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Multidimensional Poverty: One Aim, Three Approaches, Quite a Few Different Results

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Abstract

Normative and methodological conceptions of multidimensional poverty have shifted over time, paving the way for both specialised and comparative frameworks which have been heterogeneously adopted by global institutions and national governments to best serve the specialised purpose of assessing individuals' experiences of non-monetary poverty. A current understanding of the most relevant tools for measuring and monitoring multidimensional poverty is important for disentangling global progress towards achieving targets 1.2 and 1.2.2 of the Sustainable Development Goals (SDGs). This paper compares the Multidimensional Poverty Index (MPI), Multiple Overlapping Deprivation Analysis (MODA), and consensual deprivation methodologies and their empirical applications for measuring child poverty specifically. The three approaches share some characteristics and produce partially similar types of output, though with different results. They also differ on crucial elements, rendering each of them suited for particular types of analyses. We take a policy-oriented perspective to disentangle similarities and differences between the methodologies. We aim to present a state of affairs on their technical developments and empirical applications, in the context of effectively and efficiently achieving global child poverty reduction. We expand upon the implications of each method, particularly in the theoretical orientations, choices of input parameters, unit of analysis, aggregation and weighting procedures, and policy implications. These differences can lead to substantially different estimates of multidimensional deprivation/poverty. We clarify the specialised merit of each method for research and policy purposes, and further explore the implications of their respective frameworks to help dispel common misconceptions about the added value of each method for measuring multidimensional poverty and for multidimensional child poverty in particular.

Introduction

While the idea of poverty as a multidimensional concept has been accepted for a significant length of time, empirical multidimensional poverty analyses have been introduced more recently, and have prominently contributed to efforts towards eradicating poverty worldwide over the last decade. Normative and methodological conceptions of multidimensional poverty have shifted over time, paving the way for both specialised and comparative measures which have been heterogeneously adopted by global institutions and national governments to best

serve the specialised purpose of measuring children's experiences of poverty. A current understanding of the most relevant tools for measuring and monitoring multidimensional poverty is important for disentangling global progress towards achieving targets 1.2 and 1.2.2 of the Sustainable Development Goals (SDGs) [1] (UN General Assembly, 2015). Early contributions by UNICEF (2007), Gordon, Nandy, Pantazis, Pemberton, and Townsend (2003), CONEVAL (2010), Alkire (2007), Alkire and Foster (2011), and Alkire and Roche (2011) have laid the groundwork for recent studies on multidimensional poverty in general, and multidimensional child poverty in particular. These seminal works by Gordon et al., Alkire and Foster, and CONEVAL have facilitated the advancement of some of the most practical and relevant tools for assessing multidimensional child poverty in more recent times, in low, middle and high-income contexts. These tools include the Multidimensional Poverty Index (MPI) by Alkire and Foster, Multiple Overlapping Deprivation Analysis (MODA) propagated by UNICEF and de Neubourg, Chai, de Milliano, Plavgo, and Wei (2013), child material and social deprivation (MSD) (Guio et al., 2016; Guio, Gordon, Marlier, Najera, & Pomati, 2018), and the consensual poverty/deprivation approach (Gordon & Nandy, 2012, 2016). These methods have since been applied on both a global scale and for national-level assessments of child well-being, for the purpose of poverty reduction, equitable growth, monitoring achievement of the Sustainable Development Goals (SDGs) and fulfilment of national commitments to children's rights. While monetary poverty measures fit differently into the conceptual framework of these different measurement tools, the authors generally agree that examining monetary poverty alone inadequately reflects the reality of experiences of poverty, especially in the case of children. Multidimensional measures therefore aim to provide a more complete picture of actual deprivations by studying *other dimensions* of poverty, while supplying specific and practical information for policymaking to alleviate poverty. These *other dimensions* are referred to in this paper as *deprivations*. Defining and measuring these deprivations and deciding whether and how they are combined and weighted are essential steps in all measurement procedures and each of them use a different reference frame to solve the questions. Previous reviews on the frameworks of and progress in multidimensional child poverty measurement methodologies, as well as in-depth comparative studies have been carried

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[1] Sub-target 1.2 of the SDGs refers to, "By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions", while sub-target 1.2.2 specifies reducing by half, the "proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions", see UN General Assembly (2015).

out in detail by Roelen and Gassmann (2008), Delamonica, Minujin, Davidziuk, and Gonzalez (2006), as well as de Neubourg, de Milliano, and Plavgo (2014), Carraro and Chzhen (2019) and Hjelm, Ferrone, Handa, and Chzhen (2016).

This paper expands upon the MPI, MODA, and consensual deprivation methodologies and their empirical applications for measuring child poverty specifically. The three approaches – consensus deprivation, MPI, and MODA – share some characteristics and produce partially similar types of output, though with different results. They also differ on crucial elements, rendering each of them suited for particular types of analyses. We take a policy-oriented perspective to disentangle similarities and differences between the methodologies, aiming to present a state of affairs on the technical developments and their empirical application, in the context of effectively and efficiently achieving global child poverty reduction. We expand upon the implications of each method, particularly in the theoretical orientations, choices of input parameters, choice of unit of analysis, aggregation and weighting procedures, and disaggregation possibilities. These differences can lead to substantially different estimates of multidimensional deprivation/poverty. We herewith clarify the specialised merit of each method for research and policy purposes, and further explore the implications of their respective frameworks to help dispel common misconceptions about the added value of each method for measuring child poverty in particular.

This paper is structured as follows. First, we present a brief overview of the background of each tool, with reference to global, cross-country and national applications, as well as the most recent iterations. We then expand upon their similarities and differences, and the implications thereof, in the areas: theoretical orientation; selection of dataset and parameters; poverty measures; aggregation of indicators and weighting; the unit of analysis; the role of monetary poverty; multidimensional deprivation threshold. We end with concluding remarks summarising the key arguments. The main characteristics of the four approaches are summarised in Table 1.This paper discusses the major differences between the approaches and the consequences of these differences. To illustrate these arguments, we provide empirical examples for several countries using 2016-2017 survey data [2].

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[2] For conference presentation only.

