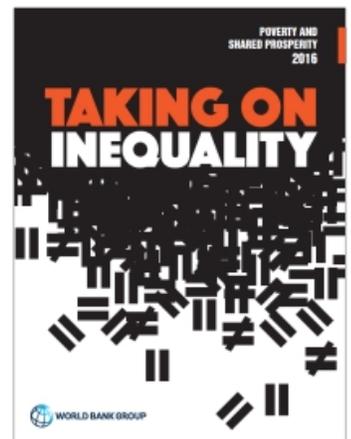




Poverty & Equity Global Practice Working Paper 085

POVERTY AND SHARED PROSPERITY  
REPORT 2016: TAKING ON INEQUALITY  
BACKGROUND PAPER

**WHO ARE THE POOR IN THE  
DEVELOPING WORLD?**



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## ABSTRACT

This paper presents a new demographic profile of extreme and moderate poverty, defined as those living on less than \$1.90 and between \$1.90 and \$3.10 per day in 2013, based on household survey data from 89 developing countries. The face of poverty is primarily rural and young; 80 percent of the extreme poor and 75 percent of the moderate poor live in rural areas. Over 45 percent of the extreme poor are children younger than 15 years old, and nearly 60 percent of the extreme poor live in households with three or more children. Gender differences in poverty rates are muted, and there is scant evidence of gender inequality in poor children's educational attainment. A sizable share of the extreme and moderate poor, 40 and 50 percent, respectively, have completed primary school. Compared with the extreme poor, the moderate poor are significantly more likely to have completed primary school and are less likely to work in agriculture. After conditioning on other individual and household characteristics, having fewer than three children, having greater educational attainment, and living in an urban area are strongly and positively associated with economic well-being. The results reinforce the central importance of households in rural areas and those containing large numbers of children in efforts to reduce extreme poverty, and are consistent with increased educational attainment and urbanization hastening poverty reduction.

This paper is a product of the Poverty and Equity Global Practice Group. It is part of a larger effort by the World Bank to provide open access to its research and contribute to development policy discussions around the world. The authors may be contacted at [dnewhouse@worldbank.org](mailto:dnewhouse@worldbank.org).

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– Poverty & Equity Global Practice Knowledge Management & Learning Team

# Who Are the Poor in the Developing World?

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## 1. Introduction

The world has made remarkable progress during the past two decades in raising the living standards of the poorest. In 1990, approximately two billion people, or 37 percent of the global population, lived on less than the current international poverty line of \$1.90 a day. By 2013, the year for which the latest global poverty estimates are available, the number of extremely poor persons had fallen by over 60 percent. During the same period, the proportion of the global population living in extreme poverty fell even faster, from 37 to 11 percent. The Millennium Development Goal of halving extreme poverty in developing countries between 1990 and 2015 was met in 2010, five years ahead of time.

Despite these impressive achievements, the latest estimate is that 770 million persons remained in extreme poverty as of 2013, a figure in the ballpark of the combined population of the European Union and the United States. Eradicating extreme poverty is a critical priority of the international development community. Ending poverty in all its forms is the first of the 17 Sustainable Development Goals adopted by the United Nations, and the World Bank has set an ambitious goal of reducing the rate of extreme poverty to 3 percent by 2030.

Achieving this goal poses a formidable challenge. Economic growth is a key driver for poverty reduction, but several studies conclude that maintaining the pace of economic growth of the recent past will not be sufficient to meet the target.<sup>2</sup> For example, based on current projections of GDP growth from 2005 to 2015, global poverty is projected to be 4.2 percent by 2030, falling shy of the World Bank's goal by over a percentage point (Ferreira et al. 2015). Global growth has slowed in recent years, and it is far from clear that the high rates of economic growth observed in the developing world during the past decade can be sustained for the next 15 years. Therefore, the pace of poverty reduction depends critically on engendering growth that reflects broadly shared prosperity and improves the living standards of the poorest. Evidence on where the extreme poor live, in which sectors they work, their demographic characteristics, and how they differ from the non-poor can help inform the strategies of country governments, multilateral development organizations and non-government organizations committed to reducing extreme poverty.

Serious knowledge gaps remain, however, about the characteristics of the extreme poor in the developing world, mainly due to the lack of globally harmonized household survey data. Country-specific poverty profiles are valuable inputs into national poverty reduction strategies, but are not internationally comparable because each country adopts a unique national poverty line. Studies that combine data from multiple countries therefore convert welfare to a common currency using Purchasing Power Parity (PPP) exchange rates, which despite their many conceptual and practical shortcomings remain the consensus method to compare welfare across countries.<sup>3</sup> Cross-country studies based on PPP exchange rates, however, often have limited geographic coverage. Banerjee and Duflo (2010), for example, provide an extensive analysis of the poor's economic behavior, including levels of saving, and investment in education and health, based on data for 13 low- and middle-income countries. Olinto et al. (2013) provide a preliminary analysis of the characteristics

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<sup>2</sup> Ferreira et al. 2015, Jolliffe et al. 2014, WDI 2016, Yoshida et al 2014.

<sup>3</sup> See Deaton (2016) for a detailed discussion of the issues associated with using PPPs to make welfare measures comparable across countries.

of the poor using a much more comprehensive sample, based on household data from 73 low- and middle-income countries in the 2000s. That analysis primarily focused on analyzing historical trends in poverty at the country level, however, and only scratched the surface by profiling a few key characteristics of the poor.<sup>4</sup>

Furthermore, little is known about those living just above the extreme poverty line, who account for a considerable share of the population. In the 89 countries considered in this study, 20%, or around a billion people, are estimated to live on more than the extreme poverty line of \$1.90 per person per day (in 2011 PPP terms) but less than \$3.10 per day in 2013. Better understanding the characteristics of this group, which we term the “moderate poor”, is important because many of them are materially deprived and considered poor by national standards. Identifying the characteristics that distinguish the moderate poor from the extreme poor may also provide a measure of insight into key factors that drive reductions in extreme poverty.

This paper presents a comprehensive demographic profile of the extreme and moderate poor by age, gender, household composition, educational attainment, urban/rural residence, and employment in the agricultural sector. The profile draws on the richest and most updated collection of household survey data on poverty assembled to date – the Global Micro Database (GMD). From this database, surveys were pooled across 89 countries, each collected since 2009. The results are based on the same welfare aggregates that are used to compute the regional and global poverty estimates published by the World Bank, which are often used by the countries themselves to estimate national poverty.<sup>5</sup> This paper is also the first to compare the extreme poor and moderate poor for a large number of countries, and to document patterns of missing data in this type of global analysis. The analysis “lines up” survey-based poverty estimates to a common year, 2013, and shows that this procedure has mild impacts on the profile of the poor.

There are five main findings. First, the poor tend to be rural and young, slightly more so than previously thought. About 80 percent of the extreme poor and 76 percent of the moderate poor live in areas classified, according to national definitions, as rural. These shares are likely overestimated, because in many cases the welfare aggregates have not been adjusted to account for the lower cost of living in rural areas. Data from South Asia, however, suggest that the magnitude of this rural bias is modest.<sup>6</sup> With respect to age, nearly 45 percent of the extreme poor are children under 15 years old, and over 60 percent of the extreme poor live in households with three or more children. Second, gender differences in poverty rates are muted. This is because poverty status is identified at the household level, whereas gender disparities are most apparent in individual-level indicators such as education, autonomy in decision making and labor market outcomes. Third, a primary school education is not sufficient to exit poverty. A sizeable minority of the extreme poor -- about

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<sup>4</sup> In addition, as discussed below, the welfare aggregates used to profile the poor in that study were not the same ones that were used to construct the World Bank’s official poverty estimates.

<sup>5</sup> Countries in Europe and Central Asia and Latin America and the Caribbean are exceptions, where the income aggregate used for global poverty monitoring has been standardized across the region and may differ from the aggregates used for national poverty estimates. In other regions, the welfare aggregates used are not consistent across countries, and vary for example in their treatment of housing and health expenditures, as well as their use of spatial deflators as discussed below.

<sup>6</sup> See section 3.7 below.

39 percent – graduated primary school, and over a quarter of those who completed primary school but not secondary school live on less than \$3.10 per day. Fourth, the moderate poor, despite having similar profiles in terms of age and household composition, are considerably better educated and are less likely to work in the agriculture sector than the extreme poor. Finally, when conditioning on other observed characteristics, having two or fewer children, completing secondary education, and living in an urban area are strongly and positively associated with economic welfare within countries.

Taken together, these findings emphasize the central importance of policies and programs that benefit households in rural areas and those with large numbers of children in reducing extreme poverty. This includes not only direct support, but also efforts to reduce the future prevalence of these types of households, such as speeding the demographic transition by increasing female education levels. The results also suggest that continued improvement in educational attainment and quality, as well as more rapid urbanization and increased non-agricultural employment, can further hasten movement from extreme to moderate poverty.

The rest of this paper is organized as follows. Section 2 describes the data and the methodology used to harmonize and calculate poverty estimates across different national surveys. Section 3 reports and analyzes the demographic profiles of the poor in comparison with those of the non-poor. Section 4 considers the robustness of key results to alternative line-up methods, spatial deflation, and varying samples due to missing data. Section 5 concludes.

## **2. Data and methodology**

### **2.1. Data**

The World Bank’s procedure for estimating global poverty rates is an extraordinarily data-intensive exercise. Global poverty estimates are derived from a collection of nationally representative survey data on household welfare – either income or consumption per capita – from 142 economies in the developing world. This collection of survey data is then combined with complementary data on population, inflation, real economic growth, and Purchasing Power Parity (PPP) exchange rates.

Estimating poverty rates for different types of households requires additional data on individual characteristics, comparable across countries and regions, from the same household surveys used to calculate poverty. Poverty profiles typically utilize a set of variables that are relatively straightforward to obtain such as age, gender, education, and sector of work. Nonetheless, compiling these variables from diverse household surveys, which differ in the quality of their data and the nature of the questionnaires, and harmonizing variable names and codes across surveys, is a remarkable achievement. These heavy data requirements are the main reason why only a few empirical studies have examined patterns across such a large number of countries.

This analysis is based on the September 2016 vintage of the Global Micro Database (GMD), a collection of globally harmonized household survey data recently developed by the Data for Goals

group of the World Bank's Poverty and Equity Global Practice.<sup>7</sup> The GMD is an ongoing initiative and new surveys are added each year. As of June 2016, it contained 443 household surveys from 134 countries. The surveys are as old as 1993, but more than 90 percent of the surveys are from 2005 or later, and surveys from 2009 to 2013 account for 56 percent of the collection of surveys.

The GMD is the richest collection of nationally representative, globally harmonized household survey data on poverty.<sup>8</sup> The figures on poverty are based on a measure of household welfare, which is either household per capita income or household per capita consumption, depending on which concept is used to measure national poverty in a particular country. Of the 89 countries in our sample, income is used in 30 of them, most of which are located in Europe, Central Asia, Latin America, and the Caribbean. The GMD is particularly suitable for profiling the global poor because its welfare aggregates are identical to those used to compute the global poverty estimates published by the World Bank, except for the notable exception of China.<sup>9</sup>

China is a special case because the World Bank does not have access to the individual level records of the Chinese Household Budget Survey (HBS), which is the source of official Chinese poverty statistics. The World Bank's international poverty estimates for China are instead based on an approximate distribution derived from grouped data, which cannot be used to profile the characteristics of the poor. This study therefore utilizes household level data from the 2013 Chinese Household Income Project Survey (CHIPS), made available to the public by Beijing Normal University. The CHIPS is drawn from the same sample frame as the HBS, and an analysis of an earlier round of the survey, collected in 2007, yielded similar poverty rates as the official HBS-based estimates (Zhang et al, 2014). The poverty rate for urban and rural China, derived from the 2013 HBS, is applied to the CHIPS data to generate profiles of the extreme and moderate poor in China.

The data from India also deserve special mention. In general, the results presented below are based on schedule one of the 2011 National Sample Survey (NSS), which is the primary source underlying both the estimates of poverty reported by the Indian government and the international poverty rate reported by the World Bank. The schedule one survey, however, does not collect information on labor market outcomes. Therefore, all information on sector of work is taken from schedule ten of the NSS, which collects both labor market information and sufficient information on household expenditure to construct an unofficial consumption aggregate. To calculate the poverty status of Indian workers by sector, the World Bank's urban and rural headcount poverty rates, which are derived from the schedule one survey, are applied to the corresponding percentiles of the urban and rural distribution of schedule ten's per capita consumption measure. Thus, the shares of agricultural workers that are below the \$1.90 and \$3.10 thresholds in India are estimated using the unofficial welfare aggregate collected in schedule ten.

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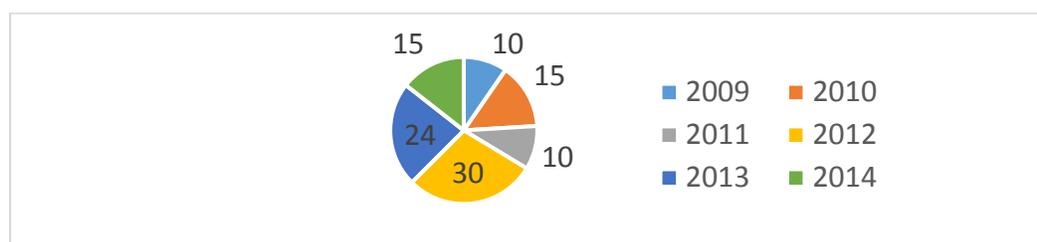
<sup>7</sup> Due to the nature of the license agreements between the World Bank and National Statistical Offices, data for most countries cannot be made publicly available.

