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Abstract

Important aspects of wellbeing are not captured by standard monetary measures of poverty. To address this concern, an established tradition of multidimensional poverty measurement accounts for these nonmonetary dimensions directly and aggregates them into an index. The analysis in this paper places monetary wellbeing alongside nonmonetary dimensions using comparable data across 119 countries for circa 2013, representing 45 percent of the world's population. By doing so, this paper explores the share of the deprived population that is missed by sole reliance on monetary poverty as well as the extent to which monetary and nonmonetary deprivations, measures of education and access to basic infrastructure services, are jointly presented across different contexts. Accounting for these aspects of wellbeing alters the perception of global poverty. The share of poor increases by 50 percent – from 12 percent living below the international poverty line to 18 percent deprived in at least one of the three dimensions of well-being. Across this sample, only a small minority of the multidimensionally poor are deprived in only one dimension, while more than a third of the poor suffer simultaneous deprivations in all three dimensions. We quantify the extent to which monetary and non-monetary deprivations coincide. Cross-country comparison suggests that targeted spending on the monetary poor and on primary education are associated with lower rates of coincidence and thereby a more even distribution of deprivation.

Introduction

Consider the following hypothetical example. Two families have the same income, say, US$3.00 per person per day. However, only one family has access to adequate water, sanitation, and electricity, while the other lives in an area lacking the necessary infrastructure for basic services, such as a power grid or water mains. This second family will still consume water and use energy for lighting and cooking. But they may have to spend hours per week fetching water from a well or pay higher prices to obtain lower quality water from a truck. For sanitation, they may use a private or communal latrine, without the convenience or hygiene benefits of a sewerage connection. And with no access to an electricity grid, its choice set for lighting and power options is severely reduced. Both households will spend some of their $3.00 per person per day to meet their energy and water needs. Yet, because their choice sets (including the prices they face) are so different, the differences in their living standards arising from the access that the first family enjoys are not captured by a monetary measure of poverty alone. The first family clearly enjoys a higher standard of living than the second, but a welfare judgment that considers only their incomes will pronounce them equally well-off. This is an example when public action – or lack thereof – can directly affect the well-being of households by expanding – or not – their choice sets in ways that incomes and prices fail to fully internalize. Indeed, it is possible that, under a broader assessment of poverty, the second family might be considered poor or deprived, even though its daily income is above the international poverty line of US$1.90 per day.

Let us be clear: Income (or consumption expenditures valued at prevailing market prices) are hugely important for human well-being. Indeed, they are the workhorse metrics of individual welfare in economic analysis. They summarize a household's capacity to purchase multiple goods and services that are crucial for well-being, such as food, clothing, and shelter. And they do so with one remarkable property: because consumers choose the quantities they consume of various goods taking their relative prices into account, these relative prices serve as natural weights with which to aggregate those quantities consumed. That is why poverty has typically been defined in terms of whether a household's income reaches or surpasses a monetary threshold, the poverty line, which represents the minimum amount needed to purchase a sufficient quantity of essential goods and services.

Yet, the point of the example is that monetary-based measures do not encompass *all* aspects of human well-being. One reason for this is that not all goods and services that matter to people are obtained exclusively through markets. Consequently, the prices necessary to cost these goods and services either do not exist or do not accurately reflect their true consumption value (World Bank 2017). Common examples of nonmarket goods without prices are public goods such as a clean environment and a secure community. Examples of goods with prices that often do not reflect true consumption value include those that require large public investments to make available – the provision of a power grid is often necessary before a household can access electricity. Other core services at least partially provided through systems supported by direct government spending include health care and education. General government health expenditure accounts for more than

half of total global health expenditure. Likewise, governments on average spend the equivalent of nearly 5 percent of the gross domestic product (GDP) of their economies on education. The presence of such goods renders the traditional monetary welfare measure incomplete with respect to a variety of core aspects of well-being.

This paper considers a notion of poverty that recognizes the centrality of the monetary measure, but looks to complement it by explicitly treating access to key non-market goods as separate dimensions of well-being. Specifically, the paper analyzes a multi-dimensional poverty measure derived from standardized data for 119 countries that provide a global picture for circa 2013. The multidimensional measure in anchored on consumption or income as one dimension of welfare, and also includes several direct measures of access to education and utilities (such as electricity, water, and sanitation) as additional dimensions.

This approach adopts a living standards perspective, in that each dimension is valued instrumentally, i.e. each dimension represents the ability to command goods and services that households value for other ends (i.e. consuming or owning these commodities allows for the satisfaction of different needs and wants). But it is also consistent with the capability framework, which calls for expanding the evaluative space for assessing welfare (Sen, 1987). The capability approach advocates for a broader perspective to capture the "plurality of different features of our lives and concerns" (Sen 2009, p. 233). In this approach people have varying abilities to convert resources into the opportunity to be and do what they most value, i.e. into what Sen terms capabilities.

Of course, measuring poverty multidimensionally is not a new endeavor. Indeed, multidimensional poverty measures have become widespread both at the global and national level. The capability framework inspired the development of the first global efforts to measure poverty multidimensionally. These were carried out by the United Nations Development Programme (UNDP), through the Human Poverty Index in the late 1990s (UNDP 1997), and more recently, through the Global Multidimensional Poverty Index (Global MPI), produced in conjunction with the Oxford Poverty and Human Development Initiative. The Global MPI was introduced in the 2010 Human Development Report (UNDP 2010) and reported annually for over 100 countries. At the country level, an increasing number of governments are choosing to expand or complement their poverty measures with multidimensional indicators. Both the UNDP's and most of the national efforts build on influential research by Sabina Alkire and James Foster (see e.g. Alkire and Foster, 2011). We add to this rich literature by a conducting a first global exercise of multidimensional poverty that explicitly anchors non-monetary deprivations with monetary poverty.

Methodological choices

The selection of the dimensions and indicators relevant to the measurement of standards of living is never simple. Possessing a clear conceptual framework to advise this process is therefore fundamental. The approach to the selection of the nonmonetary indicators is guided by the idea that poverty, at least in part, represents an inability to reach a minimum standard of material well-being comprised of both market and nonmarket goods.