Consensual deprivation approach

The consensual deprivation approach defines child poverty according to being deprived of socially perceived necessities, whereby children are identified as poor if their standard of living is below the minimum perceived as acceptable by a majority sample of the society in which they live. Practically, a representative sample of society decides upon the necessities of life that every child should be able to afford or should not be deprived of due to financial constraints. This method dates back to the 1983 Breadline Britain study, and builds upon Peter Townsend's theory of relative deprivation by distinguishing deprivations that are due to choice, and those that result from financial or material constraints (Gordon & Nandy, 2012; Gordon & Pantazis, 1997; Gordon & Townsend, 2000; Mack & Lansley, 1985; Townsend, 1979). The approach has since been adopted globally in more than 50 countries, including in a cross-country, EU-wide measure of child deprivation (Guio et al., 2016; Guio et al., 2018), and in developing contexts including Benin (Nandy & Pomati, 2015), Zimbabwe (Mtapuri, 2011), and most recently for children in Uganda (UNICEF, 2019a, 2019b). By definition, the list of items and activities is modified to reflect the local context and conditions. As such, the approach can be used to separately analyse poverty at the adult or child level by including population and age-specific indicators. As perspectives of the broader society are democratically incorporated into the measurement method, the approach has the benefit of being realistic and relevant for the particular context, and of being publicly accepted (Pantazis, Gordon, & Levitas, 2006).

In summary, the method first measures public opinion through a survey, such as through specialised modules added to existing household surveys, to define items or activities as a deprivation if majority of a representative sample of the public believe this item to be a necessity of life regardless of financial constraints. Second, the survey distinguishes if they are deprived of an item or activity due to choice, unaffordability, or another reason, and measures deprivations to be only those items or activities that are deemed both a necessity of life and are not possessed and cannot be afforded by the survey respondent (UNICEF, 2019a). Upon establishing consensus among the list of items, such as through a high degree of horizontal consensus across different population groups or age groups, the items deemed publicly necessary (by, for example, more than 50% of respondents) are used to construct deprivation indices. Respondents receive a score of 1 for each additional item or activity of which they are deprived, with scores ranging from 0 to *n* number of items deemed publicly essential. Items included in the deprivation index are tested for being reliable and valid measures of poverty

through additional scale validity and reliability tests (Gordon & Nandy, 2016; Guio et al., 2016; Nandy & Pomati, 2015; UNICEF, 2019a). The validated and reliable deprivation index can then be disaggregated at national and sub-national levels to provide a complete picture of prevalence and severity of deprivation in the studied population.

Multidimensional Poverty Index (MPI)

The MPI was introduced by Alkire and Foster (2011) to identify multidimensional poverty at the household and individual levels using national household surveys. It builds on both the Foster, Greer, and Thorbecke (1984) class of measures for measuring and decomposing monetary poverty, as well as Sen's theory of the capability approach (1999, 2001), to assess poverty in terms of deprivation of the essential capabilities and functionings that enable individuals the freedom to live a good life, or one they have reason to value (Alkire, 2007; Comim, Qizilbash, & Alkire, 2008). These capabilities and functionings form the basis of the indicators and dimensions used to identify the poor. The method calculates both incidence of multidimensional deprivation, in terms of a headcount of multidimensionally deprived individuals or households, and intensity of deprivations, in terms of the average deprivation level experienced by the population in question. While the methodology itself is flexible for adaptation to different units and parameters of analysis, it is most commonly implemented in its standardised, cross-country form – the Global MPI – which measures deprivations in indicators making up three dimensions of health, education and standard of living (Alkire & Santos, 2010, 2013). Taking the household as the unit of measurement, individuals in a household are identified as multidimensionally poor or not poor, based on the weighted number of deprivations the household experiences. Similarly, a child is considered multidimensionally poor or not poor if the weighted number of deprivations the child's household experiences is above the defined threshold, k (33% of total deprivations). These data are then used to calculate the three core poverty indices, H (headcount poverty rate), A (average intensity of deprivations experienced by those identified as poor), and M_0 (deprivation headcount adjusted for average intensity), and to construct the national multidimensional poverty index (MPI). The MPI is equivalent to the M_0 score and can be further decomposed or used for monitoring progress in poverty reduction over time, across sub-national population groups, and across countries.

The MPI, measuring household level deprivations, has also been used to measure and monitor international progress in key human development dimensions for the United Nations Development Program's (UNDP) Human Development Reports (HDR). It has therefore been

publicly accepted as a measure of economic and social progress, and as a starting point for guiding poverty reduction and development strategies, in more than 100 analysed countries. There have also been national and region-specific applications of the measure produced in collaboration with national governments and a variety of national and international institutions, such as in Bhutan (Oxford Policy and Human Development Initiative [OPHI], 2017), Thailand (OPHI, 2019), Germany (Suppa, 2015), and more recently a Latin-America wide measure (Santos & Villatoro, 2018).

Multidimensional Overlapping Deprivation Analysis (MODA)

Originally conceived as a rights-based approach specialised for children, MODA was conceived by UNICEF and builds on the seminal works by Alkire and Foster (2011), Alkire and Roche (2011), and Gordon et al. (2003) among other predecessors to analyse multidimensional poverty for children, with every component of the methodology being child-sensitive (de Neubourg, Chai, de Milliano, Plavgo et al., 2013). In its most basic form, MODA takes the international Convention on the Rights of the Child as a starting point for defining the indicators and dimensions of children's wellbeing, which aim to capture the basic needs and rights children have at different stages of their life cycle, in terms of survival, development, protection and participation (UN General Assembly, 1989). These also overlap with the basic capabilities and functionings children should be able to maximise according to Sen (1999, 2001). Multidimensional poverty for children is therefore defined in terms of their deprivation of basic goods and services that are necessary for optimum growth and development, and in terms of their unfulfilled rights. The dimensions and indicators of deprivation are defined differently at different stages of the child's life cycle, to reflect the heterogeneity of their needs through the course of childhood. The specific methodological details for MODA have been published in step-by-step guidelines by de Neubourg, Chai, de Milliano, Plavgo et al. (2013). In summary, the analysis is carried out in two stages. First, in *single deprivation analysis* the authors calculate the proportion deprivation headcount rate of children who are deprived in individual indicators and dimensions. Second, in *multiple deprivation analysis*, the authors count the number of dimensional deprivations experienced by each child, and calculate poverty indices[3] adapted from Alkire and Roche (2011) for each level of poverty intensity, *k*. The

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[3] The multidimensional poverty indices calculated at each level of poverty intensity, *k*, are the *deprivation headcount (H)*; the average intensity of deprivation (*A);* and the adjusted deprivation headcount (*M_0*). *H* measures the poverty headcount at each level of the deprivation threshold, *k. A* measures the breadth of deprivation among

method further instructs to calculate the proportion of children with overlapping deprivations, using all permutations of three dimensions. The primary SDG1.2.2. monitoring figure is the proportion headcount rate of children who are multidimensionally poor according to the nationally defined threshold, k, often referred to as the Multidimensional Child Poverty Rate (MCPR or MDCP), while the index, M_0, is referred to as the Multidimensional Child Poverty Index (MCPI).