<sup>8</sup> Only one survey is not nationally representative: Argentina's household consumption survey, the Encuesta Permanente de Hogares, which is not nationally representative and covers only about two-thirds of the country's urban population instead. Given that the urban population accounted for about 90 percent of Argentina's total population in 2013, the survey effectively only represents 61 percent of the national population.

<sup>9</sup> For more information on how the welfare aggregates are constructed, see Ferreira et al. (2015).

For the purpose of this study, we utilize data from as many as 89 countries for which a nationally representative welfare survey from 2009 or later was conducted and obtained by the World Bank, and for which 2013 poverty rates have been published.<sup>10,11</sup> Figure 1 presents the number of surveys in the final sample, according to their survey year. The final sample contains 104 surveys. In 15 of the 89 countries there are two available surveys bracketing 2013, which are both utilized as described below. The year 2009 was selected as the cut-off year to balance the competing goals of maximizing geographical coverage of the sample and minimizing error when “lining up”, or extrapolating, country-level poverty figures to 2013 as discussed in Section 2.2.

**Figure 1: Number of surveys by survey year**



In total, the 89 countries in the sample used in this paper represent 84% of the developing world’s population in 2013 and all geographical regions (Figure 2).<sup>12</sup> The 650 million in the sample that are classified as extremely poor amount to 85.4% of the estimated number of extreme poor worldwide in 2013, according to the World Bank.<sup>13</sup>

Table 1 lists the number of countries and the share of the 2013 population represented in the sample, by region and income classification. Except for the Middle East and North Africa (MENA) and Sub-Saharan Africa (SSA) regions, the sample used in this study provides excellent coverage of the global population and the extreme poor. While the extremely low data coverage in the MENA region is a concern, it is not unique to this study. In fact, PovcalNet has for several years suppressed regional poverty estimates for the MENA region due to low survey coverage. But since the region has traditionally had a much lower incidence of poverty than the average for global and developing countries, the omission of most countries from the region has a limited impact on the characteristics of the poor.<sup>14</sup> The omission of over one-quarter of the population of Sub-Saharan Africa is a greater concern, since the region has the highest number of extreme poor (389 million)

<sup>10</sup> In order to maintain consistency with the figures reported by the World Bank, we only include countries classified as “developing countries”. This excludes most of Western Europe, Canada, the United States, Australia, Japan, and the Republic of Korea.

<sup>11</sup> Not every survey is fully nationally representative, due to the exclusion of rural areas or conflict areas in particular countries.

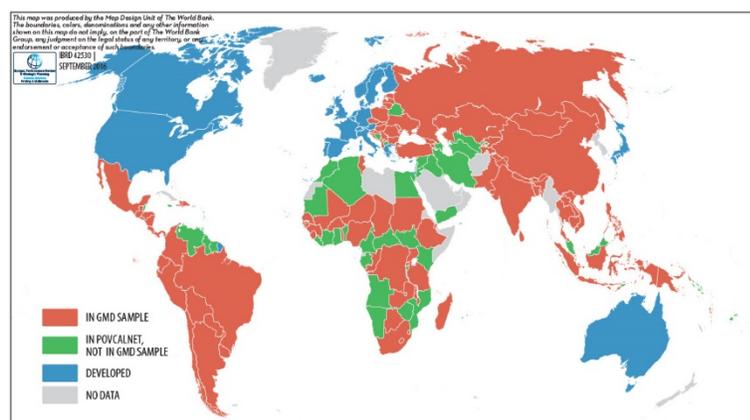
<sup>12</sup> Population figures are based on population projections by the United Nations Department of Economic and Social Affairs (UNDESA).

<sup>13</sup> Global poverty estimates are available on PovcalNet (<http://iresearch.worldbank.org/PovcalNet>). We refer to PovcalNet as a key reference point to assess the extent of our sample coverage and the validity of our estimates. As shown in Figure 1, our sample includes almost all countries covered by PovcalNet.

<sup>14</sup> In 2008, the most recent year MNA estimates are reported, the region accounted for 0.7 percent of the total number of extreme poor.

as well as the highest extreme poverty rate in 2013 (41 percent). A total of 22 Sub-Saharan African countries are excluded from the sample in this study, either because data were not available or because their latest available survey is from before 2009.<sup>15</sup> These countries combined represent 185 million people, with an average extreme poverty rate of 32 percent as of 2013.<sup>16</sup>

**Figure 2: Geographical coverage of the GMD sample**



**Table 1: Population distribution in GMD by region and income group**

	Number of countries included	Number of countries excluded	Population (millions)	Share of sample population (%)	Share of developing world population represented in sample (%)
<b>Total</b>	89	101	5,249.1	100.0	84.2%
<b>Income Group</b>					
Low income	21	14	628.5	12.0	75.0%
Lower-middle income	29	17	2,281.2	43.5	87.8%
Upper-middle income	26	30	2,071.1	39.5	86.7%
High income	13	40	267.5	5.1	65.2%
<b>Region</b>					
East Asia & Pacific	11	23	1,889.3	36.0	90.8%
Europe and Central Asia	24	14	424.7	8.1	87.6%
Latin America & Caribbean	18	23	550.3	10.5	88.8%
Middle East & North Africa	3	17	16.3	0.3	4.1%
South Asia	7	1	1,667.1	31.8	98.2%
Sub-Saharan Africa	26	22	701.4	13.4	73.9%
<b>Welfare measure</b>					
Income	59	N/A	4,497.1	85.7	N/A
Consumption	30	N/A	752.0	14.3	N/A

<sup>15</sup> They are Angola, Burundi, Cameroon, Cabo Verde, the Comoros, Côte d'Ivoire, Gabon, Ghana, Kenya, Liberia, Mauritania, Mozambique, and the Seychelles.

<sup>16</sup> According to the 2013 poverty estimates based on 2011 PPP in PovcalNet.

Finally, the surveys in the GMD also contain a substantial amount of missing data for particular characteristics, either because of non-response by respondents, or because questions were not asked in particular surveys. If the variable is missing for a fraction of the national sample, we assume this results from non-response and/or errors during the data collection and cleaning process, and include that country when generating the global profile, in order to maximize the geographical coverage of our sample. In the latter case, when a question is entirely missing in a survey, the country is excluded when generating poverty statistics for that characteristic. Therefore, although the analysis draws on data from as many as 89 countries, the number of countries in the sample varies when considering different characteristics.

Missing data, however, is less prevalent in more populous countries. Therefore, both missing and unreported data generally account for a small share of the weighted global sample, as shown in Table 2. The main exception is sector of work, which is only collected in surveys from 64 of the 89 countries. Consequently, data exist on only about 82 percent of the employed adult population, with 8.7 percent missing due to non-response and 9.6 percent missing due to the complete absence of information in the survey. The poverty profile by employment sector reported in this paper, thus, should be interpreted with appropriate caution.

**Table 2: Missing data in key profiling variables**

		Number of countries	Share of extreme poor	Share of moderate poor	Share of non-poor	Share of population
Sector of residence	Reported	87	100.0	100.0	99.9	99.9
	Non-response	.	0.0	0.0	0.0	0.0
	Not in survey	2	0.0	0.0	0.1	0.1
Employment sector of working adults aged 15+	Reported	64	68.5	78.2	84.6	81.7
	Non-response	.	18.2	15.4	5.6	8.7
	Not in survey	25	13.2	6.4	9.8	9.6
Age	Reported	89	100.0	100.0	100.0	100.0
	Non-response	.	0.0	0.0	0.0	0.0
	Not in survey	0	0.0	0.0	0.0	0.0
Gender	Reported	89	100.0	100.0	100.0	100.0
	Non-response	.	0.0	0.0	0.0	0.0
	Not in survey	0	0.0	0.0	0.0	0.0
Educational Attainment of adults aged 15+	Reported	83	94.3	94.1	95.3	95.0
	Non-response	.	4.3	5.2	2.3	3.0
	Not in survey	6	1.4	0.7	2.3	1.9
Educational attainment of children aged 12-14	Reported	70	92.3	93.8	93.2	93.2
	Non-response	.	6.3	5.3	1.9	3.5
	Not in survey	19	1.4	0.9	4.9	3.3

## 2.2. Methodology

The major technical challenge in generating global poverty profiles is combining surveys from different countries and years. Since the availability and frequency of household surveys differ significantly from one country to the next, it is not feasible to produce a global profile that maintains adequate geographical coverage of the poor using data from one particular year. This raises the challenge of how to reliably describe the characteristics of the poor based on national surveys collected in different years.

PovcalNet, the primary source of international poverty estimates maintained by the Research Department of the World Bank, reports global and regional poverty rates for particular reference years. For the reference year 2013, for example, PovcalNet uses approximately 50 surveys conducted that year. For the rest of the countries, the available survey data are “lined up” to 2013 using a complex procedure. First, the welfare measure in each country is multiplied by a constant scale factor to account for changes in welfare between the survey year and 2013. In most countries, the scale factor is the real growth between the survey year and 2013 in per capita household final consumption expenditure (HFCE), which come from the World Development Indicators Database. For the others, mostly in Sub-Saharan Africa, HFCE is either not available or has not been used, so real growth in GDP per capita in local currency units is used instead. Second, after this scale factor is applied to the welfare aggregate, extreme poverty in 2013 is calculated as the share of the sample population whose welfare falls below \$1.90 per day in PPP terms.

Two assumptions underpin this line-up method. The first is that the relative distribution of welfare across households remains constant over time; and the second is that HFCE or GDP growth provides a reasonable approximation to the growth in survey consumption means. World Bank researchers have attempted to validate these assumptions in both Africa and India.<sup>17</sup> In India, the relative distribution of welfare across households changes little across years. However, in both India and Africa, GDP growth significantly exceeded the growth in household consumption collected in surveys, meaning that the line-up procedure overstates poverty reduction.<sup>18</sup> The inconsistency between macro and survey-based measures of consumption growth further justifies setting a minimum year threshold of 2009 for surveys to be included in the analysis.

Using the lined up estimates to generate a poverty profile, instead of an estimated poverty rate, has two additional drawbacks. First, the procedure assumes that it is those households closest to the poverty line that either escape or fall into poverty when economic growth or decline occurs. In reality, households enter and exit poverty from a variety of points in the welfare distribution. Second, the line-up procedure does not account for changes in individual or household characteristics, such as increased urbanization or educational attainment that occurred between the survey year and the reference year. This means that the key variables that describe the poor, such as location, sector of work, and education, are not lined up to a common year.

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<sup>17</sup> See Joliffe et al, 2014, p. 250-254, and Beegle et al, p. 43.

<sup>18</sup> In addition, HFCE is typically calculated as a residual, meaning that its quality can vary greatly across countries and subsequent revisions can be substantial (Jerven, 2013).

Despite these issues, failing to line up poverty and population estimates is also problematic. In particular, pooling estimates from different years would bias the global profile towards characteristics of the poor in older surveys, many of whom might have since escaped poverty. For example, the most recent survey from India dates from 2011/12. Survey-based estimates show a fall in rural poverty from 36.3% to 24.8% between 2009/10 and 2011/12, and the “lined up” estimate for 2013 is 19.9%. Even though this latter estimate may overestimate poverty reduction, failing to adjust for this dramatic decline would over-represent poor rural Indians in the global poverty profile. At the same time, failing to account for population growth between 2010/11 and 2013 would underrepresent India relative to other countries.

Although we know of no systematic evidence that using this line-up method improves the accuracy of the poverty profile, our main specification is based on the “lined up” figures available on the PovcalNet website. In other words, we take the 2013 poverty rates published by the World Bank and use the corresponding percentile value to set poverty lines in the GMD sample. This ensures consistency with the published estimates and eases interpretation of the results. It also maintains continuity with the approach adopted in Olinto et al. (2013), except that we implement an additional population adjustment. In particular, the sample weight is adjusted to match population projections for each gender and age group in each country as of 2013, taken from the United Nations Department of Economic and Social Affairs (UNDESA).<sup>19</sup> In cases where population estimates by age group and gender are not available from UNDESA, we simply re-scale the sample weight to match the total population reported in the World Development Indicators. Section 3 below reports estimates based on this method.

In section 4, we test the sensitivity of key results to the choice of line-up method. In particular, we compare key results to an alternative approach that simply takes the population weighted average of country-level profiles, without any attempt to line-up data from different survey years to a common year, and find minor changes. Even though the results are generally similar under this approach, they cannot be referenced to a specific year and thus must be interpreted with caution. Appendix 1 describes the line-up procedures in greater detail.

Once the household surveys have been lined up, it is straightforward to use the pooled household survey data to construct poverty profiles. The figures displayed below are based on the international poverty lines of \$1.90 and \$3.10 per person per day in 2011 PPP as currently reported by the World Bank. The \$1.90 line is the average national poverty lines from the 15 poorest countries originally used by Chen and Ravallion (2010) to establish the \$1.25 a day poverty line in 2005 PPP terms.<sup>20</sup> As mentioned earlier, statistics are reported separately for the extreme poor, the moderate poor, and the non-poor. The moderate poor are defined as individuals whose household per capita consumption (or income) lies between \$1.90 and \$3.10

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<sup>19</sup> This reweighting procedure multiplies household weights by a scale factor in order to maintain a constant weight within each household. However, in cases where that is not sufficient to match the age group and gender-disaggregated UNDESA population estimates, weights are rescaled according to individuals’ age and gender groupings to exactly match these totals, meaning that weights for different members of the household may vary.