The choice of dimensions is informed by the following core principles:

- Centrality of private consumption. Private consumption (or income, when the former is not available) captures people's access to certain crucial goods and services, including food, clothing, and shelter. The consumption measure uses market prices to aggregate across the various consumption goods.[2] Market prices reflect the ability of people to purchase goods and services while allowing for variation in individual preferences. Other aspects of well-being on which prices are not available or are arguably not a good representation of value should therefore complement monetary poverty. Public goods as well as private goods that are heavily subsidized are cases in which prices either do not exist or, if they do exist, do not closely represent the household's valuation of the good.
- Relevance. The indicators included should be relevant in that they are widely acknowledged to represent essential aspects of well-being. Indicator thresholds should reflect minimum basic needs, comparable with the US$1.90 per person per day poverty lines. The SDGs and other similar initiatives provide useful guidance.
- Data availability. Indicators should ideally be derived from the same data source (typically a household survey). One of the key features of the multidimensional approach is that it can be used to assess the extent to which deprivation in one dimension is related to deprivation in other dimensions for the same individual. However, because of the requirement about data sources, the choice of the dimensions and indicators to be included will ultimately be shaped by the availability of meaningful data.
- Parsimony. The multidimensional measure should be parsimonious. It should involve only a small number of judiciously selected dimensions to lend prominence to multidimensionality while ensuring sufficient population coverage.

Due to data limitations, there is a trade-off between the number of dimensions (measured by harmonized indicators) that can be included in the multidimensional poverty measure and the number of countries that can be included in the analysis. For instance, comprehensive assessments

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[2] So long as markets work reasonably well, prices – the weights for the quantity of goods and services consumed – bear a very close relationship to the marginal contribution of those goods to wellbeing. In technical terms, the ratio of two prices equals their marginal rate of substitution between the two goods. When externalities or other imperfections distort the market price, then a shadow price can be used in principle to value a good. However, the information required to estimate an accurate shadow price is high and frequently shadow prices cannot be estimated with much accuracy. Typically, when there is no adequate comparator, or the distortion is too great, one moves to add the good or service in question as a separate dimension.

of health services and health outcomes are rarely available in the same household survey that also contains the lengthy questionnaires typically necessary to measure consumption poverty. In this paper, country coverage has been prioritized at the expense of coverage of dimensions. To get a global picture, three dimensions are considered, including consumption, represented by six indicators. The three wellbeing dimensions considered are the following:

- *Monetary well-being.* The first dimension is the monetary measure of well-being that the World Bank uses as its principal poverty measure: the income or consumption expenditure per person per day, valued at 2011 purchasing power parity (PPP) U.S. dollars, that is available to the individuals in the household (SDG target 1.1). The dimension encompasses the range of goods and services that can be purchased at market prices. The sufficiency threshold is the international poverty line, currently set at US$1.90 per person per day. Individuals living in households in which per capita income falls below this cutoff are considered deprived in the monetary dimension of well-being.
- *Education.* While education may be available through private or public institutions, provision among a large share of the population is fully or partially subsidized in most countries. The price that families must pay therefore does not adequately represent the value of the service. Indexes of multidimensional poverty typically include at least one indicator of access to formal education (related to SDG 4). Most often, this is a measure of school attendance (among children and youth of school age) and/or educational attainment (among adults). The education dimension here similarly has these two components. These indicators are available for many countries and are standardized in recent surveys across 119 countries.
- *Access to basic utilities.* The third dimension encompasses access to key services that often require large-scale public investments to make them widely available. Access to electricity and a certain standard of drinking water and sanitation are critical for economic activity and survival (related to SDGs 6 and 7). While many individuals pay for the provision of these services (through utility bills or otherwise), the choice set available to users (and their prices) depends to a large extent on the initial investments that governments have made on electricity grids and water and sewer networks. This public action often determines the price and quality of the service provided.[3] Indicators can be standardized across multipurpose household surveys to reflect wider definitions of "at least limited" drinking water and "at least limited" sanitation used in the SDG monitoring.[4]

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[3] Hentschel and Lanjouw (2000) distinguish three reasons for the price of public utilities to vary across consumers: rationed markets, public subsidies and increasing marginal tariff rates. The authors present a method to impute the value of consumption of basic utilities irrespective of the source of water, cooking fuel or electricity to be incorporated into the consumption aggregate. At present, data is not available at a large scale across countries and thus cannot be implemented.

[4] The core SDG drinking water and sanitation indicators focus on a concept of "safely managed", but there are relatively few datasets available with all necessary criteria (and data sources beyond household surveys are needed for some aspects of safely managed sanitation services). SDG monitoring also uses the less-stringent concepts of "limited" and "basic" access adopted in this paper, for which data availability is higher, and due to the strong relevance

Table 1 illustrates the indicators.

Table 1. Dimensions of Well-Being and Indicators of Deprivation

Dimensions	Indicators	Weight
Monetary poverty	Daily consumption or income less than US$1.90 per person	1/3
Education	At least one school-aged child up to the ages of grade 8 is not enrolled in school	1/6
	No adult in the household (ages of grade 9 or above) has completed primary education	1/6
Access to services	The household lacks access to limited-standard drinking water	1/9
	The household lacks access to limited-standard sanitation facilities	1/9
	The household has no access to electricity	1/9

One limitation of the approach followed here is that it relies on indicators that are readily available in standard household surveys. For many of the dimensions considered, relevant information on the important aspect of service quality is sometimes available in specialized surveys, but not in standard household surveys that also record other data on well-being. Essential information on quality thus cannot be used for various indicators here. If this information becomes available through multipurpose household surveys in the future or if a method can be developed to apply relevant administrative data at a sufficiently granular level, then subsequent measures of multidimensional well-being may reflect quality more accurately.

Each of the dimensions selected is considered fundamental to well-being, even if other, equally important aspects of living standards are missing. They are important separately, but also in the way they are often present or absent together. We, therefore, examine the share of people deprived according to each separate indicator, along with measures that capture the degree to which these deprivations arise together by counting the number of deprivations that individuals experience. In addition, we present summary indicators that combine household information on well-being across dimensions into a single number. Such indicators facilitate comparisons across countries and time, especially if the extent of deprivation within countries varies across dimensions under consideration.

