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MEASURING POVERTY IN LATIN AMERICA AND THE CARIBBEAN

METHODOLOGICAL CONSIDERATIONS WHEN
ESTIMATING AN EMPIRICAL REGIONAL
POVERTY LINE

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ABSTRACT

This paper contributes to the methodological literature on the estimation of poverty lines for country poverty comparisons in Latin America and the Caribbean. The paper exploits a unique, comprehensive data set of 86 up-to-date urban official extreme and moderate poverty lines across 18 countries in Latin America and the Caribbean, as well as the recent values of the national purchasing power parity conversion factors from the 2011 International Comparison Program and a set of harmonized household surveys that are part of the Socio-Economic Database for Latin America and the Caribbean project. Because of the dispersion of country-specific poverty lines, the paper concludes that the value of a regional poverty line largely depends on the selected aggregation method, which ends up having a direct impact on the estimation of regional extreme and moderate poverty headcounts.

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Measuring Poverty in Latin America and the Caribbean: Methodological Considerations When Estimating an Empirical Regional Poverty Line

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1 Introduction

The number of countries that have developed the necessary tools to measure absolute monetary poverty and that are now able to track their own performance in terms of poverty reduction has grown considerably in LAC and worldwide in recent years. However, less progress has been achieved to accurately compare poverty estimates across countries. In practice, poverty measurement differs from country to country in many respects, including: (i) the methodology to estimate the poverty line (e.g., relative vs. absolute lines, the minimum amount of calories, the choice of the reference group, or the procedure to go from extreme to moderate poverty lines); (ii) the choice of the individual welfare measure (i.e., income vs. consumption); (iii) the construction of the welfare aggregate (e.g., items included in the income or consumption aggregate or the treatment of implicit rent of own housing); (iv) the design of surveys (e.g., differences in questionnaire design); and (v) many other adjustments and considerations (e.g., adult equivalent scales vs. per capita values, economies of scale, and regional prices).¹ Consequently, the comparison of official poverty estimates across countries is generally misleading. Thus, any attempt to generate meaningful poverty comparisons and to aggregate national poverty indicators into regional and global ones requires a standardized measure of household welfare and a common poverty line.

An emerging body of research has proposed some methods to obtain standardized measures of monetary poverty that are comparable across countries and independent of the official methodologies applied in each country. The seminal work by Ravallion, Datt, and van de Walle (1991) proposed one of the first global extreme poverty lines at \$1.01 (rounded to \$1) per person per day at 1990 PPPs based on 1985 prices surveys performed by the ICP.² This global extreme poverty line corresponded to the average of the poverty lines of the eight most deprived economies in the world and became the foundation for the United Nations' first Millennium Development Goals of halving the proportion of people with incomes lower than \$1 a day between 1990 and 2015. This line was then revised by Chen and Ravallion (2001) to \$1.08 per person per day at 1993

¹ In LAC, National Statistical Offices (NSOs) are generally in charge of monitoring poverty over time. Most of the countries in the region measure poverty based on per capita income, though there is a growing tendency to consider consumption as the welfare measure.

² Ahluwalia, Carter, and Chenery (1979) used India's poverty line to estimate poverty at a global level based on the 1975 PPPs. This was the first attempt to measure global poverty, though it was based on income and consumption data from only 25 countries in the world (Ferreira et al. 2015).

PPPs, and by Ravallion, Chen, and Sangraula (2009) to \$1.25 per person per day at 2005 PPPs, the latter of which is known today as the Global Extreme Poverty Line and is computed as the average of the poverty lines of the 15 poorest countries in the world. Recently, Jolliffe and Prydz (2015, 17) proposed an update of the Global Extreme Poverty Line which resulted in a poverty line of \$1.92 per person per day in 2011 PPPs, while Ferreira et al. (2015) calculated it as \$1.88 (rounded to 1.90) per person per day.³

For the particular case of LAC, the majority of governments in the region use two poverty lines: an extreme (food) and a moderate (non-food) poverty line. Countries estimate their extreme poverty lines as the lack of per capita income required to access a basic food basket and expand them to non-food components using the Orshansky coefficient. The Global Extreme Poverty Line frequently used for international poverty comparisons in the developing world was derived from poverty lines set in the poorest Sub-Sahara African countries; therefore, they have limited applicability to the LAC context, a region composed mostly of urbanized middle-income economies. Consequently, almost all official poverty lines in the region are higher than \$2 per person per day, and the share of the population under the Global Extreme Poverty Line is relatively low in most LAC countries. Furthermore, given the economic development of the region, analysts have used higher poverty lines in LAC. The World Bank currently uses an extreme and moderate poverty line of \$2.5 and \$4 per person per day in 2005 PPPs, respectively, which were widely accepted in LAC as the extreme and moderate regional poverty lines for the region.⁴ However, little is known about the origin of these regional poverty lines since the approach, as well as the underlying information used to estimate them, have never been explicitly documented in the past.

This paper provides inputs to estimate both extreme and moderate poverty lines for LAC based on a consistent methodology and updated information that allows for meaningful comparisons of poverty across countries in the region. We use the most up-to-date *official* extreme and moderate poverty lines chosen by LAC countries and used in their own poverty and social

³ Ferreira et al. (2015) updated to \$3.10 in 2011 PPPs the \$2 per person per day poverty line in 2005 PPPs, commonly used for middle-income countries.