Similar to the Global MPI, MODA has been carried out for over 100 countries using a cross-country approach, explained in detail in de Neubourg, Chai, de Milliano, and Plavgo (2013). This *standardised* form of MODA analyses children's deprivations in the nutrition, health, education, information, sanitation, water and housing dimensions, for the age groups 0-4 years and 5-17 years. Other cross-country applications of MODA have been carried out to analyse multidimensional child poverty in the European Union (Chzhen, de Neubourg, Plavgo, & de Milliano, 2014a) and in Sub-Saharan Africa (de Milliano & Plavgo, 2014) with an updated analysis forthcoming. Since its conception, more than 30 national (N-MODA) applications have been carried out, with national governments, often in collaboration with UNICEF, led a national consultative process for analysing child poverty using MODA to specifically achieve SDG target 1.2.2., halving the rate of child poverty according to national definitions. As such, and similar to the consensual deprivation approach, national governments have adapted the original rights-based guidelines to redefine the dimensions and indicators of child deprivation, as well as the age groups and deprivation thresholds, to suit the national socio-political and ecological context, and thereby reflect a socially relevant situation of child wellbeing. Examples of these studies include those carried out in Zambia (de Neubourg & Safojan, 2016), Lesotho (UNICEF, 2018), Cambodia (Karpati, Boon, & de Neubourg, 2018), Kenya (Kenya National Bureau of Statistics [KNBS] & UNICEF, 2017), Eswatini (Government of the Kingdom of Eswatini, 2018), and Bosnia and Herzegovina (Chzhen & Ferrone, 2017).

Theoretical frameworks

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those who are multidimensionally deprived according to k, and is the sum of all deprivations among children counted as deprived, as a share of the sum of all possible deprivations among those deprived in at least k dimensions. M_0 calculates a poverty index that is sensitive to both the incidence and breadth of children's poverty, and can be summarised as $H \times A$.

The consensus, MPI and MODA approaches all deal with the central questions of: what is regarded as a deprivation? How can deprivation be measured? Whether and how are identified deprivations aggregated and weighted? In dealing with these questions, the three approaches rely on their underlying theoretical frameworks, which overlap in some respects but diverge in significant ways. This first important difference has far-reaching consequences in terms of research protocols and in terms of the potential use of the results. Both the consensual deprivation approach and MPI use a basic needs approach as a starting point for understanding and capturing multidimensional poverty, with references to the capabilities approach in the case of MPI (Alkire, 2007; Sen, 2001; Sen & Foster, 1997), and to the assumption of a socially accepted universal minimum standard of living conditions in the case of the consensual deprivation approach (Gordon & Pantazis, 1997; Mack & Lansley, 1985). The consensual deprivation approach further refers to Townsend's theory of poverty, which schematically states that poverty is relative in terms of the context, time and place in question (1979). All three approaches ultimately define a person as deprived if he/she is deprived in his/her basic needs, and deprivations are seen as a natural consequence of monetary poverty in the case of the case of the consensual deprivation approach. In comparison, MODA conventionally takes a rights-based perspective, having been developed by UNICEF to measuring multidimensional poverty among children. The approach therefore advocates for defining children's indicators and dimensions of deprivations in terms of violations of their individual rights. Indicators and dimensions of deprivation are defined in terms of the internationally ratified fundamental rights of children as the starting point of the analysis, in combination with other internationally ratified conventions such as the SDGs (de Neubourg, Chai, de Milliano, Plavgo et al., 2013; UN General Assembly, 1989, 2015). The standard MODA approach therefore attempts to, theoretically, reach a medium between existing conventions that are recognised as authoritative, and a form of public consensus achieved at the national level which may vary at the national and subnational levels.

In this sense, there are significant overlaps in each of these approaches in assuming that children need a series of basic goods and services in order to survive, to develop to their full potential, to be protected and to participate in the society. It is important to point that while the basic guidelines of each of these approaches point to varying underlying theoretical frameworks, many of the theoretical underpinnings are, in fact, shared. Furthermore, keeping these theoretical underpinnings in the background, the measurement methodologies are flexible enough to be further adjusted to fit the contextualised need, such as through nationally-led

deliberative and participatory exercises to formulate lists of deprivation thresholds which reflect local values and viewpoints. Such exercises have been widely carried out in the aforementioned national applications of MODA and MPI. While these processes come close to the framework of the consensual deprivation approach and reflect national norms, they differ in the need to rely on a group of experts or specialised institutions to set thresholds on which the public may not unanimously agree (Mack & Lansley, 1985). While all approaches allow for contextualised measurement, this has limitations. The rights-based approach necessitates that the measurement reflects a violation of the universality of children's rights. This means for example, that gender-exclusive education may be a consensual item of deprivation, it would not be valid under a rights-based approach using MODA. In all four approaches, the theoretical orientation in defining deprivations leads to observable differences in the way that deprivations are measured and combined in the protocols.

Selection of datasets, dimensions, indicators and deprivation thresholds

While guided by their respective theoretical frameworks in the selection of indicators, dimensions and deprivation thresholds, the consensual deprivation approach, MPI, and MODA are all limited by the availability of and ability to gather suitable data to illuminate the situation of deprivation in the population in question. This means that definitions of deprivation thresholds, and the interpretation of analysis results, are only possible to implement as far as the data allows. All three approaches further share the limitation that the data used in the analysis have to originate from a single database or at least from databases with a common unique identifier for individuals and households. While this factor limits the options of possible datasets to be considered, it also enriches the analytical possibilities offered by cross-sectional and panel datasets.

It is important to distinguish each of these approaches as toolboxes, or general frameworks, rather than conformist methodologies to be implemented uncritically and without consideration of context. Much of the confusion over the relative merit of these approaches, particularly in the case of MODA and MPI, is due to arguments made which reduce comparisons of the technical considerations at the heart of MPI or MODA – namely the (1) aggregation of indicators and dimensions; and (2) the calculation of deprivation headcount indices, which are in themselves processes which can be flexibly adapted according to context and demand – to the *standardised* or *cross-country* versions of these toolboxes. For example, Vaz, Oldiges, and Alkire (2019) state that while MPI is a "general framework" which can be carried out at the

household or child level or other population groups, and can be disaggregated by any representative population group, MODA,

"*... focuses exclusively on children. Its dimensions must be equally weighted. To capture the varying relevance of rights across the child life cycle, MODA has two different specifications: one for children aged 0 to 4 and another for children aged 5 to 17 years old. In both cases the indicators are defined at the household level; for instance, water, sanitation and housing account for more than half of the rights included in the measure.*" (Vaz et al., 2019)

What Vaz et al. are comparing in this instance is MPI as a general framework, to the standardised, cross-country guidelines of MODA rather than the general framework of MODA, which emphasise the flexibility of the tool. Like the MPI, MODA provides a general framework which can be and has been used to analyse the wellbeing of population groups other than children, including households, youths, adult men and women, and the elderly (de Neubourg, Dangeot, Ramful, & de Neubourg, 2015; Ramful & de Neubourg, forthcoming; UNICEF Kenya & KNBS, forthcoming). As such, the number of age groups, and the selection of dimensions and whether they are defined at the household level and imputed to individual children or not[4], are purposeful choices that can be made using MODA given the availability of data and the underlying conceptual or normative framework applied. The flexibility of both MPI and MODA, and by definition the consensual deprivation approach, make them particularly useful for adapted national applications, and for studying specific sub-populations.