Any aggregation of indicators into a single index invariably involves a decision on how each of the indicators is to be weighted. There are various approaches to the selection of weights, including those stipulated by policy makers and those that are based on a poll of the preferences among the target population (Decancq and Lugo 2013). While there are advantages and disadvantages to each of the methods, the approach chosen here follows standard practice in the field. Dimensions are

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of the concepts globally. SDG "at least limited" drinking water is drinking water that comes from an improved source (e.g. piped, borehole, protected dug well, rainwater, delivered water, etc). SDG "at least basic" drinking water has an added criterion of being within a roundtrip time of 30 minutes. SDG "at least limited" sanitation means using improved sanitation facilities (e.g. flush/pour flush to piped sewer system, septic tank, a composting latrine, etc). SDG "at least basic" sanitation has an added criterion of being for the exclusive use of the household. Thus "safely managed" is a subset of "at least basic", which is a subset of "at least limited", with each additional criterion meaning less datasets currently available for analysis.

weighted equally, and, within each dimension, each indicator is also equally weighted. The result is that indicators have different weights depending on the number of indicators within its dimension, as illustrated in table 1.[5]

The main summary measure presented here is the multidimensional poverty headcount ratio, denoted by *H*. This index describes the share of people who are considered multidimensionally deprived and parallels the headline measure used for global poverty monitoring (the poverty rate). Individuals are considered multidimensionally deprived if they fall short of the threshold in at least one dimension or in a combination of indicators equivalent in weight to a full dimension. In other words, households will be considered poor if they are deprived in indicators whose weight adds up to 1/3 or more. For instance, every person who lives in a household without access to water and sanitation and with a child who does not attend school is considered multidimensionally deprived, while members of another household may be deprived because the household income does not meet basic needs. The index is thus a simple expression of an approach whereby the number of deprivations that people suffer are counted (Atkinson 2003).

We also present two alternative multidimensional poverty indexes. The first one, the adjusted headcount measure *M*, combines the incidence of poverty (*H*) with the average breadth of deprivation suffered by each poor person, as proposed by Alkire and Foster (2011). In addition, we use a measure that penalizes for the compounding effect of multiple deprivations experienced by the same household (Chakravarty and D'Ambrosio 2006; Datt 2019). As a result, if a household is deprived in any two indicators, its deprivation will be considered greater than the sum of the deprivations of two other households each only deprived on a single indicator. The measure is referred to as the distribution-sensitive multidimensional measure, denoted by *D*. By incorporating information of the extent of deprivation suffered by individuals, both these measures bring valuable elements to the analysis. While the three measures (*H, M,* and *D)* are presented here, precedence is given to the multidimensional poverty headcount ratio *H*.

Data

The data we use comes from harmonized household surveys from the 2017 edition of the Global Monitoring Database (GMD). The GMD is the World Bank's repository of multitopic income and expenditure household surveys used to monitor global poverty and shared prosperity. The GMD contains more than 1,000 household surveys conducted in over 150 economies. For a few economies, the welfare aggregate of the GMD spans almost 50 years, from 1971 to 2018, whereas for most other economies, coverage is significantly less. The household survey data are typically

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[5] Not all indicators are applicable to every household. For example, not every household has a child below the school-age for grade 8 (necessary for the school attendance indicator). In these cases, the weight for the missing indicator is shifted to other indicators within the dimension so that each dimensional weight is unchanged. The same process occurs if the information on an indicator for a household is missing, even if the indicator is applicable. Because of this reweighting process, few households are ignored because of missing data. Indeed, only households on which information is missing on all the indicators that constitute a dimension are not considered in the analysis.

collected by national statistical offices in each country, and then compiled, processed, and vetted for inclusion in the GMD by the World Bank's internal Technical Working Group.

Selected variables have been harmonized to the extent possible such that levels and trends in poverty and other key sociodemographic attributes can be reasonably compared across and within countries over time. Surveys from the GMD have been included in this analysis if they satisfy the following criteria:

- They include a monetary welfare measure (consumption or income) and indicators on education and service access that may be used to construct a multidimensional poverty measure.
- The surveys were conducted within three years of 2013, that is, from 2010 to 2016. The circa 2013 restriction strikes a balance between maximizing country coverage of indicators and maintaining cross-country comparability.

Most of the surveys used in the analysis were conducted during 2012–14 (88 countries). No household income and expenditure survey data were available for the India and China in the 2010–16 period, which explains the low regional population coverage in South Asia and East Asia & Pacific (see table 2). The population coverage for the rest of the world category is small because of limited coverage in the GMD.

Results

How does our view of global poverty change if poverty is defined as insufficiency not only in monetary resources but also in a range of nonmonetary attributes that directly affect people's well-being? Who are the new poor? In how many ways are they deprived? How do different regions fare if a wide-angle view of poverty is considered? Insights into the differential prevalence, nature, and distribution of multidimensional poverty in contrast to monetary poverty can be important for the formulation of effective poverty reduction policies. Highlighting the additional deprivations experienced by the extreme poor sensitizes the policymakers to the importance of improving those aspects of human welfare not captured by the monetary measure alone. This is even more important as more people leave extreme poverty behind because a sizable share of the non-income-poor population experiences other deprivations.

Table 2 describes the share of people who are poor either due to monetary deprivation or due to multidimensional poverty as defined by the three dimensions and six indicators illustrated in table 1. The indicators cover the dimensions of monetary poverty, education (two indicators) and access to basic utilities (three indicators). Approximately one individual in eight (11.8 percent) in the 119 country sample in circa 2013 lives in a household experiencing monetary poverty, whereas almost one person in five (18.3 percent) lives in a multidimensionally deprived household.[6] The

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[6] These figures may not be representative of the entire region because of incomplete population coverage. The

multidimensional measure yields a more expansive view of poverty by counting as poor any individual with a cumulative deprivation above the critical threshold of 1/3.

Table 2. People Living in Monetary or Multidimensional Poverty, 119 Economies, Circa 2013

Region	Monetary		Multidimensional		Economies, number	Population coverage, %
	Headcount ratio	Share of the poor, %	Headcount ratio (H)	Share of the poor, %		
East Asia and Pacific	5.3	8.1	7.5	7.3	13	28.9
Europe and Central Asia	0.3	0.4	1.1	0.8	17	90.0
Latin America and the Caribbean	3.9	5.7	6.1	5.8	17	91.5
Middle East and North Africa	3.2	2.2	5.9	2.6	9	72.1
Rest of the world	0.5	0.5	0.5	0.3	29	39.6
South Asia	11.9	12.3	26.6	17.7	5	23.0
Sub-Saharan Africa	44.9	70.9	64.3	65.4	29	60.7
Total	11.8	100.0	18.3	100.0	119	45.0

Source: Estimates based on the harmonized household surveys in 119 countries, circa 2013, GMD (Global Monitoring Database), Global Solution Group on Welfare Measurement and Capacity Building, Poverty and Equity Global Practice, World Bank, Washington, DC.

