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Identifying the Poorest People and Groups: Strategies Using the Global Multidimensional Poverty Index

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Abstract

If development is about poverty reduction, then where the poorest live is an important question. This paper seeks to answer this question using an internationally comparable multidimensional poverty index (MPI) to identify the poor using household surveys across more than a hundred countries. We compare three approaches to identifying the bottom billion: (i) the billion living in the poorest countries; (ii) the billion living in the poorest subnational regions and (iii) the poorest billion according to the intensity of their deprivations. Although there are commonalities across these three approaches, they produce notably different findings that are relevant to the discussions of sustainable development goals.

Keywords: bottom billion, geographic decomposition of poverty, identification of the poorest, multidimensional poverty index, sub-national poverty.

JEL classification: I3, O1.

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1. Introduction

The post-2015 agenda and sustainable development goal proposals concur on (at least) two key points. The first point is that ending poverty must remain a central emphasis; the second is that there must be a focus on ‘leaving no one behind’ – which means generating and reporting disaggregated data.¹ By implication, monitoring where the poorest live is an important question. High poverty areas and groups should be priorities for national resources as well as foreign aid (HLP 2013).² And people’s interconnected deprivations should be analysed so that synergistic and cost-effective mechanisms for redressing them can be implemented (UNDP 2010). However, where do the poorest live? Paul Collier’s (2007) widely read book *The Bottom Billion: Why the Poorest Countries Are Failing and What Can Be Done About It* refers to one billion citizens of 58 countries as the ‘Bottom Billion’ – but he does not claim that all citizens of each country were poor. Sumner (2010; 2012) and Alkire *et al.* (2011, 2013b, 2014a) found that the majority of the poor do not live in low income nor fragile states. Rather they found that over 70% of the poor live in middle income countries, whether the poor are identified in terms of monetary or multidimensional poverty. However, low income and fragile states typically have higher rates of poverty and a greater severity or intensity of poverty than stable middle income countries. So, even if middle income countries are home to most of the world’s poor, where do the world’s *poorest* live? This paper addresses that question by identifying the poorest one billion persons, which we occasionally refer to using Collier’s phrase *bottom billion*, in several ways.

This paper uses three strategies to identify the poorest billion persons and compares the results. As our poverty measure, we use the Multidimensional Poverty Index (MPI) developed by Alkire and Santos (2010, 2014). The MPI implements one of the Alkire and Foster (2011) class of measures using information on direct deprivations in health, education and living standards, and has relevance after 2015 (Alkire & Sumner 2013).

In this paper, we first identify the poorest **countries** whose poor populations sum to one billion. This approach shows that the poorest billion people live in the 28 poorest countries, which are either low income countries (LICs) or lower middle income countries (LMICs). None of these countries are upper middle income countries (UMICs), and 26 of these 28 countries are in South

¹ <http://sustainabledevelopment.un.org/focussdgs.html>.

² For a discussion about the debate on the effectiveness of foreign aid, see Banerjee and Duflo (2011).

Asia or Sub-Saharan Africa. Next we go beyond national aggregates to identify the poorest regions within countries whose poor populations sum to the bottom billion. Looking at the rural-urban breakdown, we see that the bottom billion live in 38 rural and urban areas of 36 countries and that 99.6% of them live in rural areas, with only Mali and Liberia having their urban areas also in the bottom billion. Moving in to subnational units, we find that the poorest billion live in 307 subnational regions spread across 45 countries. Of these 45 countries, most are LICs and LMICs. Two are UMICs and six countries are located outside of South Asia and Sub-Saharan Africa.

Third and most precisely, we identify the bottom billion using individual poverty profiles. Multidimensional poverty profiles show the intensity of each person's poverty – the percentage of weighted indicators in which each poor person is deprived. We find that the poorest billion people are distributed across 104 developing countries. Sampled persons among the bottom billion appear in 770 of the subnational regions among those countries that can be decomposed subnationally.³ Although most of the poorest are concentrated in LICs and LMICs and South Asia and Sub-Saharan Africa, a modest number of the bottom billion are in countries not in these categories. For example, nearly 9.8% of the bottom billion reside in UMICs and 11.7% in East Asia and Pacific. The individual-level identification reveals that countries such as Indonesia, South Africa, Turkey, Bolivia, Brazil, Egypt, Morocco, Peru and Viet Nam – which did not appear in the list of countries housing the bottom billion using country and subnational region identification – are each home to more than one million of the poorest billion. We also find that although countries such as Turkey, Namibia and Iraq have a lower fraction of poorest billion, the poorest in these countries have a very high intensity of poverty. This analysis thus enables us to illuminate pockets of the poorest more universally – that is, even in UMICs.

In sum, although this new analysis consistently shows that LICs and LMICs and countries in South Asia and Sub-Saharan Africa are home to the largest fraction of the bottom billion, more fine-grained findings clearly show that disaggregation matters tremendously. Country and subnational-level identification are much less precise than individual-level identification.

It may be worth noting that the global MPI was chosen because the same exercise cannot be performed using the \$1.25/day measure of extreme income poverty. The MPI is built from direct deprivations like malnutrition or lack of access to basic services, which can be compared directly

³ These results do not reflect the statistical significance of the poorest in subnational regions.

across rural and urban regions, as well as subnational regions and countries, without Purchasing Power Parity figures (PPPs). More specifically, the MPI does not require adjustments for prices, exchange rates or inflation. This means that the MPI can be compared across subnational regions and indeed across individuals living in different countries as well as subnational regions. Because the \$1.25/day and other global monetary poverty measures use PPPs, they cannot be straightforwardly disaggregated across subnational regions by either rural/urban areas or by states/groups. It is indeed possible to identify the poorest billion income or consumption poor by adjusting the poverty line – but only under the strong assumption about the accuracy of PPPs.⁴

The paper is structured as follows: section 2 outlines the methodology; section 3 describes the data that we use for our analysis; section 4 presents the results and relevant discussions; and section 5 provides concluding remarks.

2. Approach and Methodology

The primary objective of this paper is identification of the poor, which is one of the major steps in poverty measurement (Sen 1976). Our focal measure is the global Multidimensional Poverty Index (MPI) developed by Alkire and Santos (2010, 2014) to assess the level of poverty in countries and subnational regions. The MPI uses the dual-cutoff counting approach proposed by Alkire and Foster (2011) to identify multidimensionally poor persons. The methodology is briefly reviewed here as other sources provide details (for example, Alkire et al. (2015), Chapter 5).

As an introduction to the methodology, suppose, the achievements of all n persons within a society in all d indicators are summarized by an $n \times d$ -dimensional matrix X , where x_{ij} is the achievement of person i in indicator j . Thus, row i of X represents the achievement vector of person i , summarizing the person's achievements in all d indicators and its j^{th} column contains the achievements of all n persons in indicator j . Any person i is deprived in any indicator j if her achievement falls below a threshold z_j (or $x_{ij} < z_j$), which is the *deprivation cutoff* of indicator j . The deprivation cutoffs are summarized by the vector z . We denote the relative weight attached

⁴ For a criticism related to how the incorrect computation of PPPs may result in misleading estimates of global income poverty, see Deaton (2010).

to indicator j by w_j , such that $w_j > 0$ for all j and $\sum_{j=1}^d w_j = 1$. The weights are summarized by vector w .

In the counting approach framework, the multidimensionally poor are identified in two steps. The first step identifies deprivations as mentioned above. The second step uses the deprivation profiles to identify the multidimensionally poor. In particular, we first construct the *deprivation score* c_i for each person i such that $c_i = \sum_{j=1}^d w_j g_{ij}$. In other words, the deprivation score of a person is a weighted average of deprivations that the person faces. Person i is identified as multidimensionally poor using a *poverty cutoff* k , such that if $c_i \geq k$ then the person is multidimensionally poor. Thus in order to be identified as multidimensionally poor, a person's deprivation score must be equal to or larger than the poverty cutoff.

To construct the MPI we obtain the *censored deprivation score* for each person $c_i(k)$ such that $c_i(k) = c_i$ if $c_i \geq k$ and $c_i(k) = 0$, otherwise.⁵ The MPI for a given society with achievement vector X is computed as:

$$\text{MPI}(k) = \frac{1}{n} \sum_{i=1}^n c_i(k) = \frac{q(k)}{n} \times \frac{1}{q(k)} \sum_{i=1}^n c_i(k) = H(k) \times A(k),$$

where $q(k)$ is the number of people identified as poor using poverty cutoff k . We ordinarily report two partial indices, denoted H and A . The headcount ratio $H(k) = q(k)/n$ is the proportion of the population that is identified as multidimensionally poor or the *incidence* of poverty, and the intensity $A(k) = \sum_{i=1}^{q(k)} c_i(k) / q(k)$ is the *average deprivation score* among the poor and reflects the *intensity* of deprivations among the poor.

