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Chapter 4: Multidimensional Poverty and its Measurement
GUIDE ON POVERTY MEASUREMENT

Chapter leader: Oxford Poverty & Human Development Initiative

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This chapter addresses the measurement of non-monetary aspects of poverty and social exclusion that are relevant to policy design and analysis at the national and regional level. They are also vital to completion of the Sustainable Development Goals (SDGs), which focus on poverty "in all its forms and dimensions". The chapter elaborates multidimensional poverty indices (MPIs), as the most complete alternative to monetary poverty measures, provides examples as to national MPIs that are official statistics as well as MPIs built by researchers and agencies. It also answers common questions as to weighting structures and links with the Sustainable Development Goals (SDGs). The chapter also covers the Material Deprivation Index, and dashboards of social indicators, again giving examples from the region.

At the present time, UNECE data sources differ considerably. Thus it is not possible to implement a single multidimensional poverty index (or indeed dashboard of social indicators) for all UNECE countries. The chapter proposes that each country develop a national MPI that suits its data sources and policy purposes. However, importantly, it proposals that they do so with an aim towards an eventual harmonization of at least a subset of indicators. Considering an array of recent examples, it would seem likely that the dimensions of interest would include: living standards, services, health, education, and the lived environment. That is, the aim of this chapter is to support countries in their exploration of rigorous measures of multidimensional poverty measures, and at the same time, to encourage the creation of data sources that would permit the generation of a regional MPI based on comparable indicators of non-monetary poverty.

In the case of monetary poverty, national income poverty measures are used for national poverty reduction policies, while cross-national studies are conducted that draw on comparable measures such as $3.10/day poverty measure to elucidate good practices that would be relevant to other UNECE countries. A similar structure is proposed here, with national measures providing the basic tool for national policy making, and a comparable multidimensional measure providing insights and lessons learned across national boundaries.

This chapter thus draws together and synthesizes a long and wide-ranging set of measurement studies in the region. The collection and reporting of social indicators for the analysis of poverty and exclusion has developed since the 1950s (Atkinson *et al.* 2002) driven by normative demands and also by the observed mis-matches between different poverty-related measures. Counting-based measures of deprivation date from the 1970s in both Europe and Latin America, and multidimensional poverty measures are being applied by multiple countries at the present time (Alkire *et al.* 2015). This chapter sets out the motivations for non-monetary poverty measures, and presents measurement approaches: a multidimensional poverty index that identifies who is poor multidimensionally, as well as partial tools such as a dashboard of single indicators, or a material deprivation index. These are not mutually exclusive; they are often used in combination. Their metadata for each social indicator is not included here; rather, readers are referred to existing methodological guidelines as well as those under development for the proposed indicators of the Sustainable Development Goals.

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# I.	Concepts and Methods:

I.1. Conceptual Motivations

Measures of poverty that go beyond monetary measures have been motivated by concepts such as social exclusion and inclusion,[1] basic needs,[2] social cohesion,[3] capability poverty,[4] multidimensional poverty,[5] and clustered disadvantage[6], among others. While each concept is distinct, each articulates human well-being or disadvantage directly, and generates the implication that measures of human disadvantage should include non-monetary aspects.

For example, in the 1960s Europe moved towards the development of social indicators to complement income measures (Atkinson *et al.* 2002). Key innovations included the 1968 Swedish Level of Living Study (Johannson 1973, Allardt and Uusitalo 1972), Jacques Delors' 1971 *Les indicateurs sociaux*, and P.Ch. Ludz's *Materialien zum Bericht zur Lage der Nation* (1971). The multidimensional concept of 'social exclusion' (Lenoir 1974), which seeks to assess 'the mechanisms whereby individuals and groups are excluded from taking part in the social exchanges, from the component practices and rights of social integration' (European Commission 1992, cited in Atkinson and Marlier 2010:18), widely motivated the development of social indicators. Naturally, other concepts are also in use; for example the Council of Europe published a methodological guide to indicators of 'social cohesion,' defined as 'society's ability to secure the long-term well-being of all its members, including equitable access to available resources, respect for human dignity with due regard for diversity, personal and collective autonomy and responsible participation' (2005, cf 2008).

The impetus to measure non-monetary aspects of development was paralleled internationally by the *Cocoyoc Declaration* (1974) of UNEP/UNCTAD. The concept of basic needs motivated a shift to their measurement using census data across Latin America beginning with Chile in 1975 (Feres and Mancero 2001), as well as by the development of social indicators, for example in the World Bank (Streeten *et al.* 1981). Conceptually this effort subsequently has drawn on Sen's capability approach which argues that social arrangements should be assessed with respect to people's capabilities – their freedom to enjoy valuable functionings or 'doings and beings', as well as on topics such as human rights. In the 2000s, this motivation was renewed by the qualitative work of the *Voices of the Poor* studies (Narayan *et al.* 2000), still drawing on Amartya Sen's capability approach and related work, but now often referred to as 'multidimensional poverty'. In measurement terms, the Millennium Development Goals (MDGs) launched in 2000 drew together existing standards in different indicators to propose a harmonised set of indicators.

I.2. Empirical Motivations

The main motivation for measuring for deprivations in social indicators is that people who are identified as poor in these measure may not coincide with those who are income poor. Therefore the complementarity between the two measures makes them valuable approaches for identifying poor people in all forms. If, empirically, measures of income poverty and deprivations in other social indicators coincided either in terms of who is identified as poor by each, or because each

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[1] Lenoir 1974, and the history in Atkinson and Marlier 2010.

[2] Streeten *et al.* 1981, Stewart 1985.

[3] Council of Europe 2005, 2008.

[4] Anand and Sen 1997.

[5] Alkire Foster Seth Santos Roche and Ballon 2015.

[6] Wolff and De-Shalit 2007.

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had similar trends of reduction, the impetus to develop complements to income poverty measures would be diminished. The mis-match between monetary poverty and social indicators or indice has augmented the need to develop non-monetary multidimensional measures. Examples of this mis-match will be illustrated throughout this chapter (also see Box 2.x in Chapter 2 on the mismatch between income poverty and material deprivation).

A helpful survey of the empirical research on mis-matches in identification between different indicators is found in Nolan and Whelan's 2011 book *Poverty and Deprivation in Europe*. Nolan and Whelan's study offers a systematic conceptual and empirical review of 'why and how non-monetary indicators of deprivation can play a significant role in complementing (not replacing) income in order to capture the reality of poverty in Europe' (p 1). Literature outside of Europe on this topic is also surveyed in Alkire Foster Seth Santos Roche and Ballon (2015: Ch 4).

I.3. Measurement Approaches

In response to the conceptual and empirical motivations for developing measures to complement monetary poverty measures, multiple measurement approaches have emerged. Broadly speaking, these can be divided into two groups. The first is a *dashboard* of carefully defined and validated social indicators. A dashboard presents each dimension of poverty separately as a unidimensional measure; together these measures give empirical insight into the multidimensional nature of poverty. These may include *deprivation indices* that use a set of closely related indicators to reflect an underlying unidimensional concept other than monetary poverty, such as material deprivation.

The second are *multidimensional poverty measures*. These draw together single indicators with a consistent unit of identification, and may incorporate deprivation indices. Based on the profile of joint deprivations they, like monetary poverty approaches, identify whether each person or household is poor or non-poor, and aggregate information on poor people into an overall societal measure. In the case of multidimensional poverty, the identification of who is poor (according to one or several poverty cutoffs) is usually based on the person's or household's joint distribution of deprivations, and often uses a counting approach (Atkinson 2003). These may or may not include income or expenditure poverty among the dimensions.

II.   Processes and Principles

The development of indicators related to poverty has often been the responsibility of national governments. More recently, some indicators have been estimated by an international institution. For example, the World Bank generated the $1/day index in 1990, and has developed subsequent methodological revisions until its current form of $1.90/day. UNICEF, UNESCO, and other agencies, together with data providers including the Demographic and Health Surveys, contributed to the standardisation of data and indicators with respect to other domains such as malnutrition, education, and health.

The Millennium Development Goals (MDGs) saw the advent of processes in the Inter-Agency Expert Working Group on the MDG indicators and the United Nations Statistics Commissions (UNSC) to develop relevant metadata and data quality standards. However, this process was widely criticised as being too centralized. The process of developing the indicators of the Sustainable Development Goals led by the UNSC has been considerably more inclusive, involving consultation with not only the 28 government members of the Inter Agency Expert Group but also observer governments, UN Agencies, academics, civil society actors, and online open consultations. What seems clear at this point is that the procedural aspects of indicator development and approval are vital and cannot be overlooked.

Drawing on experiences including the open method of coordination process (OMC) of the European Union in developing the EU-SILC surveys and common measurement standards, Tony Atkinson and Eric Marlier (2010) proposed to UNDESA principles and processes for the development of comparable indicators of poverty and social exclusion. This section summarizes their recommendations.

In terms of procedural matters, Atkinson and Marlier "draw on our experience from the construction of social indicators in the European Union and in their actual use in the policy process (Atkinson *et al.*, 2002; Marlier *et al.*, 2007), because there are, in our view, lessons to be learned about the way EU member states cooperate through the so-called Social OMC. The OMC process has limitations, but it illustrates concretely how 27 countries can reach agreement on common objectives and monitoring procedures and how evidence-based policymaking can be aided by comparative analysis and international benchmarking. … The fight against poverty and social exclusion is a common challenge, and there is scope for mutual learning, despite the differences in circumstances and in levels of living." (2010:387)

Atkinson and Marlier (2010: 45) outline five criteria for internationally comparable indicators of deprivation in social inclusion:

An indicator should identify the essence of the problem and have an agreed normative interpretation.	An indicator should be robust and statistically validated.	An indicator should be interpretable in an international context.

| | An indicator should reflect the direction of change and be susceptible to revision as improved methods become available. | The measurement of an indicator should not impose too large a burden on countries, on enterprises, or on citizens. | |

Finally, in July 2016, the World Bank will launch the Atkinson Commission Report on Global Poverty. This Commission report highlights the importance of multidimensional poverty, and proposes that indicators be collected, universally, to create both a dashboard of social indicators and a multidimensional poverty index (MPI) that reflects the overlap between component indicators. It comments, like this chapter, that the national policy be given priority, but that the social indicators be designed with an eye towards obtaining at least partial comparability across countries because of the rich kinds of analyses that can ensue.

The Report also proposes that the design of the multidimensional poverty indices follow due process and involve all nations and stakeholders. An interesting example of such a process, from which much can be learned, is the 'Open Method of Coordination' (OMC) followed in Europe and explicated in Box II.1.

BOX II.1 – The EU-SILC and Open Method of Coordination

The European Union Statistics on Income and Living Conditions (EU-SILC) data publish **annual** timely and comparable cross-sectional and longitudinal multidimensional micro-data on income poverty, social exclusion, and living conditions, now for over 30 countries.[1] Anchored in European Statistical System, the EU-SILC project started in 2003 and is ongoing.

A key feature of the EU-SILC is the process by which it was developed: the **open method of coordination**. This method balanced national priorities with progressive harmonisation of data and targets.

> "The open method of coordination, which is designed to help member states progressively to develop their own policies, involves fixing guidelines for the Union, establishing quantitative and qualitative indicators to be applied in each member state, and periodic monitoring" (Atkinson et al. 2002, 1–5).

The EU-SILC is replete with interesting lessons. For example many surveys are only representative at the national level, but some sample sizes are much larger. Certain questions (e.g. levels of education, self-reported health status) may still be difficult to compare across countries (Alkire and Apablaza 2015) – an issue that future surveys may address. Also, the use of registry data alongside survey data has been explored in the EU-SILC project, and studies have shown both the potentials and significant difficulties of registry data for poverty monitoring.

EU-SILC data have been used since 2010 to monitor poverty and social exclusion in the EU towards a target: "A headline poverty target on reducing by 20 million in 2020 the number of people under poverty and social exclusion has been defined based on the EU-SILC instrument."[1] This target is elaborated in x.x

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Atkinson and Marlier (2010: 8–14) also provide an insightful overview of the purposes for which appropriate indicators should be stock or flow, subjective or objective, relative or absolute, static or dynamic, input or output or outcome, and so on. When statistics are used by the public, issues such as ease of interpretation also affect indicator selection and design.

In addition, and very much pertinent to the exercise at hand, they develop three principles for the selection of a set of visible social indicators:

1. the portfolio of indicators should be balanced across the different dimensions.
2. the indicators should be mutually consistent and the weight of single indicators in the portfolio should be proportionate.
3. the portfolio of indicators should be as transparent and accessible as possible to citizens.

As the UNECE develops standardized indicators of poverty and social exclusion, a clear, inclusive and transparent process, and an effective set of principles, should be agreed upon to govern the process and ensure ownership and sustainability of the results.

III.   Multidimensional Poverty Indices

III.1. Introduction

Multidimensional poverty indices are being developed by many countries as official national statistics of poverty. Mexico has a single poverty measure, which became multidimensional in 2009, and includes income and six non-income components, Bhutan Colombia, Chile, Costa Rica, El Salvador, and Ecuador have official multidimensional poverty indices (MPIs) that complement their official monetary poverty statistics and are updated and reported regularly alongside monetary poverty measures. Countries such as Armenia and Turkey are exploring national MPIs, academic studies in the USA, Germany and elsewhere are exploring the issue, and UNDP has published studies of social exclusion that implement MPIs in the analysis.

As these are not yet as familiar as monetary measures, this section provides an introduction to them, elaborating how a multidimensional poverty index adds value to a monetary poverty measure plus a dashboard of social indicators.

The MPIs differ substantially from measures of material deprivations that will be discussed subsequently. The main departure is that the multidimensional nature of such indices is grounded in Sen's capability approach while current measures of material deprivation focus on a single dimension, namely material deprivation. In addition, the flexibility of the underlying Alkire-Foster method of the MPI allows the index to capture national and international concerns of poverty and development (e.g. national development plans and SDGs). While informative in their own right, these measures combine several variables to approximate an underlying unidimensional concept. The current MPIs that are in place include a range of indicators pertinent to dimensions of interest such as health, education, living standards, social inclusion, and employment, among others. This section describes the methodological matters in relation to building an MPI starting with the steps needed to set the unit of identification, dimensions and indicators with their respective deprivation cut-offs and weights, and poverty cut-offs. It also illustrates the advantages and disadvantages of some methodological issues in building an MPI.

The methodology underlying the MPI is based on Alkire and Foster (2011) and offers a high degree of flexibility in the choice of indicators. These indicators can be tailored to suit the specific requirements of each country and reflect the pre-occupations of policy makers. The MPI can be used for a multitude of purposes including: targeting of social and economic policies, monitoring of their impact and implementation, coordination among different decision makers, assessment of sub-national differences in development, graduation of social protection schemes, and informing social responsibility investment. Moreover, the MPI can be a particularly useful tool to assess how countries meet the SDGs. The first goal of the SDGs is to eradicate poverty in *all its forms*, which in itself is a multidimensional clause. The Alkire-Foster method captures both the headcount of those who are multidimensionally poor using the counting approach (described in more detail in this following sub-sections) and the intensity of poverty among the poor making the MPI as valuable measure to capture the extent of acute poverty.

There are two kinds of Multidimensional Poverty Indices (MPIs). National MPIs are not comparable, but, like national monetary poverty measures, reflect national priorities and are constructed using national datasets. A Global MPI, like the global income poverty measure of $1.90/day, is comparable across countries, and covers a similar number of developing countries as the World Bank's measure, drawing on national and international datasets. The Global MPI currently is computed by the University of Oxford's Poverty & Human Development Initiative (OPHI) and the UNDP for the UNDP's Human Development Report, and both institutions publish national figures, while OPHI publishes the extensive disaggregated data, and hosts an

interactive databank so users can create their own maps and infographics. The MPI in either global or national forms has been used by countries to report on Indicator 1.2.2 of the Sustainable Development Goals.

III.2. Requirements
Like other indicators, the development of an MPI requires a procedural component, clarification of data sources, and a reporting framework. These may occur at the national or regional level. It has proven tremendously useful to involve statistics users – policy makers from different relevant sectors and coordinating bodies – in measurement design. This facilitates an understanding of the relevant insights the measure can provide, such that these are translated effectively into policy actions to reduce poverty.

Contrary to some presumptions, the data requirements for an MPI is not necessarily more demanding in terms of survey costs than those of monetary measures. Monetary poverty and employment questions are time consuming to collect, but other indicators may be far faster. So the data costs depend upon which indicators are included.

III.2.1 Steps to building an MPI

Step 0
- Determine unit of identification
- e.g. Household or Individual

Step 1
- Define a set of indicators
- e.g. years of schooling, sanitation, child mortality

Step 2
- Set Deprivation Cut-off
- e.g. deprived if years of schooling less than UNICEF recommended level for age.