 As aforementioned, the consensual deprivation approach, MPI and MODA have been applied in validated international comparisons, see Guio et al. (2016), UNICEF (2007), de Milliano and Plavgo (2014), de Neubourg, Chai, de Milliano, and Plavgo (2013), Alkire, Kovesdi, Mitchell, Pinilla-Roncancio, and Scharlin-Pettee (2019), and United Nations Development Programme and OPHI (2019). In all these cases, the parameters of the analyses are standardised, meaning that the databases, the definitions of the dimensions and indicators, as

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[4] By definition of being a framework or tool rather than a strict methodology, water, sanitation and housing dimension have conventionally been measured at the household level and analysed at the child level for both MODA and MPI. This is not necessarily due to the researcher's choice, but due to these data commonly being available only at the household level for the surveys commonly used for MPI and MODA analyses, such as Demographic and Health Survey data as well as Multiple Indicator Cluster Survey data.

well as the deprivation thresholds and their weights are standardised across the countries. Since MODA uses a life-cycle approach, the age groups are also standardised in the case of cross country applications of MODA (CC-MODA). The consensual deprivation approach is by definition executed at the national level to reflect nationally socially realistic measures of deprivation. However, if national differences in what is deemed necessary for children to thrive, are accepted, the results of a set of national consensual approaches could still be compared; the international differences reflect differences the level of multidimensional child poverty for the set of parameters that is defined for each of the countries separately.

Poverty and deprivation measures

MPI and MODA share the theoretical-statistical basis as laid out in Alkire and Foster (2011). They produce estimates of the Multidimensional Poverty Headcount Rate (H), the Multidimensional Average Poverty Intensity, or Depth (A) and the Multidimensional Poverty Index (M_0), a product of H and A. Both MODA and MPI estimate various types of decompositions of M_0. The indices H, A, M_0 and their decompositions retain the same statistical and mathematical properties in MPI and MODA, although H, A and M_0 are only monotonic in MPI. This due is to the fact that MODA uses the "union approach" to combine indicators into dimensions, while indicators have predefined weights in MPI. The choice for using the union approach is a direct consequence of the theoretical starting point. If, for example, a child is attending school, it would still be considered as deprived if he or she is not able to learn adequately in school measured by indicators such as "correct grade for age" or "leaving school without a diploma/certificate". While the child satisfies the condition of attending school, the child's right to education is still violated if the school does not provide adequate education. It should also be noted that MODA and MPI use different censoring procedures for calculating A; as a result, A (and thus also M_0) in MPI and respectively in MODA, are similar but not identical [5]. The consensual deprivation approach limits the analysis to estimating the multidimensional Headcount (H) and does not calculate A and M_0. It would, however, be possible to estimate A and M_0 in this approach as well. The Alkire and Foster calculations can be applied in all three cases, making it important to distinguish Alkire and Foster as a

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[5] Under official MODA guidelines, A is defined as the average number of deprivations for the multidimensionally poor children/persons; that means that the children/persons are censored for being multidimensionally poor (in, for example, 3 dimensions) while the number of deprivations are not censored – all deprivations are taken into account.

methodology, and to MPI, MODA, and consensual deprivation approach as toolboxes. The interpretation of the results may slightly differ between the approaches due to differences in censoring decisions, and differences in decisions on the units of analysis and on aggregation procedures and weights. These differences, between MPI and MODA, and for children in particular, have been illustrated by various authors including Hjelm et al. (2016), and Carraro and Chzhen (2019).

Aggregation and weighting of indicators and dimensions

Where the consensual deprivation approach leads to a uni-dimensional measure with equally weighted indicators which are not aggregated into dimensions, both MODA and MPI instruct the measurement of deprivation according to a set of indicator which are then aggregated into dimensions with varying weighting structures. For example, the consensual deprivation approach measuring child deprivation in Uganda is reflected in 18 deprivations experienced by children due to financial constraints (UNICEF, 2019a). These indicators are not aggregated into dimensions. Quite the contrary, the approach explicitly choose for a one-dimensional approach implying that "material deprivation" is regarded as a single dimension and all indicators are chosen because they specifically fit the dimension (measured by Cronbach's α, Item Response Theory and other measure reflecting the internal consistency of the implied scale).

MPI and MODA use on average between 9 – 25 indicators to measure deprivations but they each combine them into dimensions in a different way. Conventional MPI applications usually limit the aggregating of its indicators to a small number of broadly defined dimensions. Generally, in both cross-country and national applications of MPI, the measure is constructed from three-four dimensions (living conditions, education, and health in the case of the Global MPI) with 1-6 indicators making up each dimension (Alkire et al., 2019). The MPI uses nested weights, assigning equal weights to each of the dimensions, and indicators are equally weighted within dimensions. This leads to differences in weights of each indicator, such as the indicator for nutrition (one of two indicators under the health dimension) having a weight of 1/6, while the indicator for sanitation (one of 6 under the living standards dimension) has a weight of 1/18. Deprivations are then analysed for households or individuals at the level of the indicator, rather than the level of the dimension. Weights in MPI are set by limiting the number of dimensions to three, giving education, health and living conditions equal weight in contributing to the overall deprivation indices. The number of indicators, however, differs for each

dimension. In Global MPI for example each living condition indicator a fixed weight of 1/18 while education and health indicators each got the weight of 1/6. The procedure of assigning weights to the indicators and dimensions is identical for MODA: each dimension has the same weight of 1, but combining for example 4 indicators into one dimension gives each indicator a weight of 1/4 compared to the combination of 2 indicators in one dimension which gives each indicator the weight of ½[6]. That is not very important since many of the indicators are complementary to each other (each measuring a specific aspect of the dimension). The important feature is that each dimension has the weight of 1 in MODA[7].