The global MPI has ten indicators which are ordered in three dimensions: *health*, *education* and *standard of living* as described in Table 1.⁶ Each of the three dimensions is equally weighted and each indicator within a dimension is also equally weighted (Table 1). The poverty cutoff is $k = 1/3$, which means that a person is identified as MPI poor if the deprivation score of that person is equal to or greater than $1/3$.

⁵ This property is known as *poverty focus*, which requires that an increment in the achievement of a non-poor person in any indicator should not change the level of poverty in a country.

⁶ For a detailed presentation of the indicators and deprivation cutoffs, as well as the treatment of households lacking eligible members and of missing responses, see Alkire, Conconi, and Seth (2014).

Table 1: Dimensions, Indicators, Deprivation Cutoffs and Weights of MPI

Dimension (Weight)	Indicator	Weight (w)	Deprivation Cutoff (z)
Health (1/3)	Nutrition	1/6	Any adult or child in the household with nutritional information is undernourished
	Mortality	1/6	Any child has died in the household
Education (1/3)	Schooling	1/6	No household member has completed five years of schooling
	Attendance	1/6	Any school-aged child in the household is not attending school up to class 8
Standard of Living (1/3)	Electricity	1/18	The household has no electricity
	Sanitation	1/18	The household's sanitation facility is not improved or it is shared with other households
	Water	1/18	The household does not have access to safe drinking water or safe water is more than a 30 minute walk, round trip
	Floor	1/18	The household has a dirt, sand or dung floor
	Cooking Fuel	1/18	The household cooks with dung, wood or charcoal.
	Assets	1/18	The household does not own more than one of the following: radio, TV, telephone, bike, motorbike or refrigerator, and does not own a car or truck

Source: Alkire, Conconi and Seth (2014a).

We use the MPI to identify the one billion poor people living in the poorest countries and poorest subnational regions as follows. We first rank all countries (or subnational regions) by their MPI values, from poorest to least poor, and identify the smallest set of poorest countries (or poorest subnational regions) whose cumulative population of poor people meets or exceeds one billion. Suppose the one billion poor people whom we aim to identify reside in m poorest countries (or subnational regions). We denote the incidence of country (or subnational region) ℓ by H^ℓ with population size of n^ℓ for all $\ell = 1, \dots, m$. If we denote the one billion poor people q_b , then

$$q_b = \sum_{\ell=1}^m n^\ell H^\ell(k).$$

The average MPI and the average incidence of these m poorest societies (countries or subnational regions) are computed as:

$$\text{MPI}_b = \sum_{\ell=1}^m \frac{n^\ell}{n} \text{MPI}^\ell(k)$$

$$H_b = \sum_{\ell=1}^m \frac{n^\ell}{n} H^\ell(k).$$

Note that it is the additive decomposability property which allows the average MPI_b and H_b to be computed as a population-weighted average of societies' MPIs.

Let us now briefly elaborate how we identify the one billion poorest people across the world by their poverty profiles. In this case, the poor people in all countries under consideration are ranked according to the intensity of their poverty profiles and the poverty cutoff is endogenously determined so as to identify the q_b number of poorest people.⁷ Note that, in this case, the determination of the poverty cutoff is endogenous because the poverty cutoff depends on the q_b number of poorest people we aim to identify. Let us denote this endogenously determined poverty cutoff by k_b . Now if the poorest billion people are distributed across m_b countries, then,

$$q_b = \sum_{\ell=1}^{m_b} n^{\ell} H^{\ell}(k_b),$$

where $H^{\ell}(k_b)$ is the proportion of population within country ℓ that are in the set of the poorest billion people. The number of the poorest billion residing within country ℓ is denoted by $q^{\ell}(k_b)$ such that $\sum_{\ell=1}^{m_b} q^{\ell}(k_b) = q_b$. The intensity of poverty among the poorest billion within country ℓ is $A^{\ell}(k_b) = \sum_{i=1}^{q^{\ell}(k_b)} c_i(k_b) / q^{\ell}(k_b)$.

3. Data for Analyses

A requirement for the computation of the MPIs is that information on all indicators must be available from the same survey dataset. Our *country-level and individual-level analyses* are based on 108 countries for which household surveys are available; the oldest surveys used date to 2003 and the most recent to 2012. Datasets from three main sources have been used to compute the MPI: the Demographic and Health Surveys (DHS), the Multiple Indicators Cluster Surveys (MICS), and the World Health Surveys (WHS). The datasets used and their years are listed in Appendix 1. Our overall sample of 108 countries covers nearly 78% of the world population or 5.47 billion people, using UN population figures for the year 2011 (UN 2013).⁸

Like all similar analyses of global poverty, ours has certain computational caveats that are impossible to avoid at present. First, the surveys used come from different years. When we use

⁷ In this paper, we follow an *intensity approach* to identify the poorest. The poorest may also be identified by choosing a set of more stringent deprivation cutoffs than those presented in Table 1, which is referred to as the *depth approach* to identification. For a discussion on the difference between the intensity approach to identification and the depth approach to identification and their applications, see Alkire, Conconi and Seth (2014).

⁸ Alkire *et al.* (2013a) used the population figures for the year 2010 and we have revised the analysis in this paper using the population figures for the year 2011.

the older survey with the population of year 2011, we implicitly assume that the level of poverty has remained unchanged over time. This is a common challenge for global aggregate analysis that is shared with analysis based on monetary poverty. Second, not all ten indicators were available across all 108 surveys. Seventy-six countries have ten indicators, 26 countries have nine indicators, five countries have eight indicators and only one country has seven indicators. All surveys have at least one indicator within each of the three dimensions. When an indicator within a dimension is missing, the weight of that dimension has been equally distributed across the rest of the indicators so that each dimension always weights to 1/3 of the total.

The household survey design is not always representative by subnational units. We conducted the decomposition analysis for 69 countries using surveys that satisfy three criteria. First, the survey was representative at the subnational level according to the metadata of the sample design and to basic tabulations in the country survey report.⁹ Second, the incidence of poverty (H) and the MPI were both large enough so that meaningful subnational analysis could be pursued. Specifically, we only decompose those countries whose MPI is larger than 0.005 and whose incidence of poverty is higher than 1.5%.

Third, the sample drop due to missing and non-response data should not be more than 15% at the national level.¹⁰ For borderline cases in the criterion, we performed additional bias analyses to exclude those cases where the sample reduction leads to a statistically significant bias in poverty estimates.

The 69 countries that satisfy all three criteria have 780 subnational regions (Appendix 1). Out of the 69 country surveys, 40 were conducted between 2010 and 2013, 21 were conducted between 2006 and 2009, and eight were conducted during or before 2005.

⁹ The report had to explicitly indicate that the sample design allows for representative results at the subnational level for which MPI decompositions were estimated. In addition, the report also had to provide estimations at this level among the basic tabulates on child mortality rate or a similar indicator.

¹⁰ We apply the same rule to subnational regions but with minor adjustments. Among the countries with less than a 15% overall sample drop, some have subnational regions with more than a 15% sample drop. We face a trade-off here. On the one hand, inclusion of these countries could cause the statistics of these subnational regions to be biased; on the other hand, eliminating these countries would result in the loss of a large number of subnational regions. Therefore, we eliminate those countries that have at least one subnational region with more than a 25% sample drop, and we only include the subnational regions that have sample drops between 15 and 25% if they pass a bias test.

4. Where Do the World's Poorest Live?

We now report results for these three approaches to identify the bottom billion. The first approach identifies the bottom billion at the national level as those who are living in the poorest countries. The second approach moves beyond national averages and identifies the bottom billion as those living in poorest subnational regions of different countries. The third approach moves to the individual level and identifies the poorest one billion people according to their deprivation scores.

4.1 The Bottom Billion by Poorest Countries

In order to identify the bottom billion living in the poorest countries, we rank the countries by their global MPI values, starting with the poorest to richest. Our findings are summarized in Table 2, and we report the country-specific results in Appendix 2.

We find that the bottom billion poor people – according to national poverty aggregates – live in 28 countries.¹¹ The population-weighted average MPI of these countries is $MPI=0.325$. Of these people, 65.4% are from two South Asian countries (India and Afghanistan), 33.7% are from 24 Sub-Saharan African countries and merely 0.9% are from two countries – Somalia and Timor Leste – in other regions. Of the 28 countries, India has the lowest MPI of 0.283 and the lowest headcount ratio of 53.7%. Given its large population, India alone is home to 63.6% of the bottom billion. Apart from India, Ethiopia is home to 78 million and DR Congo is home to 47 million poor people. The highest average MPI values are found in Sub-Saharan Africa and LICs. If we look across income categories, 66.8% of the bottom billion live in the six LMICs and 33.2% are from 22 LICs.¹² No UMIC or high income country (HIC) is among the 28 poorest countries.