Step 3
- Apply the Deprivation Cut-off
- Find out whether a person is deprived in each indicator

Step 4
- Select the relative weight of each indicator
- e.g. in Education dimension, each indicator will have a relative weight, and these weights must sum up to one

Step 5
- Create the weighted sum of deprivations
- This will yeild a deprivation score

Step 6
- Determine Poverty cut-off (x%)
- e.g. an individual is multidimensionally poor if the deprivation score >x%

Step 7
- Calculate the heacount ratio
- This is the proportion of people who are poor

Step 8
- Calculate the intensity of poverty among the poor
- This is calculated by adding the deprivation scores of the poor and dividing them by total number of poor people

Step 9
- Calculate the MPI (or M0)
- This is the product of the headcount ratio of Step 7 and the intesity of poverty of Step 8
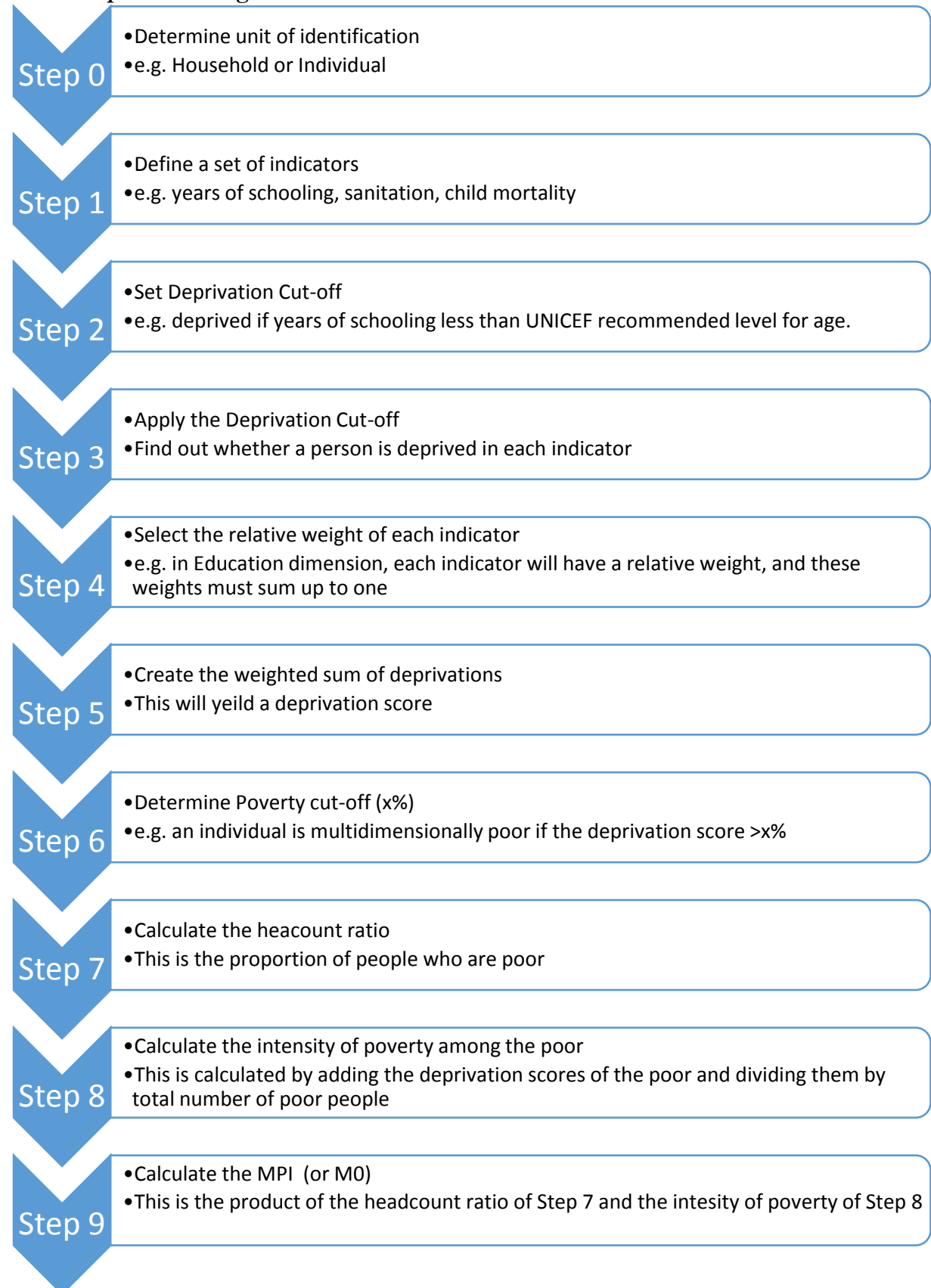
Figure 2 - Steps to Build the MPI

Figure 2 above shows the different steps needed to build an MPI. The section below entails a more detailed description of the steps involved.

Preliminary Steps
0. Determining the **unit of identification** that will be used to identify each person as poor (for example, person or household), and the **unit of analysis** by which the poverty figures will be reported (for example, percentage of the population vs percentage of households)

Once this has been accomplished, Alkire Foster Seth Santos Roche and Ballon (2015) describe the following steps for the construction of the MPI as follows:

Identification of Who is poor
"1. Defining the set of **indicators** which will be considered in the multidimensional measure. Data for all indicators need to be available for the same unit of identification.
2. Setting the **deprivation cutoffs** for each indicator, namely the level of achievement considered sufficient (normatively) in order to be non-deprived in each indicator.
3. Applying the cutoffs to ascertain whether each person is deprived or not in each indicator.
4. Selecting the **relative weight** or value that each indicator has, such that these sum to one.
5. Creating the weighted sum of deprivations for each person, which can be called his or her '**deprivation score'**.
6. Determining (normatively) the **poverty cutoff**, namely, the proportion of weighted deprivations a person needs to experience in order to be considered multidimensionally poor, and identifying each person as multidimensionally poor or not according to the selected poverty cutoff.

Aggregation
7. Computing the proportion of people who have been identified as multidimensionally poor in the population. This is the **headcount ratio** of multidimensional poverty, also called the **incidence** of multidimensional poverty.
8. Computing the average share of weighted indicators in which poor people are deprived. This entails adding up the deprivation scores of the poor and dividing them by the total number of poor people. This is the **intensity** of multidimensional poverty, also sometimes called the **breadth** of poverty.
9. **Computing the M_0 measure** [or MPI] as the product of the two previous partial indices: H times A. Analogously, M_0 can be obtained as the mean of the vector of censored deprivation scores, which is also the sum of the weighted deprivations that poor people experience, divided by the total population."

Box III.1 An Example of MPI construction:

Suppose we have a society of 3 individuals, X, Y, and Z. The MPI we seek to construct has the following indicators nested within three dimensions:

Dimensions of poverty	Indicator	Deprived if…	Weight
D1	a	…	1/6
	b	…	1/6
D2	c	…	1/6
	d	…	1/6
D3	e	…	1/18
	f	…	1/18
	g	…	1/18
	h	…	1/18
	i	…	1/18
	j	…	1/18

The data collected on these 3 individuals, and a deprivation matrix is constructed as follows:

Person		Indicators										Deprivation Score
		a	b	c	d	e	f	g	h	i	j	
	Weight	0.17	0.17	0.17	0.17	0.06	0.06	0.06	0.06	0.06	0.06	
X		1	1	0	0	1	0	0	1	0	0	0.44
Y		0	0	1	0	1	0	1	1	0	0	0.33
Z		0	1	0	0	0	0	0	0	0	0	0.17

After several robustness tests, we then choose a poverty cut-off of 33%. Under this specification, persons X and Y will be considered multidimensionally poor, while person Z is not.

Assuming equal sampling weights (this is often <u>not</u> the case in sample data), we get the following measures:

The headcount ratio (H) is 2/3 i.e. 0.66

The intensity of poverty among the poor (A) is (0.33+0.44)/2 = 0.39

The adjust headcount ratio M_0 (or the MPI) is H x A = 0.66 x 0.39 = 0.26

III.3. Key Decisions[7]

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[7] Each of these decisions is elaborated in Alkire Foster Seth Santos Roche and Ballon 2015.

III.3.1 Unit of Identification

To build an MPI, a preliminary step is to choose whether to identify poverty based on the deprivations of an individual, or whether to combine individual level characteristics within a household or other unit, to identify all members of a household as poor or non-poor. The same choice is made in constructing an income or consumption poverty index, in which usually household income or consumption is assessed, but in this case gender disaggregation, for example, can not be meaningfully performed.

In multidimensional measures, the unit of identification is normally the individual or the household. Each unit of identification has been used in official national MPIs and in research exercises, and each has advantages and disadvantages.[8] In both cases there is potential to reveal at least some of the intra-household inequalities.

When the Unit of identification is the individual, it is possible to meaningfully decompose by gender, age, occupation, and other characteristics. It is possible to assess intrahousehold patterns of poverty. However it may be difficult to define indicators that are relevant from cradle to grave, so separate measures may be more appropriate for children and for those who are above a certain age.

When the unit of identification is the household, this acknowledges the effect that one household members' deprivation has on others. It allows some child indicators to be included.[9] And it allows compensation in some indicators: for example, if an elderly household member is not highly educated but younger ones are, the elder educational deprivation may affect their own poverty condition much less.

III.3.2. Dimensions

Dimensions are conceptual categories that can be used to facilitate a particular weighting structure. For example, the 10 indicators of the global MPI are grouped into three equally weighted dimensions, so in fact this conceptual structure affects the indicator weights.

Some examples of dimensions used in official multidimensional poverty measures include:

- Health
- Education
- Work
- Housing
- Living Standards
- Basic Services
- Surroundings / Lived Environment
- Social Security
- Food Security
- Childhood and youth

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[8] For a systematic treatment see Alkire Foster Seth Santos Roche and Ballon 2015, Chapter 7.
[9] See Alkire and Santos 2014 for an example of analysis of the global MPI for households with differing child compositions.

> **Box III.2 The choice of dimensions in Different National MPIs**
>
> As mentioned previously, the Alkire-Foster methodology underlying the building of the MPI allows a large degree of flexibility in the choice of dimensions, the number of dimensions, the indicators, and the weights. Different countries have embarked on journeys to build their national MPIs in keeping with their national development agenda in order to target specific groups of the population and monitor the existing and forthcoming social protection schemes. The table below shows the different dimensions chosen by national MPIs around the world.
>
> | Country | Dimensions |
> |---------|-----------|
> | Chile | (1) Education, (2) Health, (3) Work and social security, (4) Basic standard of living. |
> | Costa Rica | (1) Education, (2) Health, (3) Work and social security, (4) Basic standard of living. |
> | Colombia | (1) Education, (2) Childhood and youth, (3) Work, (4) Health care, (5) Housing and public services. |
> | Ecuador | (1) Education, (2) Health, water and nutrition, (3) Work and social security, (4) Housing and public services. |
> | El Salvador | (1) Education and childhood, (2) Health and food security, (3) Work, (4) Housing, (5) Security and environment. |
> | Mexico | (1) Education, (2) Access to health care, (3) Access to food, (4) Access to social security, (5) Housing, (6) Basic home services, (7) Income. |
> | Minas Gerais (Brazil) | (1) Education, (2) Health, (3) Living Standards, (4) Work |
> | Ho Chi Min City | (1) Education, (2) Health Care, (3) Living Condition, (4) Information Accessibility, (5) Insurance and Social Assitance |
> | Bhutan | (1) Health, (2) Education, (3) Living Standards |
> | ECLAC | (1) Housing, (2) Basic Services, (3) Living Standards, (4) Education, (5) Employment and Social Protection |
> | Pakistan | (1) Education, (2) Health, (3) Living Standards |

III.3.3. Indicators and Deprivation cutoffs

Indicators are the variables in the matrix, that are used, with a deprivation cutoff, to identify each person as deprived or not in that indicator.

Normally the data for all indicators is available from the same data source. Exceptionally, administrative record data or satellite may be merged using the household id or GIS location, if the merging manages to retain a very high proportion of the original households.
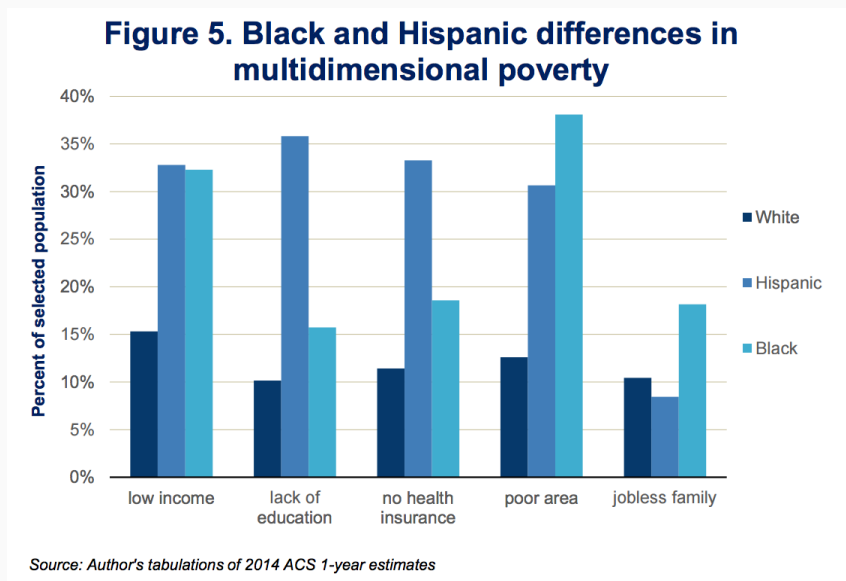
The deprivation cutoffs normally draw upon commonly agreed standards. These may include the compulsory years of schooling, age-specific standards for malnutrition. In the case of national MPIs, they may also draw upon documents such as a constitution, national development plan, or the result of a participatory process with poor people and communities.

Box III.3 "Five Evils: Multidimensional Poverty and Race in America"

Reeves, Rodrigue, and Kneebone select five dimensions of multidimensional poverty, based on William Beveridge's "Five Giant Evils" (1942). The authors understand that deprivation is a multidimensional phenomenon and seek to judge inequality in American society by assessing the degree to which economic and social hardships overlap with each other. The main thrust of policy, the authors argue, is to not only reduce disadvantage, but also to de-cluster it.

The authors use 2014 one-year estimates from the American Community Survey and include adults aged 25 to 61 inclusive. They find disadvantages in the U.S. cluster together for certain groups of people and in particular places. Multidimensional poverty is much more common among blacks and Hispanics. While blacks and Hispanics have virtually identical rates of income poverty (twice the rate of white income poverty), black Americans are more likely to live in a poor area and/or be jobless, whereas Hispanics are more likely to lack health insurance and/or lack a high school degree.

Reeves, Rodrigue, and Kneebone help understand inequality in the U.S. by illuminating race gaps in deprivations. The research, the authors argue, should implicate anti-poverty policies that reduce the consequences of having a low income by de-clustering disadvantage.

Figure 5. Black and Hispanic differences in multidimensional poverty

Source: Author's tabulations of 2014 ACS 1-year estimates

Dimensions of poverty	Deprived if…
Low household income	Household is below 150 percent of the federal poverty line
Limited education	Individual lacks a high school diploma OR has a general education development (GED)
Lack of health insurance	Individual lacks health insurance, private or public
Concentrated spatial poverty	Household is in a Public Use Microdate Area (PUMA) with poverty exceeding 20 percent at the standard 100 percent federal poverty line
Unemployment	Household has no one between 25 and 61 employed

Source: Reeves, Rodrigue, and Kneebone (2016), Beveridge (1942)

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Household level indicators such as water, sanitation, housing conditions, overcrowding, waste disposal, electricity, material deprivation, access to the internet, and so on all draw upon household indicators. If an individual is the unit of identification, household level deprivations may be attributed to her.

Indicators such as malnutrition, health functionings, years of schooling or school attendance, employment, quality of work, social security benefits, health insurance, disability benefits, pensions, and so on are normally available for certain or all individuals in the household roster. If the household is the unit of identification, information from relevant household members must be combined to define the household and all its members as deprived or not in that indicator. For example, they might be deprived if any person experiences a deprivation, or of all persons do, or some proportion. The indicator must be defined for all household types. Examples of complex indicators are:

- If no member of the household has completed lower secondary school, the household is deprived
- If any school aged child is not attending school and has not completed the compulsory level of schooling, the household is deprived.
- If all household members are un or under employed, the household is deprived.

The design of such indicators nationally depends upon the purpose of the index and its underlying conceptual structure. For example, if anyone in the household who did not complete lower secondary school creates a situation in which the entire household is deprived, then this may be effectively a stock indicator, because the uneducated will likely include many adults who cannot change their educational deprivation status through their life course.

Normally, the component indicators of multidimensional poverty indices draw upon existing social indicators, and upon national action plans to reduce poverty, and modify them as required.

III.3.4. Weights: As indicated by Sen (1996), the weighting structure should be explicit and transparent so as to be open to public debate, and further, key comparisons must be robust to a plausible range of weights. Normally, the relative weights reflect the normative assessment – for example, that achievements in health, education, and living standards are roughly equal in intrinsic value. Equal weights across dimensions also ease the interpretation of the index for policy, to the extent that Atkinson et al recommend that dimensions be chosen such that their weights can be roughly equal (2002). So in fact all official statistics to date have used a nested weight structure, with equal weights across dimensions, and equal weights across indicators within dimensions, unless particularities of the data required this structure to be modified in some dimension. Also robustness tests are always performed and reported, to ensure that the final MPI is robust to a range of plausible weights (Alkire and Santos 2014).

A full introduction to weights is found in Alkire Foster Seth Santos Roche and Ballon 2015, Chapter 6. A key point in view of the concern regarding weights is the following: "The computation of an MPI requires setting a weighting structure, a step that is frequently matter of concern. However, the weights applied in an MPI –namely a multidimensional poverty measure using the structure of the M_0 measure of the AF methodology– differ radically from weights in 'composite' indicators and are, for that reason, easier to set and to assess normatively. While weights in composite measures are applied to quantities (achievement levels), and the marginal rates of substitution across indicators are usually assumed to be meaningful at all achievement levels, this is not the case in the MPI. In the MPI, weights are applied to the 0–1 deprivation

status entry. Their function is to reflect the relative impact that the *presence or absence* of a deprivation has on the person's deprivation score and thus on their identification and, for poor people, on poverty. Correspondingly, the weights affect how much impact the removal of a particular deprivation has on the MPI. Thus they create comparability across dichotomized indicators. But because deprivation values are applied to dichotomous 0–1 variables, they need not calibrate different *levels* of deprivations in a single variable." Thus it is quite important to understand that a MPI differs from composite indicators.

In sum, the issue of weighting is no more challenging for the MPI (and actually possibly considerably less challenging) than other procedures such as imputing prices for non-market goods or adjusting rural and urban poverty lines.

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Box III.4 Multidimensional Poverty Indicators in Europe: EU-SILC

Alkire and Apablaza (2016) calculate a multidimensional poverty index (MPI) for Europe based on the Alkire Foster (AF) methodology drawing on existing Europe 2020 indicators, as well as on indicators of health, education and the living environment. They generate an MPI composed of 12 indicators and compare the results across time and space.

Dimension	Indicator Variable	Weight
Income	AROP	1/6
Employment	Quasi-Joblessness	1/6
Material Deprivation	Severe Material Deprivation	1/6
Education	Completed Primary Education	1/6
Environment	Noise	1/24
	Pollution	1/24
	Crime	1/24
	Housing	1/24
Health	Fair Health	1/24
	Chronic Illness	1/24
	Morbidity	1/24
	Unmet Medical Needs	1/24

The results of Alkire and Apablaza (2016) for MPI in Europe based on the EU-SILC data are reported in the table below. The results suggest a decline in multidimensional poverty in Europe from 2006 to 2012. It is worth noting that while less people are considered multidimensionally poor (a decrease in headcount from 10.04% in 2006 to 8.81% in 2012), the intensity of poverty among the poor people remained largely unchanged.