Note: The reported multidimensional headcount ratio is estimated based on three dimensions—monetary, educational, and service access, as defined in table 1—and an overall poverty cutoff of one-third of the weighted deprivations. The data are derived from household surveys conducted in around 2013 (+/−3 years). Because of the unavailability or incomparability of data, all countries are not included in the analysis. The last column shows the percentage of regional or global populations covered by the surveys. Percentages may not sum to 100 because of rounding.

The monetary poverty measure outlines a bipolar world, with Africa on one end (a high poverty rate) and all the other regions, South Asia included, on the other end (a relatively low poverty rate). The separation of Sub-Saharan Africa from the other regions is seen more clearly when looking at the poverty trends over the last 25 years. East Asia and Pacific, South Asia, and Sub-Saharan all started with a relatively high poverty rate in 1990, yet while poverty declined rapidly in the first two regions, the decline was much slower in Sub-Saharan Africa. Consequently, Sub-Saharan today comprises most of the world's poor, and if the trend continues, by 2030 the extreme poor will almost exclusively be in the region.

A different image of the world emerges through the multidimensional lens. The poverty rate in Sub-Saharan Africa continues to be worryingly high, with almost two in three individuals (64.3 percent) living in multidimensional poverty in circa 2013. This is an increase of 40 percent from an already high monetary poverty rate of 44.9 percent. South Asia, however, changes even more dramatically. More than twice as many people in South Asia are multidimensionally poor as they are monetarily poor (table 2).

This raises important questions about the success of poverty reduction in South Asia. The challenge in securing higher living standards for the population of South Asia is more daunting when poverty in all its forms is considered. Although South Asia is expected to meet the goal of

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coverage in East Asia and Pacific and South Asia is particularly low because China and India are not a part of this exercise due to data availability.
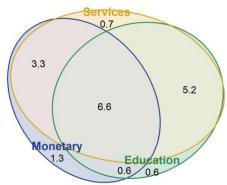
reducing extreme poverty below three percent by 2030, many people will still be living in unsatisfactory conditions if no progress is made in the other components of wellbeing.

It is apparent from table 2 that the multidimensional poverty headcount is always higher than the monetary poverty headcount. This regularity arises because of the relative importance assigned to each component and the stipulated overall poverty threshold that determines if a household is considered multidimensionally poor. If a household is deprived in at least one dimension, then the members are considered multidimensionally poor. Because the monetary dimension is measured using only one indicator, anyone who is income poor is automatically also poor under the broader poverty concept. The difference between the headcounts therefore hinges on those individuals among whom the privation is a result of a shortfall in the nonmonetary dimensions of life despite their ability to command sufficient financial resources to cross the monetary poverty threshold. These households would be deemed nonpoor under the narrower poverty concept based on insufficiency in monetary resources, leaving policy makers with an unduly optimistic assessment of poverty from a multidimensional perspective.

The underlying structure of the deprivation experienced by the multidimensionally poor is depicted in figure 1. There is a large degree of overlap between dimensions. Only a small minority of the multidimensionally poor are deprived in only one dimension, while more than a third are simultaneously deprived in all three dimensions. The overlap is the highest in Sub-Saharan Africa (figure A.1 in the annex). A larger overlap between dimensions indicates a larger extent of interdependence, which implies that policy interventions targeted exclusively towards one dimension may not reduce multidimensional poverty and therefore a multipronged approach is required.

Going from monetary to multidimensional poverty, the poverty rate more than doubles in the five South Asian countries because of the relatively low correlation in deprivations across dimensions. In these countries, a household that is deprived in education attainment has a high probability of being deprived in school enrollment as well, making them multidimensionally poor. But, the correlation between the monetary dimension and the education indicators is weak, which means the same households are not deprived in the monetary dimension. This adds new households to the count of the poor.

Figure 1. Individuals in Multidimensional Poverty

Source: Estimates based on the harmonized household surveys in 119 economies, circa 2013, GMD (Global Monitoring Database), Global Solution Group on Welfare Measurement and Capacity Building, Poverty and Equity Global Practice, World Bank, Washington, DC.
Note: The diagram shows the share of population that is multidimensionally poor, and the dimensions they are deprived in. For example, the numbers in the blue oval add up to 11.8 percent, which is the monetary headcount. Adding up all numbers in the figure result in 18.3 percent, which is the proportion of people that are multidimensionally deprived.

As the difference in poverty incidence according to the two measures is the result of cumulative nonmonetary deprivations, it is natural to inquire about the components most responsible for the difference. Table 3 presents the poverty headcount ratio at US$1.90 a day as well as the deprivation rate associated with each of the five nonmonetary indicators. Despite having made progress in poverty reduction, the countries included in the sample for South Asia still are highly deprived in the education dimension. An issue of apparent global concern is poor sanitation; approximately a quarter of the population in the 119-country sample lives in households lacking access to even a limited standard of sanitation. The population in regions with low monetary poverty like East Asia and Pacific, Latin America and the Caribbean, and Middle East and North Africa, suffer a sanitation deprivation rate several times as high as that in the monetary dimension. Globally, almost one individual in six is not connected to electricity. Yet, this is overwhelmingly a South Asian and Sub-Saharan African phenomenon: approximately one South Asian in five and three Sub-Saharan Africans in five lack electricity at home.

Table 3. Individuals in Households Deprived in Each Indicator

Region	Monetary	Educational attainment	Educational enrollment	Electricity	Sanitation	Drinking water
East Asia and Pacific	5.3	7.5	3.2	4.5	14.0	11.3
Europe and Central Asia	0.3	0.9	5.6	0.5	6.8	2.6
Latin America and the Caribbean	3.9	12.2	2.7	3.3	15.6	6.4
Middle East and North Africa	3.2	11.1	7.9	3.8	14.6	4.2
Rest of the world	0.5	1.2	0.0	0.0	0.6	0.0
South Asia	11.9	31.6	22.6	23.8	39.5	7.0
Sub-Saharan Africa	44.9	46.2	20.8	64.8	61.9	33.9
Total	11.8	17.0	9.0	15.9	23.8	10.9

Source: Estimates based on the harmonized household surveys in 119 economies, circa 2013, GMD (Global Monitoring Database), Global Solution Group on Welfare Measurement and Capacity Building, Poverty and Equity Global Practice, World Bank, Washington, DC.

