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Regional Perspectives on the Multidimensional Poverty Index

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Summary. — This paper analyzes the consequences of an alternative weighting scheme for the Multidimensional Poverty Index (MPI), using a data-driven approach, as opposed to the currently employed equal weighting scheme. This weighting scheme has been under strong scrutiny since the MPI's inception, given the sensitivity of country rankings to different weights and indicator choices. Therefore, the current study employs Multiple Correspondence Analysis (MCA) for weighting of the indicators and investigates its impact on the scores and relative ranking of 28 countries. The results show that equal weighting of the three dimensions cannot be statistically justified. Moreover, the statistical weights differ systematically across countries, implying differences in deprivations across regions, although household poverty rankings are highly correlated between normative and statistical weights. Given the high correlation between all indicators employed within the MPI, a large overlap is found in the information, implying that there might not actually be so much multidimensionality within the dimensions of the MPI.

Key words — multidimensional poverty, weights, Multiple Correspondence Analysis (MCA), index creation, Multidimensional Poverty Index (MPI)

1. INTRODUCTION

In 2010, Sabina Alkire and Marie Emma Santos first published a Human Development Research Paper, aimed at identifying a new index to measure acute multidimensional poverty across 104 developing nations (Alkire & Santos, 2014). The proposed Multidimensional Poverty Index (MPI) is not the first attempt to capture the multidimensional nature of wellbeing and deprivations. It is based on the Alkire-Foster (AF) dual cut-off methodology of measuring multidimensional poverty, which then has been widely used in national and global initiatives to measure multidimensional poverty (Alkire & Foster, 2011a, 2011b).

While some of the early composite indicators that focused on human resource development were already introduced in the 1960s, a greater focus upon more non-monetary/composite indicators of development came later (Santos & Santos, 2014). As a result, several countries have developed their own measures to capture poverty and other deprivations as a multidimensional concept (Alkire & Foster, 2011b). Although there are various non-income measures of poverty that are of prominence, this is the first that uses micro-level data with a household as the unit of measurement. Dotter and Klasen (2014, p. 6) point out the utmost achievement of the MPI when they say that "the main contribution of the MPI. . ., vis-a-vis the existing work, is its breadth of country-coverage and its international comparability."

There are several strands of literature and analyses that discuss the weaknesses encountered when one creates a single measure to account for the multidimensional nature of poverty. This literature does not reserve focus on the weakness of this most recent attempt to understand the basic needs and capabilities method, called the Capabilities Approach (Sen, 1984). Rather, there has been a copious appraisal and a multitude of studies that deal with the challenges of using a dual cut-off method (as within the AF method) and the weighting scheme within the chosen dimensions (Ravallion, 2011b, 2012), the disregard toward the aspect of inequality within the dimensions and populations (Chakravarty & D'Ambrosio, 2006; Jayaraj & Subramanian, 2010; Rippin, 2012a, 2015; Silber, 2011), or the need to adjust the dimensions in line with average wellbeing, to reflect the weakly relative nature of wellbeing and income (Dotter & Klasen, 2014; Ravallion & Chen, 2011).

The aim of this particular study is to address the concern regarding the formulation of the MPI, namely, can the use of equal weighting assigned to the three dimensions be statistically justified? Should child mortality take a weight of 1/6 and the asset indicator be assigned a weight of 1/18? This is a specific concern, especially in view of this measure's attempt to quantify multidimensional poverty while maintaining global comparability. Indeed, can all countries have uniform standardized weights for the indicators when the basic socioeconomic conditions underlying them are very different? If not, how much does the weighting change between regions? Clark and McGillivray (2007), for example, suggested that among all the other critiques concerning composite indices, it is better to allow the components and weights to vary across regions and countries, taking into account local and regional preferences. An example of this rather infrequently used consensual approach to measuring poverty is the Breadline Britain survey, carried out in the United Kingdom in 1983 and 1990. This method sought to measure poverty in the UK by investigating what the local public perceives as the minimum necessary to be considered non-poor or alternatively, well off, and then identifying those who could not afford these necessities (Gordon &

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Pantazis, 1997). While this may be an extreme example of how preferences differ across countries and along time, it is not far-fetched to imagine that different countries perceive different commodities as requisite for wellbeing.