	2006	2007	2008	2009	2010	2011	2012
Multidimensional Poverty (M_0)	0.0484	0.0443	0.0418	0.0413	0.0419	0.0424	0.0429
	(0.0012)	(0.0011)	(0.0012)	(0.0012)	(0.0011)	(0.0011)	(0.0011)
Headcount Ratio (H)	10.04%	9.24%	8.77%	8.63%	8.67%	8.75%	8.81%
	(0.0012)	(0.0012)	(0.0013)	(0.0013)	(0.0013)	(0.0012)	(0.0013)
Intensity of Poverty (A)	48.18%	47.99%	47.73%	47.80%	48.30%	48.45%	48.62%
	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0005)	(0.0006)
Contribution of each dimension to total multidimensional poverty							
Income	24.23%	24.58%	25.23%	25.67%	25.36%	25.25%	25.33%
Employment	18.40%	18.69%	18.31%	18.69%	19.88%	19.63%	19.45%
Material Deprivation	16.13%	15.83%	15.56%	14.97%	15.31%	16.43%	17.92%
Education	17.94%	17.46%	17.90%	17.38%	16.86%	16.22%	15.44%
Environment	11.80%	12.07%	11.34%	11.58%	11.16%	10.77%	10.39%
Health	11.50%	11.38%	11.66%	11.72%	11.42%	11.70%	11.48%

Note: Belgium, Bulgaria, Ireland, Croatia, Malta, Romania, Iceland, Norway and Switzerland not included.
Source: EU-SILC users' database of March 2014.
Source: Alkire and Apablaza (2016)

With the update in the EU-SILC surveys after 2013, several new indicators have surfaced which can be used to build national MPIs. Most notable of these indicators are:
- Indicators on housing: overcrowding, accommodation, rooms, and heating
- Indicator on education: an improvement over previous indicator of level of education is to assess individual's obtained qualification (adult education, national education schemes, vocational training, open learning, etc.).
- Indicators on health: disability, and activity
- Other possible indicators: indebtedness and subjective assessment of income required for good living standards.

III.3.5 Poverty Cutoff (s)

The poverty cutoff for multidimensional measures are the share of weighted indicators in which a person or household must be deprived in order to be identified as poor.

As in the case of income poverty, results may be reported for more than one poverty cutoff. For example, an extreme poverty and moderate poverty level may be reported, as in the case of Ecuador.

The poverty line is easiest to present and interpret if they bear some resemblance to the weighting structure of indicators and dimensions. They may be set using a combination of factors, including normative assessment of what poverty is, coherence with subjective poverty assessments, or observation of the share of dimensions experienced by certain groups of people. The accuracy or inaccuracy of component indicators must also be considered: if some indicator clearly identifies as deprived people who may not be poor, a union approach should not be used. If a human rights framework underlies the structure of the measure, this will also affect the poverty cutoff.

Robustness tests are always to be performed, in order to make transparent any sensitivity to the poverty line, and also to highlight comparisons which are robust to a range of poverty cutoffs. Empirically, many conclusions have been proven to be robust across a range of plausible poverty cutoffs (always considering standard errors).

III.3.6 Whether to include income in the MPI

It is frequently asked whether to include income or consumption poverty measures in a national MPI, instead of reporting them separately. To date, Mexico is the only country to do so. Here are some considerations:

III.3.6.1 Advantages of including income as a dimension

There are three main advantages of including income:

- Having a **single headline poverty indicator** that encompasses a set of key dimensions can be an advantage

- The priority of income poverty reduction relative to reduction in other deprivations is **transparent** through the relative weights. And the relative weight on income can be adjusted, whereas if there are two separate measures the weight of each is implicitly equal.

- The relationships between different deprivations can be studied easily under this framework because all indicators are drawn from the **same data source**.

Note that for the properties of the MPI to be established, income is measured using an absolute poverty line. If a relative poverty line is used for income, then the poverty focus and deprivation axioms do not hold. Having a mixture of relative and absolute cutoffs also is conceptually challenging.

Even if income is included, care must be taken in the design of the measure. For example, in the case of Mexico, it appears that economic and non-economic aspects of poverty are equally weighted. But in fact, the identification procedure is designed to exclude all persons who are not income poor from having the possibility of being identified as poor. Given the evident mismatches between income poverty and other kinds of poverty, and given that these are in part due to non-sampling measurement error, this is a limiting identification structure. Persons who

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are multiply deprived in a set of non-monetary deprivations should have the possibility to be identified as multidimensionally poor unless there is a very good reason for prohibiting this.

III.3.6.2 Limitations of including income as a dimension

There are several disadvantages to including income or consumption poverty measures within an MPI:

- Given the familiarity with income and consumption poverty measures, it can be easier to release a second measure that complements those, rather than discontinuing or changing a familiar statistic. The press and media have proven able to have the ability to understand and communicate two poverty measures, each having their distinctive contribution, effectively.

- The redundancy across indicators needs to be assessed, to exclude the possibility of 'double-counting' deprivations, as is ordinarily done during measurement design for all variables. However there may be some residual linkages across variables that redundancy tests do not capture.

- There is a practical concern whether the quality of income poverty measures that are included within a MPI will be of the same quality that they are if they stand alone and are subject to explicit public scrutiny. Yet this high quality is also required within MPIs.

- The sample designs for different survey types may need to be harmonised, and surveys may need to be extended to include all relevant indicators, without jeopardizing data quality.

- If the MPI is being used primarily to design and coordinate social policies, the inclusion of income may be less necessary as the MPI will predminantly monitor the outcomes of a distinct set of policies from income poverty.

- If the income poverty measure is 'relative', then its inclusion within an MPI creates a conceptual challenge because the other cutoffs are usually absolute.

In the end, the decision of whether to report income or consumption and expenditure poverty separately or inside a multidimensional poverty measure is a particularly important decision. There are pros and cons on both sides. The Global MPI does not include consumption poverty because that variable is not included in the surveys employed, so it is not a feasible option for consideration; however even if it were there is a benefit of separating the international comparisons given the current controversy regarding PPP exchange rates underlying monetary poverty comparisons. All countries except for Mexico have opted to keep monetary and MPI measures distinct even when, as in the case of Chile and Ecuador, both measures are developed using the same survey instrument.

Box III.5 – Towards a Multidimensional Poverty Index in Germany

A multidimensional poverty index for an advanced economy like Germany is proposed by Suppa (2015). Drawing on the capability approach as conceptual framework, the Alkire-Foster method is applied to the German context. The increasing interest of academics and policy makers in alternative measures for human well-being, also seems to bring about a consensus about relevant dimensions. The proposed multidimensional poverty index for Germany strongly relies on these insights and recommendations, in particular on Stiglitz et al. (2009), Atkinson et al. (2002), Nussbaum (2001) and OECD (2011). Moreover, the specification also relates to the public debate on poverty and deprivation in Germany. Specifically, most indicators included in the proposed poverty measure are already considered as "core indicators" by Germany's official reports on poverty and wealth (e.g., Bundesregierung, 2013). These indicators themselves have been selected based on scholarly advice (Arndt & Volkert, 2007).

The proposal uses data from the German Socio-Economic Panel (SOEP), a rich multi-purpose household survey for Germany (see Wagner et al., 2007). The poverty index is calculated for 3 points of time, spanning a period from 2001-2012 and comprises 6 dimensions, 4 of which can be related directly to functionings, i.e. the beings and doings individuals have reason to value (education, health, housing, and social participation). Social Participation, for instance, is operationalized using information about the frequency of social activities common in contemporary Germany (e.g., attending cultural or religious events, meeting friends, engaging in voluntary work, helping out friends and neighbours, etc.) An individual is considered deprived in social participation if she reports to never meet her friends or to never perform any of the other 7 activities. Two further dimensions, employment and material deprivation, are included as they contribute extra information on otherwise ignored functionings (practical reason, economic security, self-respect, agency). Importantly, income is not included for both conceptual and empirical grounds. Conceptual arguments against a lack-of-income dimension rely on potential double-counting since dimensions income is instrumental for, are already directly implemented, such as social participation. Empirically, it is shown that income-poverty is largely captured by material deprivation indicators and, moreover, by using comprehensive wealth information that a low income inaccurately reflects material well-being for a significant share of the income-poor (ca. 20%). The detailed specification is summarized in Table 1. Dimensions are weighted equally and most indicators are also equally weighted within dimensions. For most analyses a poverty cutoff of k=33 is used. Many results are, however, robust to the choice of k.

From a policy perspective it is important that the implemented dimensions establish a direct sensitivity to major economic developments. The period of investigation covers for instance an extensive labour market reform and the financial crisis. The decomposability properties of the Alkire-Foster method allow to uncover the effect of these developments on the poor: unemployment and material deprivation are identified as critical factors behind changes in multidimensional poverty over the whole decade. However, as the poor are simultaneously hit by very different trends, a more complex picture emerges. Precarious and underemployment, for instance, rise throughout the decade, whereas unemployment and material deprivation both peak around 2007. While unemployment later falls even below its initial level, material deprivation remains high.

Another important question is whether both measures identify the same individuals as poor. Applying a multidimensional poverty cutoff of k=33 and a income poverty cutoff of 60% of the median net household equivalent income implies poverty rates of 11-13%. However, only 5% of the population are identified as poor by both measures, while 8% are only income-poor and 5% are only multidimensionally poor. This result is robust to different cutoffs: Generally less than 50% of the income-poor are also multidimensionally poor. As both measures substantially disagree on who is poor, different policy implications are to be expected.

Recently, *SpiegelOnline*, a major news portal in Germany, asked what poverty means in Germany. A tool illustrating different approaches to poverty also presents a slightly simplified version of the specification discussed above (http://www.spiegel.de/wirtschaft/armutsrechner-bin-ich-arm-a-1093182.html).

The MPI specification of Suppa (2015) is as follows:

Functioning	Deprivation Cutoff	Weight
Education	elementary schooling not completed or elementary schooling completed but no vocational qualification[a]	1/12
	less than 10 books in household	1/12
Housing	house requires major renovation or is ready for demolition	1/18
	neither of bath or shower, kitchen, warm water, toilet	1/18
	overcrowded (less than one room per person)	1/18
Health	partially or severely disabled	1/18
	reporting 2/4 health issues[b]	1/18
	body mass index larger than 30	1/18
Material Deprivation	reporting 2/4 goods missing for financial reasons[c]	1/12
	none of life insurance, pension, owning the house or apartment, other house, financial assets, commercial enterprise, tangible assets	1/12
Social Participation	5/7 activities performed never[d]; remaining at most less than monthly	1/12
	never meeting friends	1/12
Employment	unemployed	1/6
	invol. hours worked < 30	1/18
	precariously employed (incl. temporary work)	1/18

Notes: [a]Graduation in Germany is usually achieved after 10 years of schooling. [b]The four health issues are (i) a strong limitation when climbing stairs, (ii) a strong limitation for tiring activities, (iii) physical pain occurred always or often during the last 4 weeks, and (iv) the health condition limited always or often socially. [c]The four goods asked for are (i) a warm meal, (ii) whether friends are invited for dinner, (iii) whether money is put aside for emergencies, and (iv) whether worn out furniture is replaced. [d]Activities included are (i) going to the movies, pop music concerts, dancing, disco, etc, (ii) going to cultural events (such as concerts, theatre, lectures), (iii) doing sports yourself, (iv) volunteer work, (v) attending religious events, (vi) helping out friends, relatives or neighbours (vii) involvement in a citizens' group, political party, local government.

III.4 Example: the Global MPI

Another example, which is not relevant to most UNECE in content – because it focuses on acute poverty – but may be relevant in concept, insofar as it illustrates the kinds of insights that can emerge from rigorously comparable multidimensional poverty measures, is the global MPI.

The Global MPI is a measure of acute global poverty developed by the Oxford Poverty and Human Development Initiative (OPHI) with the United Nations Development Programme's Human Development Report Office (Alkire and Santos 2010, 2014; UNDP 2010 and Alkire and Robles 2015).[10] Acute poverty is understood as a person's inability to meet *simultaneously* minimum internationally comparable standards in indicators related to the Millennium Development Goals (MDGs)[11] and to core functionings. The mathematical structure of the index belongs to the family of measures developed by Alkire and Foster (2007, 2011a; Alkire, Foster, Roche, Seth, Santos, Roche and Ballon 2015). In particular, the MPI is one possible application of the adjusted headcount ratio, M_0 using indicators that were available for more than 100 developing countries in 2009. The primary data sources are the Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS), with some national or regional datasets also included.

Table 1: The dimensions, indicators, deprivation cutoffs and weights of the Global MPI

Dimensions of poverty	Indicator	Deprived if…	Weight
Education	**Years of Schooling**	No household member aged 10 years or older has completed five years of schooling.	1/6
	Child School Attendance	Any school-aged child is not attending school up to class 8.	1/6
Health	**Child Mortality**	Any child has died in the family in the five-year period preceding the survey	1/6
	Nutrition	Any adult aged 70 or younger or any child for whom there is nutritional information is malnourished.	1/6
Living Standard	**Electricity**	The household has no electricity.	1/18
	Improved Sanitation	The household's sanitation facility is not improved (according to MDG guidelines), or it is improved but shared with other households.	1/18
	Improved Drinking Water	The household does not have access to improved drinking water (according to MDG guidelines) or safe drinking water is equal or more than a 30-minute walk from home, roundtrip.	1/18
	Flooring	The household has a dirt, sand, dung or 'other' (unspecified) type of floor.	1/18
	Cooking Fuel	The household cooks with dung, wood or charcoal.	1/18
	Asset ownership	The household does not own more than one radio, TV, telephone, bike, motorbike or refrigerator and does not own a car or truck.	1/18

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[10] The Global MPI is one implementation of one member of the Alkire and Foster class of multidimensional poverty measures that extends the Foster Greer Thorbecke class of poverty measures (2011a,b). Alkire, Foster *et al.* 2015, a book, systematically introduces this measurement methodology and situates it in the field of multidimensional methodologies used for poverty comparisons.

[11] A revised Global MPI would naturally reflect core poverty indicators in the SDGs.

The 2015 global MPI assesses multidimensional poverty for people in 101 countries for which data from 2005 onwards are available.[12] As summarized in Table 2, the MPI uses information from 10 indicators which are organised in three dimensions:[13] health, education and living standards. Each dimension is equally weighted as is each indicator within a dimension. Each person is denoted as deprived or non-deprived in each indicator based on a deprivation cut-off. Health and Education indicators reflect achievements of all applicable household members. Then, each person's deprivation score is constructed based on a weighted average of the deprivations they experience using a nested weight structure: equal weight across dimension and equal weight for each indicator within dimensions. Finally, a poverty cut-off of 33.33% identifies as multidimensionally poor those people whose deprivation score meets or exceeds this threshold. Figure 3 takes the example of a hypothetical person – Grace – and shows the move from individual deprivations to the deprivation score of each unit (or household) in order to compute the Global MPI for each country.
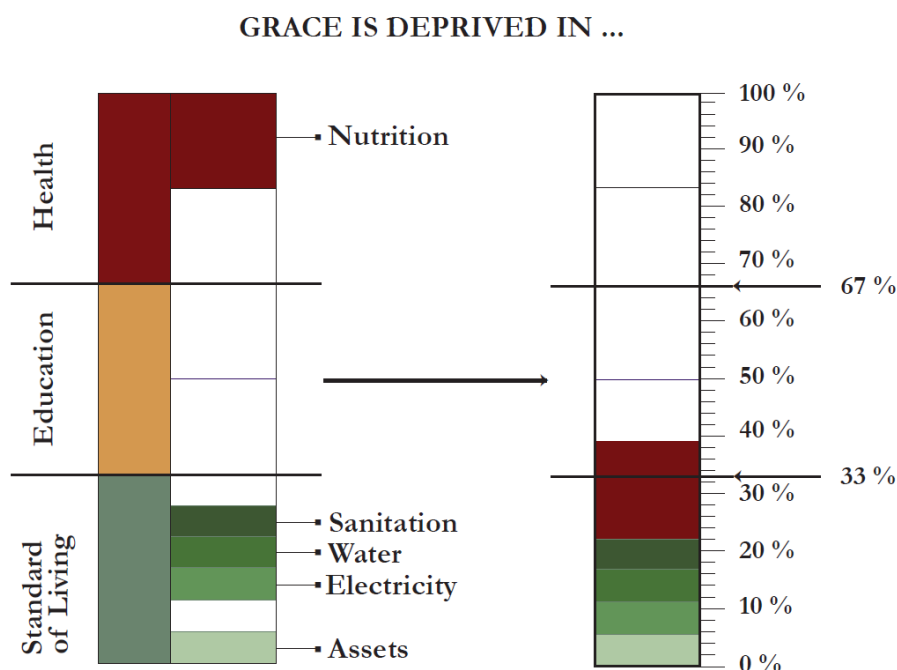
GRACE IS DEPRIVED IN ...

Figure 3 - Moving from individual deprivations to the deprivation score

The MPI reflects both the **incidence** or headcount ratio (H) of poverty – the proportion of the population that is multidimensionally poor – and the average **intensity** (A) of their poverty – the average proportion of indicators in which poor people are deprived. The MPI is calculated by multiplying the incidence of poverty by the average intensity across the poor ($H \times A$).[14] A person is identified as poor if he or she is deprived in at least one third of the weighted indicators. Those

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[12] MPI estimations prior to 2004 are available online in Table 7 and detailed tables upon request.
[13] For a more detailed description of the current indicator definitions, see Alkire and Robles (2015) and for the original MPI indicators see Alkire and Santos (2010).
[14] The MPI can be equivalently computed as the mean of the censored deprivation matrix, times the number of indicators (here, 10). Se Alkire, Foster, Roche, Seth, Santos, Roche and Ballon 2015, Chapter 5.

identified as 'Vulnerable to Poverty' are deprived in 20% – 33.33% of weighted indicators and those identified as in 'Severe Poverty' are deprived in 50% or more of the dimensions.

The Global MPI is published in every Human Development Report since 2010, and from 2015 is being updated twice per year.