Table 2: Distribution of Bottom Billion in the Poorest Countries by World Region and Income Category

World Region	Number of Countries	Total Population		Total MPI Poor		Average MPI
		in '000	% of World Pop.	in '000	% of Bottom Billion Poor	
Total	28	1,726,238	31.5%	1,032,275	100.0%	0.325
Geographic Region						
Europe and Central Asia	0	-	-	-	-	-
Latin America and the Caribbean	0	-	-	-	-	-

¹¹ Because of country sizes, this method actually identifies $q_b = 1.03$ billion people.

¹² The income categories are based on the World Bank's Atlas method.

Arab Countries	1	9,908	0.2%	8,041	0.8%	0.514
East Asia and Pacific	1	1,096	0.0%	746	0.1%	0.360
South Asia	2	1,250,262	22.8%	675,596	65.4%	0.285
Sub-Saharan Africa	24	464,973	8.5%	347,892	33.7%	0.430
Income Category						
High Income	0	-	-	-	-	-
Upper Middle Income	0	-	-	-	-	-
Lower Middle Income	6	1,272,310	23.2%	689,428	66.8%	0.286
Low Income	22	453,929	8.3%	342,848	33.2%	0.436

These findings are coherent with recent studies, which show that the geography of poverty is changing and a higher number of the world's poor are increasingly living in MICs (Alkire et al. 2011, 2013b; Glassman et al. 2013; Sumner 2012; Kanbur and Sumner 2012). However, as we will show, national averages hide wide disparities within countries.

4.2 The Bottom Billion by Poorest Subnational Regions

Country aggregates may overlook a great deal of variation in poverty levels within the country across various population subgroups. For example, if we look inside Tanzania across its subnational regions, we find that in the Zanzibar region in 2010 41.9% of people are poor; whereas in the central region a staggering 81% are poor. Incidentally, the intensity of poverty in the Zanzibar region is 47.7%; whereas the intensity in the central region is 53.1%. Across Nigeria's regions, the range is even greater – from 2.6% in Lagos to 89.5% in Bauchi.⁺

One then wonders how results differ if we identify the bottom billion according to the poorest subnational regions where they live. As noted in the data section, it was possible to disaggregate MPI by subnational regions for 69 of the 108 countries. Countries for which we were unable to decompose are included as a single entry in order to use all data points in the analysis.¹⁵ As before, all subnational regions are ranked from poorest to least-poor according to their MPI value. We then identify the the poorest subnational regions whose cumulative population is one billion. The poorest entries in the subnational analysis include three countries – Yemen, Somalia and Chad – that could not be disaggregated by subnational regions. However, each country has less than 25 million people, making them smaller than a number of subnational regions that we included.

¹⁵ A preliminary analysis on national disparities and world distribution of multidimensional poverty was undertaken in Alkire, Roche and Seth (2011).

Table 3: Distribution of Bottom Billion in the Poorest Subnational regions by World Region and Income Category

World Region	Number of Countries	Number of Subnational Regions	Total Population		MPI Poor		Average MPI
			in '0000	% of World Pop.	in '0000	% of Bottom Billion Poor	
Total	45	307	1,441,937	26.3%	1,001,407	100.0%	0.389
Geographic Region							
Europe and Central Asia	0	0	-	-	-	-	-
Latin America and Caribbean	1	8	5,111	0.1%	3,161	0.3%	0.316
Arab States	2	2	33,212	0.6%	20,279	2.0%	0.352
East Asia and Pacific	3	23	5,769	0.1%	3,475	0.3%	0.312
South Asia	5	29	864,403	15.8%	563,193	56.2%	0.356
Sub-Saharan Africa	34	245	533,442	9.7%	411,298	41.1%	0.446
Income Category							
High Income	0	0	-	-	-	-	-
Upper Middle Income	2	4	620	0.0%	390	0.0%	0.313
Lower Middle Income	14	103	916,919	16.8%	609,431	60.9%	0.369
Low Income	29	200	524,398	9.6%	391,585	39.1%	0.424

Table 3 presents the subnational results (details can be found in Appendix 3). The one billion poor people living in the poorest subnational regions are distributed across 307 subnational regions in 45 countries. On average, the MPI of these poorest regions is 0.389 – which is higher than the country-level decomposition. Now 61% of the MPI poor live in MICs and 39% in LICs. Before, only 0.9% of the bottom billion lived outside of South Asia and Sub-Saharan Africa; in the subnational analysis, this rises slightly to 2.6%, but this is still very low.

The share of bottom billion poor in South Asia is 56.2%, which is much lower than the corresponding share of 65.4% in Table 2; whereas the share of bottom billion poor in Sub-Saharan Africa is 41.1% (vs. 33.2% previously). This is because while in Afghanistan, seven of its eight subnational regions contribute to the poorest billion, in India it is only 13 out of 29 states that are counted. The share of the bottom billion residing in these 13 Indian states is only 46.5%, which is much lower than the 63.6% of the bottom billion residing in India using country-level identification.

Certain other country cases are particularly interesting. Consider Nigeria and Pakistan. Neither country appeared in the list of countries housing the bottom billion in the country-level analysis. However, the subnational analysis reveals that the third highest number of bottom billion (51 million) reside in 15 of the 37 regions of Nigeria. Furthermore, Pakistan is home to the fifth highest number of bottom billion, who reside in three of its six subnational regions. Indeed the countries whose subnational regions contribute most to the poorest billion are, in order, India, Ethiopia, Nigeria, DR Congo, Pakistan, Bangladesh and Tanzania.

The case of Haiti is also interesting. When we identified at the country level, Haiti was not included. However, using subnational-level identification, eight of Haiti's ten subnational regions contribute to the bottom billion. We also find that four subnational regions from two UMICs – Gabon and Namibia – contribute to the bottom billion.

Subnational decompositions are tremendously useful as they clearly reveal existing disparities in poverty within countries and show the need for varied policy responses subnationally. There has been substantial debate on the need for disaggregated poverty data as part of the post-2015 discussion. Decomposition by other subgroups of population (rural/urban, ethnicity, etc.) is possible and could add even further insights.¹⁴ Yet even looking at poverty at the subnational region level conceals inequality across the poor within that subnational region. Neither does the country-level analysis nor the subnational analysis fully tell us who the poorest one billion people are. Therefore, we go one step further and look at the poverty profiles of individuals from every survey household across our 108 countries in order to identify the poorest billion people and find where they live.

4.3 The 'Poorest Billion' by Individual Poverty Profiles

In order to identify the poorest billion people, we pool all the survey datasets and rank the individuals in all of the 108 country surveys according to the intensity of their poverty profile or their deprivation scores.¹⁵ That is, we start by taking the people in all 108 countries who are deprived in all indicators (or a deprivation score of $c_i = 1$). The total number of people deprived in all indicators is 27.1 million, of whom 11.1 million live in Ethiopia and India. We then add people with a deprivation score of $c_i = 0.95$ and so on until we have identified the poorest bottom billion. It turns out that 1.1 billion people living in 104 countries have deprivation scores of 0.444 or higher. Thus, the endogenously determined poverty cutoff that identifies the poorest one billion people is $k_b = 044.4\%$.¹⁶

¹⁴ For example, decomposition of 106 countries by rural/urban areas reveals that the bottom billion live in 38 regions in 36 countries. Only two countries –Mali and Liberia – contribute both urban and rural regions; the remaining countries' contributions to the bottom billion arise from their rural areas alone. Indeed by this analysis, 99.6% of the bottom billion live in rural areas.

¹⁵ The analysis actually ranks weighted respondents as it is based on household surveys.

¹⁶ The trade-off is that now we can only report the number of people and their deprivation scores, not the percentage of poor people hence not the MPI. Note that the poverty cutoff of $k_b = 0.444$ in fact identifies 1.1 billion people instead of precisely 1 billion people because using sample weights, 334 million people across 104 countries share exactly the same deprivation score of $c_i = 0.444$.

We present the distribution of the poorest billion across geographical regions and across income categories in Table 4 and across countries in Appendix 4. Our results in Table 4 show that the poorest billion people are distributed across 104 countries. On average, they are deprived in 59.6% of weighted indicators, which is reported in the final column. Among these poorest billion, 52.2% reside in eight South Asian countries, 32.9% reside in 37 Sub-Saharan African countries and 11.7% reside in ten East Asian and Pacific countries. Also, 9.8% of the poorest billion people reside in UMICs, and 358,000 live in eight HICs. Only four out of 108 countries have zero people in the set of poorest billion: Belarus, Hungary, Slovenia and Slovakia. India and China are home to the largest numbers of the bottom billion. Nearly 457 million (41%) the poorest billion reside in India and 99 million (9%) reside in China (Appendix 4).