An examination of deprivation rates one indicator at a time generally confirms that the regional ranking for one indicator is consistent with the ranking for others. Regions more deprived in one indicator are highly likely to be more deprived in other indicators. However, there are anomalies. For example, Europe and Central Asia region shows the lowest incidence of monetary poverty, but, in the share of people deprived in schooling enrollment, that region performs less well than both the East Asia and Pacific region and the Latin America and Caribbean region.

Important insights on the pattern of development can be gleaned from country outcomes as well. For example, Vietnam and Pakistan both have a low absolute poverty rate, but Pakistan's level of deprivation in education attainment and enrollment is far higher compared to that of Vietnam. These countries typify the development experience of the two regions. Expansion in access to education preceded or was contemporaneous to the growth in income in East Asia, whereas despite rising incomes, human development has lagged in South Asia (World Bank 2018). Iraq experiences the highest deprivation in the education dimension, and it is one of the few countries where school enrollment outcome is worse than education attainment. Over the last 15 years, access to schooling in Iraq has been disrupted due to conflict, which is a reminder that progress cannot be taken for granted, especially in fragile and conflict settings.

The examination of indicator deprivation rates does not reveal information about the simultaneity of deprivations. To consider this aspect, other tools are needed. One of the simplest approaches involves counting the number of indicators in which people are deprived contemporaneously. Figure 2 shows the shares of individuals deprived according to the maximum of six indicators. Approximately 60 percent the people in the 119 countries are not deprived in any of the six indicators. While more than 80 percent of Sub-Saharan Africans exhibit at least one deprivation, a smaller share of South Asians (65.6 percent) experience at least one deprivation, and, as the number of deprivations rises, a large gap opens between South Asia and Sub-Saharan Africa. Whereas 20.5 percent of South Asia's population is deprived in three or more indicators, 55.1 percent of Africans are so deprived. On the shares experiencing four or more deprivations, South Asia catches up to the world at large. Thus, in addition to the relatively larger share of Sub-Saharan Africans who are deprived in each dimension, Sub-Saharan Africans suffer from a greater average number of deprivations than people elsewhere.
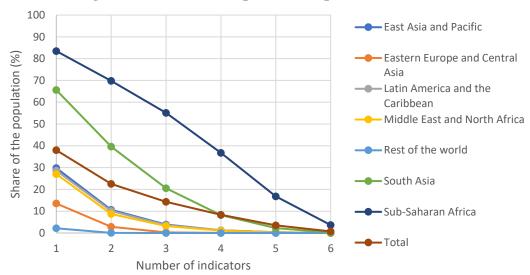
Figure 2. Individuals Deprived on Up to Six Indicators

Source: Estimates based on the harmonized household surveys in 119 economies, circa 2013, GMD (Global Monitoring Database), Global Solution Group on Welfare Measurement and Capacity Building, Poverty and Equity Global Practice, World Bank, Washington, DC.

Summarizing the information on the number of deprivations into a single index proves useful in making comparisons across populations and across time. Aggregate multidimensional poverty measures provide an easy way to rank countries and monitor their progress. The adjusted headcount measure (*M*) defined in the previous section is sensitive to both the incidence and breadth of multidimensional poverty. If a poor household becomes deprived in additional elements, the changes are registered by the measure – something that will not be captured by the headcount H. The adjusted headcount measure, however, does not take into account the deprivations of households deemed to be multidimensionally nonpoor. This can ignore a substantial portion of deprivation. Indeed, 15.5 percent of the total population is deprived in only one indicator, and another 8.2 percent deprived in two indicators (table 4). A subset of these households is not identified as multidimensionally poor because their total weighted deprivation does not cross the poverty threshold of one-third. In fact, most individuals experiencing one deprivation and two-thirds of individuals experiencing two deprivations are not multidimensionally poor. They face an average of 0.13 and 0.25 weighted deprivations, respectively, which is missed by the intensity-sensitive measure.

Table 4. The Multidimensionally Poor and the Breadth of Deprivation, by Number of Deprivations

percent

Number of deprivations	Share of the population	Multidimensional poverty status			Breadth of deprivation	
		Total	*Nonpoor*	*Poor*	*Nonpoor*	*Poor*
0	62.0	62.0	62.0	0.0	0.00	*n.a.*
1	15.5	15.5	14.1	1.4	0.13	0.33
2	8.2	8.2	5.7	2.5	0.25	0.43
3	6.0	6.0	0.0	6.0	*n.a.*	0.48
4	4.8	4.8	0.0	4.8	*n.a.*	0.65
5	2.8	2.8	0.0	2.8	*n.a.*	0.83
6	0.7	0.7	0.0	0.7	*n.a.*	1.00
Total	100.0	100.0	81.7	18.3	0.04	0.58

n.a. Not applicable.
Source: Estimates based on the harmonized household surveys in 119 economies, circa 2013, GMD (Global Monitoring Database), Global Solution Group on Welfare Measurement and Capacity Building, Poverty and Equity Global Practice, World Bank, Washington, DC.
Note: A household is multidimensionally poor if it is deprived in more than a third of weighted deprivations. The breadth of deprivation refers to the average number of deprivations relative to the total number of indicators. It varies from 0 to 1, where 1 represents a person deprived in all six indicators. The shares may not sum to 100 because of rounding.

The picture of poverty can shift yet again under the distribution-sensitive measure (*D*), the third measure, because it differs from the adjusted headcount measure in two crucial ways. Unlike the adjusted headcount measure, the distribution-sensitive measure is not associated with a pre-specified poverty threshold so it counts deprivations experienced by all households. Second, it penalizes compounding deprivations such that poverty is higher when one household experiences two deprivations than when two households experience one deprivation each.

The regional estimates for the adjusted headcount and the distribution-sensitive measures are presented in table 5. Because the scales of the two measures do not lend themselves to easy comparison, the focus is on the regional contribution to global poverty under each approach. Moving from multidimensional poverty headcount (*H*) to the intensity-sensitive measure (*M*), the concentration of poverty shifts very slightly further to Africa. This shift is driven by the breadth of deprivation in Sub-Saharan Africa, which is twice as high as in South Asia and several times higher than in other regions of the world.

