes in weighting schemes and the poverty cutoff. At the same time our results document, that the global MPI is not globally robust to parametric decisions, which essentially reflects that effectively fundamentally different measures can actually be designed within the same framework. Likewise, it highlights that decisions should be made well-informed in the first place. Therefore, it is vital for the decision process to account for these normative implications in the first place.

Given the relatively low burden in computation, we recommend to perform analyses along the suggested lines on a routinely basis. Normative implications then can be identified early on, and results on local insensitivity results may facilitate reaching an agreement on some of the parameters.

A potential caveat of the headcount ratio under a union-cutoff is its potentially strong sensitivity to the indicator selection. We find that this is not only a theoretical possibility, but does indeed occur. In practice, this may become problematic, for instance, if upcoming indicator updates cause pronounced changes in the headcount, which then may undermine credibility and support of the entire measure.