 Due to its life cycle approach, MODA studies usually have more indicators combined into more dimensions. MODA generally is made up of 5-7 dimensions of deprivation for each age group (in the case of children, usually 2-4), with 2-4 indicators making up each dimension. Cross-country MODA as an example uses 13 indicators combined into 6 dimensions per age group, with two age groups in total: Nutrition, Health, Education, Protection from Violence, Water, Sanitation, Housing and Access to Information[8]. MODA deliberately distinguishes, wherever possible, traditional policy sectors, which facilitates the translation of analysis results into useful policy and programming pathways. While MODA analyses invariably tend towards identifying children/persons suffering from many deprivations simultaneously, and thus emphasises improved interdepartmental collaboration, the interventions will likely still be implemented by separate policy departments. MODA analyses tend to advocate for better coordinated, more effectively and efficiently designed interventions for reducing single and multiple deprivations among the studied population. MODA applications not only produce estimates for multidimensional poverty rates and other aggregate indices, but also intend to inspire policy makers to direct their combined actions towards reducing multidimensional poverty of children, men and women as required by the SDGs. In their Multidimensional Child

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[6] MODA tries to limit the number of distinct indicators to 1 – 2 per dimension; in most cases where more indicators are used, they are complementary in the sense that they are relevant to different subgroups in the specific age group and thus have only a weight for that particular subgroup.

[7] The discussion on weights potentially leads to heated debates with some participants saying that the weights in MPI are completely arbitrary and other stating that assuming equal weights is meaningless.

[8] Note that N-MPI's and N-MODA's can have very different number of indicators and dimensions depending for example on the number of age groups distinguished in MODA.

Poverty analysis for Europe, Guio et al. (2018) take a different stance: they conclude that statistically indicators cannot be combined into dimensions and therefore stops the analysis at the indicator level: we believe, however, that dimensions are not a statistical construct, but a conceptual combination of indicators that clearly belong together. Moreover, because of the theoretical funding in the rights-based definition of deprivations, each of the dimensions refer to a specific of rights to be fulfilled.

In MODA deprivations are measured and analysed at *both the indicator and dimension levels*. While dimensions are equally weighted, the union approach, as described by de Neubourg, Chai, de Milliano, Plavgo et al. (2013), dictates that an individual will be counted as deprived in a dimension if they are deprived in any one of the indicators making up that dimension. For example, in the case of a dimension measuring deprivation in education, and two indicators measuring deprivation in "compulsory school attendance" and "primary school attainment", a child will be considered deprived in the education dimension if they are deprived in either or both of these indicators. This method is based on two key assumptions: 1) a rights-based approach delineates any unfulfilled right as a deprivation; 2) measuring a socially realistic and rights-based deprivation in a dimension is often insufficient with a single indicator. Using the same example of the education dimension, the theoretical underpinning of MODA necessitates a more specific, rights-based understanding of children's deprivation in education: children should not only be attending school – they should also be adequately able to learn (reflected in a proxy indicator for schooling quality and learning achievement). Using another example, for a dimension measuring deprivation in water using two indicators: 1) access to an improved drinking water source; 2) distance to fetch water and return takes under 30 minutes – having access to safe drinking water, but having the source be out of reach, means the individual or household is still deprived in the water dimension. In some cases, the use of the union approach in MODA is just simple logic as each indicator is only applicable to a subset of the children in the age group; so, for each child there is only one relevant indicator measuring the dimension. This is often the case in nutrition for 0 – 4 years old as breastfeeding is only relevant for children younger than 6 months old and infant and young child feeding indicators are only relevant for children older than 6 months.

Although these differences between MODA and MPI have been identified by some as important (Evans & Abdurazakov, 2018; Vaz et al., 2019), they are in fact arbitrary. Furthermore, they confuse differences in theoretical frameworks, and the consequential choices

of dimensions and indicators, with arithmetic differences which invalidate the analysis results as over- or under- estimations of deprivation. For example, arguments reducing MODA to analyses decomposed only at the dimension level, leading to a loss of policy-relevant information which does not occur at the indicator-level analysis using MPI, are simply mistaken, as the MODA guidelines advise analyses to be carried out at both the indicator and dimension levels. The resulting information is therefore on par with the policy relevance of the analysis results of MPI. Furthermore, more recent studies on child poverty using the MPI clearly demonstrate that when the MPI is carried out at the individual child level, with corresponding age-specific choices of indicators and dimensions of deprivation, the differences between child-level MPI and MODA approaches become minute (OPHI, 2017, 2019).

Units of Analysis: individuals and households

Perhaps the most important difference between the consensual deprivation approach and MODA on the one hand, and MPI on the other hand, is the unit of analysis. In the consensual deprivation approach and the majority of studies using MODA, individuals (i.e. children) are the unit of analysis. As aforementioned, MODA is a framework that was originally developed to analyse multidimensional poverty among individual children, but it can be applied to all individuals or population groups, and thereby vary the unit of analysis according to need. MPI, while technically being a framework that can leave the choice of unit of analysis up to the researcher, was designed as an analysis of multidimensional poverty among households. This was to satisfy the purpose of international comparability, and for devising an aggregate measure for progress in human development in a country. In the overwhelming majority of MPI studies prior to 2019, households are the unit of analysis and individuals were identified as deprived if they lived in multidimensionally poor households (Alkire et al., 2019; Alkire & Santos, 2010, 2013; Evans & Abdurazakov, 2018). When MPI was analysed for children, households remained as the unit of analysis, while children were the unit of measurement, i.e. children were identified as multidimensionally poor if they live in a multidimensionally poor household (Alkire, Jindra, Robles, & Vaz, 2017; Evans & Abdurazakov, 2018). The adoption of the individual child as the unit of measurement and of analysis for child-level studies using MPI, following the MODA framework, has only been recently and limitedly implemented (OPHI, 2017, 2019; OPHI & Multidimensional Poverty Peer Network [MPPN], 2019). The consensual deprivation approach in practice, as in the case of an EU-wide measure, has been developed for measuring material deprivation among households, as well as among children (Guio et al., 2016; Guio et al., 2018). In order to avoid misunderstanding, it is important to note

that all three approaches use individuals and households as units of *measurement,* which differs from the unit of *analysis*. MODA and the consensual approach conventionally analyse all deprivations at the individual level (child, women, men); MPI and conventionally analyses all deprivations at the household level.

The difference in the units of measurement has far reaching consequences. It implies that deprivations along dimensions and indicators are measured as deprivations of *persons* (children, women, men) in the case of the consensual approach and MODA and as deprivations of *households* which are experienced by individuals in the case of MPI. In household-based estimates, members of the same households are necessarily either <u>all</u> <u>deprived</u> in a particular indicator/dimension or <u>all non-deprived</u> in that indicator/dimension. If, for example, education is considered as a relevant MPI indicator, *all* members of a household are counted as deprived if one of the children in that household is not attending compulsory school or if one of the household members older than 16 and younger than 40 is illiterate. Under the household-based approaches, it is argued that, in both cases, all household members can be regarded as deprived since they suffer from negative externalities caused by one of the children not going to school or one their household members being illiterate. In consensual and MODA studies, only the child who does not go to school or the person who is illiterate would be considered as deprived while his/her siblings and parents would not be regarded as deprived in education, assuming the existence of data at the individual level for all members in the household, allowing for further analysis of intra-household differences.