Table 4: Distribution of the Bottom Billion According to Individual Poverty Profile by World Region and Income Category

World Region	Number of Countries	Bottom Billion MPI Poor		
		Thousands	% of world	Average Intensity
Total	104	1,107,135	100%	59.6%
Geographic Region				
Europe and Central Asia	20	2,666	0.2%	52.3%
Latin America and Caribbean	18	13,058	1.2%	53.7%
Arab States	11	19,338	1.7%	62.5%
East Asia and Pacific	10	129,765	11.7%	52.2%
South Asia	8	577,935	52.2%	59.8%
Sub-Saharan Africa	37	364,373	32.9%	62.1%
Income Category				
High Income	8	358	0.03%	48.0%
Upper Middle Income	26	108,312	9.8%	51.7%
Lower Middle Income	39	638,898	57.7%	59.9%
Low Income	31	359,503	32.5%	61.4%

In the final four columns of Appendix 4, we report the number of poor denoted $q(k_b)$, the proportion of the population who are in the set of poorest billion $H(k_b)$, the proportion of the MPI poor in a country who are in the set of the poorest billion $H(k_b)/H(k)$, and their average deprivation scores $A(k_b)$. The numbers and proportions of the poorest billion residing within countries vary widely, as expected. Across the 104 countries, 20.3% of people are among the bottom billion. The highest incidence is in Niger, where fully 82.2% of the population are among the bottom billion, followed by Ethiopia with 79.2% and Mali with 76.6%. Indeed the 20 countries that have the highest incidence of population who are deprived in 44.4% of dimensions are all in Africa. In Afghanistan, 47.5% of the population are among this bottom billion; in India it is 37.5%; in Bangladesh, 32%; in Pakistan, 28.4%; and in Nepal, 27.6%. In Haiti it is 33.2%,

and in Timor Leste, 49.7%. On the other hand, in 28 countries less than 1% of the population are among this bottom billion, and in 45 countries it is less than 5%. Another interesting pattern is the variation in the proportion of the MPI poor in a country who are in this set of the poorest billion and the intensity of poverty among these poor.

In 27 countries, the proportion of the MPI poor who are in the set of this poorest billion is 70% or higher; in 21 countries the proportion is between 50% and 70%; in 20 countries the proportion is between 30% and 50%; in 22 countries the proportion is between 20% and 30%; and in seven countries the proportion is positive but less than 10%.

Does a larger proportion of MPI poor within a country being in the set of the poorest billion imply that their intensity of poverty $A(k_b)$ is also higher? This is not necessarily the case even though there is a positive relationship between the final two columns of Appendix 4. Consider the case of Madagascar and Yemen, which have similar population sizes. In Madagascar, 66.9% of the population is MPI poor with intensity $A(k) = 53.3\%$; whereas in Yemen, 52.5% of the population is MPI poor with intensity $A(k) = 53.9\%$. This shows that although there is a much smaller proportion of MPI poor in Yemen, the intensity of poverty is similar to that of Madagascar. When we look at the proportion of MPI poor who are in the set of the poorest billion, the proportion appears to be much larger in Madagascar (79.9%) than in Yemen (68.8%). However, the intensity of poverty among the people in the poorest billion in Yemen is much larger than that in Madagascar (62.3% vs. 57.5%). Thus, even when there is a lesser proportion (and number) of people from the set of the poorest billion in Yemen, they are more intensely deprived than the same in Madagascar. This type of distinction could be difficult to pick up in the country or subnational-level analysis.

Another interesting comparison is Pakistan vs. Afghanistan. In Pakistan, 28.4% of the population are among this poorest billion – which is 50 million people – and their average intensity is fully 61.2% of deprivations. In contrast, in Afghanistan, fully 47.5% of people are among the poorest billion – nearly 14 million people – but the average intensity is a little lower at 60.3%. Honduras is also an outlier: only 6.3% of its population are among this bottom billion, but the average intensity is 56.7%; whereas in Tanzania, where average intensity is 56%, 48.3% of the population are MPI poor.

Certain other country cases also confirm why the identification of the poorest billion by individual poverty profiles is important. Countries such as China and Indonesia do not appear in the list of countries when the bottom billion poor are identified through country as well as

subnational-level analysis. Even though one may express doubts on the high number of bottom billion poor in China because the dataset is reasonably old, it is hard to argue against the existence of more than 16 million bottom billion poor in Indonesia, more than 1.5 million poor each in South Africa and Turkey, and more than one million poor each in Bolivia, Brazil, Egypt, Morocco, Peru and Viet Nam. The existence of these bottom billion poor would not be known using country and subnational-level identification. The existence of a small number of the poorest billion in certain countries may be expected but may be particularly relevant for policy if those people belong to a particular subnational region or are from a particular ethnic minority.

Table 5: Deprivations in Different Indicators among the Poorest Billion

World Region	YS	AT	MO	NU	EL	SA	WA	FL	CF	AS
Total	50.9%	48.9%	49.1%	59.5%	65.4%	88.2%	43.4%	74.6%	97.0%	65.6%
Geographic Region										
Europe and Central Asia	36.2%	85.9%	67.5%	44.6%	1.6%	62.8%	57.7%	29.9%	45.5%	41.7%
Latin America and Caribbean	68.5%	29.5%	42.0%	27.8%	61.0%	73.1%	57.2%	68.0%	95.5%	65.8%
Arab States	55.2%	70.9%	57.2%	40.5%	70.7%	67.6%	77.8%	63.2%	74.4%	70.1%
East Asia and the Pacific	81.1%	29.6%	19.7%	26.6%	9.3%	79.5%	41.6%	29.0%	91.6%	31.9%
South Asia	43.4%	48.1%	50.8%	74.6%	61.5%	89.7%	23.3%	80.9%	97.5%	74.1%
Sub-Saharan Africa	51.5%	50.6%	56.7%	47.5%	91.9%	90.9%	73.4%	82.1%	99.4%	64.0%
Income Category										
High Income	97.1%	31.1%	2.8%	11.4%	0.7%	63.4%	50.5%	1.1%	26.6%	92.2%
Upper middle income	93.1%	43.9%	7.0%	26.2%	3.6%	80.3%	36.4%	33.2%	90.6%	29.2%
Lower middle income	43.0%	50.0%	54.6%	70.7%	61.6%	88.6%	32.6%	76.0%	96.7%	68.7%
Low income	52.3%	47.1%	52.2%	50.4%	90.9%	90.0%	64.6%	84.8%	99.4%	70.9%

YS: Schooling, AT: Attendance, MO: Mortality, NU: Nutrition, EL: Electricity, SA: Sanitation, WA: Water, FL: Floor, CF: Cooking Fuel, AS: Assets.

An additional valuable analysis may be to assess how the poorest billion are deprived in different indicators. Table 5 presents this information in the ten MPI indicators. Globally, across 104 countries, the indicator in which 97% of the poorest billion are deprived is cooking fuel and 88.2% are deprived in access to sanitation, while 74.6% are deprived in flooring material. Around 65% of the poorest billion are deprived in electricity and assets, and between 50% and 60% are deprived in the remaining indicators except water. Water deprivation is lowest among the poorest billion. However, deprivations vary across geographic regions and across income categories. We have highlighted in bold the two indicators that have the highest incidence in each region; each indicator, except nutrition, flooring and assets, are among the two indicators with the highest incidence in some region.

Looking across regions, schooling deprivation is highest among the poor in East Asian and Pacific countries; whereas electricity deprivation is highest in the Sub-Saharan African region. Nutrition deprivation is highest in South Asia, and water deprivation is highest among countries

in Arab states. Although a very small fraction of the bottom billion reside in HICs, they are highly deprived in schooling and child mortality.