<sup>20</sup> See Ferreira et al (2015) for more details on how these lines are derived.

per person per day, while the non-poor have consumption or income greater than \$3.10 per person per day.<sup>21</sup>

### 3. Findings

#### 3.1. Poverty is disproportionately rural

As shown in Figure 3, 18.2% of rural residents subsist on less than \$1.90 a day, and 45.6 percent of rural residents are either extremely or moderately poor, and therefore live on less than \$3.10 per person per day. The corresponding rates for urban residents, in contrast, are 5.5% and 16.2%. This large gap in poverty rates, combined with the concentration of the general population in rural areas, translates into a startling disparity in the number of poor people. About 80% of the extreme poor and 76% of the moderate poor live in rural areas, as compared to only 44% of the non-poor. Given that there are 655 million extreme poor and a little over a billion moderate poor people represented in the sample, the rural sector accounts for a total of 525 million extreme poor and additional 789 million moderate poor. Of course, these absolute numbers underestimate the true global figures, since the sample of 89 countries is only representative of 86.5% of the population of the developing world, and 73% of the population of the globe, in 2013.

Figure 3: Poverty rate by residential sector

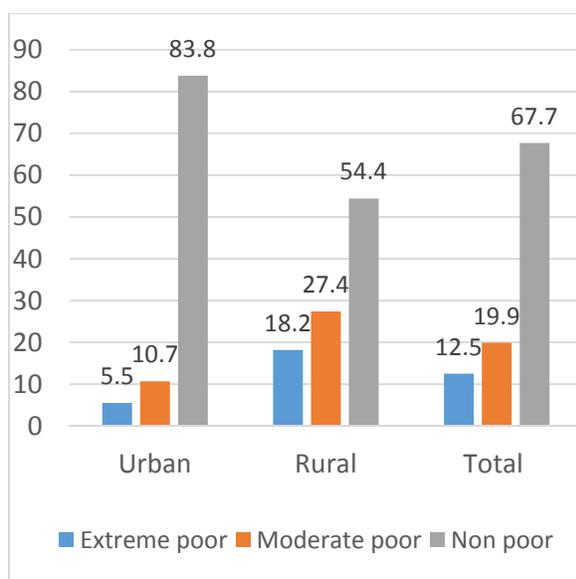
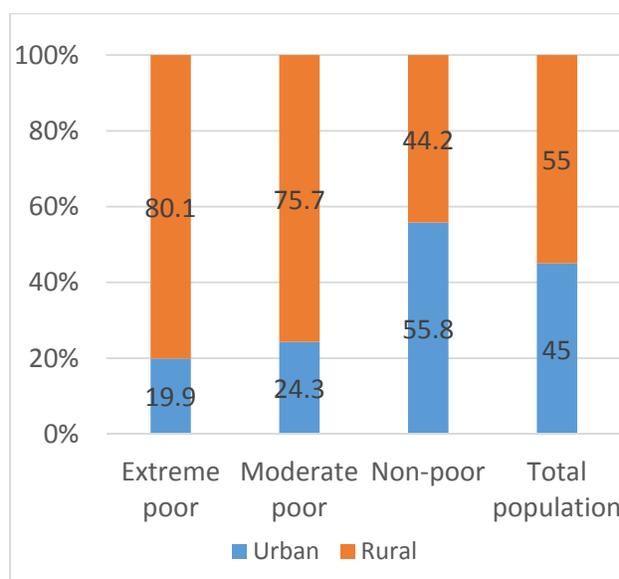


Figure 4: Share of population by residential sector



This finding suggests a slightly higher level of concentration of the poor in rural areas than previously thought. The study most comparable to this one is Olinto et al. (2013), which applied the \$1.25 extreme poverty line (2005 PPP) in 2010 to a different set of harmonized household

<sup>21</sup> These figures are generally calculated using the PPPs from 2011. But as of June 2016, The 2011 PPP conversion factors had not yet been adopted for 5 countries: Bangladesh, Cabo Verde, Cambodia, the Lao People's Democratic Republic, and Jordan. In these cases, we use the \$1.25 and \$2.00 dollar-a-day poverty lines (measured in 2005 PPP), which are roughly equivalent to the \$1.90 and \$3.10 lines in 2011 PPP terms. (Ferreira et al. 2015).

surveys, from 2000 to 2009 for 73 low- and middle-income countries. That analysis reported that 58% of the total population and 78% of the extreme poor lived in the rural sector, as compared to 55% and 80%, respectively, in our sample. The slightly lower share of the total population living in rural areas in this analysis likely reflects increased urbanization in recent years, as this paper draws on newer household surveys and lines up the sample to 2013 instead of 2010. Although the two studies are not directly comparable, the higher share of the extreme poor in rural areas in the more recent data is suggestive that the rural sector has lagged in reducing poverty since 2010.<sup>22</sup>

As mentioned above, the extent of poverty in rural areas is subject to two countervailing biases. On the one hand, the failure to spatially deflate the welfare aggregate in several countries overestimates the extent of rural poverty, by not adjusting for the lower cost of living in rural areas. On the other hand, the use of outdated urban/rural definitions in national surveys understates rural poverty by continuing to classify newly urbanized suburbs, which tend to be less poor than more remote areas, as rural. The former is mitigated by the use of separate urban and rural PPP exchange rates in China, India, and Indonesia. This, combined with evidence from South Asia presented below, suggests mild effects on the overall share of rural poor of less than five percentage points. It is not possible to assess the magnitude of the second source of bias with the data at hand.<sup>23</sup>

In line with the high rate of rural poverty, however, poverty is also deeply ingrained in the agriculture sector. Nearly two-thirds of extremely poor workers aged 15 and above reported that their primary job is in the agricultural sector; and extreme poverty rates among these workers is more than four times higher than among non-agricultural workers (Figures 5 and 6).<sup>24</sup> The significant gap in poverty rates between the agriculture and non-agriculture sectors is consistent with the well-documented earnings penalty faced by agriculture labor.<sup>25</sup> While the proportions of the extreme poor and moderate poor living in rural areas are roughly similar (80.1% vs. 76.0%, or a 4.1 percentage point difference), the moderate poor are much less likely than the extreme poor to work in the agriculture sector (64.7 vs. 52.0 percent, a 12.7 percentage point difference). This is consistent with growth in non-agricultural employment facilitating movement from extreme to moderate poverty.

Non-agriculture employment, however, is far from sufficient to escape poverty. Of the extremely poor workers in rural areas, nearly 24 percent work in non-agriculture jobs, and just under 40 percent of moderately poor workers in rural areas work outside of agriculture (Figure 7). This suggests further analysis to better understand why these non-agricultural workers in rural areas remain poor, and whether either facilitating migration to urban areas or greater investment in infrastructure would raise their productivity. Further analysis of the GMD, for example, can

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<sup>22</sup> Future work analysis will examine trends in the poverty profile using a comparable sample of countries.

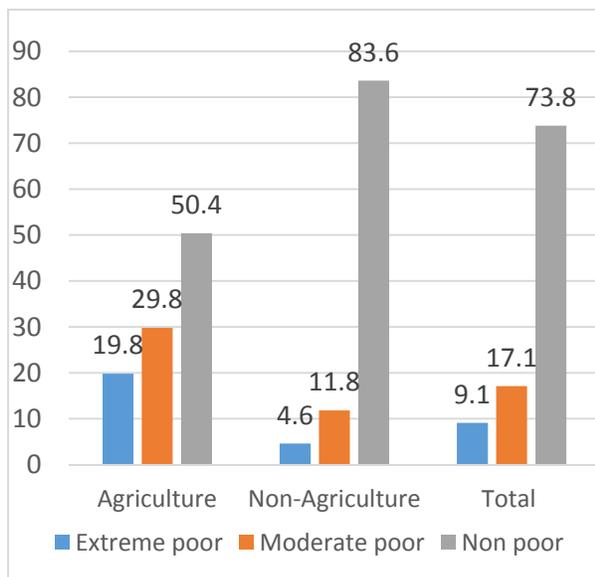
<sup>23</sup> An additional source of bias, if the population of interest is the entire developing world, results from the non-random selection of countries into the sample. In general, results can be interpreted as representing the 89 sample countries, which as noted above represent 86.5 percent of the developing world population.

<sup>24</sup> The total poverty rate in Figure 6 is lower by 2.4 percentage points than in Figure 4. This is primarily due to the smaller number of surveys for which the variable on the sector of work is available.

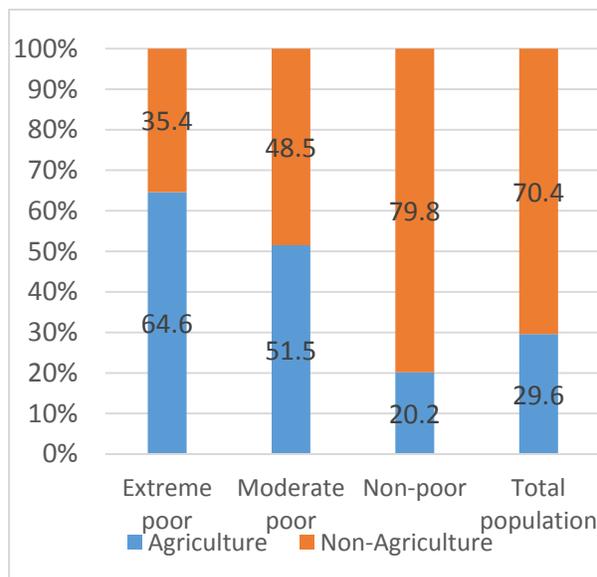
<sup>25</sup> A longstanding literature documents the central role of low returns to agriculture in development (Lewis (1954), Harris and Todaro (1970)). Alvarez-Cuadrado and Poshke (2012) and Gindling and Newhouse (2014) provide more recent empirical evidence on the earnings penalties faced by agricultural workers in developing countries.

explore in more detail how changes in local employment patterns relate to changes in economic welfare, to better understand the types of jobs that reduce extreme poverty in the rural sector.

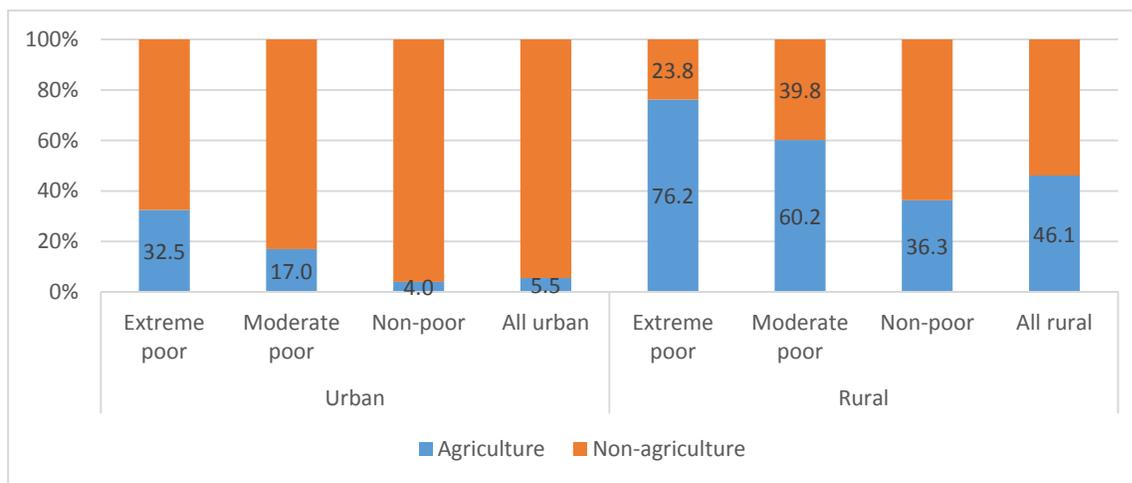
**Figure 5: Poverty rate by employment sector**



**Figure 6: Share of population by employment sector**



**Figure 7: Share of workers in agricultural sector by urban/rural**

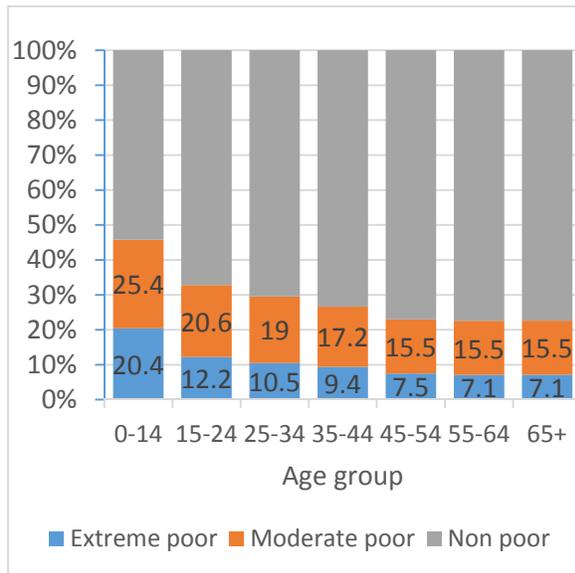


### 3.2. The poor tend to be young

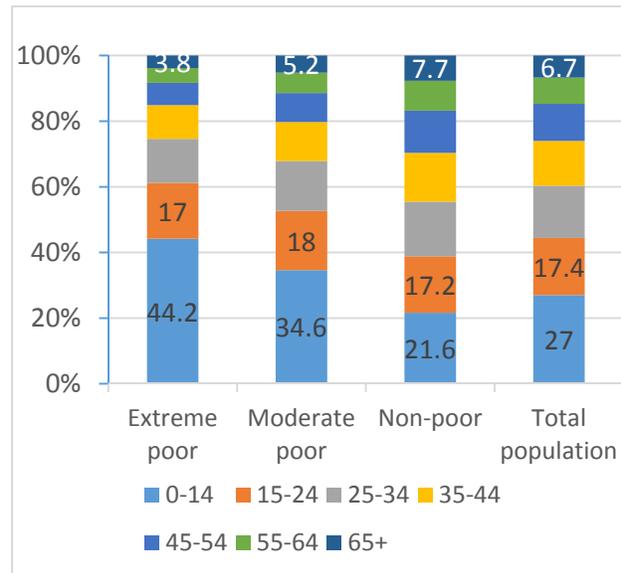
Over one in five children under 15 lives in an extremely poor household, and children under 15 make up 44% of all extreme poor (Figures 8 and 9). Extreme poverty rates are 8.2 percentage points higher for children 0 to 14 than those for young adults 15 to 24, and over 13 percentage points higher than adults aged 65 and above. This variation in poverty rates across age groups is

striking, but not new. Batana et al. (2013), for instance, find substantial gaps in poverty headcount rates between children and adults, and children and elderly 65 and above. These gaps amount to 14.4 and 19.5 percentage points, respectively, when defining children to be below 12 years old. Similarly, Olinto et al. (2015) find that 34% of the extreme poor but only 20% of the non-poor are children between 0 and 12 years old. In results not reported below, we find somewhat larger disparities when using these age cut-offs -- 39.7% of the extreme poor are children 0 to 12, as compared to 19% of the non-poor and 24 percent of the sample population Furthermore, these estimates assume that resources are equally distributed within the household, and relaxing that assumption may further raise child poverty.<sup>26</sup> High rates of child poverty have serious implications for child mortality, morbidity, malnutrition, physical development, psychological health and education, which compromises both their long-term earnings potential and the growth prospects of the countries in which they live.