The importance of the difference in the unit of measurement is further elaborated in six aspects:
1. MODA uses a life cycle approach to define needs and deprivations;
2. Household based approaches have more difficulties to identify gender and age-group differences;
3. MODA is designed to study overlapping deprivations, while it is less straightforward with the other approaches;
4. Consensual deprivation, MODA and MPI adopt a different strategy in selecting indicators, dimensions and deprivation thresholds;
5. The approaches adopt a different procedure to deal with missing values;
6. MODA differ from the other approaches in the use of profiling variables and further analysis;

1.

Because deprivations in consensual and MODA studies are defined at the individual level, it is possible and logical to use a *life-cycle approach*. In MODA that is standard practice; in both the MPI and the consensual approach it would be technically possible. Recent examples of child-MPI applications show first attempts to study individual child-level and age-sensitive deprivations (OPHI, 2017, 2019). This feature is especially important for children, but it may also be relevant to other age groups such as youths and senior adults, as evidenced by a comprehensive poverty analysis using MODA in Kenya (UNICEF Kenya & KNBS, forthcoming). It can easily be understood that the needs, and thus the potential deprivations, for a 3 year old differ from the needs of a 14 year old, for example, and thus should be measured using different indicators[9]. The logical consequence is that MODA has to be undertaken in more steps than in the other analyses. A MODA analysis requires that first all calculations and estimations are done for each age-group separately and then the results have to be aggregated using the correct population weights. All steps of a basic MODA analysis are carried out for each age group separately, and these results can be aggregated to obtain the relevant poverty indices for the whole-child population. This is not necessary in the case of the standard MPI, as its methods require, calculate and estimate the results including the core figures at the aggregate household level. The use of the life cycle approach, however, can be assumed to be more precise in the definition of the potential deprivations.

2.

As household-based analyses, MPI necessarily face more difficulties to analyse gender and age-groups differences. As under consensual deprivation and MODA, individuals are the units of measurement, they can be essentially *gender- and age-specific*. MPI in its standard form can be applied to all households and sub-groups of households, but as a general framework can measure other population groups as well. Consensual approach and MODA, can be applied to all individuals or to age- and gender specific subgroups. It is possible to estimate H, A and M_0 and to carry out the full overlap analysis using MODA for all children age $0 - 17$ years or for all women or men age 18 years and older. This makes MODA especially useful for estimating precise indicators that can be used for monitoring *SDG 1.2.2*. The European application of

[9] See UNICEF-IRC's CC-MODA web portal for basic examples of the different selection of dimensions and indicators of deprivation for children age 0-4 years old and children age 5-17 years old (https://www.unicef-irc.org/MODA/).

consensual deprivation approach distinguishes a material deprivation headcount estimate for children and for households. In comparison, MPI conventionally produces results at the household level, which are then disaggregated to obtain specific information on a population sub-group to show the composition of poverty within and among these subgroups, and how the poverty index and its decomposition contribute to these groups. Depending on the representativeness of the database used, all approaches can produce disaggregated results for regional breakdowns such as provinces, districts, municipalities or rural-urban divisions.

3.

Taking individual children, women or men as the unit of measurement provides MODA with the explicit possibility to study whether children (persons) experience several deprivations simultaneously (in other words, study *overlapping deprivations*). This is standard practice in MODA studies. Because the consensual deprivation approach does not aggregate the indicators into dimensions, overlaps can be calculated by indicator, but is not done as the normal practice. This is an important feature, as it allows both MODA and MPI to use the deprivation threshold, k, in allowing for the estimation of multidimensional poverty rates and indices using various "poverty lines", or various values of k. In a MODA study, the focus is on estimating the distribution of deprivations over children or individuals experiencing $0, 1, 2 \dots n$ deprivations, rather than a proportional deprivation cut-off as in MPI; this yields more information that can be used in policy relevant analyses. As such, MDOA provides a policy aim for the countries – the policy objective can be defined as "pushing" the distribution of deprivations to the left. Countries that perform better have a higher proportion of children with low levels of deprivations, such as zero or one. The application of EU-MODA clearly showed that in rich countries with elaborate welfare states and a high level of public provisions, nearly all children are found at the left hand side of the distribution with more than 90 percent not being confronted with deprivations at all (0) and the rest of the children suffering from 1 dimensional deprivation (Chzhen, de Neubourg, Plavgo, & de Milliano, 2014b).

4.

MODA traditionally adopts a strict interpretation of using the child, woman or man as the unit of analysis[10]. This implies that in each MODA analysis, a serious effort has to be made to *measure all indicators for all the relevant persons* in the sample. For example, whether a person is employed or not should be measured for all the persons in the relevant age-group in the case of MODA/consensual approach, while household-based analyses such as the conventional MPI would rely on information about any one of the members in the household within a specific age range. This can also be applied to indicators like smoking behaviour, teenage pregnancy or medical visits if one of the household members has been ill in a certain time period. Under MODA, the use of these indicators would require that we measure or could reasonably impute the employment status, the smoking behaviour or the probability of a medical visit during illness for all persons in the (sub-) sample. MODA is therefore less flexible in its adoption of indicators but is more precise in its assessment. For example, MODA never uses an indicator that measures the number of health visits if a person has been ill during the last 2 or 4 weeks (a variable that is often found in surveys used for multidimensional poverty research); the reason is that surveys only observe this variable for the persons/children that have been ill during the last 2 or 4 weeks and thus no information is available for the other people in the sample. The missing values are therefore unacceptably high while it is impossible to assume that the persons who have not been ill in the reference period would not be deprived in this health indicator. In some cases, national applications of the MPI have used this variable as a health indicator, assuming that at the household level the odds ("of having been ill") between the households are much more equal.

5.

An additional consequence of the differences in the unit of measurement is that household-based studies have to adopt a slightly different strategy in the *treatment of missing values* than individual-based studies. As MODA/consensual deprivation require indicators to be available for all relevant individuals in the sample, it has to adopt a relatively strict policy when it comes to missing values. Under a MODA analysis using imputation for "completing" missing values is only admissible if a 'solid' assumption can be formulated to justify the imputation at the individual level. For example, under MODA procedures it is reasonable to assume that if the

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[10] Strictly spoken a MODA analysis can also been executed at the household level; that is, however so far only done in one country case (Botswana).

youngest child younger than 2 years is not vaccinated in a household, his/her younger siblings are also not vaccinated. On the other hand, MODA would not accept the assumption, that if a 14-year-old boy is involved in child labour, all his siblings between age 10 and 15 years could be assumed to be involved in child labour, would not fit the normal protocol of a MODA study. For household-based studies, the reasoning would be different: assuming that child labour would be seen as a deprivation, it would be possible to assume that a household is deprived in that indicator if one of the children between 10 and 15 would be involved in child labour. The conventional MPI can use imputation in a more relaxed way because it makes assumptions at the household level and not at the individual (child, woman, man) level.