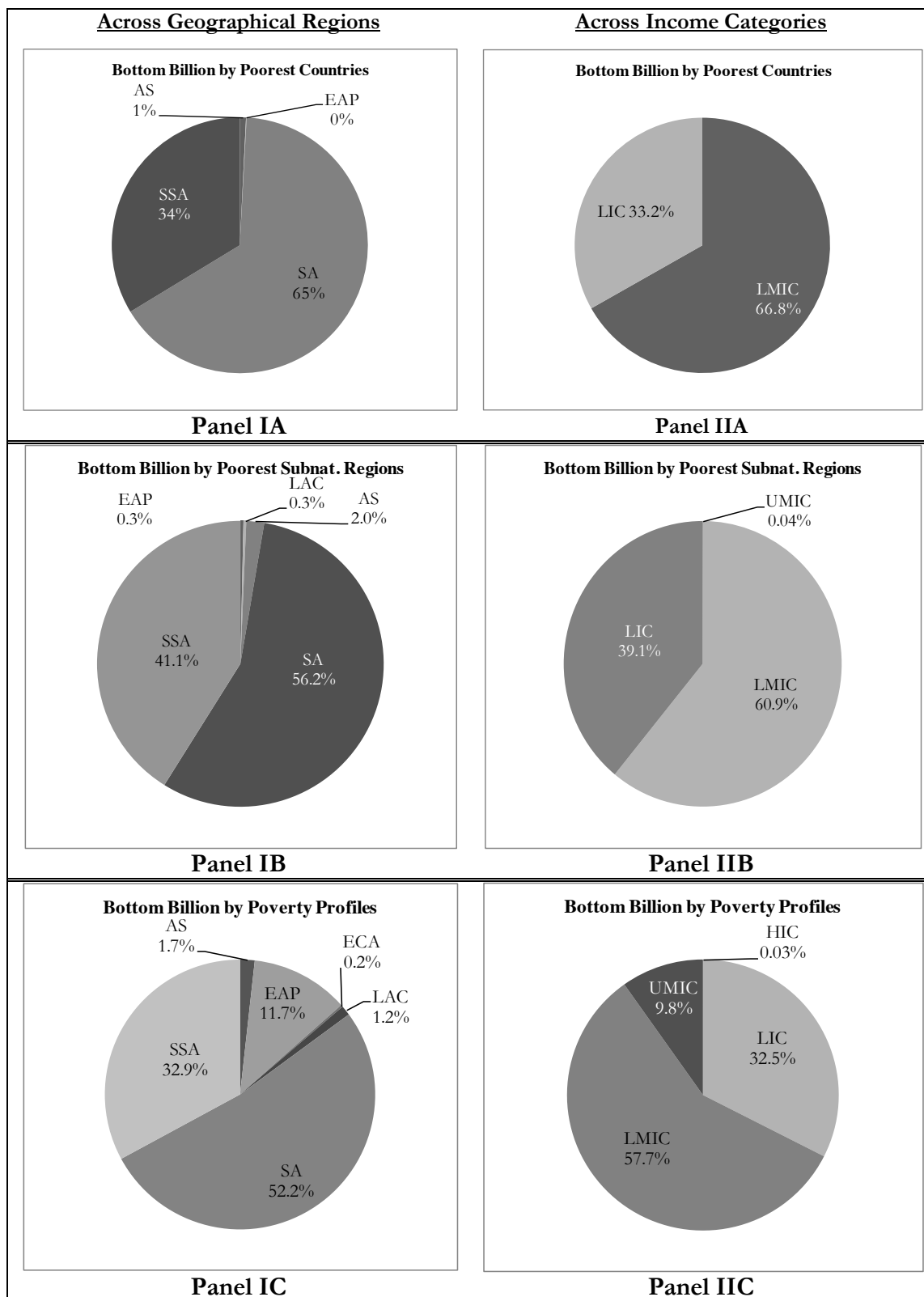
4.4 Comparison of the Three Approaches

Thus far we have provided three different answers to the question ‘Where do the bottom billion live?’ National poverty aggregates indicate the bottom billion live in 28 poorest countries, but it has the problem of hiding subnational disparities. If figures are disaggregated by region, we find instead that the bottom billion live in 307 subnational regions across 45 countries. If we look directly at people and their deprivation score, hence effectively choosing a different poverty cutoff, we find that the billion poorest people are distributed across 104 countries, including HICs.

Figure 1 provides a visual comparison of the bottom billion distribution. Panels IA, IB and IC present the distribution of the bottom billion across geographical regions for the three types of identification. During identification by country aggregates, 99% of the bottom billion are distributed between South Asia and Sub-Saharan Africa. Even for subnational-level identification, more than 97% of the bottom billion are distributed between South Asia and Sub-Saharan Africa. However, the identification by poverty profiles finds that nearly 15% of the poorest one billion people reside beyond South Asia and Sub-Saharan Africa.

Panel IIA, IIB, and IIC present the distribution of the bottom billion across income categories. Similar picture appears in this case. The country-level identification shows no bottom billion people outside of LICs and LMICs. Subnational analysis confirms only a small number of the bottom billion in UMICs. However, identification through individual poverty profiles indicates nearly 10% of the poorest billion reside in UMICs and even in HICs.

Figure 1: Distribution of Bottom Billion Poor by Different Approaches



SA: South Asia, SSA: Sub-Saharan Africa, EAP: East Asia and Pacific, AS: Arab States, LAC: Latin America and the Caribbean, ECA: Europe and Central Asia. HIC: Higher Income Countries, UMIC: Upper-Middle Income Countries, LMIC: Lower-Middle Income Country, LIC: Lower Income Country.

5. Concluding Discussion

What can we conclude from the discussion? Much of the discussion on the post-2015 framework for poverty is about ending global extreme poverty. If that is indeed the objective then a useful question to ask is how the world's poorest are distributed.

The answer is, however, not straightforward and differs according to which of the three approaches is taken. There are, though, some commonalities across approaches. First, South Asia has the largest contribution to world poverty as it is home to 52–65% of the bottom billion by various estimates. Even when the bottom billion are identified most precisely, using individual poverty profiles, India is home to 37.5% of the world's poorest billion people. India is followed by Sub-Saharan Africa, with 33–41% of the bottom billion. Second, we find that most of the *poorest* billion live in Middle Income Countries (MICs). This is an important finding because for some donors, the crossing of arbitrary thresholds is sufficient reason to question aid to a country and focus solely on Low Income Countries (LICs), which are home to just 32–39% of the bottom billion. Presumably, the post-2015 framework will also have content and/or targets on aid.

The identification of who is poor, how poor they are, and, thus, to some considerable extent, what policies will most effectively eradicate their poverty are likely to be important in the post-2015 policy discussions. The three-method calculations of the bottom billion show the importance of having poverty measures that can be disaggregated. It also demonstrates the flexibility of the MPI methodology.

The MPI is a direct measure of poverty and is not mediated by prices or other location-specific markers. In essence, we can dissolve national boundaries and undertake direct comparisons using people's deprivation profiles. We have illustrated that potential in this paper. That said, one should not forget that this exercise remains constrained by the datasets in terms of year, and indicator and variable definition. These are particularly acute for MPI estimates based on the World Health Survey, and for countries lacking indicators.¹⁷ Naturally, the accuracy of the MPI will also vary in different contexts. However similar constraints plague all global poverty measures. This paper has shown that the global MPI provides a starting point for undertaking such comparisons across countries and subnational regions. An MPI 2015+ could be designed to

¹⁷ See discussion in Alkire and Santos (2010), Alkire et al. (2011, 2013a, 2014a).

reflect the SDG framework (Alkire and Sumner 2013). The fact that the global MPI can be easily computed and analysed in a disaggregated fashion, as we have shown, is of direct relevance to post-2015 development agenda and the SDGs.

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Appendix 1: List of 108 Country Survey Datasets and Years of Surveys