**Figure 8: Poverty rate by age group**



**Figure 9: Share of population by age group**



High rates of child poverty are also reflected in the household composition of poor households. Extremely poor households, on average, have 7.9 members, 3.5 of which are children under 15. This substantially exceeds the average number of children in moderately poor and non-poor households, which is 2.3 and 0.9 (see Table 3). Put another way, children 0 to 14 make up 44 percent of extremely poor households, 35 percent of moderately poor households, and only 21 percent of non-poor households.

<sup>26</sup> Bargain et al. (2014).

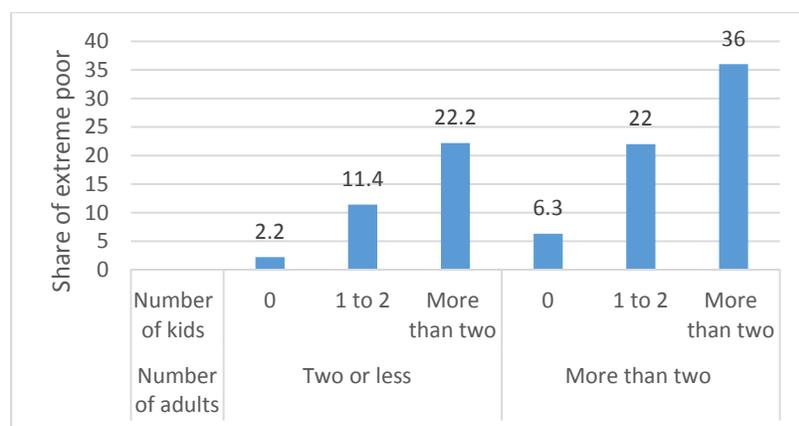
**Table 3: Household composition**

Age group	Average number of members per household		
	Extreme poor	Moderate poor	Non-poor
0-14	3.5	2.3	0.9
15-24	1.3	1.2	0.7
25-34	1.1	1	0.7
35-44	0.8	0.8	0.6
45-54	0.5	0.6	0.5
55-64	0.4	0.4	0.4
65+	0.3	0.3	0.3
<b>Total</b>	<b>7.9</b>	<b>6.6</b>	<b>4.3</b>

In contrast to children, the poverty rate among the elderly (aged 65 and above) is the lowest among the age groups considered. This is evident by both the low share of elderly in poor households – adults 65 and over account for less than 4 percent of the extreme poor and 5.2 percent of the moderate poor, as compared with 7.7 percent of the non-poor. (Figure 9).

The youthful nature of extreme poverty is also reflected in the large share of the poor – over 58 percent – that live in households with three or more children (Figure 10). While 36 percent of the poor live in larger households with more than two children and more than two adults, a sizeable 22 percent have three or more children and two or fewer adults. Of the extreme poor, less than one in ten have no children under the age of 15.

**Figure 10: Share of the extreme poor by number of children and adults in household**

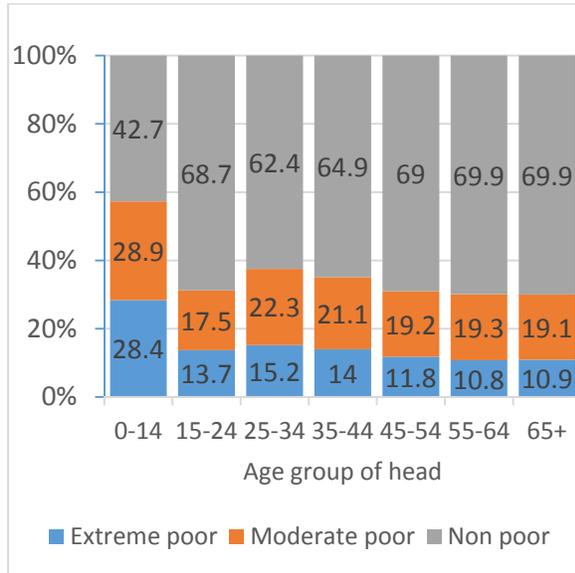


Note: Children defined as less than age 15

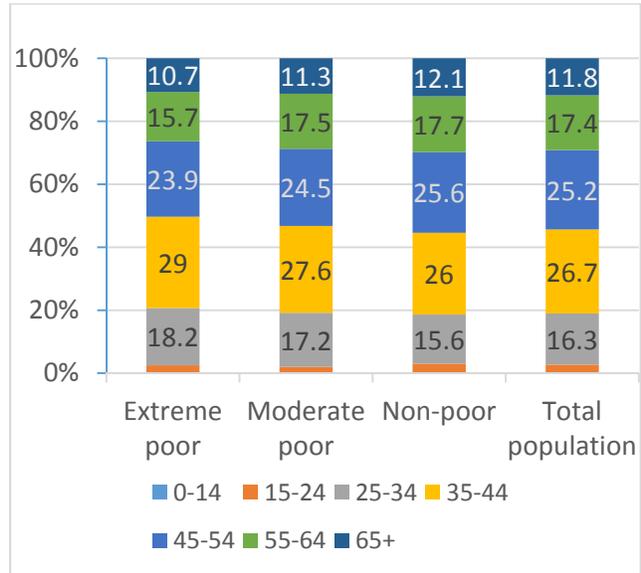
Poverty rates vary sharply according to the age of the household head as well. (Figures 11 and 12). On the one hand, 57 percent of those living with a household head below 15 years old are either extremely or moderately poor, highlighting the deprivation and vulnerability of households in which an adult head is not present. Households with young heads are extremely rare, however, as

they make up 0.5 percent of the population, and even households with heads from 15 to 24 only comprise 3 percent of the population. Compared to households with heads aged 15 to 24, poverty rates are higher for households with heads between the ages of 25 and 34, who are more likely to be burdened with children. As the age of the head exceeds 34, the poverty rate declines slightly, reflecting the greater earnings power of older workers.

**Figure 11: Poverty rate by age of HH head**



**Figure 12: Share of population by age of HH head**

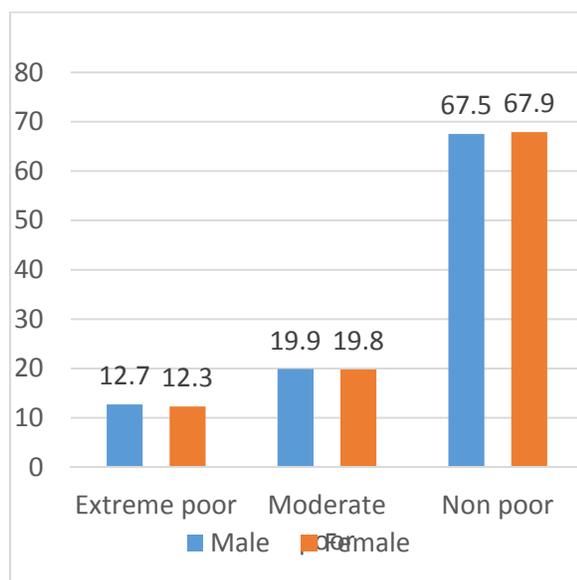


### 3.3. Gender gaps in poverty are modest

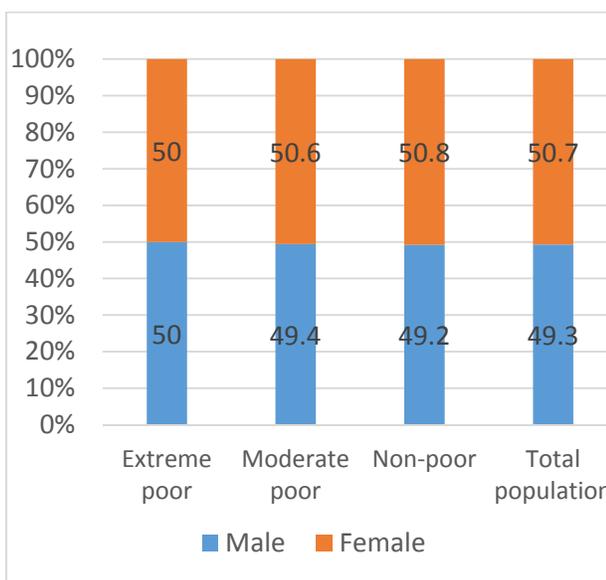
Tallying the share of men and women that live in poor households shows modest gender inequality in measured poverty (Figures 13 and 14), but this reflects the fact that poverty status is measured at the household level. By assumption all household members are classified as either in or out of poverty, and the ratio of males to females is roughly 50/50 in both poor and non-poor households. Recently, two more sophisticated studies have used differential patterns of consumption to attempt to measure individual levels of poverty, with diverging results. Attempting to account for differences in consumption within households greatly increased poverty for women in Malawi, but had little effect in Côte d’Ivoire.<sup>27</sup> But given the strong assumptions underpinning these estimates, future work can fruitfully examine gender disparities in labor market outcomes, intra-household allocation, and autonomy. These indicators of female empowerment are not only central to the gender agenda but can also have powerful indirect effects on poverty, by for example reducing the prevalence of households with large numbers of children.

<sup>27</sup> Dunbar et al, 2013, Bargain, et al (2014).

**Figure 13: Poverty rate by gender**

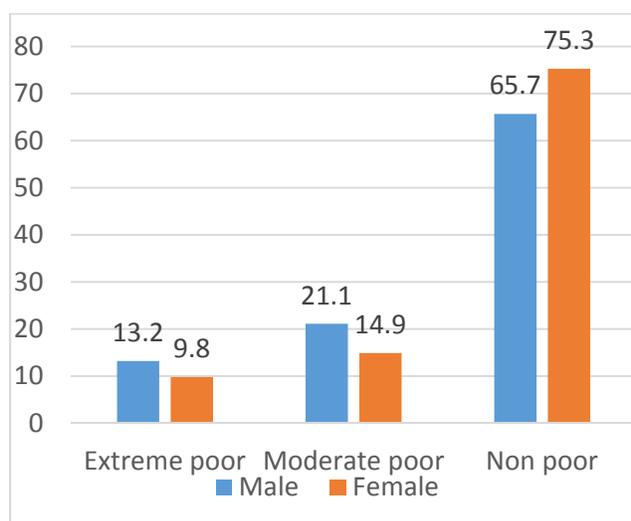


**Figure 14: Share of population by gender**

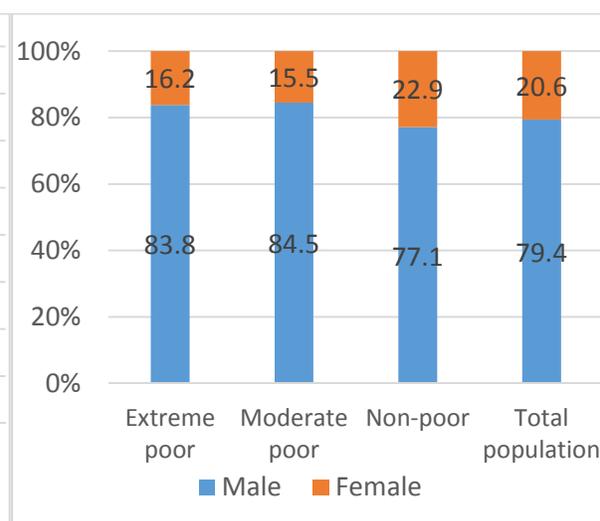


There are larger differences when considering gender of the household head, as poverty rates on average are moderately higher for male headed households than for female headed households. Male headed households are 3.4 percentage points more likely to be poor than female heads, and the share of the extreme poor living in male headed households is 4.4 percentage points higher than the population average (see Figures 15 and 16). There are a number of potential explanations for this result, which may at first glance appear to be counter-intuitive. A household is likely to report a female head if the usual male head is a migrant working out of town, in which case the household may benefit from remittances that make them less likely to be poor. Second, households are more likely to identify a female head if the woman is the breadwinner, which tends to occur in less poor households. Finally, single or divorced women may also be more likely to be financially independent.