Ravallion (2011b) and Decancq and Lugo (2013) examine indices of wellbeing and poverty critically, in terms of the weights that are derived for each dimension. They discuss the importance of implicit trade-offs between dimensions in such indices (wherein the MPI assumes that improvements in one dimension make up for the failings in another, like other equal weighted indices) and conclude that the implicit trade-offs between dimensions (and more so within dimensions) are important in terms of measuring what a poverty or wellbeing index claims to measure. This is a key theoretical consideration that prompts the research into the appropriate weighting scheme for multidimensional indices. Since the indicators of poverty cannot be considered similar across countries, given the differences in deprivation and needs across regions and changes over time, it also implies varying trade-offs for each dimension within the index itself. Therefore, the motivation of this work is to examine these indicators and dimension weights with the help of a data-driven approach, where no paternalistic judgment is set upon definitions of poverty.

There are several methods that have been examined in the literature with respect to the creation of a multidimensional measure of wellbeing, and they will be discussed in further detail here. The main idea for this research builds upon the paper by Nguefack-Tsague, Klasen, and Zucchini (2011), wherein they perform a similar exercise for the Human Development Index and find that statistically, all three dimensions receive the same weight and therefore corroborate the story behind the equal weighing of the HDI. In an attempt to answer the question of the appropriate weighting scheme in the context of the MPI, a detailed analysis of 28 countries, across four different regions, is undertaken. These countries are in South & South-East Asia, Sub-Saharan Africa, Northern Africa-Western Asia-Europe (Eu-West Asia), and Latin America and Caribbean, which is how the Demographic and Health Survey (DHS) has categorized these regions as well. [1] The statistical technique used to derive the weights in this paper is Multiple Correspondence Analysis (MCA), which is considered appropriate for categorical or binary data, as in the case of the indicators of the MPI.

The results suggest that there are indeed differences in the definition of poverty, based on the distribution of the data. Not only is there no singular weighting scheme that can be used for describing poverty across two regions, this is not even found to be similar for two countries within the same region. This implies that the comparisons intended with the equal nested weights of the MPI are implying inaccurate trade-offs between poverty definitions across countries and regions.

This paper is organized as follows: the following sections provide a brief description of the Multidimensional Poverty Index (MPI), and then discuss the literature surrounding the shortcomings with the current weighting scheme. Section 4 explains the methodology and the conducted analyses, Section 5 describes the data, while Section 6 details the results from the analysis. The next section tries to test the methods and the results more rigorously. Finally, I discuss the conclusions that can be drawn from these results and how it can be applied in understanding the nature of multidimensional poverty across countries.

2. THE MULTIDIMENSIONAL POVERTY INDEX (MPI)

The MPI is not the first of its kind to define the multidimensional nature of poverty. There have been closely related multidimensional poverty measures proposed in the literature before Alkire and Foster (2011a, 2011b) suggested their own measures: the Physical Quality of Life Index (PQLI) (Morris, 1979), the HDI, or the HPI (United Nations, 1990) to name a few. These are also based on the (weighted) aggregation of deprivations across dimensions, some using ordinal data and some based on original macro data from each country. However, the focus of this paper will not be to examine the differences within these measures, but rather to examine the relevance of the weights of the MPI in a global context, which is among the first multidimensional index applied to many countries using micro-level data and building up an aggregate index from these micro data.

The MPI uses 10 indicators, broadly categorized into three dimensions, namely health, education and standard of living. The weights are nominally assigned to each dimension, to constitute an index with equally weighted dimensions, that is one third each, and the indicators within these dimensions also assume equal weights among themselves (equal nested weights. Table 1 provides a basic overview of the MPI as explained above. It also describes the threshold set within each indicator to determine whether a household is to be considered deprived in the particular basic functioning or not. Most of the standard of living indicators follow the Millennium Development Goals (MDG) guidelines, and their cut-offs are set on that basis. Each household receives an *a priori* weight when it fails to pass the cut-off and is therefore considered to be deprived in terms of that particular indicator. In the end, the weights for

Table 1. *The Multidimensional Poverty Index and its weighting structure*

Indicator	Weight	Deprived
Health	1/3	
Child mortality	1/6	If any child has died in the family
Nutrition	1/6	If any adult or child in the family is malnourished (BMI<18.5 & z-score<2SD for adults and children respectively)
Education	1/3	
Years of schooling	1/6	If no household member has completed 5 years of schooling
child enrollment	1/6	If any school-aged child is out of school in years 6–14 / 7–15/ 8–16
Standard of living	1/3	
Electricity	1/18	If there is no electricity
Drinking water	1/18	If MDG standards are not satisfied
Sanitation	1/18	If MDG standards are not satisfied including shared toilet
Flooring	1/18	If flooring is made of earth, sand or dung
Cooking fuel	1/18	If wood, charcoal, or dung is used
Assets	1/18	If household does not own more than one of radio, television, telephone or motorbike; and does not own a car/ truck

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