6.

As the only of the four approaches that for which a gender and age-group approaches is standard, MODA provides a lot more *profiling possibilities* than the others, since it can cross-tabulate and combine a wide range of variables with the deprivation rates at the indicator level, at the dimensional level and at the level of the indices H, A and M_0. These profiles might include variables such as the gender of the household head, the gender of the child, the geographic location of the individual, birth registration status, among other individual and household characteristics that aim to identify differences between the deprivation incidence and intensity of the individual. This list of variables is only constrained by the variables measured in the survey. This is an opportunity that household-based methodologies do not have since they are necessarily limited to variables that profile or distinguish groups of households (such as location, region, composition and typical household characteristics). A child level MODA analysis typically profiles the results in single- and multiple deprivations using characteristics of the child (gender, living with parents, etc.), characteristics of their father and mother (educational level, employment status, age, religion, ethnicity, etc.), characteristics of the household/family and characteristics of the community. Recent national applications of the MPI for children, using children as the unit of analysis following the MODA framework, also share these profiling properties (OPHI, 2017, 2019).

Role of monetary poverty in measuring multidimensional poverty
MPI differs from MODA in its treatment of *pseudo financial or household wealth information* into the indicators used to make estimates of multidimensional poverty. By distinguishing a dimension like Living Conditions and including information on the availability of assets, MPI allows indicators into the multidimensional poverty estimates that have a close link to the

financial situation of the household, which are commonly used in principal component analyses to construct asset-wealth indices for determining relative wealth of households in a population dataset. MODA takes a more purist position; as argued in detail in de Neubourg, Chai, de Milliano, Plavgo et al. (2013) and de Neubourg et al. (2014), mixing financial- and pseudo financial information in the indicators and dimensions blurs the distinction between monetary poverty and multidimensional poverty. The former measures the financial means/wealth needed to pay for access to goods and services needed for survival and development; the latter measures the actual access to these goods or services. Combinations of assets in adjusted wealth indices are used in MODA studies as a profiling variable facilitating the exploration of the overlap (or the lack thereof) between the wealth of households and the multidimensional deprivations of its members. MODA therefore explicitly avoids all parameters linked to monetary poverty and only studies deprivations which are, in most societies at least partially but strongly, linked to public goods or semi-public goods such as education services, health services, water, sanitation, etc.

The consensual deprivation approach takes a very specific position in this context because of its link to the Townsend poverty theory that defines deprivations as the consequence of monetary poverty. Consistent with this approach, persons/children are only deprived if the lack is "enforced" by not having enough financial resources in the households. The EU-SILC data on which the European application of the approach is based, allows for this distinction. In the European context the difference between "enforced" deprivations and all deprivations are very small. It is very likely that the differences would be much bigger if this procedure would be used in low- and middle-income countries. Moreover, MODA would find this approach unsuitable since it is not important for the violation of rights according to the CRC, whether deprivations are due to the lack of financial resources or due to discrimination or the lack of adequately available services. In all cases, the child is deprived no matter the origin of the deprivation. In the case of a rights-based approach, there is no reason for dimensions of deprivations or multidimensional poverty to be correlated with monetary poverty or with a wealth gradient. Multidimensional poverty measures deprivation, whatever the source of the deprivation is. Some may argue that, for example, violence against children is not correlated with poverty or household income or with wealth, it should not be used as a dimension in multidimensional poverty measurement. In a rights-based approach, children that experience violence are deprived no matter whether it happens in poor or non-poor households.

Multidimensional deprivation threshold

MPI and MODA differ in their construction of a *multidimensional poverty line*. In both cases, an absolute poverty line is used, but with the conventional MPI the poverty line fixed as 33,3% of weighted indicators, while MODA uses a flexible poverty line that can be set by researchers or by the local authorities, and presents results at all possible cut-off points, k, ranging from 1-n dimensions. In other words, MODA uses the properties of k (the deprivation cut-off point) to estimate H, A and M_0 for all levels of k that exist. That means that the Multidimensional Poverty Headcount (H), its average intensity (A) and the Adjusted Deprivation Headcount (M_0) are always estimated for all values of k. For this reason, in the situation where persons are suffering from 0, 1, 2, 3, or more simultaneous deprivations, the choice of setting the appropriate level for the analysis or the policy objective is left to the analysts or the policy maker.

In an attempt to discuss the relevance of the differences in the procedures for MODA and MPI, Hjelm et al. (2016) tried to estimate the impact of the combined differences in selecting the indicators, in combining the indicators and their weighting. The results show that the estimates for MPI and MODA differ substantially with MODA leading to higher child deprivation rates than MPI. The latter seems to capture more the children who suffer from more deprivations than is the case in MODA[11]. It is remarkable that the differences show little consistent patterns, with the overlap between the two subgroups (MPI-poor children and MODA-poor children) ranging from only 7.5 per cent in Mongolia, to 59.5 per cent in Mali. The big differences between the two estimates, both in the percentage of multidimensionally poor and in the degree of overlap, is due to many factors as explained in the paper above: the sources of the differences are the recognition of the character of the a deprivation (basic needs or rights), the level of analysis (individual child or household), the selection of the indicators, the life cycle approach in MODA, the aggregation method and weighting of the indicators and dimensions. It is very difficult to disentangle the impact of each of these differences empirically, although the authors try to single out the influence of the aggregation method. They simulate MODA results if an aggregation procedure similar to one adopted in MPI would be used. The results show that the differences become smaller in most cases, but they do not disappear leaving ample room for

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[11] The estimations were executed for four countries comparing the results of CC-MODA and Global MPI: Cambodia, Ghana, Mali and Mongolia.

the other factors such as the choice of indicators and the life cycle approach to play a role. Consistent with the previous findings, the changes are not systematic if compared internationally between the four countries. The conclusion must be that it matters which approach is chosen depending on the purpose of the analysis.