Country	Survey	Year	Country	Survey	Year	Country	Survey	Year	Country	Survey	Year
Afghanistan*	MICS	2010/11	Dominican Republic*	DHS	2007	Macedonia	MICS	2011	Sierra Leone*	MICS	2010
Albania	DHS	2008/09	Ecuador	WHS	2003	Madagascar*	DHS	2008/09	Slovakia	WHS	2003
Argentina	ENNyS	2005	Egypt*	DHS	2008	Malawi*	DHS	2010	Slovenia	WHS	2003
Armenia	DHS	2010	Estonia	WHS	2003	Maldives	DHS	2009	Somalia	MICS	2006
Azerbaijan	DHS	2006	Ethiopia*	DHS	2011	Mali*	DHS	2006	South Africa	NIDS	2012
Bangladesh*	DHS	2011	Gabon*	DHS	2012	Mauritania*	MICS	2007	Sri Lanka	WHS	2003
Belarus	MICS	2005	Gambia*	MICS	2005/06	Mexico*	ENSANUT	2012	Suriname*	MICS	2010
Belize*	MICS	2011	Georgia	MICS	2005	Moldova, Republic*	DHS	2005	Swaziland*	MICS	2010
Benin*	DHS	2006	Ghana*	MICS	2011	Mongolia*	MICS	2005	Syrian Arab Republic	MICS	2006
Bhutan	MICS	2010	Guatemala	WHS	2003	Montenegro*	MICS	2005/06	Tajikistan*	DHS	2012
Bolivia*	DHS	2008	Guinea*	DHS	2005	Morocco	LSMS	2007	Tanzania*	DHS	2010
Bosnia and Herzegovina	MICS	2011/12	Guinea-Bissau	MICS	2006	Mozambique*	DHS	2011	Thailand*	MICS	2005/06
Brazil	PNDS	2006	Guyana*	DHS	2009	Namibia*	DHS	2006/07	Timor-Leste*	DHS	2009/10
Burkina Faso*	DHS	2010	Haiti*	DHS	2012	Nepal*	DHS	2011	Togo*	MICS	2010
Burundi*	DHS	2010	Honduras*	DHS	2011/12	Nicaragua*	DHS	2011/12	Trinidad and Tobago*	MICS	2006
Cambodia*	DHS	2010	Hungary	WHS	2003	Niger*	DHS	2012	Tunisia	MICS	2011/12
Cameroon*	DHS	2011	India*	DHS	2005/06	Nigeria*	MICS	2011	Turkey*	DHS	2003
Central African	MICS	2010	Indonesia*	DHS	2012	Occupied Palestinian Territory	PAPFAM	2006/07	Uganda*	DHS	2011
Chad	WHS	2003	Iraq*	MICS	2011	Pakistan*	DHS	2012/13	Ukraine*	DHS	2007
China	WHS	2002	Jordan*	DHS	2009	Paraguay	WHS	2002/03	United Arab Emirates	WHS	2003
Colombia*	DHS	2010	Kazakhstan	MICS	2010/11	Peru*	DHS	2012	Uruguay	WHS	2002/03
Congo, Dem. Republic*	MICS	2010	Kenya*	DHS	2008/09	Philippines*	DHS	2008	Uzbekistan*	MICS	2006
Congo, Republic*	DHS	2011/12	Kyrgyzstan	MICS	2005/06	Russian Federation	WHS	2003	Vanuatu	MICS	2007
Cote d'Ivoire*	DHS	2011/12	Lao*	DHS	2011/12	Rwanda*	DHS	2010	Viet Nam*	MICS	2011
Croatia	WHS	2003	Latvia	WHS	2003	Sao Tome and Principe*	DHS	2008/09	Yemen	MICS	2006
Czech Republic	WHS	2002/03	Lesotho*	DHS	2009	Senegal*	DHS	2010/11	Zambia*	DHS	2007
Djibouti*	MICS	2006	Liberia*	DHS	2007	Serbia	MICS	2010	Zimbabwe*	DHS	2010/11

DHS: Demographic Health Survey, ENNyS: National Survey of Nutrition and Health, ENSANUT: National Health and Nutrition Survey, LSMS: Living Standards Measurement Survey, MICS: Multiple Indicators Cluster Survey, PAPFAM: Pan Arab Population and Family Health Project, PNDS: National Survey of Demographic and Health, NIDS: National Income Dynamics Study, WHS: World Health Survey.

* Subnational analysis was possible for the country.

Appendix 2: List of Twenty-eight Poorest Countries Housing One Billion MPI Poor People

Country	Geographic Region	Income Category (2012)**	MPI(k)	Population ('000)	Incidence (Hk)	MPI Poor (q(k)) ('000)	Share of the One Billion Poor (q/q _b)
Afghanistan	SA	LIC	0.353	29,105	66.2%	19,256	1.87%
Benin	SSA	LIC	0.412	9,780	71.8%	7,024	0.68%
Burkina Faso	SSA	LIC	0.535	15,995	84.0%	13,436	1.30%
Burundi	SSA	LIC	0.454	9,540	80.8%	7,706	0.75%
Central African Republic	SSA	LIC	0.430	4,436	77.6%	3,441	0.33%
Chad	SSA	LIC	0.344	12,080	62.9%	7,598	0.74%
Congo, Democratic Republic	SSA	LIC	0.392	63,932	74.0%	47,296	4.58%
Cote d'Ivoire	SSA	LMIC	0.310	19,390	58.7%	11,391	1.10%
Ethiopia	SSA	LIC	0.564	89,393	87.3%	78,070	7.56%
Gambia	SSA	LIC	0.324	1,735	60.4%	1,048	0.10%
Guinea	SSA	LIC	0.506	11,162	82.5%	9,208	0.89%
Guinea-Bissau	SSA	LIC	0.462	1,624	77.5%	1,259	0.12%
India	SA	LMIC	0.283	1,221,156	53.7%	656,340	63.6%
Liberia	SSA	LIC	0.485	4,080	83.9%	3,423	0.33%
Madagascar	SSA	LIC	0.357	21,679	66.9%	14,498	1.40%
Malawi	SSA	LIC	0.334	15,458	66.7%	10,304	1.00%
Mali	SSA	LIC	0.558	14,417	86.6%	12,486	1.21%
Mauritania	SSA	LMIC	0.352	3,703	61.7%	2,284	0.22%
Mozambique	SSA	LIC	0.389	24,581	69.6%	17,109	1.66%
Niger	SSA	LIC	0.605	16,511	89.3%	14,740	1.43%
Rwanda	SSA	LIC	0.350	11,144	69.0%	7,684	0.74%
Senegal	SSA	LMIC	0.439	13,331	74.4%	9,919	0.96%
Sierra Leone	SSA	LIC	0.388	5,865	72.5%	4,254	0.41%
Somalia	AS	LIC	0.514	9,908	81.2%	8,041	0.78%
Tanzania	SSA	LIC	0.332	46,355	65.6%	30,389	2.94%
Timor-Leste	EAP	LMIC	0.360	1,096	68.1%	746	0.07%
Uganda	SSA	LIC	0.367	35,148	69.9%	24,576	2.38%
Zambia	SSA	LMIC	0.328	13,634	64.2%	8,747	0.85%
World			0.325	1,726,238	59.8%	1,032,275	100%

* SA: South Asia, SSA: Sub-Saharan Africa, EAP: East Asia and Pacific, AS: Arab States.

** LMIC: Lower Middle Income Country, LIC: Lower Income Country.

Appendix 3: List of 307 Poorest Subnational Regions from 45 Countries Housing One Billion MPI Poor People

Country	Geographic Region**	Income Category (2012)***	MPI	Poorest Subnational Regions where the Bottom Billion Reside					
				Number of Regions****	Average MPI of the Regions	Total Pop. in the Regions ('000)	Average Incidence (H_b) of the Regions	Total MPI Poor Pop. in the Regions ('000)	Share of the One Billion Poor
Afghanistan*	SA	LIC	0.353	7 of 8	0.376	24,460	69.9%	17,094	1.7%
Bangladesh	SA	LIC	0.253	4 of 7	0.278	65,799	55.7%	36,629	3.7%
Benin*	SSA	LIC	0.412	11 of 12	0.441	8,956	76.4%	6,844	0.7%
Burkina Faso*	SSA	LIC	0.535	12 of 13	0.579	14,106	89.4%	12,606	1.3%
Burundi*	SSA	LIC	0.454	4 of 5	0.474	8,907	83.9%	7,474	0.7%
Cambodia	EAP	LIC	0.212	6 of 19	0.304	2,721	60.7%	1,651	0.2%
Cameroon	SSA	LMIC	0.248	4 of 12	0.455	8,389	76.4%	6,411	0.6%
Central African Republic*	SSA	LIC	0.430	15 of 16	0.484	3,581	85.5%	3,063	0.3%
Chad*	SSA	LIC	0.344	1 of 1	0.344	12,080	62.9%	7,598	0.8%
Congo, Democratic Republic*	SSA	LIC	0.392	10 of 11	0.431	56,532	80.9%	45,708	4.6%
Congo, Republic	SSA	LMIC	0.181	8 of 12	0.303	1,427	63.4%	904	0.1%
Cote d'Ivoire*	SSA	LMIC	0.310	10 of 11	0.357	15,641	66.5%	10,404	1.0%
Ethiopia*	SSA	LIC	0.564	10 of 11	0.583	86,021	89.9%	77,373	7.7%
Gabon	SSA	UMC	0.070	1 of 10	0.264	57	53.7%	31	0.0%
Gambia*	SSA	LIC	0.324	5 of 8	0.494	807	84.6%	683	0.1%
Ghana	SSA	LMIC	0.139	3 of 10	0.342	4,183	65.8%	2,754	0.3%
Guinea*	SSA	LIC	0.506	7 of 8	0.561	9,563	89.8%	8,589	0.9%
Guinea-Bissau*	SSA	LIC	0.462	1 of 1	0.462	1,624	77.5%	1,259	0.1%
Haiti	LAC	LIC	0.248	8 of 10	0.316	5,111	61.9%	3,161	0.3%
India*	SA	LMIC	0.283	13 of 29	0.370	694,404	67.1%	466,014	46.5%
Kenya	SSA	LIC	0.229	5 of 8	0.262	28,177	53.3%	15,028	1.5%
Lao People's Democratic Republic	EAP	LMIC	0.174	5 of 17	0.285	2,131	53.2%	1,134	0.1%
Lesotho	SSA	LMIC	0.156	1 of 10	0.284	171	61.4%	105	0.0%
Liberia*	SSA	LIC	0.485	6 of 6	0.485	4,080	83.9%	3,425	0.3%
Madagascar*	SSA	LIC	0.357	21 of 22	0.387	18,472	72.1%	13,315	1.3%
Malawi*	SSA	LIC	0.334	3 of 3	0.334	15,457	66.6%	10,300	1.0%