**Figure 15: Poverty rate by gender of HH head**



**Figure 16: Share of population by gender of HH head**



The moderately greater poverty rates among male headed households are driven mainly by lower middle income countries (Table 4). In these countries, which account for 58 percent of the extreme poor, the poverty rate for female headed households is 3 percentage points lower than that for male headed households. The remainder of the difference is due to female headed households being slightly more prevalent in upper middle income countries, which have much lower rates of extreme poverty. But even in low income countries, the differences in poverty rates between male and female headed households is minor.

**Table 4: Poverty rates for female head households are similar within income groups.**

Country Income Group	Share of population in female headed households	Share of extreme poor	Extreme poverty rate for female headed households	Extreme poverty rate for male headed households	Total extreme poverty rate
Low Income	16.6	33.6	35.6	34.9	35.0
Lower Middle-Income	16.6	58.1	14.3	17.2	16.7
Upper Middle-Income	21.4	8.2	3.3	2.4	2.6
High Income	57.5	0.1	0.2	0.4	0.3
Total	20.6	100.0	9.8	13.2	12.5

Finally, we see little evidence that poverty exacerbates gender discrimination in the educational attainment of older children. Table 5 shows the distribution of attainment among children 12 to 14 years old, by gender and poverty status. The results are nuanced: A slightly higher share of girls than boys have not completed any education, but a slightly higher share have already completed some secondary school. Compared to the total population, boys that are extremely poor are 2.7 times more likely to have no education. The same is true for girls, suggesting that the mild female penalty at the bottom of the education distribution is, if anything, less pronounced among the poor.

**Table 5: Distribution of highest educational attainment by gender and poverty status, children 12-14**

	Extreme poor	Moderate poor	Non-poor	Total
<b>Male</b>				
No education	13.7	6.7	1.7	5.0
Incomplete primary	45.2	38.3	44.8	43.2
Complete primary or incomplete secondary	38.5	54.2	52.8	50.7
Secondary or above	2.6	0.8	0.8	1.1
<b>Female</b>				
No education	15.5	7.6	1.9	5.8
Incomplete primary	41.7	34.9	41.4	39.9
Complete primary or incomplete secondary	40.3	56.4	55.5	52.9
Secondary or above	2.6	1.1	1.2	1.4

### 3.4.A sizeable minority of the extreme poor have attended secondary school

Poor adults tend to be poorly educated, and there is a strong link between an individual’s educational attainment and his or her economic well-being.<sup>28</sup> As shown in Figure 17, nearly a quarter of all those with no education are extremely poor, and 58 percent live on less than \$3.10 per day. Despite these high rates of poverty, however, those with no education are now a distinct minority of the population, and only constitute 39 percent of the extreme poor and 28 percent of the moderate poor (Figure 18). Headcount poverty rates, not surprisingly, decline sharply as education increases. Most strikingly, those with at least one year of completed tertiary education are very unlikely to be poor, as a mere 1.5% of these adults are extremely poor, and only 5.2% live on less than \$3.10 per day.

Figure 17: Adult poverty rate by education

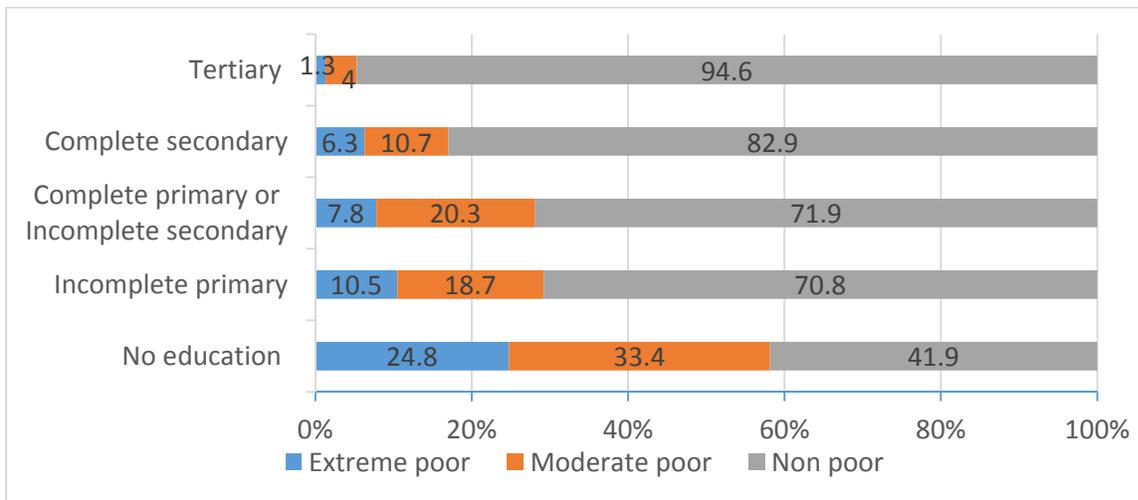
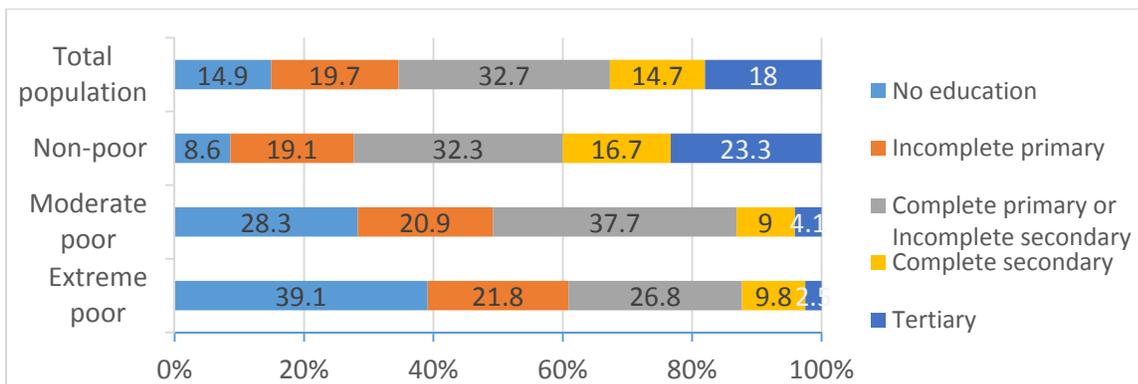


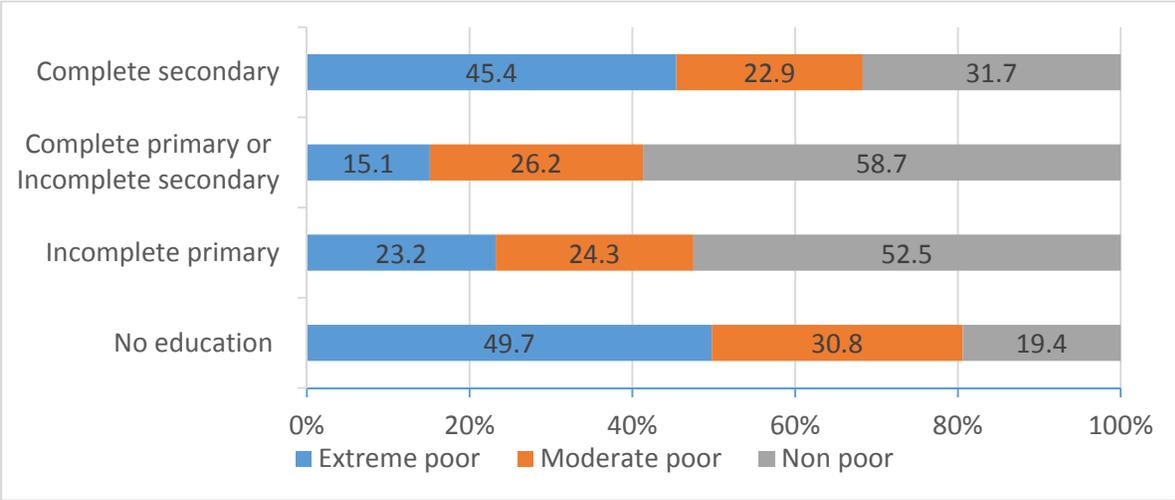
Figure 18: Share of adults by education



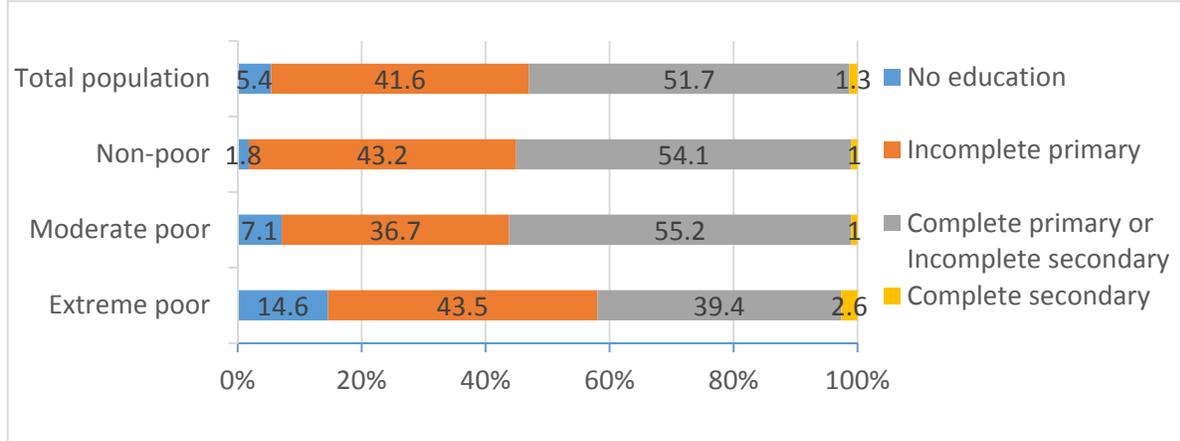
<sup>28</sup> An individual is defined as having no education if she/he has never attended any formal school. The individual is defined as having primary, secondary, or tertiary education if she/he has attended at least one year within that education level. A five category measure of educational attainment was utilized because it maintains strong country coverage while also allowing for disaggregation between those that did not and did complete primary school.

Poor children age 12 to 14 appear to be having mixed success, in terms of educational achievement and attendance. On the positive side, a full 85 percent of extremely poor children aged 12 to 14 have completed at least some primary school, and 40 percent of these have graduated primary school. But household poverty clearly depresses children’s educational attainment. Of the 5.4 percent of children who never completed any schooling, half are extremely poor and 80 percent live on less than \$3.10 per day (Figures 19 and 20). The corresponding poverty rates for children whose educational attainment is more likely to be on track – having at least completed primary school – is only 15 and 41 percent. Furthermore, nearly 15 percent of extremely poor children aged 12 to 14 have never attended school (Figure 20), likely consigning them to an adult life of at least moderate poverty. Efforts to reduce the tuition and travel cost of school attendance can help break the intergenerational cycle between household poverty and children’s educational attainment.

**Figure 19: Child poverty rate by education**



**Figure 20: Share of children by education and poverty status**



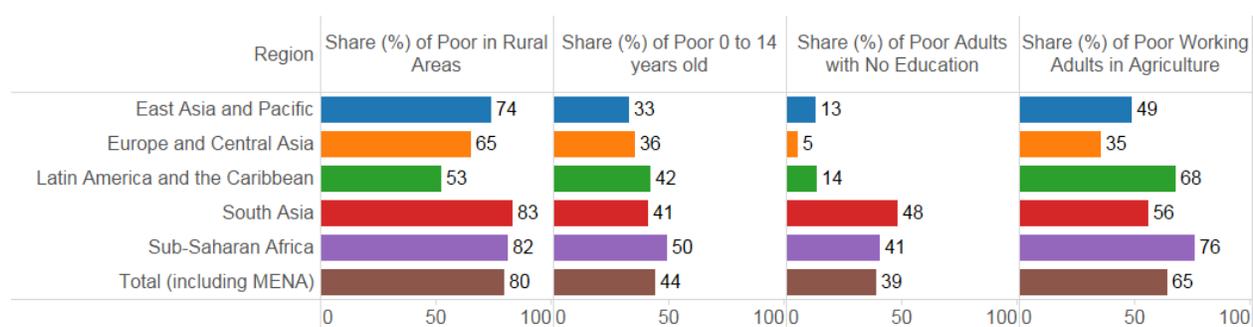
The analysis presented so far has only considered aggregates for the entire sample, and this section briefly touches on regional differences in the characteristics of the poor.<sup>29</sup> The share of the poor according to key characteristics are displayed in Figures 21 and 22. The predominantly rural nature of poverty is apparent in all regions except for Latin America and the Caribbean. Regions with high poverty incidence, such as South Asia and Sub-Saharan Africa, have a greater share of rural residents. Within each region, the extreme and moderate poor tend to have a similarly higher share of rural residents, while the non-poor have a much lower share of rural residents. The only exception is Sub-Saharan Africa, where the rural share among the extreme poor is notably higher than that of the moderate poor.

As expected, working in agriculture is closely related to poverty status in each region, and poorer regions have higher shares of adults working in agriculture. In all regions, both extremely and moderately poor adults are much more likely to work in agriculture than non-poor adults are. Differences are starkest in Europe and Central Asia, Latin America, and East Asia and Pacific.