III.5 Example: Colombia's MPI – Structure and Policy Applications
Colombia's MPI was launched in 2011 based on the priorities established in the National Development Plan (NDP) of 2011. It uses the Alkire and Foster method to generate the MPI and the associated set of sub- and partial indices. It defines the household as the unit of identification, justifying this not only because of data availability but also because of the desire to recognise the importance of the household and incentivize caring and sharing across household members. It defines 5 equally weighted dimensions, and 15 indicators which are equally weighted within each dimension. The weights and poverty threshold are justified both normatively and also by reference to subjective poverty assessments and to the number of deprivations experienced by persons who are, and are not, income poor. The household survey that provides information for the index is fielded annually and the MPI is updated annually, with the data being publicly available and the .dofiles and other algorithms all freely available online.
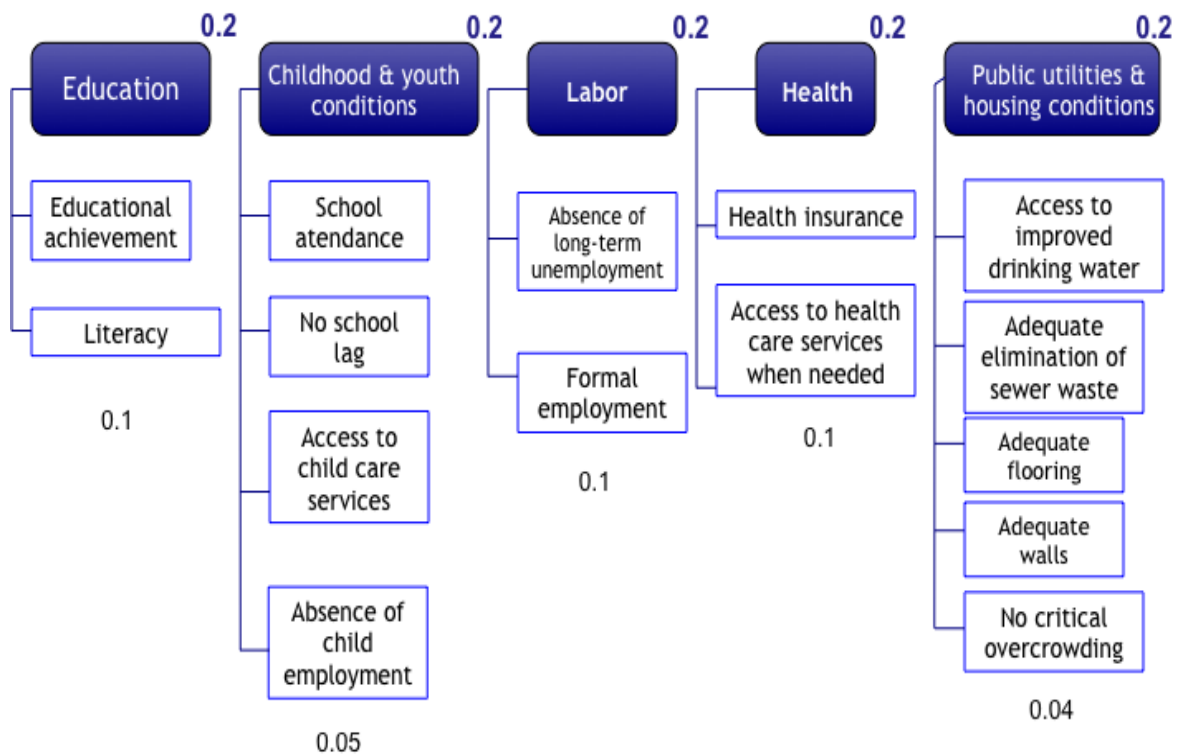
Source: Angulo, Pardo y Díaz (2011)

In the dimension of education, the household is deprived in **education achievement** if members aged 15 or older has less than an average of 9 years of schooling. And the household is deprived in **literacy** if any member 15 years or older cannot read and write.

In the dimension of childhood and youth conditions, the household is deprived in **school attendance** if at least one child (between 6 and 16 years) is not attending school. If at least one
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child aged between 7 and 17 years has **educational gap**, meaning number of approved years lower than the national mean, then the household is deprived in this indicator. The household is deprived in **access to childcare services** if at least one child (aged 0 to 5 years) has no access to childcare (health, nutrition, care). The household is deprived in **child labour** if at least one child aged 12 to 17 is not working.

In the dimension of labour, the household is deprived in **long-term unemployment** if one member unemployed for more than 1 year. And the household is deprived in **formal employment** if at least one member of the household is employed with no pension scheme.

In the health dimension, the household is deprived in **healthcare insurance** if at least one member older than 5 years does not have access to healthcare. And the household is deprived in **healthcare access** when needed if at least one member who in the last 30 days required healthcare but did not seek a physician, specialist, or any health institution.

In the dimension of public utilities and housing conditions, the household is deprived if **water** is not from the tap in urban settings and if the water is from an unprotected source or well in rural areas. The household is deprived in **sanitation** if it does not have a flush septic system in urban areas and it does not have toilet with connection in rural areas. The households is deprived if **dwellings'** walls are made out of plants, fabric, cardboard, rubbish, corrugated iron in rural or urban areas, or of wood without protection in urban areas only. It is also deprived if the dwellings' floor is made of earth. And it is also deprived in **overcrowding** if there are threeindividuals per room in urban areas, or more than three individuals in urban and rural areas.

What is the MPI-C used for in Colombia?	
Targeting	☑
Institutional design	☑
Policy coordination	☑
Monitoring of targets by sector	☑
Graduation of social protection programs	☑
City-level measures	☑
Informing social responsibility investment	☑

Colombia's MPI has proved to be a powerful tool to inform specific policy actions against poverty and track its progress, as it can be broken down to reveal the contribution of each indicator to overall poverty levels and to each of the regions and sociodemographic groups in Colombia. Colombia also developed detailed poverty maps using census data for 11 of the 15 indicators, which provides information to local actors. The MPI directly informs the programme Families in Action that assigns cash transfer to households who improve their educational achievements and it also gives access to the benefits in the UNIDOS programme. Importantly, it is the basis of monitoring and accountability in the special ministerial cabinet round table that ensures the targets in the National Development Plan are on track. At a geographical aggregated level, it also informs targeting of resources. A social map at municipal level is uploaded online, and projects and activities by the private sector and other non-governmental organisations are displayed on it, together with cases of success and other information, in order to urge actors outside government to play their part in fighting poverty in all its dimensions.

Box V.6 Lessons from National MPIs

Columbia:

Angulo (2016) describes the general process through which Columbia has built and implemented its national MPI (C-MPI). The process as described in section V.3 involves some key decisions for the statistical implementation but also requires political coordination to adopt the correct dimensions for the MPI to be a useful policy tool. The Alkire-Foster methodology censors the information from people who are considered non-poor in the aggregation of the MPI. This serves two fundamental purposes: 1) a focus on poverty which makes the index strictly sensitive to changes in the poor people's achievements and 2) sub-group decomposability by gender, geographical location, ethnic groups, and other groups. These properties are instrumental for the purposes of targeting social protection schemes and designing effective public policy (Angulo, 2016). Because most significant tools of the poverty reduction strategy in Colombia are focused on the household rather than on the individual, the unit of identification was chosen to be the household. In Columbia, three (main) stakeholders were involved in the building, dissemination, and application stages of the national MPI: the National Planning Department (DNP), the National Statistics Office (DANE), and the Department for Social Prosperity (DPS). While DANE is the main actor in the dissemination process, the application process at the national level is carried out by the DNP and the DPS. The DNP focuses on monitoring the National Development Plan and public policy design, while the DPS tends to use the C-MPI either as a targeting tool or for designing and operating social programs.

How was the C-MPI used in practice?	
Application	Description
National Roundtable to Reduce Poverty and Inequality	Use of C-MPI in a high-level committee for monitoring the national poverty and inequality reduction strategy
Geographic targeting tool for social programs	- A criterion to introduce geographic differentiation in the conditional cash transfer program (Families in Action Plus)
	- A diagnostic tool for regional development plans elaborated by the DNP and local governments
	- A criterion to distribute the overall number of beneficiaries per municipality in several programs from the DPS
Social map	A geographic tool to encourage public-private partnership to reduce poverty and inequality and improve the quality of life
Graduation criteria for the Colombian safety net to overcome extreme poverty (Unidos)	The C-MPI and the extreme poverty line are two criteria to graduate households from the safety net Unidos. In this case, the C-MPI has to be estimated using beneficiary surveys.
Definition of policy combinations to reduce multidimensional poverty and to consolidate the expansion of the middle class	- Use of the C-MPI to identify the most frequent deprivation combinations in order to design public policy and social programs
	- Use of the C-MPI, in combination with the World Bank's income methodology, to measure the middle class. The DPS is designing a public policy agenda to foster the consolidation of the middle class in the country.

Source: Angulo (2016)

III.6 Example: The Mexican MPI

Mexico's MPI was developed through a process that started in 2000 and culminated with its launch in December 2009. It was the first national poverty measures to reflect multiple dimensions along with income and it is estimated by the Council for the Evaluation of Social Policy (CONEVAL) which has autonomy from the Mexican executive body. To this date it remains the only official MPI that includes its income measure as a single dimension, in this case weighted at 50%.

The national household survey that provides information for Mexico's MPI is fielded every two years. The dimensions were defined by the Legislative power in the General Law for Social Development (LGDS) based on social rights guaranteed by the National Constitution. The unit of identification is the individual person, so the index can be disaggregated by gender and age. Mexico's MPI is defined in the economic wellbeing space and in the social rights space. Economic wellbeing is gauged according to national income poverty line for either urban or rural areas. It uses the food poverty line for extreme poverty and the basic needs poverty line for moderate poverty. The social rights space contains six social rights.

1. The deprivation on **educational gap** occurs when individuals aged three onwards lack mandatory basic education level that prevailed for their cohort.
2. Deprivation in access to **health services** identifies individuals as deprived if they are not enrolled in or entitled to any mechanism of health protection either public or private.
3. A deprivation on **social security** for those economically active occurs if they do not enjoy the benefits established in the law or are not voluntarily enrolled in social security or retirement investment plan. For those out of the labour force, a deprivation in social security occurs when they cannot benefit from a retirement program or pension for them (either voluntary or universal pension system) or their relatives.
4. A deprivation in the **quality of dwelling** occurs when either the ratio per room is greater than 2.5; the dwelling has dirt floor; or is made of cardboard, metal or asbestos sheets; waste; mud; daub; wattle; reed; bamboo or palm tree.
5. A deprivation in access to **basic services** in the dwelling is identified if water is from an unprotected or shared source, the drainage is inexistent or connects to unprotected disposal, there is no electricity, or wood or coal with no chimney are used for cooking inside the dwelling.
6. Deprivations in **access to food** occurs in the presence of moderate or severe food insecurity according to FAO (2006).

A person is identified as multidimensional poor if she is deprived in economic wellbeing by the basic needs poverty line and is deprived in one or more social rights. Hence, income and social rights have an effective weight of 50%, and each of the social rights have an equal weight. A person is in extreme poverty if she is deprived according to a more extreme (food) income poverty line and in at least three social rights. CONEVAL's report on multidimensional poverty presents the headcount ratio of multidimensional poverty (H), and also the average number of social deprivations among the poor. A modified form of a multidimensional poverty index is reported, which is H times the proportion of social rights in which poor people, on average, are deprived (not including income).
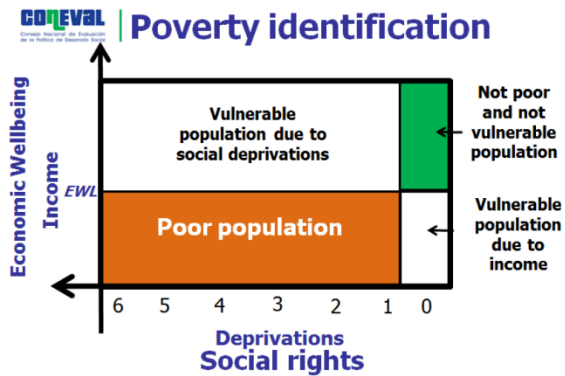
Image from Coneval (2010), used with permission

The household survey that provides information for the Mexico's MPI is fielded and the MPI is updated every two years, with the data being publicly available and the .dofiles and other algorithms all freely available online. The MPI and associated statistics are decomposed by state, by gender, by indigenous identity, and other salient characteristics, and presented in the national reports. Mexico's MPI is used by a Cabinet as a tool for policy coordination across programmes and sectors. In addition, the Mexican MPI was a fundamental informative tool in the creation of two major policies against poverty in 2010: the National Crusade against Hunger and the universal pension system.

III.7. Assessment of the MPI

III.7.1.1 Headline or Tier 1 Poverty Indicator: A headline MPI enables comparisons across regions and trends that summarize at-a-glance if poverty – defined with reference to multiple deprivations – is higher or lower, or has increased or decreased. For "the prospect of headlines like 'Government says poverty is higher, lower and unchanged' hardly inspires confidence" (Alkire Foster Santos 2011).

A national or regional MPI could be reported alongside the monetary poverty headline indicator, as a sister measure. This is increasingly occurring nationally – for example in Colombia, Bhutan, Chile, Costa Rica, El Salvador and Ecuador.

III.7.1.2. Joint Distribution of Deprivations:
For Human development in the context of the Sustainable Development Goals, four criteria are particularly important:
1. **dimensional** analysis,
2. **decomposition** (or disaggregation),
3. **linkages** across dimensions (joint distribution), and
4. **weights** and robustness

The MPI illuminates the overlapping disadvantages poor people experience. It is built from unit data structured to define binary deprivations for each chosen indicator and unit. The deprivation profiles depict the 0-1 vector of deprivations each person does or does not experience. It uses these (weighted) vectors to **identify** who is poor, to **aggregate** information on poverty into a headline measure, and to **generate** the MPI as well as the incidence, intensity, and dimensional composition of poverty. Because of its order of aggregation – first across indicators for each person and then across the population – the MPI captures the interconnections between the

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different deprivations for the same person. In this way the MPI builds upon the counting traditions widely used in Latin America and Europe (Atkinson 2003). Dashboards and standard composite indices do not capture the joint distribution of deprivations, because they first aggregate information about one deprivation across all units.

III.7.1.3. Informs integrated, multisectoral policies: Beyond being the first proposed Sustainable Development Goal (SDG), reducing poverty in all its dimensions is a crosscutting goal in the SDGs. Because an MPI incorporates multiple dimensions, it can promote integrated and collaborative policies across a subset of SDG indicators, while prioritizing the poor. According to a July 2015 UNGA document the SDGs are providing "a stronger incentive than in the past for cross-sector, integrated and collaborative work. Similarly, to evaluate progress under the sustainable development goals, it will be necessary to look at multiple goals concurrently and in an integrated fashion." In terms of core poverty indicators, an MPI is a tool satisfying the call of the SDGs to "facilitate integration and policy coherence across sectors".[15] At the national level, this has already been a key attraction of the MPI, and animates Mexico's Crusade against Hunger and Colombia's Poverty Round Table, as discussed below.

III.7.1.4. Identifies somewhat different set of poor than monetary measures: An MPI cannot be assumed to identify the same persons as poor nor to proxy the level or the trend of income poverty measures. Many studies have documented the mis-match between non-monetary deprivations and monetary poverty. This mismatch is also evident between MPIs and monetary poverty measures. For example in Chile, 14.4% of people are income poor; 20.4% are MPI poor, but only 5.5% are poor in both national measures (Ministerio de Desarrollo Social - Gobierno de Chile, 2015). And a study of moderate multidimensional poverty in 17 Latin American countries over time suggests that a significant proportion of the populations are not income poor yet are multidimensionally poor (Santos *et al.* 2015). Using both income and MPI measures provides a more accurate picture of poverty. Reductions in multidimensional poverty also may not match monetary poverty trends nationally or subnationally. For example, in India the absolute reduction in monetary poverty rates in initially poorer states were faster between 1993-94 and 2004-05; whereas unfortunately the reduction in the MPI poverty rates were slower in initially poorer states during a similar period (Alkire and Seth 2015).

III.7.1.5. Reflects a multidimensional situation no single indicator proxies: Empirical studies also show limited overlaps between deprivations in different indicators. Deprivation in one indicator does not necessarily proxy deprivations in other indicators. For example, the next table shows the deprivation rates of the 10 indicators across 101 countries in the second row and second column. Table 3 also shows at its centre the proportion of population that showed coupled deprivations in any two given of the 10 indicators. We can point out that although the levels of the two education indicators are very similar (18.4% and 19.9%), their overlap is relatively low, with 8% of people experiencing both deprivations.Such a mis-match, which occurs in many indicator pairs, suggests the value of looking at a set of simultaneous

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[15] (The Economic and Social Council of the UN GA, 2015 Session July; A/70/75-E2015/55) http://www.un.org/ga/search/view_doc.asp?symbol=A/70/75&Lang=E That document observes that "Insufficient understanding of and accounting for trade- offs, interlinkages, synergies and benefits across sectors have at times resulted in incoherent policies, adverse impacts of some sector-specific development policies and, ultimately, diverging outcomes and trends across broad objectives for sustainable development." It recognises the need for "United Nations agencies, funds and programmes concerned with a specific goal (e.g. education, health, economic growth)" to take into account targets that refer to other goals".

deprivations together in order to distinguish those who are deprived in larger set of indicators from those who are not deprived or deprived in a lesser set.

Table 2: Average Deprivation in Pair-wise Indicators across 101 Developing Countries

		Years of schooling	School attendance	Child Mortality	Nutrition	Electricity	Sanitation	Drinking Water	Floor	Cooking Fuel
Population deprived in each indicator		14%	14%	17%	27%	22%	40%	26%	27%	53%

Percentage population simultaneously deprived in the column and row indicators

		Years of schooling	School attendance	Child Mortality	Nutrition	Electricity	Sanitation	Drinking Water	Floor	Cooking Fuel
Years of schooling	14%									
School attendance	14%	5%								
Child Mortality	17%	4%	5%							
Nutrition	27%	5%	6%	7%						
Electricity	22%	8%	7%	8%	9%					
Sanitation	40%	10%	10%	11%	15%	19%				
Drinking Water	26%	5%	5%	5%	8%	10%	13%			
Floor	27%	8%	8%	9%	12%	17%	22%	9%		
Cooking Fuel	53%	12%	12%	14%	19%	21%	33%	19%	25%	
Assets	23%	8%	7%	7%	10%	14%	19%	8%	16%	21%

Source: Table 4, Alkire and Robles 2016.

III.7.1.6. Communication and Data Visualization: The MPI is the product of two easy-to-understand and intuitive partial indices. The **headcount ratio** (H) can be easily explained to journalists, who are already familiar with this idea from monetary measures. And the new partial index of **intensity** (A) – the percentage of deprivations that poor people in that country (for example) face at the same time – creates powerful properties yet also ties the poverty measure back to human lives and experiences. Data visualization examples including maps, poverty composition graphics, bubble charts of incidence and intensity, and so on.