Mali*	SSA	LIC	0.558	8 of 9	0.601	12,725	91.6%	11,656	1.2%
Mauritania*	SSA	LMIC	0.352	8 of 13	0.497	2,135	82.9%	1,771	0.2%
Mozambique*	SSA	LIC	0.389	9 of 11	0.428	21,642	76.2%	16,484	1.6%
Namibia	SSA	UMC	0.187	3 of 13	0.318	563	63.9%	360	0.0%
Nepal	SA	LIC	0.217	2 of 5	0.291	6,116	58.5%	3,576	0.4%
Niger*	SSA	LIC	0.605	7 of 8	0.633	15,416	92.6%	14,281	1.4%
Nigeria	SSA	LMIC	0.240	15 of 37	0.435	70,819	72.6%	51,449	5.1%
Pakistan	SA	LMIC	0.230	3 of 6	0.291	73,624	54.2%	39,881	4.0%
Rwanda*	SSA	LIC	0.350	4 of 5	0.372	10,039	72.8%	7,308	0.7%
Senegal*	SSA	LMIC	0.439	13 of 14	0.508	10,230	82.7%	8,463	0.8%
Sierra Leone*	SSA	LIC	0.388	12 of 14	0.430	5,025	79.5%	3,996	0.4%
Somalia*	AS	LIC	0.514	1 of 1	0.514	9,908	81.2%	8,041	0.8%
Tanzania*	SSA	LIC	0.332	6 of 8	0.355	38,550	69.7%	26,854	2.7%
Timor-Leste*	EAP	LMIC	0.360	12 of 13	0.402	917	75.2%	690	0.1%
Togo	SSA	LIC	0.250	4 of 6	0.320	3,684	62.1%	2,287	0.2%
Uganda*	SSA	LIC	0.367	9 of 10	0.387	32,816	73.5%	24,127	2.4%
Yemen	AS	LMIC	0.283	1 of 1	0.283	23,304	52.5%	12,238	1.2%
Zambia*	SSA	LMIC	0.328	7 of 9	0.396	9,544	75.6%	7,214	0.7%
Zimbabwe	SSA	LIC	0.172	2 of 10	0.266	2,023	58.1%	1,175	0.1%
Total					0.389	1,441,937	69.4%	1,001,407	100%

* Country where bottom billion resided as reported in Appendix 2 when the identification used country aggregates, overlooking subnational decomposition.

** SA: South Asia, SSA: Sub-Saharan Africa, EAP: East Asia and Pacific, AS: Arab States, LAC: Latin America and the Caribbean.

** UMIC: Upper Middle Income Country, LMIC: Lower Middle Income Country, LIC: Lower Income Country.

**** N/A means subgroup decompositions were not possible for these countries and they were included as a whole.

Appendix 4: List of 104 Countries Housing the Poorest One Billion People by Individual Poverty Profiles

Country	Geographic Region ^{***}	Income Category (2012) ^{***}	Total Population ('000)	MPI(·;k)	Incidence (H(k))	Intensity (A(k))	Poorest Billion			
							Number of Poor (q(k _p))	Incidence (H(k _p))	% of MPI Poor (H(k _p)/H(k))	Intensity (A(k _p))
Afghanistan*	SA	LIC	29,105	0.353	66.2%	53.4%	13,812	47.5%	71.8%	60.3%
Albania	ECA	UMIC	3,154	0.005	1.4%	37.7%	8	0.2%	14.3%	45.9%
Argentina	LAC	UMIC	40,729	0.011	2.9%	37.6%	190	0.5%	17.2%	48.2%
Armenia	ECA	LMIC	2,964	0.001	0.3%	35.2%	1	0.0%	0.0%	44.4%
Azerbaijan	ECA	UMIC	9,202	0.021	5.3%	39.4%	138	1.5%	28.3%	49.0%
Bangladesh**	SA	LIC	152,862	0.253	51.3%	49.4%	48,970	32.0%	62.4%	57.3%
Belize	LAC	UMIC	316	0.018	4.6%	39.6%	4	1.4%	30.4%	49.4%
Benin*	SSA	LIC	9,780	0.412	71.8%	57.4%	5,471	55.9%	77.9%	63.4%
Bhutan	SA	LMIC	729	0.119	27.2%	43.9%	88	12.1%	44.5%	54.0%
Bolivia	LAC	LMIC	10,324	0.089	20.5%	43.7%	1,040	10.1%	49.3%	51.8%
Bosnia and Herzegovina	ECA	UMIC	3,839	0.002	0.5%	37.3%	0	0.0%	0.0%	55.6%
Brazil	LAC	UMIC	196,935	0.011	2.7%	39.3%	1,073	0.5%	18.5%	50.7%
Burkina Faso*	SSA	LIC	15,995	0.535	84.0%	63.7%	11,417	71.4%	85.0%	68.6%
Burundi*	SSA	LIC	9,540	0.454	80.8%	56.2%	6,211	65.1%	80.6%	60.9%
Cambodia**	EAP	LIC	14,606	0.212	45.9%	46.1%	3,291	22.5%	49.0%	56.5%
Cameroon**	SSA	LMIC	21,156	0.248	46.0%	53.8%	6,797	32.1%	69.8%	61.5%
Central African Republic*	SSA	LIC	4,436	0.43	77.6%	55.5%	2,805	63.2%	81.4%	60.0%
Chad*	SSA	LIC	12,080	0.344	62.9%	54.7%	5,534	45.8%	72.8%	62.5%
China	EAP	UMIC	1,368,440	0.056	12.5%	44.9%	98,844	7.2%	57.6%	51.7%
Colombia	LAC	UMIC	47,079	0.022	5.4%	40.9%	844	1.8%	33.3%	52.3%
Congo, Democratic	SSA	LIC	63,932	0.392	74.0%	53.0%	36,479	57.1%	77.2%	58.4%
Congo, Republic**	SSA	LMIC	4,225	0.181	39.7%	45.7%	948	22.4%	56.4%	53.4%
Cote d'Ivoire*	SSA	LMIC	19,390	0.31	58.7%	52.8%	8,278	42.7%	72.7%	59.1%
Croatia	ECA	HIC	4,324	0.016	4.4%	36.3%	19	0.4%	9.1%	48.7%
Czech Republic	ECA	HIC	10,611	0.01	3.1%	33.4%	1	0.0%	0.0%	44.4%
Djibouti	AS	LMIC	847	0.139	29.3%	47.3%	134	15.8%	53.9%	57.0%
Dominican Republic	LAC	UMIC	10,148	0.018	4.6%	39.4%	120	1.2%	26.1%	50.0%
Ecuador	LAC	UMIC	15,246	0.009	2.2%	41.6%	125	0.8%	36.4%	51.3%