Similar patterns hold for poverty among children. Except for Europe and Central Asia and Latin America and Caribbean, where poverty incidence is low, the share of children 14 years or younger is the highest for the extreme poor and lowest for the non-poor. Sub-Saharan Africa, the poorest region, has a particularly high share of children among extreme poor (50 percent) and moderate poor (44 percent).

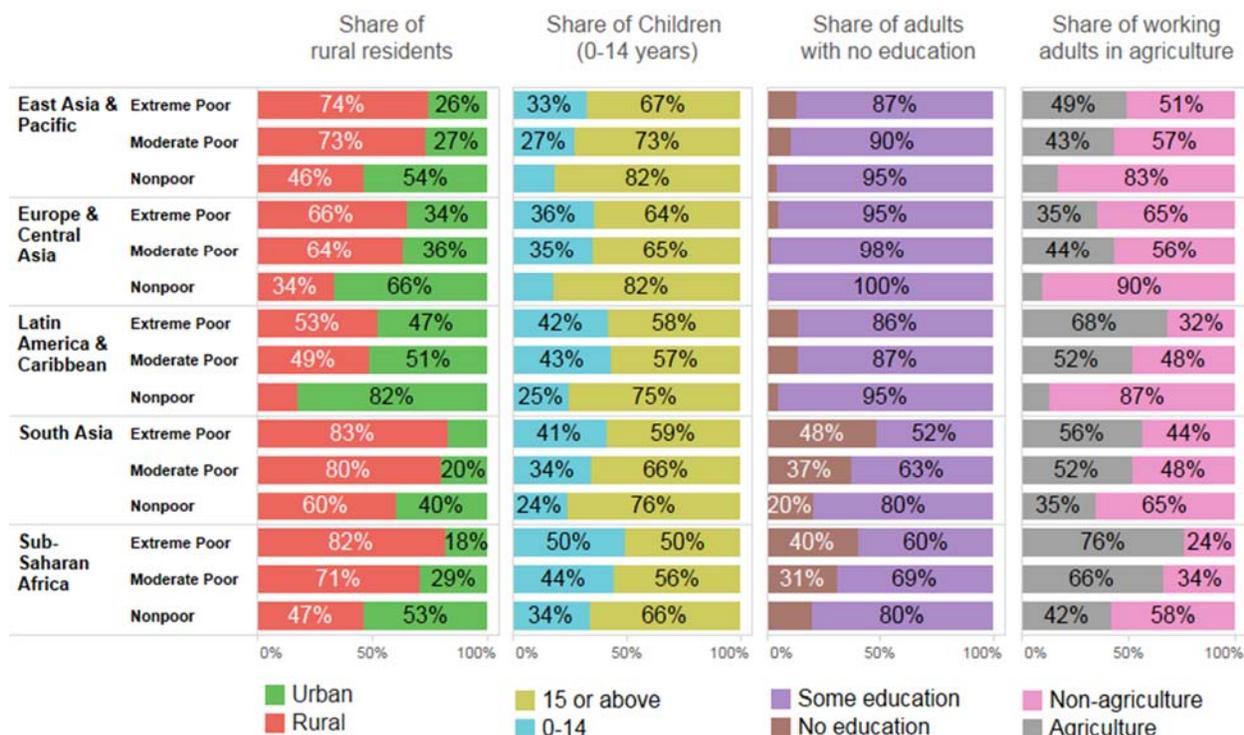
With respect to adult education, regional differences are clearer. While about 39 percent of extremely poor adults (15 years or above) have no formal education overall, less poor regions (East Asia and Pacific, Europe and Central Europe and Latin America and Caribbean) have a lower share of adults with no formal education (5 to 14 percent). In contrast, South Asia and Sub-Saharan Africa have a much higher incidence of adults with no formal education, 48 percent and 41 percent, respectively. In these two regions, educational attainment is closely correlated with poverty status; extremely poor adults are much more likely to have no education than moderately poor adults, who are in turn much more likely to have no education than the non-poor.

**Figure 21: Share of extreme poor by region and selected characteristics**



<sup>29</sup> Profiles for Middle East and North Africa are withheld due to low data coverage.

Figure 22: Share of population by region and poverty status



### 3.5. Rural residence, household composition, and educational attainment remain strongly correlated with welfare after controlling for other observed characteristics

The analysis has so far looked at unconditional correlations between poverty and demographic characteristics. This section examines conditional correlations, estimated from a simple regression of welfare on demographic characteristics. Because the relationships between poverty and these characteristics are complex and interwoven, the results should not be interpreted as causal relationships. Nevertheless, when interpreted as descriptive correlations, they can provide useful insight into whether the patterns observed in the profiles remain, after controlling for multiple household and individual-level characteristics.<sup>30</sup> The first set of regressions uses individual-level data and regresses the log of the welfare aggregate on household and individual characteristics. The regressions are estimated both with and without country fixed effects, which control for all characteristics common to each country (Table 6). The coefficients from the fixed effects regressions represent a pooled average of within-country relationships; for example, the coefficient on rural location in the fixed effect regression represents the penalty that rural residents face relative to their urban compatriots in the same country, averaged over all countries in the sample. This estimate, therefore, is not influenced by the greater prevalence of rural residents in poorer countries. The second set of regressions uses household-level data, and regresses the same dependent variable on characteristics of the households and their heads (Table

<sup>30</sup> The regressions are not exactly comparable, as the dependent variable is the log of welfare rather than the poverty rate. But given their close inverse relationship, using log welfare instead of the poverty rate as the dependent variable does not alter the main conclusions drawn from the regression results.

7). Because the dependent variable is the log of welfare, each coefficients can be interpreted as the approximate percentage difference in per capita consumption associated with a particular category, compared to the omitted category, holding the other included variables fixed.

The regressions confirm that, conditional on other characteristics, welfare is strongly and positively correlated with urban residence, having two or fewer children in the household, and educational attainment. When examining the fixed effects regression, persons living in urban areas on average consume or earn approximately 30 percent more per person than those in rural areas. Compared to those living in households with three or more kids, individuals living in households with one to two kids enjoy a 37 percent welfare premium if there are two or fewer adults, and a 24 percent premium if there are three or more adults.<sup>31</sup> With respect to educational attainment, those who completed primary school but not secondary consume or earn 24 percent more than those with no education, while the attainment premiums rise to 43 and 68 percent, respectively, for those that complete secondary or tertiary education.

These key results also hold when limiting the sample to households and examining how household and head characteristics relate to welfare. When comparing within country and conditioning on the other independent variables, welfare is on average 23 percent higher for urban households. In addition, the welfare of households whose head works outside of agriculture is another 23 percent greater on average than those that work in agriculture.<sup>32</sup> For households with two or more adults, having two or more kids is associated with a 50 percent welfare penalty, and heads who have primary, secondary, and tertiary education enjoy a 20, 42, and 74 percent premium in welfare.

While the results on gender inequality generally confirm the small differences found in the profile, the female head premium falls significantly when controlling for country fixed effects. In the individual regression, the premium falls from 9 to 1 percent, while in the household regressions, it falls from 19 to 10 percent. These reductions confirm the findings in Table 4, namely that a sizeable portion of the female head premium results from female headship being more prevalent in less poor countries. Meanwhile, the smaller premium in the individual regression suggests that the female head premium can largely be explained by differences in the observed characteristics of household members other than head, such as their gender, age, and educational attainment.

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<sup>31</sup> These are obtained by subtracting the coefficient for 1-2 kids from those for 3 or more kids in the right column of table 6, which gives -0.24 for more than two adults and -0.37 for two or fewer adults.

<sup>32</sup> The estimate of 14 percent is obtained by subtracting -0.04 from 0.19 in Table 7.

**Table 6: Individual-level regression**

Independent variables	Category	Coefficients	
		Without country FE	With country FE
Residence	Urban		
	Rural	-0.30	-0.30
Demographic structure	Two or less adults		
	0 kids		
	1-2 kids	-0.4	-0.36
	More than two kids	-0.87	-0.73
	Two or more adults		
	0 kids	-0.28	-0.27
	1-2 kids	-0.53	-0.49
	More than two kids	-0.87	-0.73
Marital Status of adults	Married		
	Never married	-0.02	-0.02
	Divorced	-0.06	-0.13
	Living together	-0.03	-0.07
	Widowed	0	0.02
Gender of household head	Man		
	Woman	0.09	0.01
Characteristics of individual			
Age group	0-14		
	15-24	-0.22	-0.20
	25-34	-0.12	-0.14
	35-44	-0.05	-0.08
	45-54	-0.03	-0.07
	55-64	-0.02	-0.08
	65 and up	-0.05	-0.13
Gender	Man		
	Woman	0.02	0.02
Educational attainment	No education		
	Incomplete primary	0.15	0.09
	Complete primary or some secondary	0.31	0.24
	Complete secondary	0.52	0.43
	Tertiary	0.86	0.68
Constant		2.07	2.19
Adjusted R2		0.43	0.50
Number of countries		78	78
Number of observations		5,971,267	5,971,267
Weighted number of observations ( '000s)		4,734,522	4,464,869

Note: Standard errors and significance is not reported because of the absence of PSU identifiers for many counties. In a subsample of 38 countries, all coefficients are statistically significant. Grey shading indicates that the category is excluded from the regression specification.

**Table 7: Household-level regression**

Independent variables	Category	Coefficients	
		Without country FE	With country FE
Residence	Urban		
	Rural	-0.22	-0.23
Demographic structure			
Two or less adults	0 kids		
	1-2 kids	-0.49	-0.42
	More than two kids	-1.00	-0.80
Two or more adults	0 kids	-0.29	-0.27
	1-2 kids	-0.57	-0.50
	More than two kids	-1.04	-0.82
Marital Status of head	Married		
	Never married	-0.09	-0.02
	Divorced	-0.10	-0.17
	Living together	-0.18	-0.15
	Widowed	-0.09	-0.01
Characteristics of household head		-0.08	0.00
Age of household head	0-14		.
	15-24	0.10	0.26
	25-34	0.10	0.23
	35-44	0.15	0.26
	45-54	0.17	0.29
	55-64	0.23	0.33
	65 and up	0.24	0.33
Gender of household head	Man		
	Woman	0.19	0.08
Educational attainment of head	No education		
	Incomplete primary	0.20	0.11
	Complete primary or some secondary	0.33	0.26
	Complete secondary	0.48	0.45
	Tertiary	0.89	0.73
Type of work of head	Head not working		
	Head working in agriculture	-0.15	-0.04
	Head working outside of agriculture	0.19	0.19
	Head 0-14		
Constant		.	.
Adjusted r2		1.84	1.68
Number of countries		0.42	0.5
Number of observations		76	76
Weighted number of observations ( '000s)		1,718,873	1,718,873

Note: All coefficients are statistically significant at 1 percent confidence level. Standard errors are not reported because they are not adjusted for sample survey design due to missing PSU identifiers for many counties. In a subsample of 38 countries, all coefficients are statistically significant. Grey shading indicates that the category is excluded from the regression specification or omitted due to multicollinearity.

## 4. Robustness checks

### 4.1. Sensitivity to lining up methods

The results reported above are based on the selected line-up method (Method 1), which adjusts the population using the UNDESA projections and redraws the poverty line in each survey to match the World Bank’s published poverty estimates for 2013, as described in section 2.2 above. This method aims to reduce biases that arise from pooling data collected in different years and ensures consistency with the existing published estimates. However, the method relies on a line-up procedure that imposes strong assumptions. These assumptions have not to our knowledge been systematically validated across several countries, and there is no hard evidence that applying the procedure provides a more accurate poverty profile for 2013 than simply pooling data for multiple years. Therefore, as an initial robustness check, we report selected key results under two other line-up methods: one that adjusts both survey weights and the welfare aggregate as described in section 2.2 above, and uses the international poverty lines \$1.90 and \$3.10 (Method 2); and another that adjusts only the sample survey weights to match the UNDESA population projections (Method 3).

In general, the choice of method makes little difference to the estimates. The key results, with respect to the share of the extreme poor belonging to different groups, changes by at most one to two a percentage points (Table 8). The results that are mildly sensitive to the choice of lineup method are the share of the poor working in agriculture and the share of the poor with no education, but even in these cases the changes barely exceed 2 percentage points and do not alter the qualitative nature of the results. This comparison does, however, illustrate that replicating the line-up procedure used to generate the published estimates is not necessarily straightforward, and that the nature of the line-up method usually has small but noticeable impacts on the profile.