III.7.1.7. Decomposition by Population Subgroups: Because the MPI is additive and decomposable, and because the data it uses is directly comparable across populations, the MPI, H, A and dimensional index levels and trends can be disaggregated by any subgroup for which the data are representative, such as subnational region, ethnic group, age group, or other social categories. This supports the SDG goal of 'leaving no one behind' and seeing whether the poorest groups are catching up over time. For example, the global MPI mentioned below has been disaggregated for 1468 subnational regions, by rural-urban areas for all except two countries, by age group (Vaz 2014 and Vaz forthcoming 2015), gender, and, for some countries, by additional variables such as ethnicity, caste, gender of the household head, and disability status (Alkire and Seth 2015). In the 2015/16 Global MPI tables, 990 subnational regions are reported. All low-income countries, 37 of the 39 Sub-Saharan African countries, 9 of the 10 East Asian countries, 14 of the 18 Latin American Countries and all South Asian countries covered can be disaggregated subnationally for example. All National MPIs are disaggregated by relevant groups (geographic, rural-urban, indigenous etc), and South Africa, Mexico and Colombia for example build National MPIs from census data to obtain poverty maps directly.

III.7.1.8. Coordinated Dashboard and Tables: Any MPI will be published with a coordinated dashboard showing the deprivations in each indicator that composes it, and how the composition of poverty varies by subgroup and over time. Such information is essential to guide integrated policies. Whereas the traditional dashboard of non-monetary indicators reflects deprivations of all people, rich and poor (and is also reported), the coordinated dashboard of consistent sub-indices that unpack the MPI is focused on the poor. The MPI and its associated statistics can be reported for more than one poverty line or cutoff. For each national, rural-urban, and subnational entry of the Global MPI, for example, online tables report the headcount ratio H and intensity A (poverty cut-off 33%), dimensional contributions, headcount ratios for poverty cutoffs of 20% and 50%, censored headcount ratio for each indicator, percentage contribution (weighted) of each indicator to overall poverty, and uncensored headcount ratios for each indicator. Standard errors and confidence intervals for national figures are available online (others by request). The tables also report the subset of the poor who are destitute (using a set of destitution deprivation cutoffs for key indicators), and inequality among the poor as well as any drop in the sample retained for estimations. Nationally, similar tables are issued, and the indicator dashboards are used extensively for policy formulation and monitoring.

III.7.1.9. Cross-national comparisons: Alongside *indirect* monetary measures of poverty, Amartya Sen (1981) proposes using *direct* measures of poverty, which reference deprivations in functionings or their proxies. Direct methods verify whether people actually achieve certain *functionings* or satisfy certain needs. Indirect methods such as an income or consumption budget set establish people's access to the resources which might enable them to achieve such functionings – yet do not guarantee them. An additional advantage of direct measures for a regional measure or international measure is that standardized assessments can be compared directly across regions and countries and do not require adjustments for price or PPP or inflation. The MDGs and associated harmonization of social indicators has standardized many deprivation definitions (safe water, adequate sanitation, etc), and a regoinal MPI may build on these and on evolving SDG indicators.

III.7.1.10. Statistical inference: The MPI, H, A and consistent indicator levels and trends are published with their respective standard errors and confidence intervals. This permits assessments of statistically significant differences across poverty levels, including across countries and subnational groups.[16]

III.7.2 Limitations
III.7.2.1. Confusion with Composite Indicators: Just as countries normally measure income per capita, income inequality, and income poverty, so too the suite of human development measures have a measure of each type: a measure of wellbeing (such as the HDI), a measure of inequality (such as the IHDI), and a measure of Poverty (such as the MPI). Each measure is different and valuable in its own right, and they all come together to measure human development.

The largest single disadvantage of MPI is that, because the methodologies are relatively new, statisticians are not familiar with them. In particular, multidimensional poverty indicators are

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[16] Alkire and Santos 2014 compare results for bootstrapped and analytical standard errors for the Global MPI; Chapter 8 of Alkire, Foster, Roche, Seth, Santos, Roche and Ballon 2015 cover analytical standard errors and statistical inference for comparisons of level and trend.

often incorrectly confused with 'composite' indicators which first aggregate across unit data, and then build an overall measure – examples being the better life index, social progress index, and human poverty index. Composite indicators have very different properties. They do not reflect the joint distribution of deprivations. They do not identify who is poor. Also, the weights for composite indicators are required to play a much more demanding role as mentioned above, because they generate marginal rates of substitutability between indicators at different levels of achievement. In contrast, the MPI, like a monetary poverty index or like the material deprivation index, is based on unit record data, and aggregates this for each person or household, identifies who is poor, and only subsequently builds a national measure.

III.7.2.2 Data Requirements Because the data for the MPI must come from a single data source, or from sources that must be merged, the information available for each topic may be more limited than indicators deriving from extensive surveys on a single topic.

III.7.2.3 Generality: No measure will sufficiently reflect poverty for all society groups in all dimensions. Thus the MPI will be used ordinarily within a small set of indicators, for example including income poverty if it is not within the MPI.

The MPI's ability to provide an overview of disadvantages of different population groups may be improved in the design phase. For example, many countries include variables pertaining to childhood and youth in their MPI or else have a separate dimension focused on childhood and youth conditions. In the absence of such an effort, there may be a value in developing a supplementary MPI for children, which is able to highlight the differing challenges faced by children 0-17 in different cohorts across the society. Bhutan, for example, has chosen to produce an MPI for children aged 0-17 which has 50% the same indicators as their national MPI, and 50% child-specific indicators, which are separately defined for each age cohort and, in some cases, gender.

As was mentioned in Chapter 2, given the populations currently overlooked by household surveys, including the homeless, and institutionalized populations, special studies may need to be performed in order to assess the poverty of certain groups which may have unusually high but invisible levels of poverty.

IV. Comparable Dashboards

A dashboard on poverty provides level of deprivation in different dimensions, presenting each dimension using a unidimensional measure. It would desirable for dashboards to have a clear hierarchy and set of priorities, and for example to name a small set of 5-10 indicators as tier 1 or key indicators.

IV.1. Requirements
Processes: The development of comparable dashboards requires a process first of identifying an agreed set of indicators and definitions. Europe's Open Method of Coordination which developed a set of key indicators based on National Action Plans and further discussion, is a good example of such a process.

Data Sources: Following the agreement of indicator definitions, member states need to embark on a process to harmonise survey questions or administrative or registry data sources, sample design and definitions of groups by which indicators are to be disaggregated, periodicity, methods of tabulation, and reporting formats.

Reporting: A comparable dashboard for member states could be reported on a common platform, or provided by a coordinating institution.

IV.2. Example: European Social Indicators

Box IV.1 European Social Indicators
Source: EU social indicators (http://ec.europa.eu/social/main.jsp?catId=756)

The social Open Method of Coordination has developed the EU social indicators in the areas of social inclusion and social protection. The European Social Indicators cover several areas:
- Europe 2020 poverty and social exclusion target
- Overarching portfolio
- Social inclusion
- Pensions
- Health care and long-term care
- Investing in Children

The table below shows the different indicators used to monitor the Europe 2020 poverty and social exclusion target.

At risk of poverty or social exclusion rate (Headline Indicator for Europe 2020)	The sum of persons who are: at-risk-of-poverty or severely materially deprived or living in households with very low work intensity as a share of the total population.
At-risk-of poverty rate	Share of persons aged 0+ with an equivalised disposable income below 60% of the national equivalised median income. Equivalised median income is defined as the household's total disposable income divided by its "equivalent size", to take account of the size and composition of the household, and is attributed to each household member. Equivalization is made on the basis of the OECD modified scale.
Population living in very low intensity (quasi-jobless) households	People aged 0-59, living in households, where working-age adults (18-59) work less than 20% of their total work potential during the past year.
Severe material deprivation rate	Share of population living in households lacking at least 4 items out of the following 9 items: i) to pay rent or utility bills, ii) keep home adequately warm, iii) face unexpected expenses, iv) eat meat, fish or a protein equivalent every second day, v) a week holiday away from home, or could not afford (even if wanted to) vi) a car, vii) a washing machine, viii) a colour TV, or ix) a telephone.

These dashboards are often useful in terms of policy evaluation (e.g. the Europe 2020 vision), monitoring the progress on the poverty and social exclusion target, assessing specific social challenges facing EU countries (e.g. through the Joint Assessment Framework), identifying the key social trends in the EU (e.g. through the Social Protection Performance Monitor), reporting on social policies and adequacy in the EU in terms of child poverty and well-being, and for analytical work in the field of social and economic policy.

Box IV.2 "Social Exclusion Index" - UNDP Regional HDR 2011

The 2011 UNDP Regional Human Development Report introduces a methodology to analyze social exclusion and articulates a conceptual framework for the relationship between human development and social inclusion. If human development is the goal, then social exclusion is the obstacle that limits people to lead lives in accordance to their needs and interests. The conceptual basis assumes individual characteristics, such as identity and status, can put people at risk of social exclusion. Whether exclusion occurs, however, depends on the interaction of individual risks with national drivers of social exclusion, including institutions, norms, values, behavioral patterns, and policies. Varying local contexts also influence the social status of an individual.

The Social Exclusion Survey (2009) was conducted in six countries in the Europe and Central Asia region - Kazakhstan, Moldova, FYR Macedonia, Serbia, Tajikistan, and Ukraine. The countries in transition represent a balance in income, conflict, and geography. The survey uses a multistage random sample of 450 clusters, by age, gender, and territory at the sub-national level. It does not sample pre-defined groups as the report assumes all members of society face some individual risk. 136 questions reflect 500 variables in face-to-face interviews.

The report assumes the respondent's survey answers to be valid for the entire household. Respondents with missing indicators are removed from the sample. The Social Exclusion Index encompasses 6,185 respondents representing 23,091 household members. The unit of observation is the person.

The index is composed of three dimensions of exclusion: economic life, social services, and civic and social participation. Each dimension has eight equally weighted indicators with corresponding deprivation cutoffs. The deprivation cutoff to be considered socially excluded is nine deprivations of 24. The indicators were chosen on the basis of expert opinion, availability of data, and research findings. The authors performed regression analyses to select indicators that best reflected the diversity of living standards across the region and performed a factor analysis that indicated robustness.

The three measures outlined in the AF method are constructed in the Social Exclusion Index. The headcount ratio reflects the incidence of social exclusion. The average deprivation share across the socially excluded reflects intensity. The Social Inclusion Index is the product of the two partial indices and reflects both the incidence and intensity of social exclusion.

Box IV.3 "Social Exclusion Index" (cont.)

Figure 3.4: Social exclusion is the product of a wide range of deprivations

Percentage of people deprived in each indicator by social exclusion status

Indicator	Not excluded	Excluded
Incomes: At risk of poverty rate (60% of median equivalent expenditures)	12	16
Subjective basic needs: Unable to meet basic needs	2	6
Employment: Unemployment (ILO definition)	4	5
Financial services: No bank account on own name	34	32
Housing deprivation: Unable to afford a bed for every HH member, or livingroom furniture	5	19
Amenities: Can't afford washing machine, freezer or microwave	13	27
ICT: Can't afford a computer or internet	18	26
Overcrowding: Households with less than 6m² per person	1	4
Public utilities: Households with no running water or sewerage system	21	29
Public utilities: Households heating with wood or with no heating	20	20
Education: Low educational achievements (basic schooling) and early school leavers	6	12
Education: Unable to afford books for children	13	12
Education: Household with children not in school / preschool	2	4
Health care: Unable to afford medication or dental checks for children	7	16
Health care: Unmet medical needs due to barriers in health care system	22	24
Cultural opportunities: Unable to afford cultural events, or unable to attend due to distance	18	21
Social capital: Rare or seldom contact with family/relatives	3	3
Social capital: Rare contact with friends	2	3
Social capital: Lack of support networks that could help in emergency situations	6	8
Social participation: Can't afford socializing with friends or family	3	8
Social participation: Can't afford books, cinema or theatre	20	29
Civic participation: No participation in elections due to ineligibility or distance	1	2
Civic participation: No participation/membership in associations, teams or clubs	36	29
Civic participation: No participation in political/civic activities	53	32

■ People who face this deprivation, but are not excluded

■ People who face this deprivation and are excluded

Source: Social Exclusion Survey 2009.

Source: UNDP (2011)

Box IV.3 "Social Exclusion Index" (cont.)

The key finding is that despite heterogeneous growth, the intensity of social exclusion is similar across the post-socialist countries. Pre-transition structures, inefficient institutions, and attitudes influence social exclusion in the region. The policy implication is that transitional countries should simultaneously address the three dimensions of social exclusion. Though challenging, the report advocates for a mix of interventions at the lowest level of government to ensure an inclusive society. Social inclusion must be a key policy goal alongside economic goals. Similar to the EU experience, a common set of indicators would benefit policy learning and information exchange. Countries should maintain responsibility to design and implement preemptive policies that address individual risks as well as empowering policies that expand people's opportunities and capabilities. Other policy goals include changing mindsets for tolerant societies, fine-tuning policies to the local context, and integrating monitoring and evaluation into the social inclusion policy process.

Table 3.1: Social exclusion in the six surveyed countries

	KZH	MLD	SER	TJK	FYRM	UKR
Magnitude of social exclusion						
(A) Social exclusion headcount (%)	32	40	19	72	12	20
(B) Intensity: Average number of deprivations among the socially excluded	10.5	11	10.8	11.1	10.8	10.4
(C) Intensity: Average share of deprivations (the number of deprivations as a percentage of the 24)	44	46	45	46	45	43
Social Exclusion Index (A) *(C)	14	18	8	33	5	9
Contribution of dimensions to the Social Exclusion Index						
Economic exclusion	34	32	31	39	30	28
Exclusion from social services	34	39	38	34	38	36
Exclusion from participation in civic and social life and networks	32	30	31	27	32	36

Source: Social Exclusion Survey 2009.

Source: UNDP (2011)

Box IV.3 "Social Exclusion Index" (cont.)

Dimensions	Indicators	Deprived if...
Exclusion from economic life	Incomes	At-risk-of-poverty rate (60 percent of median equivalent expenditures in a country)
	Subjective basic needs	In past 12 months, the household has not been able to afford three meals a day, or pay bills regularly, or keep the home adequately warm, or buy new clothes and shoes
	Employment	Being unemployed or a discouraged worker
	Financial services	Lack of access to a bank account on one's own name
	Housing	The household cannot afford a bed for every member of the household
	Amenities	Household needs a washing machine, freezer or microwave but can't afford one
	Internet and computer	Household needs a computer or internet but cannot afford one
	Overcrowding	Household with less than 6m-squared per person
Exclusion from social services	Water	Household with no running water or sewage system
	Heating	Household heats with wood or with no heating device
	Education	Low educational achievements (basic schooling) and early school leavers
	School materials	Household could not afford to buy school materials for every child in the past 12 months
	School attendance	Household with young children not in school or pre-school
	Medication	Household could not afford medication or dental checks for every child in the past 12 months
	Health care	Medical needs not being met by the healthcare system
	Transportation	Lack of opportunities to attend events due to distance (lack of transportation)
Exclusion from social networks and civil participation	Social ties family	Rare or infrequent social contact with family or relatives
	Social ties friends	Rare social contact with friends
	Support networks	Lack of support networks that could help in the event of an emergency
	Social participation private	In the past 12 months the household has not been able to afford inviting friends or family for a meal or drink at least once a month
	Social participation culture	The household has not been able to afford to buy books, cinema or theatre tickets in the past 12 months
	Social participation clubs	No participation/membership in associations, teams or clubs
	Political participation	Inability to vote due to lack of eligibility or distance to polling station
	Civic participation	No participation in political/civic activities

Source: UNDP (2011)

IV.3. MDGs and SDGs

A prominent implementation of a dashboard approach was the Millennium Development Goals: a dashboard of 49 indicators initially, which were defined to monitor the 18 targets to achieve the eight goals. Improvements in different aspects of poverty were evaluated with independent indicators such as the proportion of people living below $1.25-a-day, the fraction of children under 5 years of age who are under-weight, the child mortality rate, the share of seats held by women in single or lower houses of national parliaments, and so on. The MDG indicators provided a multi-faceted profile of a population's achievements across a range of dimensions and tracked changes in these over time.

The process of developing the more than 231 sustainable development goal indicators and their associated metadata is ongoing at the time of writing. Responding to very strong demands by both government and civil society actors, the process has been considerably more inclusive than the development of MDG indicators. Discussions of the SDG indicators and their underlying data needs were informed by the early work of the High Level Panel, and subsequent group on the Data Revolution. The process since 2015 is described in the document "Data and Indicators for the 2030 Sustainable Development Agenda" (E/CN.3/2016/2) which was affirmed in the 2016 United Nations Statistics Commission; the High Level Panel (July 2016) is the next stage of discussion in which 22 countries are sharing their experience in implementing the SDG indicators.

IV.4. Assessments of Dashboards

Advantages

Dashboards are an essential component of poverty measurement. The issue for decision is not whether to have dashboards – for they will be used in very many contexts. The issue is whether to *limit* poverty measurement to a set of unidimensional indicators, to highlight a subset of these prominently, and to promote their use to assess the overall situation of a population. There are a number of advantages in doing so.

First, the single indicators that comprise a dashboard can draw on different specialised datasets. This provides the possibility of using detailed data sources for each component indicator – which may include surveys, administrative records and registry data, or 'big-data'. Furthermore, the additional information contained in that data source can be used to design sector-specific policies. Thus certain indicators, which are complex or which can only be designed using specialised surveys or sample designs, are likely only to appear in dashboards.

Second, the single indicators that comprise a dashboard can refer to and analyse diverse segments of the population. For example, quality of education and skills formation could be drawn from a survey of schools and school-going children; an employment-related indicator could be estimated from labor force surveys; an indicator of social security could draw upon administrative records, and so on. Also, if surveys are used as the data source, each survey's sample design can be representative for the particular population groups that are of special relevance to that indicator, as these will vary across indicators.

Third, conventions regarding data quality and meta-data are already in place for many social indicators, making their computation relatively straightforward. They are also readily familiar to statisticians and citizens alike, facilitating their communication. And each indicator is likely to be generated by a different expert group with specialised skills and interests in the topic and which will also manage other data sources and analyses related to that sector.

Disadvantages

However dashboards have a set of clear drawbacks.

One potential drawback of dashboards is that they provide too much information, risking diffuse or competing priorities. As Stiglitz Sen and Fitoussi observed, "large and eclectic" dashboards lack a sense of priority. Furthermore, dashboards do not provide an explicit weighting across indicators. These can be ameliorated if, as Atkinson and Marlier suggest, the indicators are organised in tiers, in which the 'top' tier portfolio of indicators is relatively balanced across dimensions, in which the weight is proportionate, and the indicators are easy to communicate and understand.