The distribution of global poverty is subject to two countervailing effects when going from the intensity-sensitive measure (*M*) to the distribution-sensitive measure (*D*). Counting all deprivations pushes the distribution of poverty to regions that have few multidimensionally poor but many who suffer from at least one deprivation. At the same time, assigning more importance to compounding deprivations pulls it towards regions with a high breadth of deprivation. The first effect more than offsets the second in Europe and Central Asia, Latin America and the Caribbean, and Middle East and North Africa, resulting in a slightly higher contribution of these regions to global poverty under *D* than under *M*.

Table 5. Regional Contributions to Multidimensional Poverty

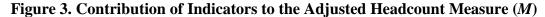| Region	Breadth of deprivation	Share of the population, %	Multidimensional headcount		Adjusted headcount measure		Distribution-sensitive measure	
			H	Contribution, %	M	Contribution, %	D	Contribution, %
East Asia and Pacific	0.07	17.8	7.5	7.3	0.03	5.8	0.02	5.5
Europe and Central Asia	0.02	13.3	1.1	0.8	0.00	0.5	0.01	0.9
Latin America and the Caribbean	0.07	17.4	6.1	5.8	0.03	4.7	0.02	5.1
Middle East and North Africa	0.06	8.1	5.9	2.6	0.03	2.1	0.02	2.2
Rest of the world	0.00	12.7	0.5	0.3	0.00	0.2	0.00	0.2
South Asia	0.21	12.1	26.6	17.7	0.14	15.9	0.09	15.2
Sub-Saharan Africa	0.44	18.6	64.3	65.4	0.40	70.8	0.29	70.9
Total	0.14	100.0	18.3	100.0	0.11	100.0	0.07	100.0

Source: Estimates based on the harmonized household surveys in 119 economies, circa 2013, GMD (Global Monitoring Database), Global Solution Group on Welfare Measurement and Capacity Building, Poverty and Equity Global Practice, World Bank, Washington, DC.
Note: Breadth of deprivation refers to the average number of deprivation relative to the total number of indicators. It varies from 0 to 1, where 1 represents a person deprived in all six indicators.

An appealing feature of the adjusted headcount measure *M* is that the overall measure can be easily decomposed into the relative contribution of each indicator (figure 3). Such decompositions matter for understanding the drivers of multidimensional poverty, and the sectors that ought to be given priority in the design of poverty alleviating policies. If the poverty rate is high because of income insufficiency, a focus on economic growth or income support is appropriate, but, if education or access to utilities play a dominant role in multidimensional poverty, investments in the corresponding sectors may yield the highest returns to poverty reduction.

In high-income countries, poverty, though extremely low, almost exclusively arises because of insufficient income given the near-universal access to education and utility services. For the multidimensionally poor in Europe and Central Asia, access to electricity is a much more important driver of poverty than elsewhere. The comparison across Sub-Saharan Africa and South Asia reveals how the underlying structure of deprivations differs across the two regions. In South Asia, the education dimension has a disproportionate contribution to poverty (46 percent), whereas the contribution of monetary poverty is relatively low (24.6 percent). In Sub-Saharan Africa, the services (39.7) and the monetary (36.1) dimensions contribute the most to multidimensional poverty, while the education dimension contributes the least (24.2 percent). This may suggest a different policy focus in the two regions. The priority in South Asia should be wider access to education while expansion of basic infrastructure services will have the strongest impact in Sub-Saharan Africa.
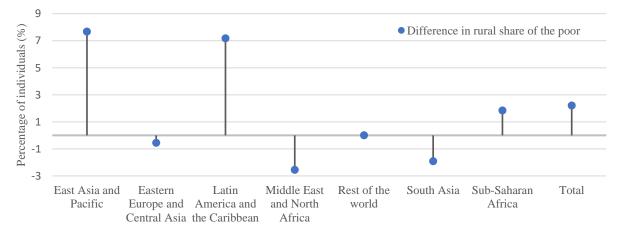
Figure 3. Contribution of Indicators to the Adjusted Headcount Measure (*M*)

Source: Estimates based on the harmonized household surveys in 119 economies, circa 2013, GMD (Global Monitoring Database), Global Solution Group on Welfare Measurement and Capacity Building, Poverty and Equity Global Practice, World Bank, Washington, DC.
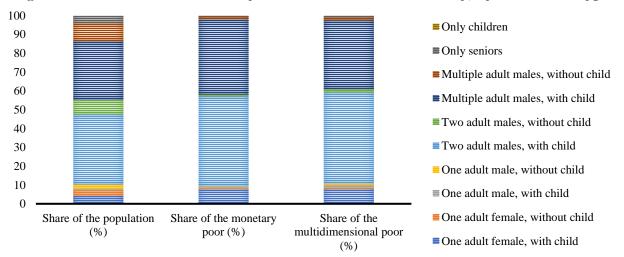
As the definition of poverty broadens to include additional aspects of deprivation, the composition of the poor changes. Monetary poverty is predominantly a rural phenomenon; 45.8 percent of the total sample population is rural, but 81.3 percent of the monetary poor are living in rural areas (table A.1 in the annex). If poverty is considered more broadly with the multidimensional lens, the distribution of poverty tilts even more toward rural areas. Thus, 83.5 percent of the multidimensionally poor are rural dwellers, implying that, relative to urban households, rural households suffer cumulatively more deprivations in access to education and essential utilities. The most pronounced shifts of poverty toward rural areas are observed in East Asia and the Pacific and in Latin America and the Caribbean (figure 4). In these regions, the shift in the composition is largely driven by deprivations in improved sanitation and adult educational attainment. In contrast, poverty becomes more urban in Middle East and South Asia suggesting that the nonmonetary deprivations in these regions are more predominantly urban than the monetary ones.

Figure 4. Difference in the Share of the Poor in Rural Areas, Multidimensional Headcount vs Monetary Headcount

With respect to household composition, households with children are overrepresented among both the monetary poor and the multidimensionally poor, regardless of the gender or quantity of adults in the household (figure 5).[7] The shift from an exclusively monetary approach to a multidimensional account of poverty does not substantially change the demographic composition of the poor, though households with only one adult woman (with or without children) represent a larger share in the latter case (8.8 percent compared with 8.1 percent). All indicators included are measured at the household level and thus do not distinguish differences within households. The estimates also assume that resources are distributed equally within a household, all household members have similar needs, and there are no scale economies in larger households. Assessing individual wellbeing requires measuring intrahousehold resource allocation and the needs of each household member.