**Table 8: Sensitivity to line-up method**

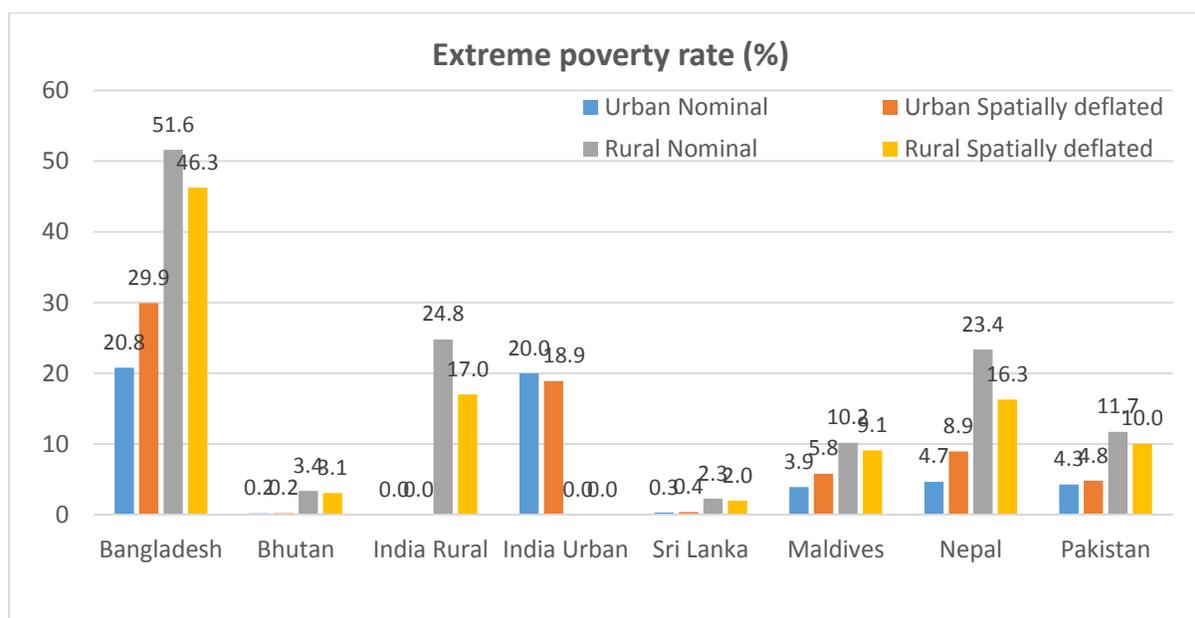
	<b>Method 1 (Use published estimates)</b>	<b>Method 2 (Adjust welfare and population)</b>	<b>Method 3 (Adjust population only)</b>
Percent of extreme poor in rural areas	80.1	80.0	80.3
Percent of poor working adults in agriculture	64.6	62.7	63.1
Percent of extreme poor being 0-14 years old	44.2	43.0	42.5
Percent of poor adults with no education	39.1	37.4	37.7
<b>Methodological details</b>			
Year	2013	2013	2009-2014 mixed
Poverty lines	Derived from PovcalNet poverty rates	\$1.90 and \$3.10	\$1.90 and \$3.10
Welfare aggregate adjustment	Adjusted using national account data on real consumption or GDP growth	Adjusted using national account data on real consumption or GDP growth	None
Population			

## 4.2. Sensitivity to spatial deflation

As mentioned above, the headline result that 80 percent of the extreme poor live in rural areas may be an overestimate. In Africa and much of South Asia, where the majority of the extreme poor live, welfare aggregates are not consistently spatially deflated when estimating international poverty rates. Since the cost of living is typically lower in rural areas, failure to account for regional price differences will overstate the share of poor that are rural.

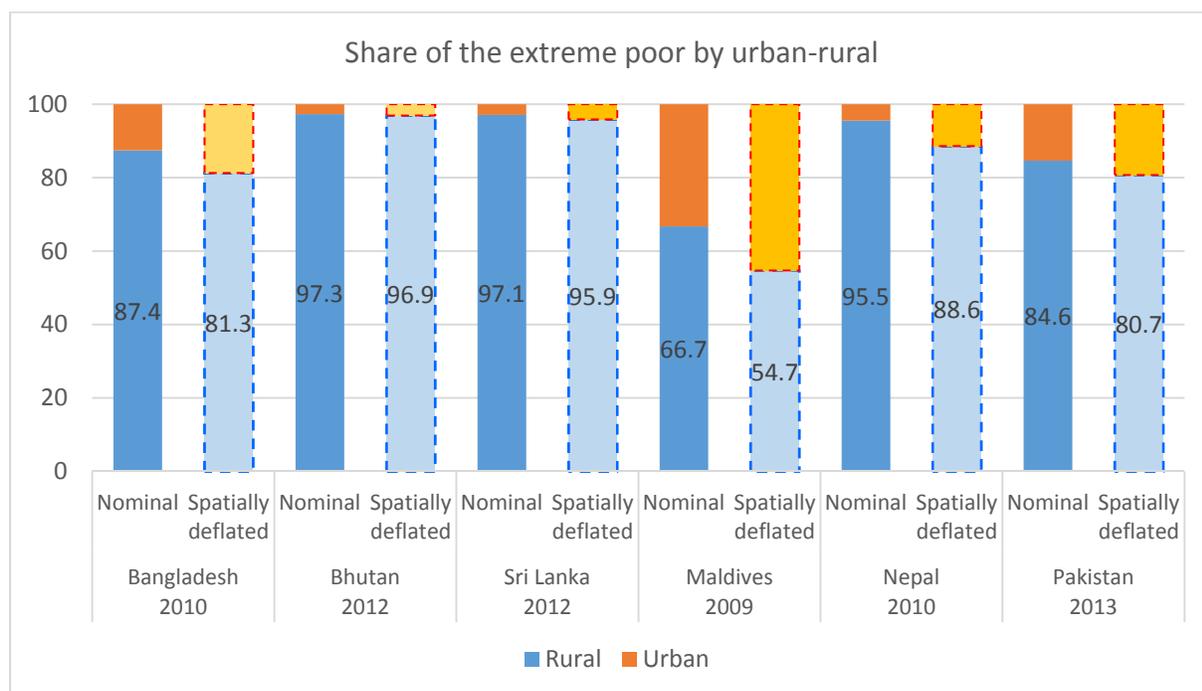
How much would using nominal welfare aggregates affect the share of the poor that is rural? To get a sense of this, we analyze data from countries in South Asia.<sup>33</sup> For the purposes of this exercise, urban and rural India are considered to be separate countries, because each uses a different PPP exchange rate. As expected, using spatially deflated aggregates lowers poverty in rural areas, and within urban and rural India, reverses the urban-rural gap in the poverty rate (Figure 23). However, using deflated rather than nominal aggregates only moderately decreases the share of the poor in rural areas (Figure 24). In Bangladesh and Nepal, for example, deflating the welfare aggregate using regional poverty lines would cause the share of the poor that are rural to fall 6 to 7 percentage points.

Figure 23: Sensitivity of urban/rural poverty rate to spatial price adjustment



<sup>33</sup> Data on spatial deflation was conveniently available for South Asia. Figures for Bangladesh are based on 2005 PPPs, and spatial deflators for Bangladesh are based on district level poverty lines.

**Figure 24: Sensitivity of the urban-rural gap to spatial price adjustment**



How much could this bias affect the global estimate of the share of the poor living in rural areas? An important consideration is that a sizeable share – about 39 percent -- of the extreme poor live in India, China, and Indonesia. These three countries use separate urban and rural PPP conversion factors for calculating regional and international poverty estimates. Because of this, the share of poor that is rural in these countries is not overestimated, even when using nominal welfare aggregates, because any differences in prices between urban and rural areas should be captured by the PPP conversion factor. An upward bias of about 6 to 7 percentage points that applies to 60 percent of the extreme poor would lead the estimate to overestimate the share of extreme poor by about 4 percentage points, modestly reducing the share of the extreme poor in rural areas only from about 80 to 76 percent.

#### **4.3.Sensitivity to missing data**

The degree of missing data in the GMD varies by variable. (Table 9). The variable most severely affected by missing data is sector of work. This variable is reported in only 64 out the 89 countries in the sample, representing 2.1 billion of the full sample’s 5.25 billion people. For the purposes of this exercise, we consider education across all ages, which is reported in 83 out the 89 countries. Education is not asked for very young children, however, with the cutoff age varying across countries. The education profile, therefore, only represents 4.7 of the 5.25 billion people covered by the full sample.

The results reported above use a separate sample for each profiling variable. To see if using a fixed sample would significantly alter the results, we construct key profile statistics based on two fixed

samples and comparing them with the results from the profile-specific samples reported above. The first fixed sample includes only observations that have full information on three key variables, urban/rural, age, and education. This sample includes 6.8 million of the original 7.7 million observations, and covers 81 countries. The second fixed sample additionally drops all observations that are missing sectoral employment, which includes all children under 15 and all adults that do not work. Because of this, the sample falls to 1.6 million observations, covering 59 countries (see Table 9).

**Table 9: Profiling-variable specific samples and fixed samples**

	Number of countries	Weighted population	Number of observations
<b>Full sample</b>	89	5,249,087,488	7,657,672
<b>Variable-specific sample</b>			
Urban/rural residence	87	5,245,339,648	7,603,967
Sector of work	64	2,087,739,904	2,876,159
Age	89	5,249,087,488	7,657,672
Education (all ages)	83	4,701,530,624	6,859,233
<b>Fixed samples</b>			
For urban/rural, age, and education	81	4,698,225,664	6,810,288
For urban/rural, age, education and sector of work	59	1,557,865,216	2,613,824

The concentration of poverty in rural areas is robust to the choice of samples (Table 10). The proportion of the extreme poor living in rural areas varies by 0.6 or 1.7 percentage points in absolute terms, which is 0.7 or 1.9 percent in relative terms, when one switches from the variable-specific sample to the fixed samples. It is particularly reassuring that the share of the poor in the rural sector changes only slightly (from 80.1 to 81.8 percent) even when the sample size is drastically reduced from 89 to the 59 countries for which all variables, including sector of work, are available.

**Table 10: Sensitivity to missing data**

	Varying samples	Fixed sample 1: for urban/rural, age, and education	Fixed sample 2: for urban/rural, age, education, and employment sector
Percent of extreme poor in rural areas	80.1	79.5	81.8
Percent of extreme poor working adults in agriculture	64.6	N/A	67.9
Percent of extreme poor adults 0-14 years old	44.2	40.9	N/A
Percent of extreme poor of all ages with no formal education	43.7	43.7	31.5

The share of the poor that work outside agriculture, that are children, and have no formal education are all noticeably lower in the fixed samples. For example, the share of the poor working outside agriculture drops 3.3 percentage points, from 35.4 to 32.1, when limiting to observations where urban/rural and education are non-missing. The share of the poor under the age of 15 drops by 3.3 percentage points in the first fixed sample, because the sample differentially excludes poor children that did not report educational attainment. The proportion of poor adults with no schooling decreases 12 percentage points from 43.7 percent to 31.5 percent in the second fixed sample, which excludes all children and non-working adults. This sensitivity indicates that the pattern of missing variables is not independent across variables. Conducting the analysis on a fixed subsample for which all data are present would therefore distort the findings.<sup>34</sup>

## 5. Conclusions

Using harmonized household data from 89 countries, this paper provides an overarching demographic profile of the global extreme poor and moderate poor in 2013, shedding light on where they live and who they are, and the extent to which they work in the agricultural sector. Not only is this the most updated and most comprehensive profile of the poor in terms of global coverage, but the analysis breaks new ground by examining the characteristics of the moderate poor, and presenting conditional correlations between demographic variables and household welfare. Five main conclusions emerge.

First, both the extreme and moderate poor are rural and young, and mostly live in larger households with more children. More than four in five of the extreme poor live in rural areas, which is slightly more than previously thought. Moreover, 44 percent of the extreme poor are children under 15, and households with three or more children comprise nearly 60 percent of the extreme poor. The prevalence of child poverty raises the prospect of long-term consequences on the physical and intellectual development of poor children, which could in turn impede their future earning capacity. The gender gap in poverty is not apparent in traditional poverty measures, because poverty is measured based on household per capita welfare, whereas gender disparities are most apparent in individual-level indicators such as education, decision making power and labor market outcomes. Male headed households, however, are disproportionately likely to be poor, at least in the lower middle-income countries that contain the majority of the extreme poor. In general, these findings emphasize the potential benefits of programs that directly or indirectly support children, large households, and rural households, as well as indirect measures to reduce the future incidence of child poverty.

Shifting out of low productivity agricultural work, while important, is not sufficient to escape poverty. Consistent with the clustering of the poor in rural areas, poor workers are much more likely than non-poor workers to make their living from agricultural work. Yet a substantial proportion of the extreme and moderate poor who live in rural areas – 24 and 40 percent, respectively – work outside the agricultural sector. Within the scope of this study, it is unclear why

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<sup>34</sup> Multiple imputation methods, which can address problems created by non-random patterns of missing survey data, can be explored in the future (Rubin, 2004).

non-agricultural labors in rural areas remain poor, and more broadly, what determines inequality within rural areas. Further research is therefore needed to better understand, for example, how industry of work relates to economic welfare, and which types of jobs have led to larger reductions in rural extreme poverty.

Third, poverty and educational attainment are strongly and negatively correlated, among both children and adults. Most notably, although only 15 percent of adults have no formal education, nearly 25 percent of them live in extreme or moderate poverty, and another 33 percent live in moderate poverty. At the same time, a sizable proportion of extremely and moderately poor adults, 27 percent and 38 percent, respectively, have at least some secondary education. Not surprisingly, those with tertiary education are almost exclusive non-poor. The different education profiles of extremely poor, moderately poor, and non-poor adults highlight the role of education in driving poverty reduction. Nonetheless, graduating from primary school, while important, far from ensures an escape from poverty.

Fourth, despite similarities in terms of age, household composition, and residential sector, there are two noticeable differences between the extreme poor and the moderate poor. First, the moderate poor are much less likely to make their living from agriculture. Second, they are significantly more likely to have graduated from primary school, but not secondary school. If one considers moderate poverty as a transition stage between extreme poverty and the absence of deprivation, these differences point to non-farm employment and basic education as potential pathways to improve living standards of the extreme poor.

Finally, many of the most striking differences in the demographic profiles of the poor remain when controlling for differences in various characteristics as well as country fixed effects. Conditional on other characteristics, living in an urban area, having fewer than three children, and having greater educational attainment have a particularly strong and positive association with economic welfare within countries.