Second, because dashboards present each deprivation in isolation, and may use distinct and specialised survey instruments, they do not show the overlapping or joint distribution of deprivations. Yet at an ethical level, and from participatory studies, it seems important to know who suffers multiple clustered disadvantages, as these may be more deeply impoverishing than experiencing just one. These cannot be analysed by a dashboard. Furthermore, in terms of policy efficacy, policies that address interconnected deprivations together, in a coordinated, multi-sectoral or integrated approach, have been demonstrated to be more cost-effective (UNDP 2010). Alkire and Robles (2016) have proposed that dashboards drawing on the same survey should, when possible, at a minimum describe this joint deprivation and have proposed graphical methods for so doing.

Third, dashboards do not provide a headline figure. They identify different aspects of poverty individually, but do not identify who is poor overall, based on deprivations in multiple indicators. That provides a communication challenge, when a headline could be, 'poverty has gone up, gone down, and stayed the same' (Alkire Foster and Santos 2011). However, there is clear political as well as societal momentum generated from updates to monetary poverty measures. These updates provide a clear trend that can be discussed and analysed. This momentum can be dissipated by the complexity of a dashboard update. The relationship between income poverty measures and other elements of a dashboard are also not clear.

Fourth, the resource costs for dashboards must be considered. Dashboard indicators may be updated with different frequencies, depending upon the pace of change in an indicator. While this is appropriate, updates of the dashboard will be required to clarify which indicators are based on new data and which are carried over from the previous update. Yet even if each indicator is not updated each year, a large dashboard based on a diversity of specialised and possibly extensive harmonised data sources implies the need to sustain each of these data sources over time, and the cost implications of this must be considered.

V.   Multiple Deprivation Indices

Multiple Deprivation Indices have been generated to complement monetary poverty measures by bringing into view a different but related measure of material deprivation. They have come to greater prominence in Europe because material deprivation, together with quasi-joblessness and At Risk of Poverty and Exclusion indicators, together form the EU-2020 poverty measure. Also, in the UK, the Index of Multiple Deprivation is used for complementary policy purposes.

Material deprivation indices are distinct from the multidimensional poverty indices discussed subsequently for two very significant reason:

i.   They are focused on one dimension: material deprivation

ii.   They combine multiple variables to approximate an underlying unidimensional concept. Therefore the statistical methodologies used to assess validity and reliability in material deprivation indices are distinct from methodologies used to design multidimensional poverty measures, which do not posit an underlying unidimensional concept.

V.1. Requirements:

As in the case of comparable dashboards, the development of official indices of material deprivation requires a <u>process</u> to agree upon set of component items, and to assess and select the final methodology; harmonisation of <u>data sources,</u> including frequency, disaggregation; and reporting comparable indices on a central platform.

V.2 Example: Material Deprivation in Europe

One multiple deprivation approach, to tackling poverty and deprivation, is the Material Deprivation Rate. Eurostat (2002) constructed an index of non-monetary poverty (*pauvreté d'existence*) for European countries, and the index reported since 2010 by Eurostat built upon it. The Material Deprivation Rate is an indicator which is defined as the enforced inability to afford some items which are considered, by most people, to be desirable or even necessary to lead an adequate life. Importantly this indicator considers the *choice* that individuals have, it is only if they cannot afford the good or service, rather than choose not to have them. The indicator is computed by Eurostat and published as part of the EU-2020 target; a sub-indicator of the 'people at risk of poverty or social exclusion' indicator (Eurostat, 2015). The standard EU Material Deprivation rate is defined according the proportion of individuals within households which have an enforced inability to afford three or more of the nine specified items, these individuals are classed as 'materially deprived' (Guio et al., 2013). Individuals are seen as 'severely materially deprived' if they have an enforced inability to afford four or more of these items. The nine items currently adopted within the EU portfolio, drawn from Guio et al. (2009), are shown below:

1) coping with unexpected expenses;
2) one week's annual holiday away from home;
3) avoiding arrears (in mortgage or rent, utility bills or hire purchase instalments);
4) a meal with meat, chicken, fish or vegetarian equivalent every second day;
5) keeping the home adequately warm;
6) a washing machine;
7) a colour TV;
8) a telephone;
9) a personal car

In order to aggregate the data; different characteristics (i.e. the 9 items) are combined at the individual level, then summed over individuals to form an aggregate index. This is referred to as an 'aggregated' indicator. This is distinct from 'composite' indictors, such as the HDI approach, which first aggregates across people and then across these characteristics.

V.2.1 Construction of the Material Deprivation Index

To justify the nine items Guio et al. (2009) show that they each met two selection criteria – social consensus and homogeneity of preferences. To begin with 15 'objective' items, within three groups: Economic Strain, Enforced Lack of Durables and Housing, were identified in EU-SILC.

They focus on the criteria stemming from the approach developed by Peter Townsend (1979), that the 'poor' are defined as: "the persons whose resources (material, cultural and social) are so limited as to exclude them from the minimum acceptable way of life in the Member State to which they below" (Guio et al., 2009). This approach points to a relative measure of what is the acceptable minimum, it is however, rather vague. In order to make concrete what was vague, Guio et al. (2009) used an EU wide Eurobarometer survey in 2007. With this they attempted to identify the *relevance* of each of the items. Answers for each of the 15 items where under the categories: "absolutely necessary, no one should do without", "necessary", "desirable but not necessary" and "not at all necessary". They found all but one item, enforced lack of a *computer*, was found to be at least "necessary" by at least 50% of the EU sample. The second criteria is concerned with **homogeneity of preferences**, that the ideas of what is minimally acceptable should be held common throughout different social strata of the population, otherwise what is unacceptable could become the opinion of one group. They used bivariate analysis in order to assess the influence of: gender, subjective financial difficulty, age, household type and occupational status. They found that, even through this second criteria, only the *computer* item failed the criteria.

The next stage was to assess the Dimensional Structure of the index. What was required was not as such the individual items themselves, but the latent underlying situation of deprivation they aimed to capture. Therefore, what was necessary was the analysis on the dimensional structure, to inform the decision of how to aggregate the items into an index which captured just this. To conduct the analysis Guio et al. (2009) used Confirmatory Factor Analysis (CFA). CFA assumes the precise structure of the factor model, then tests to see whether or not the data used meets the necessary conditions for its valid application. There were two models suggested; the first three-factor solution, with each Economic Strain, Enforced Lack of Durables and Housing, the second a two-factor solution, merging Economic Strain and Enforced Lack of Durables into one variable. From the results the EU opted for the two-factor solution; firstly, as in the three-factor model the correlation between Economic Strain and Enforced Lack of Durables was very strong and secondly, it was seen as advantageous in terms of parsimony.

With a two-factor solution, the indicators for Economic Strain/Enforced Lack of Durables and Housing could be seen as distinct. Further to this, Cronbach Alpha tests were ran (which measures the internal consistency of the scale) finding that the Economic Strain/Durables had relatively high values, while Housing did not perform so well. With this result Giou et al. (2009) decided to depart from the Housing dimension, recommending that further research should be conducted, and focusing upon the uni-dimensional material deprivation framework, with the 9 items shown above. Furthermore, Giou et al. (2009) concluded, from an analysis of five weighting procedures, that the impact of the weighting scheme has little impact when ranking countries; that the index would weighted equally, as it was both simple, transparent and suitable for the EU Material Deprivation Index.

V.2.2 Material Deprivation Rate: Availability and Results

The indicator is updated annually, based on the *EU Statistics on Income and Living Conditions* (EU-SILC) instrument, and is publically available on the Eurostat website. For some countries the oldest data begins in 2004, while the most recent can be found for 2015. The indicator has been used by the European Commission, alongside their measure of Monetary Poverty and Very Low Work Intensity, to assess their progress in reaching the EU-2020 goal to 'reduce the number of people at *risk of poverty or social exclusion* by 20 million by 2020 compared with 2008' (Eurostat, 2015). As previously discussed in Chapter 2, a degree of overlap exists between those classed as Materially Deprived, Income Poor and Expenditure Poor. A similar overlap emerges within the

three sub-indicators. In order to reach the 2020 target a focus upon one aspect of poverty or social exclusion is not enough, a multifaceted approach, backed with reliable data is necessary.

Figure 4: Aggregation of sub-indicators of 'People at risk of poverty or social exclusion', EU-28, 2013 (Estimated Data, Million People)
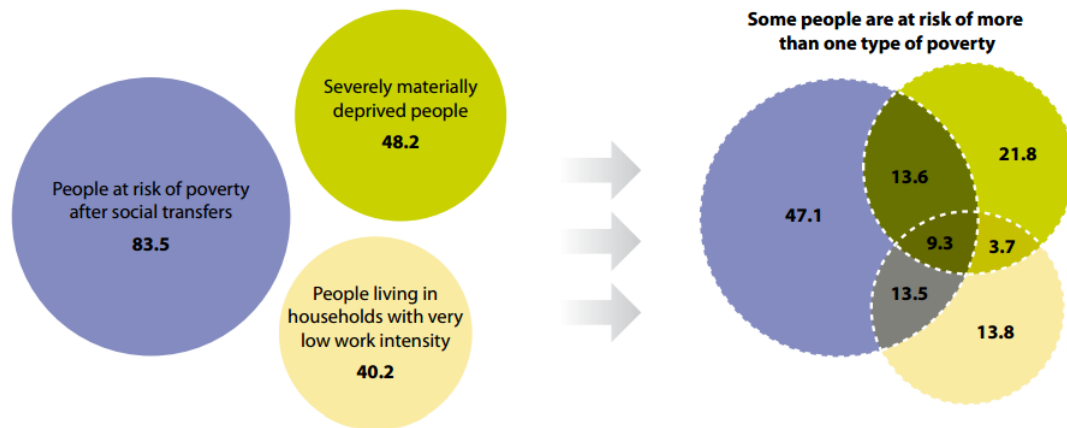
==Permission will need to be requested to publish this and subsequent figures.==

Further to comparisons between sub-indicators Eurostat provides detailed data for each country, in each possible year, for the index. Below, three mediums Eurostat provides are shown for the % of the population who are 'severely materially deprived'. Table 3 shows the data for each country, in each year the index is available,

Figure 6: Severe Material Deprivation Rate, by Sex and Age Group, EU 28, 2010 and 2013
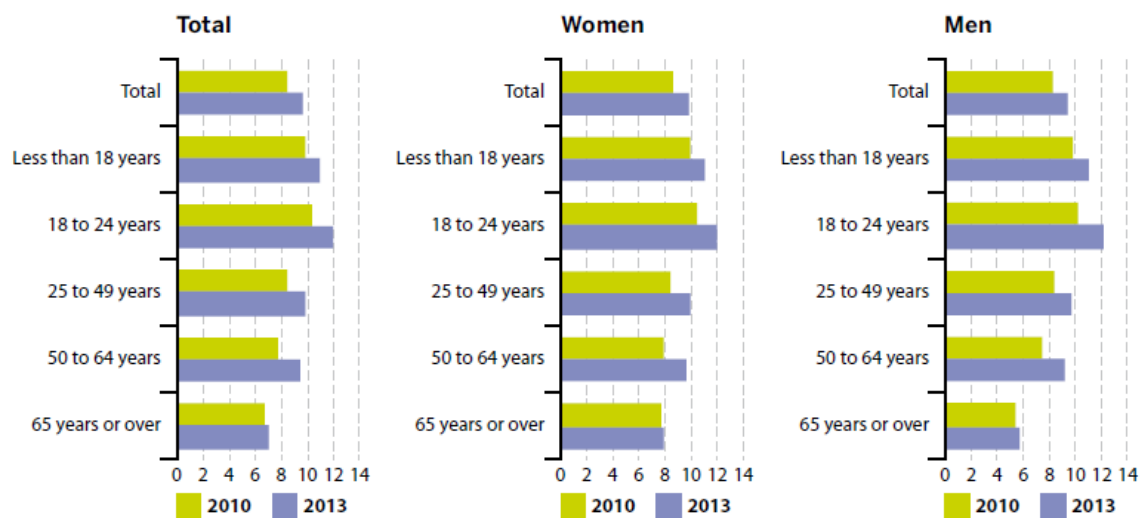

Figure 7: Severe Material Deprivaion Rate by Household Type, Educational Attainment and Country of Birth, EU-28, 2013
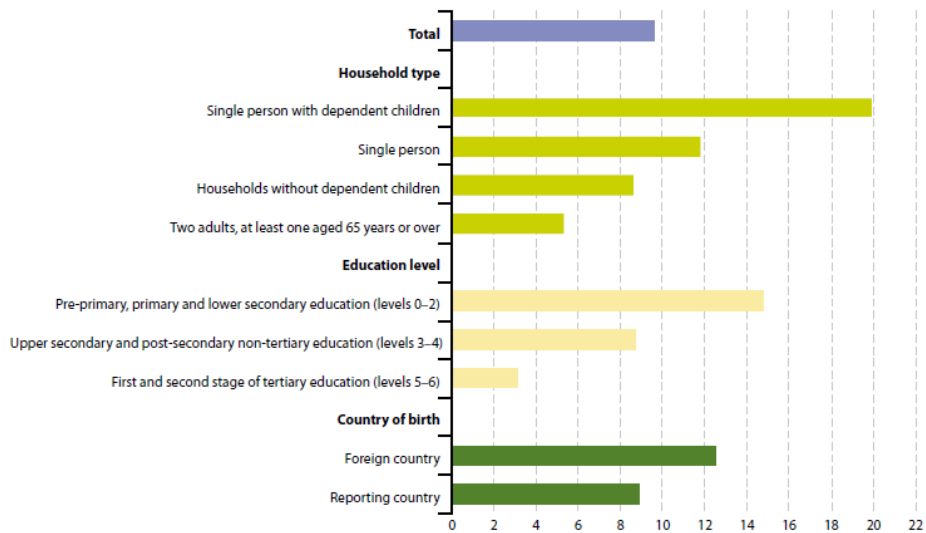
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Figure 8 graphically highlights the differences between countries, in 2008 and 2013, while Figure 5 provides a geographical mapping of the differences between countries' severe material deprivation for 2014.

Figure 5: Map of Severely Materially Deprived Countries, 2014 (% of pop.)[17]Data is also provided at a decomposed level, for demographics such as Age, Gender, Household type, Educational Attainment and Country of Birth. Figure 6 and Figure 7 show some of these decompositions in graphical form.
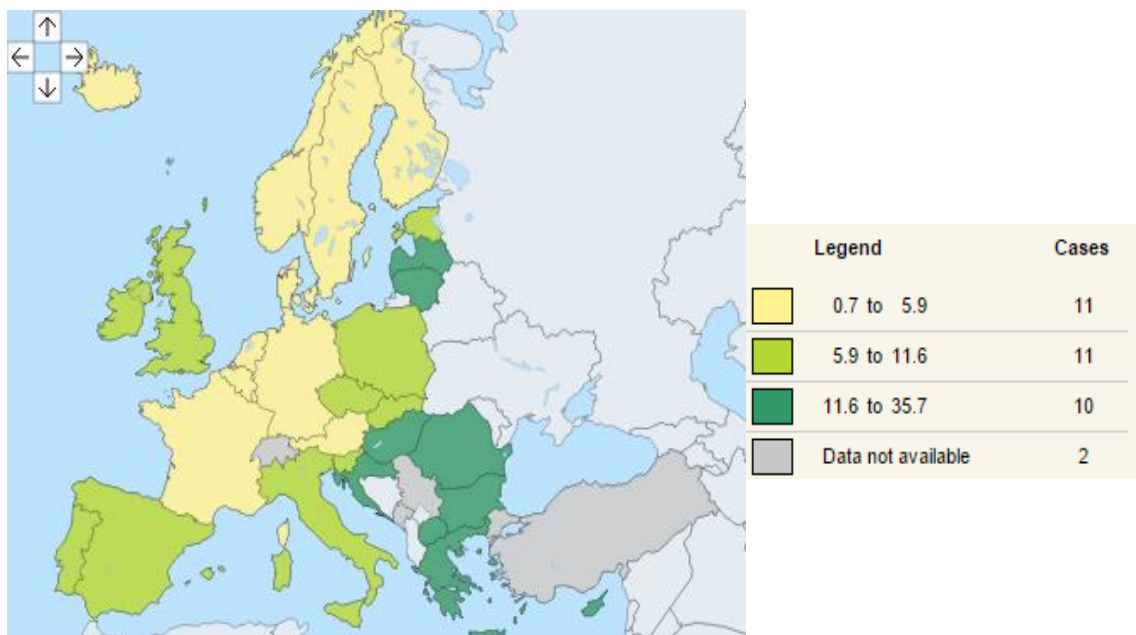
[17]Accessed   at:
http://ec.europa.eu/eurostat/tgm/refreshMapView.do?tab=map&plugin=1&init=1&toolbox=types&pcode=t2020_53&language=en [03/02/2016]

Table 3: Severely Materially Deprived People (% of pop.)[18]