Figure 5. Contribution to Monetary and Multidimensional Poverty, by Household Type

Source: Estimates based on the harmonized household surveys in 119 economies, circa 2013, GMD (Global Monitoring Database), Global Solution Group on Welfare Measurement and Capacity Building, Poverty and Equity Global Practice, World Bank, Washington, DC.
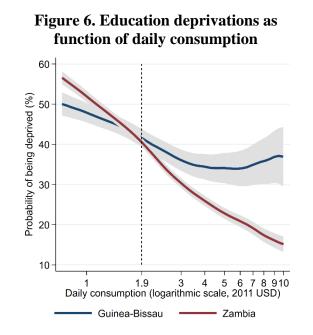
The coincidence of monetary and non-monetary deprivations

An advantage of having monetary poverty included in the measure of multidimensional poverty is that the relationship between monetary poverty and non-monetary poverty can be scrutinized at the household level. The relationship matters for a number of reasons. The more the overlap between households in monetary and non-monetary poverty, the more the worst off suffer from multiple deprivations, which fosters poverty traps and makes it difficult to escape destitution, and the greater is also inequality in a multidimensional sense. Greater overlap also makes it

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[7] See the demographic composition typology proposed in Muñoz-Boudet et al. (2018) for the methodology followed.

straightforward to channel resources as there is no tension between targeting the monetary and non-monetary poor. From a methodological perspective, if non-monetary and monetary deprivations co-incide strongly, multidimensional poverty measure yields few new insights, with multidimensional poverty proxied quite well by the monetary measure.

Guinea-Bissau and Zambia illustrate how the relationship between monetary and non-monetary deprivations (here deprivations in education) can differ. The two countries have similar monetary poverty rates (67.1% vs. 57.5%) and educational deprivation rates (46.6% vs. 43.3%). Yet the relationship between consumption and educational deprivations differs greatly for the two countries (Figure 6). In Zambia, individuals with daily consumption of $1 (2011 PPP) have more than a 55% probability of being deprived in education, while the same figure for a person with daily consumption of $10 is less than 15%. In Guinea-Bissau the rate only drops from about 50% to 35%, meaning that consumption is a much stronger predictor of educational deprivations in Zambia than in Guinea-Bissau.

Figure 6. Education deprivations as function of daily consumption

We can quantify the extent to which monetary and non-monetary poverty coincide through the following measure:

$$ratio_{dim} = \frac{P(deprived\ in\ dim\ |\ consumption<1.90)}{P(deprived\ in\ dim\ |\ consumption>1.90)},$$

where dim signifies a non-monetary dimension, which in our case is education or infrastructure. This measure will equal 1 if non-monetary deprivations are completely independent of monetary deprivations and go towards infinity if monetary deprivations are a perfect predictor of non-monetary deprivations. In other words, the higher the ratio, the more the two coincide.

We can calculate this measure for all countries in our dataset, both for education and infrastructure dimensions. To assure that we have enough mass in the numerator, we restrict ourselves to countries that have a least 50 households that are below $1.90. Figure 7 plots the ratios against monetary and non-monetary deprivations for the two dimensions. The measure converges to 1 as the share of people deprived in the non-monetary dimension or in monetary poverty goes to 100%, as this makes non-monetary deprivations independent of monetary deprivations. Yet, there is important variation across countries with same deprivation rates, as illustrated with the Guinea-Bissau and Zambia example.
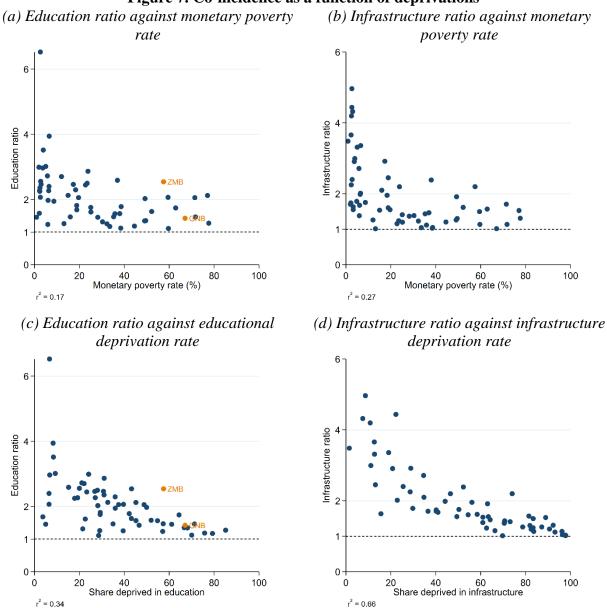
Figure 7. Co-incidence as a function of deprivations

(a) Education ratio against monetary poverty rate

(b) Infrastructure ratio against monetary poverty rate

(c) Education ratio against educational deprivation rate

(d) Infrastructure ratio against infrastructure deprivation rate

For a given level of deprivation rates, higher rates of co-incidence imply that the worst off are suffering from multiple deprivations, making it harder to escape poverty. For this reason, it is constructive to see if these cross-country differences can be explained and moderated by active policy choices. To look into this, we correlate our measures of co-incidence against a number of variables from the World Development Indicators. We utilize variables on government spending on education, government spending in general, details about social protection programs, urban/rural population shares and growth, sectoral contributions to GDP, and CPIA ratings. To ensure that the correlations are not driven by the mechanical relationship between the ratio of co-incidence and monetary and non-monetary poverty, we regress our measure of co-incidence on the dimensional deprivation rate and the dimensional deprivation rate squared, take the residual from this regression, and correlate with the covariates mentioned above. Figure 8 shows the variables with a correlation coefficient significant at least at the 10% level in the educational domain.
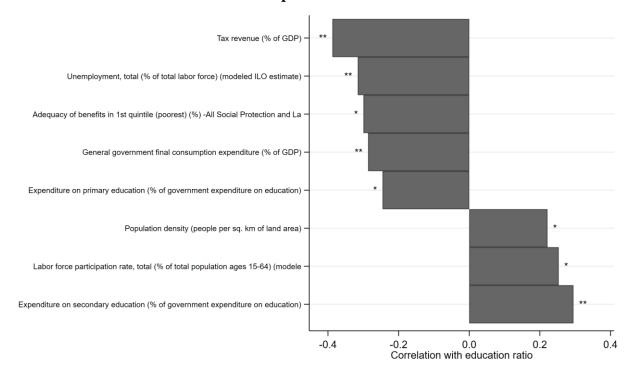
Figure 8. Variables correlated with co-incidence of monetary and educational deprivations

Note: * significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level.