Table 1 Summary table of the main characteristics of multidimensional poverty analyses [12]

	Consensual deprivation	MPI	MODA
1. Conceptual framework	Relative poverty theory(Townsend, 1979); basic needs approach(Gordon & Pantazis, 1997)	Capability approach; basic needs (Alkire, 2007; Sen, 2001; Sen & Foster, 1997)	Rights-based approach; existing convention/public 'consensus' (e.g. SDGs) (de Neubourg, Chai, de Milliano, Plavgo et al., 2013; UN General Assembly, 1989, 2015)
2. Units of measurement	Individual and household	Individual and household	Individual and household
3. Unit of analysis	Individual Child, man, woman, etc.	Household	Individual Child, man, woman, etc.
4. Age-specific indicators	Yes, for children and adults	Sometimes.	Yes, by age bracket and gender
5. Relationship Monetary poverty - deprivations	Deprivations are necessarily the product of financial constraints	Deprivations are related to unfilled basic needs.	Deprivations are violations of rights and unfulfilled basic needs.
6. Main Objective(s) of analysis	Produce a decomposable deprivation headcount and index with reference to material deprivation, essential items and activities, by indicators to assess the level of deprivation in a society according to the society's minimum acceptable standards.	Produce a multidimensional poverty index that can be used for multidimensional poverty monitoring over time and between population sub-groups. Identify specific indicators which contribute most to the MPI and thus calling for prioritized action.	Produce a multidimensional poverty headcount as a primary measure, with transparency of additional MD deprivation indices, while focusing on dimensions that coincide with policy areas and focusing on the overlap of dimensional deprivations to prioritize policy action.
7. Data requirements	All data must come from a single survey to allow multidimensional poverty to be assessed. Additional survey modules need to be carried out through quantitative or qualitative means to gather data on public	All data must come from a single survey to allow multidimensional poverty to be assessed. Microdata at the individual and/or household level necessary.	All data must come from a single survey to allow multidimensional poverty to be assessed. Microdata at the level of unit of interest (individual, household, child, women…) necessary.

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[12] The columns 4 and 5 are based on table 1 in Hjelm et al. 2016.

	consensus over essential items and activities.		
8. Age-specific indicators	All indicators are measured on individual level children – adults	All indicators are measured at household level with some referring to children/individual	All indicators are measured at the reduced to individual level and further specified by age and gender according to demand.
9. Aggregation of indicators into dimensions	No aggregation. Uni-dimensional scale.	Assigns indicators to three main dimensions and aggregates indicators directly into one index.	Aggregates indicators into policy relevant dimensions using the union approach.
10. Number of indicators per dimensions	Indicators are not aggregated into dimensions.	Typically 2 - 6 indicators per dimension.	Typically 1 – 3 indicators in each dimension.
11. Weighting	_	Dimensions have the same weight and indicators are weighted equally within dimensions.	Dimensions are weighted equally; reports the number of dimensions an individual is deprived in.
12. Sensitivity to changes in indicators	Sensitive to variation in single indicators.	Sensitive to variation in a single indicator because each indicator has a separate weight.	Sensitive to variation in a single indicator only when this indicator defines the entire dimension, i.e. one indicator per dimension (union approach).
13. Overlaps analysis	No overlap analysis	Supports analysis of overlaps between dimensions at the household level.	Routinely reports overlaps illustrating where the individual is deprived in multiple dimensions + specifications of overlaps
14. Use of monetary indicators in defining deprivation indicators	Implicit reference to monetary poverty by focussing on "enforced" lack of resources.	Excludes monetary indicators but allows for wealth-related indicators such as assets	Excludes monetary indicators in the definition of deprivation indicators but theoretically allows for wealth-related further analysis.
15. Overlap Monetary and multidimensional poverty	Can be estimated when both type of data are in the same database.	Can be estimated when both type of data are in the same database	Can be estimated when both type of data are in the same database.
16. MD threshold	Produces a deprivation count between 0 and the maximum of indicators.	Produces an index between 0 and 1 for each household and has a predefined 'global' cut-off to define poor households (e.g. 0.33).	Produces a deprivation headcount rate and a deprivation index between 0 and 1, based on a defined threshold (e.g. ≥ 2 or 3 deprivations out of the the maximum number of dimensions considered).
17. Headline population-level MD measure	Deprivation headcount.	Produces headcount, intensity and intensity-adjusted headcount measures.	Produces headcount, intensity and intensity-adjusted headcount measures.

18. Cross-country comparability	Consensus relies on societal consensus e.g. national. Early iterations of the deprivation headcount calculations in the form of the Bristol approach have produced global studies on child poverty (UNICEF, 2007).	Global and regional MPI publications exist alongside national applications. Both have been adopted and ratified by international and national institutions.	Global and regional MODA publications exist alongside national applications. Both have been adopted and ratified by international and national institutions.

Conclusion

The three tools for estimating and analysing multidimensional poverty (consensual deprivation, MPI and MODA) share the view that measuring poverty by a money-metric variable is too limited. Poverty is regarded to be a multidimensional concept requiring a deprivation-oriented analysis focusing on various dimensions. The tools also share some technical features and possibilities, but they differ substantially in important aspects.

The first striking difference lies in the underlying theoretical framework. Consensual deprivation MPI emphasize a basic needs approach with some references to the capability approach; MODA is strongly anchored in a rights-based approach regarding all deprivations (of children) as equally important. The consensual approach also relies on Townsend's theory of poverty that considers deprivations as the result of monetary poverty. The differences in the units of analysis is particularly important since it has far reaching consequences for all kinds of technical decisions taken in the analyses. While these technical decisions seem futile in the light of the broader aim to mapping the deprivations of households, children, men and women, they are co-responsible for widely differing outcomes of the analysis.The differences in the theoretical underpinnings as well in the choice of the units of analysis are complemented by outspoken differences in the aggregation and weighting methods used. Not only does the combination of these differences produce very different types of outcomes, it also reflects the initial objectives of each of the analyses.

The objectives of the four analyses are different both in term of their academic purpose and in terms of the policy consequences they are focusing on. What each of them tries to understand about the nature and the depth of poverty and deprivation among the population is not the same, with the conventional MPI focusing on levels of multidimensional poverty for international comparisons and consensual deprivation focusing on levels and indicators of only socially

relevant sources of material deprivation among the poor households and individuals/children. MODA intends to highlight the nature and depth of violation of children's (individual's) rights.

The EU-wide application of the consensual deprivation method sets out the standards for monitoring levels of material deprivation among children and adults in the light of the poverty alleviation agenda of mostly high-income countries in Europe. MPI succeeded in setting the stage of comparing multidimensional poverty measurement and monitoring at a global comparative scale leading to more global policy attention for to non-monetary aspects of poverty. The protocols of MODA are constructed to provide detailed information on the multiple deprivations that poor and non-poor children, men and women are suffering from, with the aim to guide policy actions towards multi-sectorial policy interventions in order to tackle the often overlapping deprivations that children and others are experiencing. In the light of measuring progress towards SDG target 1.2, MPI and MODA have the ambition to point to meaningful measurement and monitoring tools. MPI conventionally takes a household based approach, while MODA focuses on the individual level directly enabling the analysis to provide age- and gender specific estimates.

The three approaches all have their merits and limitations and are differently useful both in academic research and in policy oriented advises. Their differences in a series of aspects defines their usefulness and their appropriateness for addressing specific types of analyses including monitoring multidimensional poverty for the poverty related SDG agenda. Each approach or framework should, upon deliberation prior to implementation, be evaluated for their distinctive merit and against the ultimate purpose of the research assignment.

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