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
EU (28 countries)	:	:	:	:	:	:	8.5	8.9	9.9	9.6	9.0	:
EU (27 countries)	:	10.8[e]	9.9[e]	9.2	8.5	8.2[e]	8.4	8.8	9.9	9.6	8.9	:
Euro area (18 countries)	:	6.0	5.8	5.5	5.9	5.9	5.9	6.8	7.7	7.4	7.3	:
Belgium	4.7	6.5	6.4	5.7	5.6	5.2	5.9	5.7	6.3	5.1	5.9	:
Bulgaria	:	:	57.7	57.6	41.2	41.9	45.7	43.6	44.1	43.0	33.1[b]	:
Czech Republic	:	11.8	9.6	7.4	6.8	6.1	6.2	6.1	6.6	6.6	6.7	:
Denmark	2.9	3.2	3.1	3.3	2.0	2.3	2.7	2.6	2.8	3.6	3.2	:
Germany	:	4.6	5.1	4.8	5.5	5.4	4.5	5.3	4.9	5.4	5.0	:
Estonia	9.4	12.4	7.0	5.6	4.9	6.2	9.0	8.7	9.4	7.6	6.2[b]	:
Ireland	4.8	5.1	4.8	4.5	5.5	6.1	5.7	7.8	9.8	9.9	8.4	:
Greece	14.1	12.8	11.5	11.5	11.2	11.0	11.6	15.2	19.5	20.3	21.5	:
Spain	4.8	4.1	4.1	3.5	3.6[b]	4.5	4.9	4.5	5.8	6.2	7.1	6.4[p]
France	6.1	5.3	5.0	4.7	5.4	5.6	5.8	5.2	5.3	4.9	4.8	:
Croatia	:	:	:	:	:	:	14.3	15.2	15.9	14.7	13.9	:
Italy	7.0	6.8	6.4	7.0	7.5	7.3	7.4	11.1	14.5	12.3	11.6	:
Cyprus	:	12.2	12.6	13.3	9.1[b]	9.5	11.2	11.7	15.0	16.1	15.3	:
Latvia	:	39.3	31.3	24.0	19.3	22.1	27.6	31.0	25.6	24.0	19.2	16.4
Lithuania	:	32.6	25.3	16.6	12.5	15.6	19.9	19.0	19.8	16.0	13.6	:
Luxembourg	0.8	1.8	1.1	0.8	0.7	1.1	0.5	1.2	1.3	1.8	1.4	:
Hungary	:	22.9	20.9	19.9	17.9	20.3	21.6	23.4	25.7	27.8	23.9	:
Malta	:	5.4	3.9	4.4	4.3	5.0	6.5	6.6	9.2	9.5	10.2	:
Netherlands	:	2.5	2.3	1.7	1.5	1.4	2.2	2.5	2.3	2.5	3.2	:
Austria	3.8	3.5	3.6	3.3	5.9[b]	4.6	4.3	4.0	4.0	4.2	4.0	:
Poland	:	33.8	27.6	22.3	17.7[b]	15.0	14.2	13.0	13.5	11.9	10.4	:
Portugal	9.9	9.3	9.1	9.6	9.7	9.1	9.0	8.3	8.6	10.9	10.6	:
Romania	:	:	:	36.5	32.9	32.2	31.0	29.4	29.9	28.5	26.3	:
Slovenia	:	5.1	5.1	5.1	6.7	6.1	5.9	6.1	6.6	6.7	6.6	5.8[p]
Slovakia	:	22.1	18.2	13.7	11.8	11.1	11.4	10.6	10.5	10.2	9.9	:
Finland	3.8	3.8	3.3	3.6	3.5	2.8	2.8	3.2	2.9	2.5	2.8	2.2[p]
Sweden	3.0	2.3	2.1	2.2	1.4	1.6	1.3	1.2	1.3	1.4	0.7	:
United Kingdom	:	5.3	4.5	4.2	4.5	3.3[u]	4.8	5.1	7.8[b]	8.3	7.3	:
Iceland	2.5	2.7	2.1	2.1	0.8	0.8	1.8	2.1	2.4	1.9	1.4	:

[18] :=not available e=estimated b=break in time series p=provisional u=low reliability
Available at: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=t2020_53 [03/02/2016]

Norway	2.7	3.5	2.8	2.3	2.0	2.2	2.0	2.3	1.7	1.9	1.2	:
Switzerland	:	:	:	2.3	2.1	2.1	1.7	1.0	0.8	0.7	:	:
Republic of Macedonia	:	:	:	:	:	:	34.7	40.3	40.9	37.7	35.7	:
Serbia	:	:	:	:	:	:	:	:	:	26.9	26.3	:
Turkey	:	:	67.5	58.8	57.7	56.7	:	:	:	:	:	:

Figure 6: Severe Material Deprivation Rate, by Sex and Age Group, EU 28, 2010 and 2013[19]
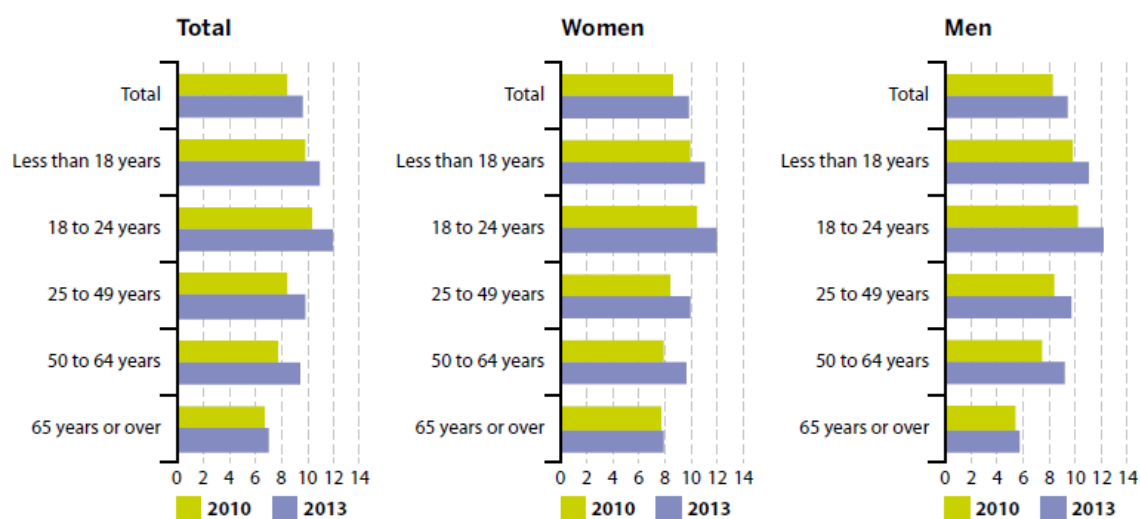
Figure 7: Severe Material Deprivaion Rate by Household Type, Educational Attainment and Country of Birth, EU-28, 2013[20]

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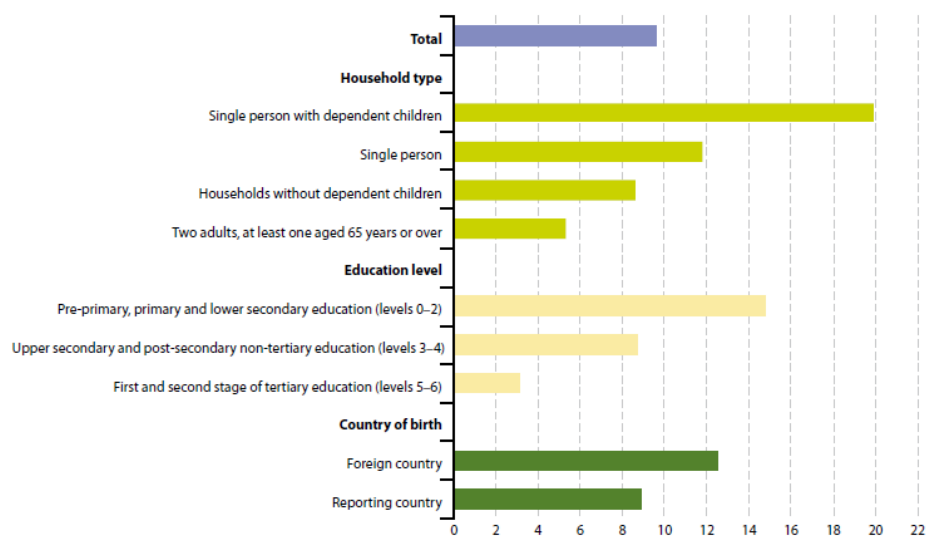
[19] 2013 Data are estimates: (Eurostat, 2015)

[20] Estimated data; for education the population is restricted to those aged 18 or over. (Eurostat, 2015)

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Figure 8: Severely Materially Deprived People, by Country, 2008 and 2013 (% of pop.)[21]
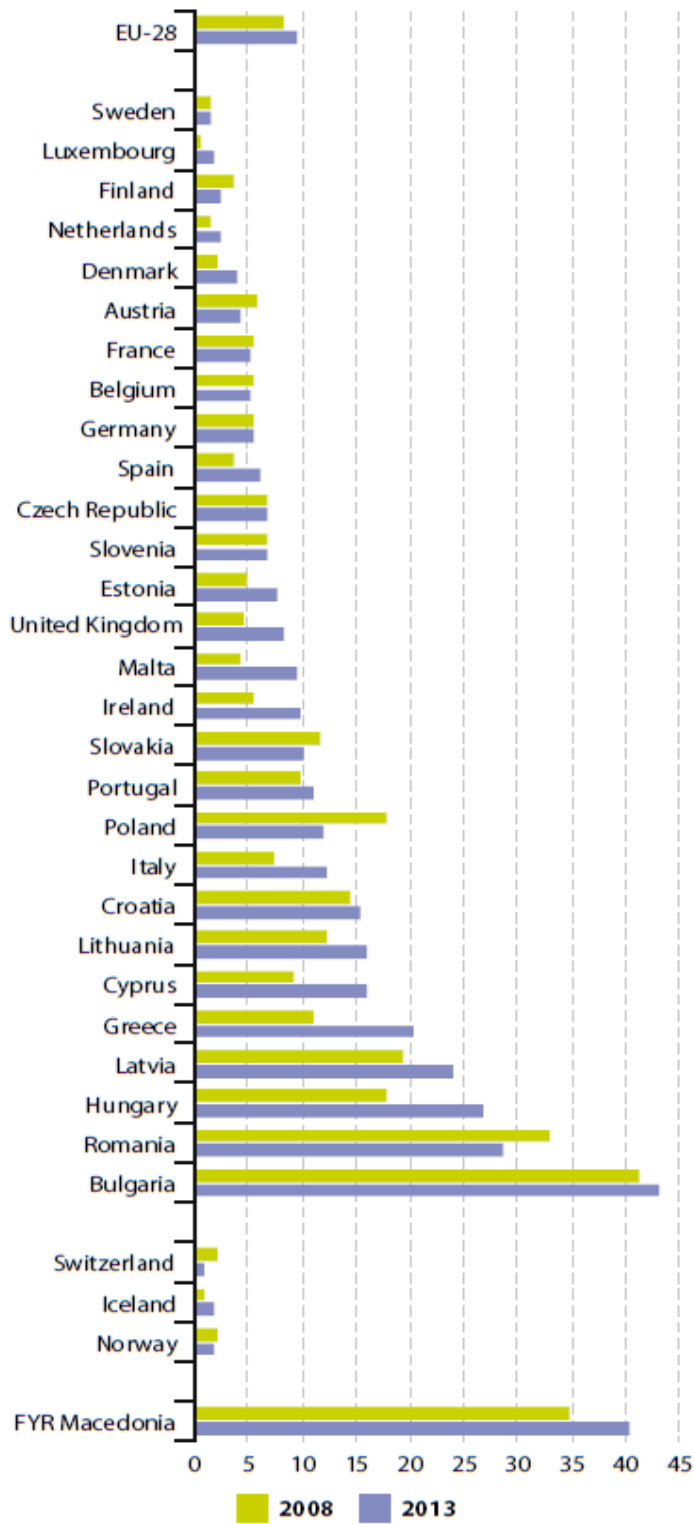
[21] (Eurostat, 2015)

V.2.3 Alternative Material Deprivation Rate

With a view to revising the official Material Deprivation Index, an alternative indicator has been proposed more recently by Guio, Gordon and Marlier (2012). Their suggested indicator consists of 13 items; six of which are within the existing indicator, seven of which are new. Furthermore, they have created a separate indicator for children (1-15) with 18 items. As with the previous item set Guio et al. (2012) are positing the set of items to identify the latent characteristic of deprivation. Based on this proposal the extended 13-item list has been collected in EU-SILC 2013 and 2014. The proposed list for MD indicators for the whole population, from Guio et al. (2012), is as follows:

a) **Personal items**: The person cannot afford (but would like to have, i.e. a lack is an 'enforced lack' and does not simply reflect a choice):

> 1. To replace worn-out clothes by some new (not second-hand) ones
> 2. Two pairs of properly fitting shoes, including a pair of all-weather shoes
> 3. To spend a small amount of money each week on oneself without having to consult anyone
> 4. To have regular leisure activities
> 5. To get together with friends/family for a drink/meal at least monthly

b) **'Household items'**, i.e. items collected at household level (population: whole population living in private households). The household cannot afford:

> 6. To replace worn-out furniture
> 7. A meal with meat, chicken, fish or vegetarian equivalent every second day
> 8. To face unexpected expenses
> 9. One week annual holiday away from home
> 10. To avoid arrears (mortgage or rent, utility bills or hire purchase instalments)
> 11. A computer and an Internet connection (enforced lack: cannot afford but would like to have)
> 12. To keep home adequately warm (enforced lack)
> 13. A car/van for private use (enforced lack)

As an illustration, if we set the threshold at 5+ missing items (out of 13), the proportion of materially deprived people in the EU as a whole (EU-27 weighted average) is 17.7 % in 2009, a percentage that is close to the current EU indicator of 'standard' MD (3+ items are lacking out of nine) which is 17.1 %. A threshold of 7+ missing items (out of 13) leads to a MD rate for the EU as a whole that is slightly higher than the current EU indicator of 'severe' MD (4+ lacked items out of nine): 9.2 % as opposed to 8.1 %.

The proposed MD indicator, from Guio et al. (2012), for children is as follows:

a) **'Children's items'**, i.e. items specifically focused on children (these items are collected at household level). The household cannot afford for at least one child to have (enforced lack):

> 1. Some new (not second-hand) clothes
> 2. Two pairs of properly fitting shoes, including a pair of all-weather shoes
> 3. Fresh fruits & vegetables daily
> 4. One meal with meat, chicken, fish or vegetarian equivalent daily
> 5. Books at home suitable for the children's age
> 6. Outdoor leisure equipment

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7. Indoor games

8. A suitable place to do homework

9. Regular leisure activities (sports, youth organisations, etc.)

10. Celebrations on special occasions

11. To invite friends round to play and eat from time to time

12. To participate in school trips and school events that cost money

13. One week annual holiday away from home

b) **'Household items'**, i.e. items collected at household level (population: whole population living in private households). The household cannot afford:

14. To replace worn-out furniture

15. To avoid arrears (mortgage or rent, utility bills or hire purchase instalments)

16. A computer and an Internet connection (enforced lack: cannot afford but would like to have)

17. To keep home adequately warm (enforced lack)

18. A car/van for private use (enforced lack)

V.2.4 Statistical Assessment of the Alternative Material Deprivation Rate

In order to select the indicators Guio, Gordon and Marlier (2012) proposed an analytical framework to ensure that firstly, the *dimensional structure* was coherent and secondly, that the indicators were **robust** and could be used to monitor and analyse 'deprivation' at national and EU levels (Guio et al., 2013). Robustness was assessed on an item-by-item basis, considering: suitability, reliability validity and additivity. The items used had to identify the unobserved characteristic of 'deprivation', which is the characteristic of interest, while fulfilling the analytical criteria. The full set of items to consider was from the 2009 wave of EU-SILC, numbering 50 items, with 17 child specific items. While this analytical framework follows in the footsteps of the Guio et al. 2009 selection criteria, the methods used are somewhat more advanced. Both address the *dimensional structure* of the proposed index, consider the relevance/suitability of the proposed items, establish that they conform to a *homogeneity of preferences* and conduct tests, such as that of the Cronbach alpha. Yet, the later paper conducts further tests and provides a more clear structure to their analytical framework; through the *robustness* checks.

The *dimensional structure* was assessed using three type of *dimensional analysis; factor analysis, multiple correspondence analysis* and *cluster analysis*. *Factor analysis* is concerned with grouping a wide number of variables into a smaller dimension; identifying two components: a common component and an idiosyncratic component. Variables can then be grouped into a smaller number of factors, each factor with a common trend, with each individual variable containing some idiosyncratic error, diverging away from that which is common. Four factors were selected: 'Material Deprivation', 'Basic Durables, Basic Amenities and Housing', 'Local Environment' and 'Accessibility Problems'. The first two were closely correlated; while the later two were only weakly correlated. This confirmed that they measure distinct characteristics of living conditions. The second analysis, *multiple correspondence analysis* is not dissimilar to principle component analysis, with categorical data. The results they found were similar to the first analysis, however, the housing dimension was clustered with the MD dimension. *Cluster analysis*, the final stage of analysis, examined the multidimensional grouping of variables. Their main findings were that the 'local environment' appeared to be a distinct cluster, a distinct cluster related to 'accessibility problems' could be formed from two items, and that basic amenities and basic durables was grouped. Those items relating to 'housing' were borderline in many of the tests. While not explicitly excluding any variables, the *dimensional structure* analysis enabled a grouping of the items into factors/clusters.

Next was the analysis to exclude those variables which were not **robust**. The *suitability* of the item was determined by whether citizens of different member states considered that item to be necessary to enable people to have an acceptable standard of living within their country. This criterion was assessed in a similar way to that in the Guio et al. (2009) item set. Most of the items were 'wanted' by the vast majority of the population at both national and EU levels, with the minimum proportion of people 'wanting' the item at 60%. This was assessed by an EU wide Eurobarometer survey, in 2007, for stated preferences, and 2009 EU-SILC data, to assess actual behaviour. Further tests for the *homogeneity of preferences* within countries were conducted, as above, with the main result that there was a high degree of consistency between groups.

For *validity* each item had to 'exhibit statistically significant relative risk ratios with three independent variables known to be correlated with MD (At-risk-of-poverty, Subjective poverty and Self-reported health status)' (Guio et al., 2012). The aim was to ensure that each item within the set was correlated with variables known to be correlated with deprivation, the latent construct. Binary logistic regressions were run, for each item, and the significance of the relationship tested. Items were 'invalid' if two out of three validity tests were not significant, and the item rejected if it was 'invalid' for 2 of 26 member states. For the indicators for the whole population two items were rejected, while 13 items were rejected for the child population. For those deprivation items that remained there was a clear social gradient with each of the three independent variables in all EU countries.

Reliability assessed the internal consistency of the scale as a whole. This was measured by to how closely the set of MD items were related as a group; based upon Cronbach's alpha, within Classical Test Theory. Cronbach's alpha measures how close a set of items are as a group; often interpreted as the expected correlation of two items that try to identify an underlying latent variable. If Cronbach's alpha is sufficiently high, 0.7 or higher in the literature, then the item can be considered to be 'reliable', and 'unreliable' if it does not reach this threshold. The item was 'unreliable' if it was considered 'unreliable' in three or more countries. There were 14 items which were rejected due to the initial *reliability* tests. Additional analysis was ran by using Item Response Theory (IRT). IRT can provide additional information about the reliability of each individual item. The IRT model assumes 'deprivation' is an unobservable variable that can be measured indirectly through certain indicators, or items. The items need to be able to well distinguish between different levels of 'depravity'; this 'discrimination' is a desirable trait as the indicator should well measure how 'deprived' an individual is. A two-parameter IRT test was ran to ascertain the 'severity', "the likely severity of MD suffered by a person who lacks this item", and 'discrimination'. A range of 'severity' values was desirable, and a 'discrimination' level above 0.4 was required. This was carried out at both the EU level, and individual member state level. Four items for the whole population indicator were found to be problematic, with one suspect case, while three items were problematic, one suspect and one borderline for the child indicator.

In order to test for *additivity* the MD indicator's components must add up; that those who have a higher score for the MD indicator are indeed suffering more than those with a lower score. This was tested using an ANOVA model. The models assume that individuals with two deprivations should have, on average, lower net equalised incomes than those suffering from one deprivation. The additivity analysis was conducted on both EU and country level, and rejected one item for the child population.