The main findings on the nature of poverty are generally robust to a variety of methods. The share that is rural seems to vary little regardless of the lineup method or sample used. Furthermore, calculations based on South Asian data suggest that the share of the poor in rural areas would remain high even if welfare aggregates were spatially deflated in all countries. On the other hand, the shares of the poor that are young and less educated, and working in agriculture are mildly sensitive to how the welfare aggregates for each country are lined up to 2013, with differences of one to two percentage points. Therefore, further research could usefully document in detail the exact procedure used to line up the estimates and explore whether lining up improves the accuracy of profiles. As with all household survey data, there are missing values because information is occasionally not reported or processed. Because patterns of missing values vary across different variables, restricting the analysis to a common subsample would distort the key findings.

This study is a first step towards exploiting the World Bank's unique inventory of household survey data to better understand the poor's living conditions, earning capacity, and economic constraints at a large scale. The database can also help fill in other important knowledge gaps on global poverty. These include a more detailed look at the relationship between labor market

outcomes and welfare, and how different types of households contribute to economic inequality. Furthermore, when past surveys are added to the GMD for all regions, additional analysis can document which groups of people have exited extreme poverty during the past decade, and how changes in labor market outcomes, educational attainment, and urbanization have contributed to recent reductions in extreme poverty.

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## Appendix 1: List of countries and survey years

Country name	Region	Income group	Survey year	Welfare measure	Inflator factor
Cambodia	East Asia and Pacific	Low income	2012	Consumption	HHFCE
China	East Asia and Pacific	Upper middle income	2013	Consumption	HHFCE
Indonesia	East Asia and Pacific	Lower middle income	2011, 2014	Consumption	HHFCE
Lao PDR	East Asia and Pacific	Lower middle income	2012	Consumption	HHFCE
Mongolia	East Asia and Pacific	Upper middle income	2012	Consumption	HHFCE
Papua New Guinea	East Asia and Pacific	Lower middle income	2009	Consumption	PCGDP
Philippines	East Asia and Pacific	Lower middle income	2012	Income	HHFCE
Thailand	East Asia and Pacific	Upper middle income	2012	Consumption	HHFCE
Tonga	East Asia and Pacific	Upper middle income	2009	Consumption	PCGDP
Vanuatu	East Asia and Pacific	Lower middle income	2010	Consumption	HHFCE
Vietnam	East Asia and Pacific	Lower middle income	2012, 2014	Consumption	HHFCE
Albania	Europe and Central Asia	Upper middle income	2012	Consumption	HHFCE
Armenia	Europe and Central Asia	Lower middle income	2013	Consumption	HHFCE
Bulgaria	Europe and Central Asia	Upper middle income	2013	Income	HHFCE
Croatia	Europe and Central Asia	High income	2013	Income	HHFCE
Czech Republic	Europe and Central Asia	High income	2013	Income	HHFCE
Estonia	Europe and Central Asia	High income	2013	Income	HHFCE
Georgia	Europe and Central Asia	Upper middle income	2013	Consumption	HHFCE
Hungary	Europe and Central Asia	High income	2013	Income	HHFCE
Kazakhstan	Europe and Central Asia	Upper middle income	2013	Consumption	HHFCE
Kosovo	Europe and Central Asia	Lower middle income	2013	Consumption	HHFCE
Kyrgyz Republic	Europe and Central Asia	Lower middle income	2012	Consumption	HHFCE
Latvia	Europe and Central Asia	High income	2013	Income	HHFCE
Lithuania	Europe and Central Asia	High income	2013	Income	HHFCE
Moldova	Europe and Central Asia	Lower middle income	2013	Consumption	HHFCE
Montenegro	Europe and Central Asia	Upper middle income	2013	Consumption	HHFCE
Poland	Europe and Central Asia	High income	2013	Income	HHFCE
Romania	Europe and Central Asia	Upper middle income	2013	Income	HHFCE
Russian Federation	Europe and Central Asia	High income	2012	Consumption	HHFCE
Serbia	Europe and Central Asia	Upper middle income	2013	Consumption	HHFCE
Slovak Republic	Europe and Central Asia	High income	2013	Income	HHFCE
Slovenia	Europe and Central Asia	High income	2013	Income	HHFCE
Tajikistan	Europe and Central Asia	Low income	2009	Consumption	HHFCE
Turkey	Europe and Central Asia	Upper middle income	2012	Consumption	HHFCE
Ukraine	Europe and Central Asia	Lower middle income	2013	Consumption	HHFCE
Argentina	Latin America and Caribbean	High income	2012, 2014	Income	HHFCE
Bolivia	Latin America and Caribbean	Lower middle income	2012, 2014	Income	HHFCE
Brazil	Latin America and Caribbean	Upper middle income	2012, 2014	Income	HHFCE
Chile	Latin America and Caribbean	High income	2013	Income	HHFCE
Colombia	Latin America and Caribbean	Upper middle income	2012, 2014	Income	HHFCE

Costa Rica	Latin America and Caribbean	Upper middle income	2012, 2014	Income	HHFCE
Dominican Republic	Latin America and Caribbean	Upper middle income	2013	Income	HHFCE
Ecuador	Latin America and Caribbean	Upper middle income	2012, 2014	Income	HHFCE
El Salvador	Latin America and Caribbean	Lower middle income	2012, 2014	Income	HHFCE
Guatemala	Latin America and Caribbean	Lower middle income	2011, 2014	Income	HHFCE
Haiti	Latin America and Caribbean	Low income	2012	Income	HHFCE
Honduras	Latin America and Caribbean	Lower middle income	2013	Income	HHFCE
Mexico	Latin America and Caribbean	Upper middle income	2012, 2014	Income	HHFCE
Nicaragua	Latin America and Caribbean	Lower middle income	2009, 2014	Income	HHFCE
Panama	Latin America and Caribbean	Upper middle income	2012	Income	HHFCE
Paraguay	Latin America and Caribbean	Upper middle income	2012, 2014	Income	HHFCE
Peru	Latin America and Caribbean	Upper middle income	2012, 2014	Income	HHFCE
Uruguay	Latin America and Caribbean	High income	2012, 2014	Income	HHFCE
Djibouti	Middle East and North Africa	Lower middle income	2012	Consumption	HHFCE
Tunisia	Middle East and North Africa	Upper middle income	2010	Consumption	HHFCE
West Bank and Gaza	Middle East and North Africa	Lower middle income	2009	Consumption	HHFCE
Bangladesh	South Asia	Low income	2010	Consumption	HHFCE
Bhutan	South Asia	Lower middle income	2012	Consumption	HHFCE
India	South Asia	Lower middle income	2011	Consumption	HHFCE
Maldives	South Asia	Upper middle income	2009	Consumption	PCGDP
Nepal	South Asia	Low income	2010	Consumption	HHFCE
Pakistan	South Asia	Lower middle income	2013	Consumption	HHFCE
Sri Lanka	South Asia	Lower middle income	2012	Consumption	HHFCE
Botswana	Sub-Saharan Africa	Upper middle income	2009	Consumption	PCGDP
Burkina Faso	Sub-Saharan Africa	Low income	2009	Consumption	PCGDP
Chad	Sub-Saharan Africa	Low income	2011	Consumption	PCGDP
Congo, Dem. Rep.	Sub-Saharan Africa	Low income	2012	Consumption	PCGDP
Congo, Rep.	Sub-Saharan Africa	Lower middle income	2011	Consumption	PCGDP
Ethiopia	Sub-Saharan Africa	Low income	2010	Consumption	PCGDP
Guinea	Sub-Saharan Africa	Low income	2012	Consumption	PCGDP
Guinea-Bissau	Sub-Saharan Africa	Low income	2010	Consumption	PCGDP
Lesotho	Sub-Saharan Africa	Lower middle income	2010	Consumption	PCGDP
Madagascar	Sub-Saharan Africa	Low income	2010	Consumption	PCGDP
Malawi	Sub-Saharan Africa	Low income	2010	Consumption	PCGDP
Mali	Sub-Saharan Africa	Low income	2010	Consumption	PCGDP
Mauritius	Sub-Saharan Africa	Upper middle income	2012	Consumption	PCGDP
Niger	Sub-Saharan Africa	Low income	2011	Consumption	PCGDP
Nigeria	Sub-Saharan Africa	Lower middle income	2010	Consumption	PCGDP
Rwanda	Sub-Saharan Africa	Low income	2010	Consumption	PCGDP
São Tomé and Príncipe	Sub-Saharan Africa	Lower middle income	2010	Consumption	PCGDP
Senegal	Sub-Saharan Africa	Low income	2011	Consumption	PCGDP
Sierra Leone	Sub-Saharan Africa	Low income	2011	Consumption	PCGDP
South Africa	Sub-Saharan Africa	Upper middle income	2010	Consumption	PCGDP

Sudan	Sub-Saharan Africa	Lower middle income	2009	Consumption	PCGDP
Swaziland	Sub-Saharan Africa	Lower middle income	2009	Consumption	PCGDP
Tanzania	Sub-Saharan Africa	Low income	2011	Consumption	PCGDP
Togo	Sub-Saharan Africa	Low income	2011	Consumption	PCGDP
Uganda	Sub-Saharan Africa	Low income	2012	Consumption	PCGDP
Zambia	Sub-Saharan Africa	Lower middle income	2010	Consumption	PCGDP

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## Appendix 2: Lining up surveys to 2013

The exact implementation of the method used to line up surveys to 2013 varies across countries, depending on the availability of data from different years. If a country's latest survey was conducted in 2013, that survey was used without adjusting the welfare aggregate. If a country's most recent survey is before 2013, the latest survey is lined up forward to 2013. To do this, the World Bank poverty rates for 2013, taken from PovcalNet, are applied to the household survey data.<sup>35</sup> If surveys are available both from before and after 2013, the surveys closest to 2013 on either side are lined up, backward and forward, to reduce potential extrapolation bias.

Disaggregated poverty rates and the number of poor are then calculated as the weighted average of the estimates, where the weights are the distance between the survey years and 2013. This sandwiching procedure mirrors the procedure used generate the poverty estimates reported on PovcalNet, and was applied to 15 of the 89 countries in the sample.<sup>36</sup>

We examine two alternative approaches to lining up the surveys. The first approach brings population to its 2013 level but does not adjust the welfare aggregate, thus providing a poverty profile that pools data from different years. As noted in the text, this tends to give more weight to countries with older surveys. The second alternative approach is a variant of the official line-up methodology used by the World Bank. First, the welfare aggregate in each country is multiplied by a scale factor to account for changes in welfare between the survey year and 2013. For 60 of the 89 countries, the scale factor is the real growth between the survey year and 2012 in per capita household final consumption expenditure (HFCE), taken from the World Development Indicators Database. For the others, mostly in Sub-Saharan Africa, where HFCE is not available, real growth in GDP per capita in local currency units is used instead (see Appendix 1).

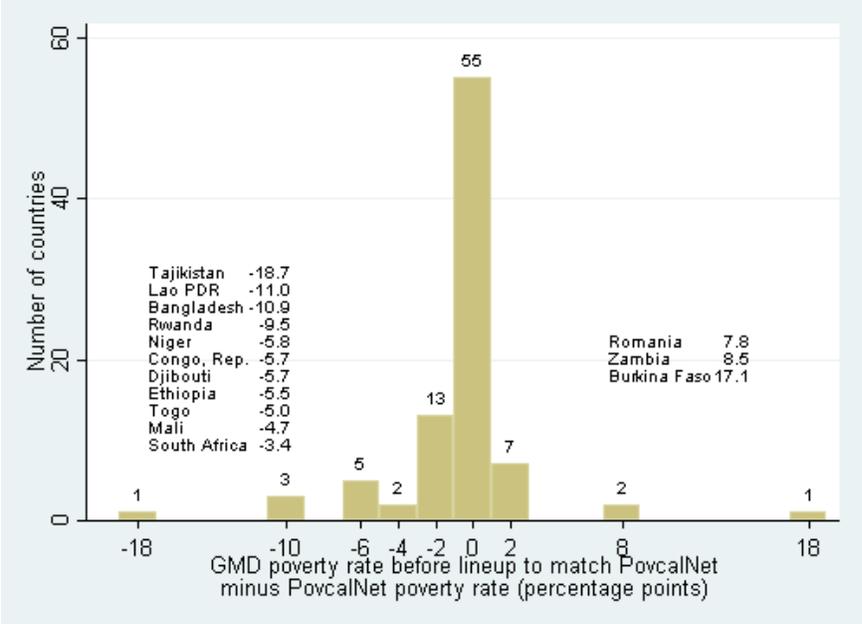
Even after applying this line-up procedure, there remain discrepancies in the 2013 poverty rates between the lined-up GMD sample and the poverty rates published by PovcalNet. As displayed in Figure 25, the magnitude of the difference is less than one percentage point for 55 countries, and between 1 and 3 percentage points for 20 countries. Larger discrepancies are rarer, in only seven cases was the difference between 3 and 7 percentage points, and a further five countries have large differences of 7 percentage points or greater. These discrepancies warrant further investigation and likely arise from the use of different vintages of inflation and real economic growth data obtained from external sources such as the World Development Indicators, which are updated quarterly. The exercise illustrates however that it is not necessarily straightforward to replicate the World Bank's official estimates with publicly available macroeconomic data, even when using the same household data.

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<sup>35</sup> For India, China, and Indonesia, national poverty rates are used, rather than urban and rural specific poverty rates.

<sup>36</sup> These are almost all in Latin America. Namely, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Mexico, Peru, Paraguay, El Salvador, and Uruguay contain surveys from 2012 and 2014, as does Vietnam. Guatemala and Indonesia contain surveys from 2011 and 2014.

Figure 25: Distribution of the discrepancy in national poverty rates between the second alternative approach and PovcalNet





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