Egypt	AS	LMIC	79,392	0.024	6.0%	40.7%	1,321	1.7%	28.3%	52.7%
Estonia	ECA	HIC	1,294	0.026	7.2%	36.5%	9	0.7%	9.7%	46.9%
Ethiopia*	SSA	LIC	89,393	0.564	87.3%	64.6%	70,838	79.2%	90.7%	67.6%
Gabon**	SSA	UMIC	1,594	0.07	16.5%	42.5%	111	7.0%	42.4%	51.4%
Gambia*	SSA	LIC	1,735	0.324	60.4%	53.6%	747	43.1%	71.4%	60.6%
Georgia	ECA	LMIC	4,374	0.003	0.8%	35.2%	3	0.1%	12.5%	45.8%
Ghana**	SSA	LMIC	24,821	0.139	30.4%	45.8%	3,741	15.1%	49.7%	56.0%
Guatemala	LAC	LMIC	14,707	0.127	25.9%	49.1%	2,724	18.5%	71.4%	54.1%
Guinea*	SSA	LIC	11,162	0.506	82.5%	61.3%	7,883	70.6%	85.6%	65.5%
Guinea-Bissau*	SSA	LIC	1,624	0.462	77.5%	59.6%	1,045	64.3%	83.0%	64.4%
Guyana	LAC	LMIC	791	0.03	7.7%	39.2%	17	2.1%	27.3%	49.5%
Haiti**	LAC	LIC	10,033	0.248	49.4%	50.3%	3,329	33.2%	67.2%	57.3%
Honduras	LAC	LMIC	7,777	0.072	15.8%	45.7%	491	6.3%	39.9%	56.7%
India*	SA	LMIC	1,221,156	0.283	53.7%	52.7%	457,334	37.5%	69.8%	59.9%
Indonesia	EAP	LMIC	243,802	0.066	15.5%	42.9%	16,411	6.7%	43.2%	52.4%
Iraq	AS	UMIC	31,837	0.045	11.6%	38.5%	828	2.6%	22.4%	52.5%
Jordan	AS	UMIC	6,731	0.008	2.4%	34.4%	6	0.1%	4.2%	49.5%
Kazakhstan	ECA	UMIC	16,098	0.001	0.2%	36.2%	3	0.0%	0.0%	44.4%
Kenya**	SSA	LIC	42,028	0.229	47.8%	48.0%	12,624	30.0%	62.8%	55.2%
Kyrgyzstan	ECA	LIC	5,403	0.019	4.9%	38.8%	64	1.2%	24.5%	50.8%
Lao**	EAP	LMIC	6,521	0.174	34.1%	50.9%	1,429	21.9%	64.2%	59.2%
Latvia	ECA	HIC	2,073	0.006	1.6%	37.9%	6	0.3%	18.8%	46.7%
Lesotho**	SSA	LMIC	2,030	0.156	35.3%	44.1%	389	19.2%	54.4%	51.3%
Liberia*	SSA	LIC	4,080	0.485	83.9%	57.7%	2,787	68.3%	81.4%	62.6%
Macedonia of	ECA	UMIC	2,104	0.002	0.7%	35.7%	1	0.0%	0.0%	44.4%
Madagascar*	SSA	LIC	21,679	0.357	66.9%	53.3%	11,565	53.3%	79.7%	57.5%
Malawi*	SSA	LIC	15,458	0.334	66.7%	50.1%	7,202	46.6%	69.9%	56.0%
Maldives	SA	UMIC	332	0.018	5.2%	35.6%	1	0.3%	5.8%	51.5%
Mali*	SSA	LIC	14,417	0.558	86.6%	64.4%	11,037	76.6%	88.5%	68.0%
Mauritania*	SSA	LMIC	3,703	0.352	61.7%	57.1%	1,807	48.8%	79.1%	62.7%
Mexico	LAC	UMIC	119,361	0.011	2.8%	38.8%	875	0.7%	25.0%	49.6%
Moldova	ECA	LMIC	3,543	0.007	1.9%	36.7%	11	0.3%	15.8%	46.4%
Mongolia	EAP	LMIC	2,754	0.065	15.8%	41.0%	165	6.0%	38.0%	50.4%

Montenegro	ECA	UMIC	621	0.006	1.5%	41.6%	3	0.5%	33.3%	51.7%
Morocco	AS	LMIC	32,059	0.048	10.6%	45.3%	1,240	3.9%	36.8%	59.4%
Mozambique*	SSA	LIC	24,581	0.389	69.6%	55.9%	13,891	56.5%	81.2%	60.4%
Namibia**	SSA	UMIC	2,218	0.187	39.6%	47.2%	546	24.6%	62.1%	54.0%
Nepal**	SA	LIC	27,156	0.217	44.2%	49.0%	7,503	27.6%	62.4%	57.1%
Nicaragua	LAC	LMIC	5,905	0.072	16.1%	45.0%	499	8.4%	52.2%	53.6%
Niger*	SSA	LIC	16,511	0.605	89.3%	67.7%	13,576	82.2%	92.0%	70.4%
Nigeria**	SSA	LMIC	164,193	0.24	43.3%	55.3%	50,860	31.0%	71.6%	63.0%
Occupied Palestinian	AS	LMIC	4,114	0.005	1.4%	37.3%	6	0.1%	7.1%	48.9%
Pakistan**	SA	LMIC	176,166	0.23	44.2%	52.1%	49,988	28.4%	64.3%	61.2%
Paraguay	LAC	LMIC	6,573	0.064	13.3%	48.5%	495	7.5%	56.4%	58.2%
Peru	LAC	UMIC	29,615	0.043	10.5%	41.0%	1,215	4.1%	39.0%	50.0%
Philippines	EAP	LMIC	95,053	0.064	13.4%	47.4%	7,757	8.2%	61.2%	54.3%
Russian Federation	ECA	HIC	143,438	0.005	1.3%	38.9%	374	0.3%	23.1%	48.1%
Rwanda*	SSA	LIC	11,144	0.35	69.0%	50.8%	5,334	47.9%	69.4%	57.1%
Sao Tome and Principe	SSA	LMIC	183	0.154	34.5%	44.7%	28	15.6%	45.2%	54.6%
Senegal*	SSA	LMIC	13,331	0.439	74.4%	58.9%	7,735	58.0%	78.0%	65.3%
Serbia	ECA	UMIC	9,597	0	0.1%	40.2%	4	0.0%	0.0%	45.5%
Sierra Leone*	SSA	LIC	5,865	0.388	72.5%	53.5%	3,164	53.9%	74.3%	59.6%
Somalia*	AS	LIC	9,908	0.514	81.2%	63.3%	7,124	71.9%	88.5%	66.8%
South Africa	SSA	UMIC	51,949	0.044	11.1%	39.5%	1,627	3.1%	27.9%	48.5%
Sri Lanka	SA	LMIC	20,926	0.021	5.3%	38.7%	239	1.1%	20.8%	51.4%
Suriname	LAC	UMIC	530	0.024	5.9%	40.8%	10	1.9%	32.2%	52.3%
Swaziland	SSA	LMIC	1,212	0.086	20.4%	41.9%	101	8.3%	40.7%	51.0%
Syrian Arab Republic	AS	LMIC	21,804	0.021	5.5%	37.5%	219	1.0%	18.2%	50.0%
Tajikistan	ECA	LIC	7,815	0.054	13.2%	40.8%	361	4.6%	34.8%	50.4%
Tanzania*	SSA	LIC	46,355	0.332	65.6%	50.7%	22,374	48.3%	73.6%	56.1%
Thailand	EAP	UMIC	66,576	0.006	1.6%	38.5%	199	0.3%	18.8%	50.2%
Timor-Leste*	EAP	LMIC	1,096	0.36	68.1%	52.9%	545	49.7%	73.0%	59.1%
Togo**	SSA	LIC	6,472	0.25	49.8%	50.3%	2,092	32.3%	64.9%	57.9%
Trinidad and Tobago	LAC	HIC	1,333	0.02	5.6%	35.1%	5	0.4%	7.1%	48.4%
Tunisia	AS	UMIC	10,753	0.004	1.2%	38.5%	31	0.3%	25.0%	47.0%
Turkey	ECA	UMIC	73,059	0.028	6.6%	42.0%	1,504	2.1%	31.8%	54.8%

Uganda*	SSA	LIC	35,148	0.367	69.9%	52.5%	18,267	52.0%	74.4%	58.0%
Ukraine	ECA	LMIC	45,803	0.008	2.2%	35.5%	75	0.2%	9.1%	49.6%
United Arab Emirates	AS	HIC	8,925	0.002	0.6%	35.3%	8	0.1%	16.7%	45.0%
Uruguay	LAC	HIC	3,383	0.006	1.7%	34.7%	1	0.0%	0.0%	48.3%
Uzbekistan	ECA	LMIC	28,152	0.008	2.3%	36.2%	81	0.3%	13.0%	47.4%
Vanuatu	EAP	LMIC	242	0.129	30.1%	42.7%	28	11.7%	38.9%	52.2%
Viet Nam	EAP	LMIC	89,914	0.017	4.2%	39.5%	1,095	1.2%	28.6%	51.0%
Yemen**	AS	LMIC	23,304	0.283	52.5%	53.9%	8,420	36.1%	68.8%	62.3%
Zambia*	SSA	LMIC	13,634	0.328	64.2%	51.2%	6,356	46.6%	72.6%	57.1%
Zimbabwe**	SSA	LIC	13,359	0.172	39.1%	44.0%	2,704	20.2%	51.7%	51.8%
Overall			5,445,780		30.0%		1,107,135	20.3%	67.8%	

* Country where bottom billion people resided as reported in Appendix 2 when the identification used country aggregates.

** Country where bottom billion people resided as reported in Appendix 3 when the identification used subnational aggregates.

*** SA: South Asia, SSA: Sub-Saharan Africa, EAP: East Asia and Pacific, AS: Arab States, LAC: Latin America and the Caribbean, ECA: Europe and Central Asia.

**** HIC: Higher Income Country, UMIC: Upper Middle Income Country, LMIC: Lower Middle Income Country, LIC: Lower Income Country.