The indicators which did not pass each of the **robustness** checks were dropped; the 13, and 18, indicators proposed for the whole, and child population respectively, revised material deprivation rate, passed each check of suitability, reliability validity and additivity.

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Guio and Marlier (2013) also examine the overlap between the current (3+ deprivations out of 9) and the alternative (5+ deprivations out of 13) measures of multiple deprivations. Figure 9 shows the overlap between the two measures. While the mismatch exists between those who are identified as poor in each of the two measures, the overlap is considerable in all countries studied. At the EU-27 level, 13% of people are deprived in both measures and around 9% deprived in one but not the other (Guio and Marlier, 2013). Approximately 74% of those who are considered deprived using the Alternative Material Deprivation measure separately are in fact deprived in the standard Material Deprivation.
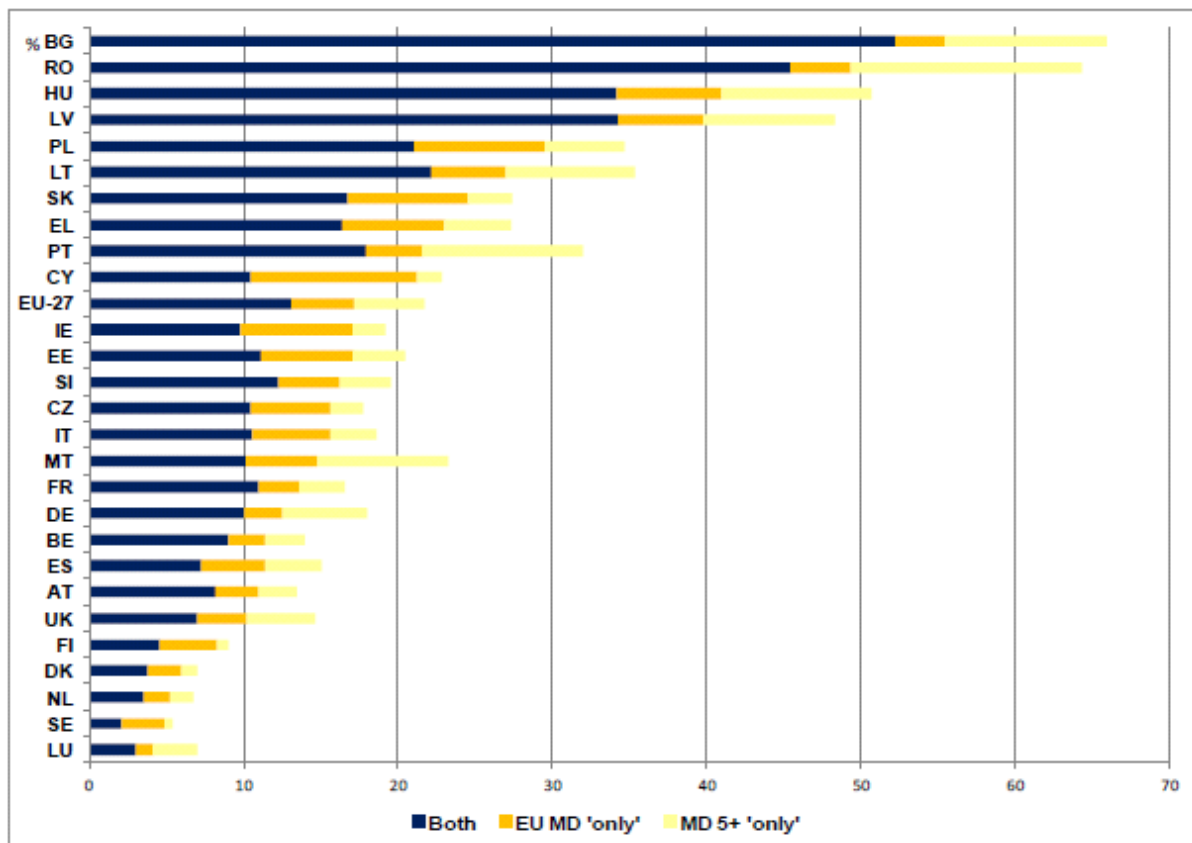
Figure 9 - The overlap between Current (in dark yellow) and Alternative (in light yellow) measures of Material Deprivation in %. Source: Guio and Marlier (2013) using EU-SILC 2009 Cross-sectional Data

V.2.5 Policy Uses of Deprivation Indices

The Material Deprivation Index has been used within EU policy in several ways. Since 1987, in order to provide for the most deprived in society, the EU developed the Food Distribution programme for the Most Deprived Persons. In 2014 the EU Parliament set forth regulation which created the 'Fund for European Aid to the Most Deprived'.[22] This programme aims to alleviate deprivation, and ensure member states can progress towards the EU-2020 goals. €3.8 billion of funding, in real terms, has been allocated for the period 2014-2020, where member

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[22] Document Accessible at:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2014:072:0001:0041:EN:PDF [09/02/2016]

states would co-finance 15% of programmes in line with the fund, where the fund would provide the remaining 85%. The fund does not explicitly require the use of the Materially Deprived Rate and allows for a degree of flexibility for specific member states. There are, however, several examples of member states utilising the fund, to adopt programmes to specifically reduce the number of materially deprived individuals. Latvia for instance will receive €41 million in the period 2014-2020 to help tackle its high rate of severe material deprivation.[23] Greece and the Czech Republic will receive €280 million and €23.3 million, respectively, to address food and material deprivation of specific groups.[24] Each member state can access the fund and while not the only measure of poverty and deprivation that will be used by programmes accessing this fund, the Material Deprivation Rate will have an important role in enabling countries to best allocate these funds.

It will be necessary for member states to focus upon groups who are *at risk of poverty and social exclusion* in order to make progress towards the EU-2020 poverty goals. Within the National Reform Programmes (NRPs) member states have defined national targets within the more general EU goals. 'Youth on the move', 'An Agenda for new skills and jobs' and 'European Platform against poverty' are all flagship initiatives which outline the actions to be taken to enable member states to focus upon these groups (Eurostat, 2015).

While just one policy tool which can be utilised to enable Europe to progress towards the EU-2020 goals, as a core element of the *at risk of poverty and social exclusion* headline indicator, the Material Deprivation Rate will be invaluable in the future. With member states being able to use the statistics to highlight areas and groups in deprivation, and funds such as the 'Fund for European Aid to the Most Deprived' being available, deprivation in Europe will hopefully decrease towards the EU-2020 targets.

V.2.6 Summary: Material Deprivation rate

The Material Deprivation Rate is an indicator which is defined as the enforced inability to afford some items which are considered, by most people, to be desirable or even necessary to lead an adequate life. By using the set of proposed items, the aim is to measure the latent construct of 'deprivation'. Those individuals who do not have the *choice* to be able to afford a certain number of items, 3 or 4, are seen to be deprived. The MD rate is distinct from other Multidimensional Indices in two key aspects; firstly the items proposed are not in themselves of immediate interest, but enable the unobservable 'deprivation' factor to be measured, secondly it is an 'aggregated' indicator, rather than a 'composite' indicator, where the characteristics (or items) are aggregated at the individual level then summed over individuals. In order to select the items a series of rigorous statistical tests have been conducted by Guio et al. (2009), leading to the nine items shown above. These items are used in the computations by Eurostat to form the index, which is being used as a sub-indicator of the 'people at risk of poverty or social exclusion' indicator for the EU-2020 target. An alternative, whole population and child population, index has been proposed by Guio et al. (2012) to reflect the additional data available, collected in EU-SILC 2013 and 2014.

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[23] Press Release: http://europa.eu/rapid/press-release_IP-14-1234_en.htm [09/02/2016]
[24] Press Release: http://ec.europa.eu/social/main.jsp?langId=en&catId=1089&newsId=2184&furtherNews=yes [09/02/2016]

V.3 Example: English Index of Multiple Deprivation

In Britain, the interest in measuring geographical variations in social and economic circumstances (to guide urban policy resource allocation) came in the wake of the emergence of the concept of 'social exclusion' in the European Union in the 1980s. In the UK it led gradually to the creation of an Index of Multiple Deprivations which has different definitions in England, Ireland, Scotland and Wales. Here we focus on the English index.

As part of its efforts at countering social exclusion, funding schemes such as Neighbourhood Renewal Funding, Sure Start and Urban Bus Challenges were launched to be targeted to the most deprived local authorities in England. Initially the government of England developed indices of deprivation in 2000, and improved upon them first in 2004 and next in 2007, then 2010 and 2015. The English Indices of Deprivation are the Government's official measure of multiple deprivations at the small area level. Deprivation is measured on a relative scale; an area would be characterised as deprived, if it was deprived *relative to other areas*.

The Index uses census and administrative data to map differences in deprivation across local areas for the targeting and effective provision of government services. The Index combines indicators that cover a range of economic, social and housing issues into a single deprivation score for each small area in England allowing them to be ranked in order of deprivation around the average score. The Indices are then used to analyse patterns of deprivation, to identify areas that would benefit from special state initiatives and are also used to determine eligibility for specific funding streams. For example, the Index of Multiple Deprivation 2007 (IMD 2007) which forms part of the ID 2007 was based on the small area geography known as Lower Super Output Areas (LSOAs). LSOAs have between 1000 and 3000 people living in them with an average population of 1500 people.[25] There are also two supplementary indices i.e. Income Deprivation Affecting Children and Income Deprivation Affecting Older People which are subsets of the income deprivation domain.

The model of multiple deprivation is based on the idea of distinct dimensions of deprivation which can be recognized and measured separately. The IMD brings together 37 different indicators which cover 7 dimensions along which deprivation takes place: Income, Employment, Health and Disability, Education, Skills and Training, Barriers to Housing and Services, Living Environment and Crime. Statistical indicators for each domain are combined to produce ward rankings for each domain. The different domains are then combined to create the overall IMD 2007 after being weighted as follows: Income (22.55), Employment (22.5%), Health and Disability (13.5%), Education, Skills and Training (13.5%), Barriers to Housing and Services (9.3%), Living Environment (9.3%) and Crime (9.3%). The weights selected were based on theoretical considerations and took account of established academic work, the results of research on previous Indices and the consultation process. The indicators for each domain were selected according to technical criteria so that all indicators would be:

- 'Domain specific' and appropriate for the purpose (i.e. the best possible measures of that form of deprivation);

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25 There are 32,482 LSOAs in England. The LSOA ranked 1 by the IMD 2007 is the most deprived and that ranked 32,482 is the least deprived. In most cases, these are smaller than wards, thus allowing the identification of small pockets of deprivation.

- Measure major features of deprivation (not just conditions experienced by a very small number of people or areas);
- Up-to-date;
- Capable of being updated on a regular basis;
- Statistically robust; and
- Available for the whole of England at a small area level in consistent form.

In order to calculate the Indices of Deprivation 7 steps are followed, these are summarised below in Figure 1.

Figure 10: Overview of the Methodology[26]
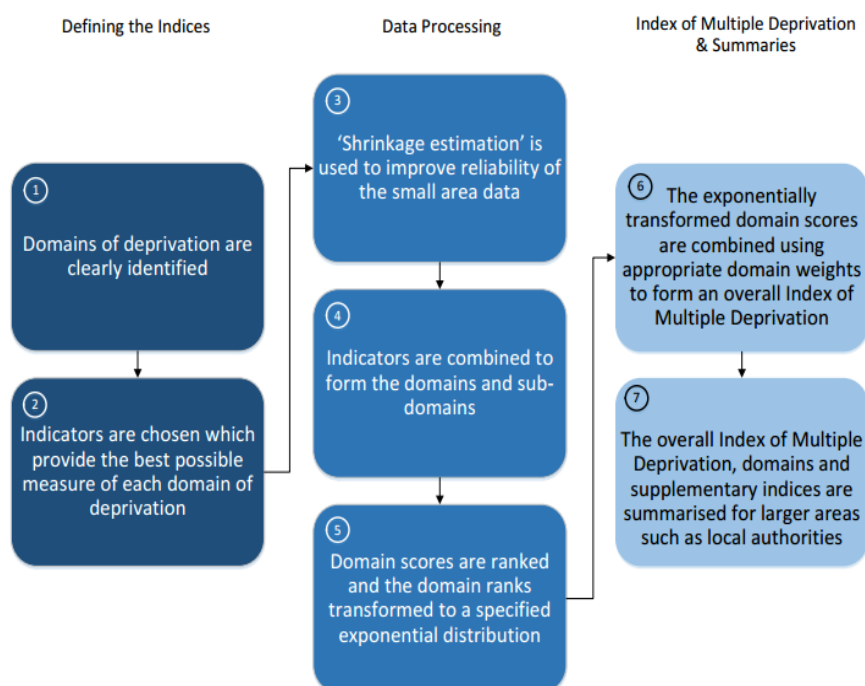
At the district level 6 local authority district level summary measures of the IMD have been produced. The six summary measures are:

1. **Average Score:** the population weighted average of the combined scores for the SOAs in a district.
2. **Average Rank**: the population weighted average of the combined ranks for the SOAs in a district.
3. **Extent**: the proportion of a district's population living in the most deprived SOAs in the country.
4. **Local Concentration**: the population-weighted average of the ranks of a district's most deprived SOAs that contain exactly 10% of the district's population.

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[26] (Smith, Tom, et al., 2015)

5. **Income Scale**: the number of people who are income deprived.
6. **Employment Scale**: the number of people who are employment deprived.

No single summary measure is favoured over another as there is no single best way of describing or comparing England's 354 local authority districts because of the diversity in population density and composition. However, once the index is calculated the data can be accurately mapped to reveal the most (and least) deprived areas in England, as shown in Figure 2, and is available as an interactive map. Data is available at the small area level, at both IMD level and individual domain level, for Decile, Rank and Score statistics. The former two statistics relay data about the deprivation within that area relative to the other areas, and the latter statistic, from which the former two are calculated, is calculated for each indicator within each domain, with specific numerators and denominators.

Figure 11: The Index of Multiple Deprivation 2015[27]

Contains OS data © Crown copyright (2015)
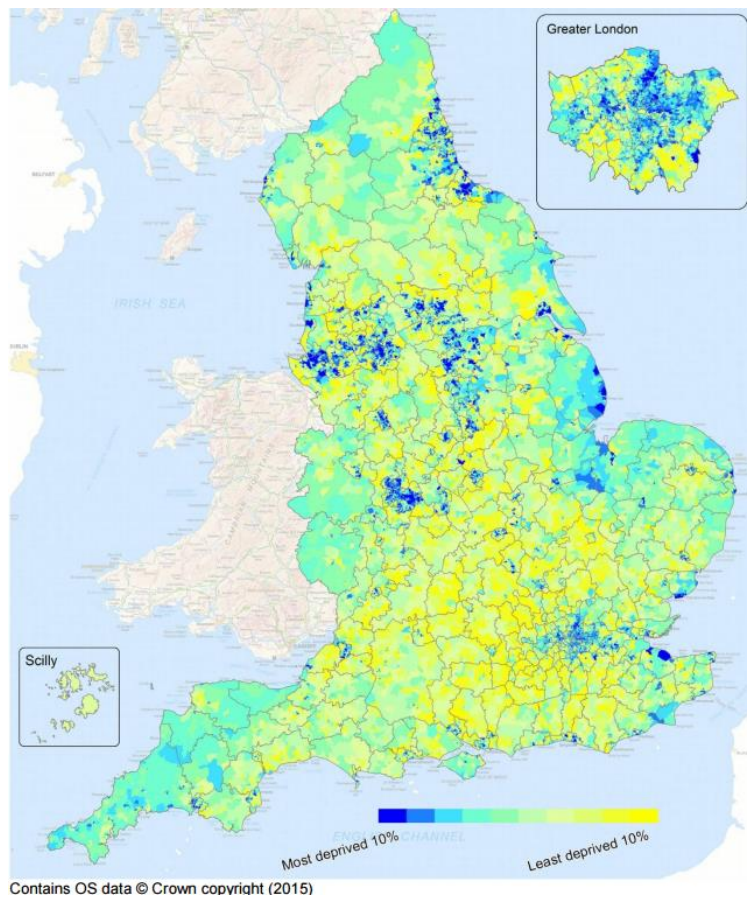
Possible Limitations

While the IMD is a useful tool, in measuring deprivation in England there are several limitations which should be considered.

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[27] (Smith, Tom, et al., 2015)

- The published ranks and deciles are purely relative, while the interpretation of the scores is not straightforward. Neither statistic is cardinal, so comparisons cannot be done on an absolute scale.
- There are issues relating to dynamic comparisons; while the index for an area is comparable for one year, real comparisons overtime are difficult due to the relative nature of the index.
- The data for each of the indicators is not from a single consistent time point (however, most for the 2015 IMD are from the 2012/13 tax year). Furthermore, the data will always lag somewhat behind the current situation, making recent changes to address issues unrepresented.
- While the Decile, Rank and Score statistics is readily available there is limited availability of the 'raw' empirical data, so assessment of the robustness of the index is somewhat difficult.
- There are separate indices produced for each of England, Northern Ireland, Scotland and Wales, making comparisons between the four infeasible.

V.4 Assessment of Deprivation Indices

V.4.1 Advantages:
The clear advantage of Material Deprivation Indices is that they capture aspects of economic deprivation that monetary poverty measures overlook, that people experience, and that, furthermore, show surprising levels of mis-match with income poverty. Thus they improve the extent to which poverty statistics match experiences of poverty.

Used together with income poverty measures, the material deprivation measures may improve the accuracy of poverty assessments. For example they also may reflect wealth or permanent income insofar as these are relevant to the poor but omitted from monetary measures.

Material deprivation indices have fewer data requirements than monetary measures in terms of survey length and complexity, and may have lower non-sampling measurement errors. .

The material deprivation index, once validated, is easy to compute and to compare across countries. Comparisons do not require prices, inflation, or purchasing power parity between currencies.

V.4.2 Limitations:
The material deprivation index is a limited proxy for this particular concept. So by design it does not reflect other relevant dimensions of poverty, nor their joint distribution. For example, quasi-joblessness shows yet a different pattern of deprivation, as might health or education.

For the above reason, the index is a very welcome item on a dashboard, or component of an index, but is not a stand-alone measure of poverty in all its dimensions.

Some elements of the material deprivation index that may be validated statistically may be problematic for other reasons, including in terms of policy prescriptions – car ownership being one such example. So the methodology needs to incorporate consultative input and policy considerations into indicator design, while ensuring that the final measure satisfies statistical criteria.

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