The findings are rather intuitive. Countries with high tax revenue and high expenditure tend to have lower rates of co-incidence – presumably because they are able to allocate these resources to help the poorest in monetary terms. Countries with high unemployment rates also tend to have lower rates of coincidence. One possibility is that in cases of high unemployment, monetary poverty reacts stronger than non-monetary deprivations, which loses the bond between the two and ensures that co-incidence is lower. We also find some evidence in favor of coincidence being

low when the adequacy of social protection benefits for the poorest quintile is high. We conjecture that a high adequacy rate among the poorest equalizes the distribution, and thus makes non-monetary deprivations less tied to monetary deprivations. Countries that spend much of their educational expenditure on secondary education have high rates of co-incidence. This is no surprise since our measure of educational deprivation is focused on primary education, and targeting resources to secondary education or higher will likely leave the poorest segments with less than primary education behind.

When moving to the infrastructure domain, only one variable is significantly related to the ratio of co-incidence at the 5% level: adequacy of social protection benefits among the poorest quintile. Again, we conjecture that countries with high transfers to the poorest are able to delink monetary and non-monetary deprivations and thus ensure low rates of co-incidence.

These findings suggest that co-incidence between monetary and non-monetary poverty, and thereby multidimensional inequality and the risk of poverty traps, can be reduced through policy choices. With sufficient resources, spending on any dimension – either education, social transfers and (although we lack data to show this directly) also spending on basic infrastructure – can delink deprivation rates and create more equitable outcomes.

Conclusions

Monetary poverty is the World Bank's workhorse measure to assess progress in poverty reduction across the world. This paper examines the effects of extending the measure of poverty by adding nonmonetary dimensions in an attempt to broaden the measurement of well-being. In addition to income and consumption, two other dimensions of poverty are included in the analysis, represented by a total of 6 indicators of well-being. While there are many other valuable indicators that could have been included in the portfolio of nonmonetary indicators, the selected indicators satisfy explicit principles, including the centrality of private consumption; data availability and parsimony.

The consideration of access to education and utilities, alongside income, in a sample of 119 economies for circa 2013 reveals that about a third of those who are multidimensionally deprived are not captured by monetary poverty. The most prevalent deprivation is access to adequate sanitation, which is associated with higher deprivation rates than income.

A growing toolbox for the assessment of well-being enhances the understanding of poverty. In some regions, deprivations in one dimension are accompanied by deprivations in other dimensions, while, for other regions, this is not the case. This has important implications for policies aimed at reducing human suffering. Although this appreciation is not new or original, elevating additional aspects of well-being to the same level as consumption or income poverty can highlight the relevance of those aspects in comparison to an exclusive focus on monetary poverty.

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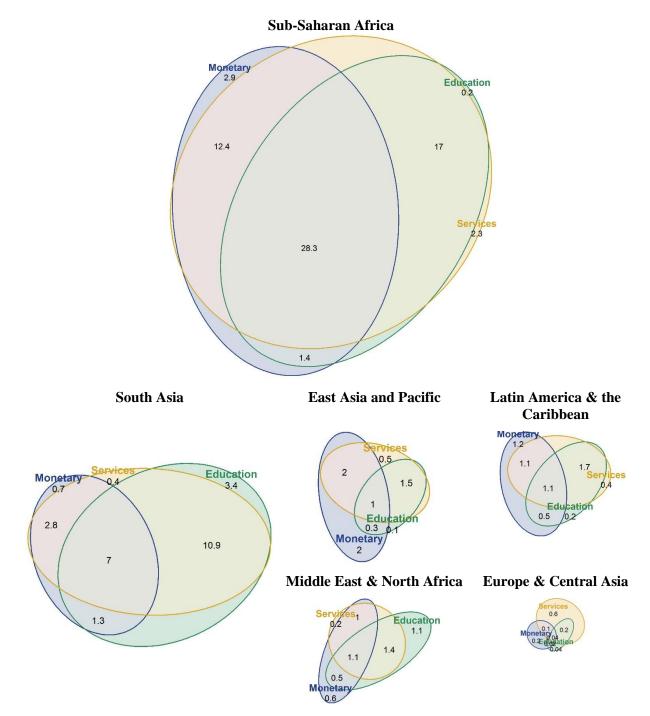
Annex

Table A.1. Poverty Is Disproportionately Rural, 119 Economies, Circa 2013

Region	% rural	Monetary Headcount ratio, %			Multidimensional Headcount ratio, %			Countries, number	Population coverage, %
		Rural	Urban	Rural share of the poor	Rural	Urban	Rural share of the poor		
East Asia and Pacific	55.7	6.5	3.9	67.8	10.2	4.2	75.5	13	28.9
Europe and Central Asia	33.5	0.5	0.2	52.7	1.8	0.8	52.2	17	90.0
Latin America and the Caribbean	21.0	11.2	1.9	61.0	19.9	2.5	68.2	17	91.5
Middle East and North Africa	43.6	6.4	0.9	84.8	11.5	1.9	82.2	9	72.1
Rest of the world	24.6	0.6	0.4	30.7	0.6	0.4	30.7	29	39.6
South Asia	70.6	15.2	3.9	90.3	33.3	10.5	88.4	5	23.0
Sub-Saharan Africa	67.0	55.9	22.6	83.4	81.8	28.8	85.2	29	60.7
Total	45.8	21.0	4.1	81.3	33.6	5.6	83.5	119	45.0

Source: Estimates based on the harmonized household surveys in 119 economies, circa 2013, GMD (Global Monitoring Database), Global Solution Group on Welfare Measurement and Capacity Building, Poverty and Equity Global Practice, World Bank, Washington, DC.
Note: Location of residence is missing for 1 percent of the total sample.

Figure A.1: Regional Venn diagrams

Sub-Saharan Africa

South Asia

East Asia and Pacific

Latin America & the Caribbean

Middle East & North Africa

Europe & Central Asia

Note: The diagrams show the fraction of the regional population that is multidimensionally poor, and the dimensions the poor are deprived in.