⁴ López-Calva and Ortiz-Juarez (2014); Gasparini, Cicowiez, and Escudero (2013); Ferreira et al. (2012); World Bank (2015); World Bank (2014); World Bank (2013); World Bank (2011).

policy debates. In particular, we exploit a unique data set of 86 urban official poverty lines across 18 LAC countries,⁵ as well as the recent 2011 PPPs from the ICP.

In doing so, we make an important contribution to the existing literature on international comparable poverty measurement at the regional level, which can be extrapolated to other regions in the world. In the particular case of LAC, this study can be considered the first one that explicitly documents the calculation of comparable regional extreme and moderate poverty headcounts. This paper also provides at least five additional elements that contribute to some extent to this literature. First, the paper includes a comprehensive list of all countries for which up-to-date data on urban official poverty lines are available (18 countries representing roughly 85.3 percent of LAC's population in 2011 and almost all urban population of the region). As such, any existing bias in the estimation of the value of the regional poverty lines that results from excluding certain countries is likely to be relatively small.⁶ Second, using up-to-date information from NSOs in LAC on poverty lines used to estimate official extreme and moderate poverty numbers in every country can be considered more transparent and easier to communicate to governments in the region. Third, the method proposed in this paper is relatively simple and easy to replicate, which is key to ensure credibility to the process (Ferreira et al. 2015). Fourth, this paper uses *subnational* official poverty lines when available, which accounts for regional disparities in the standard of living within countries and allows for the replication of countries' official poverty estimates. Finally, by using the most up-to-date poverty lines from NSOs in LAC, our approach is less sensitive to changes in Consumer Price Index (CPI) data (Chen and Ravallion 2010; Jolliffe and Prydz 2015).

Depending on the specification chosen, the paper estimates the set of extreme and moderate poverty lines to be approximately \$2.5 to \$3.2 and \$5 to \$6.8 per person per day at 2011 PPP values, respectively. We then apply these lines to the distribution of household per capita income, which is standardized under the SEDLAC project, a joint initiative of the World Bank and the Center for Distributional Labor and Social Studies (CEDLAS) at Universidad Nacional de La Plata (UNLP) in Argentina,⁷ in all LAC countries for which microdata are available. Depending on the

⁵ The data set of poverty lines is available also for rural regions, summing up to 109 official poverty lines. However, the ICP-2011 round collected prices only for urban areas in most of the countries in LAC, making the use of rural poverty lines misleading.

⁶ Deaton (2010) argues that changes in the composition of the 15 countries used by Ravallion et al. (1991) result in significant changes in the value of the poverty line and the count of the poor worldwide (Jolliffe and Prydz 2015).

⁷ CEDLAS and World Bank (2015).

regional poverty line selected, we find that approximately 8.0 percent to 12.0 percent of individuals qualified as extremely poor in 2013, while approximately 25.0 percent to 33.0 percent qualified as moderately poor during the same year. Finally, we present an innovative decomposition exercise which shows the effect that the new underlying data of subnational poverty lines, the new PPP values, and the change of time period have on the poverty headcount.

The rest of the document is organized as follows. Section 2 introduces several stylized facts related to the estimation of comparable poverty lines. Section 3 brings together the various sources of information used, highlighting the potential of the official poverty lines data set as well as the recent 2011 PPP-ICP. Section 4 presents the methodology and the results, including the proposal for international poverty lines for LAC and a simple simulation exercise of the potential effects of the introduction of these new reference lines on poverty rates in LAC using a harmonized set of household surveys under the SEDLAC project. Section 5 presents our conclusion.

2 Counting the poor: Why do we need to update the regional methodology in LAC?

Given the economic development of most of the countries in LAC, all nationally-defined official poverty lines in the region are greater than \$2 per person per day, and the share of population under the Global Extreme Poverty Line frequently used for international poverty comparisons in the developing world (i.e., \$1.25 per person per day) is relatively low in most economies in the region. Therefore, researchers and international organizations have used higher lines for poverty comparisons in LAC. The World Bank has used a \$2.5 and \$4 per person per day for extreme and moderate poverty in 2005 PPPs, respectively. In this section we argue that there are several important reasons for considering the update of these two regional lines for poverty comparisons in LAC.

First, the ICP has recently released new internationally comparable 2011 PPP values, increasing coverage, both globally and within countries, and introducing certain changes to the methodology used to calculate PPP values in 2005. The new 2011 ICP data have solved some of the well-known overestimation of the 2005 PPPs in Asia, Western Asia, and Africa (Ferreira et al. 2015; Deaton and Aten 2014). Moreover, Central American countries, including the Dominican Republic and Haiti, did not participate in the 2005 ICP round; their PPP values were obtained from

a regression exercise instead.⁸ Therefore, it is expected that the new 2011 PPPs better reflect the spatial price differences of these particular economies.⁹ For this reason, we think that poverty estimates need to be calculated based on the most up-to-date information on relative prices.¹⁰ As Jolliffe and Prydz (2015) mention, there is a presumptive trade-off when changing the poverty line since it can be perceived as an intention to accelerate the achievement of specific goals (e.g., the World Bank's goal of eliminating global poverty by 2030) instead of improving poverty measurement and cross-country comparison. However, the authors show that this trade-off is not relevant as the poverty headcount based on the 2005 PPPs changes slightly when using 2011 PPPs.

Second, the method used to estimate the current \$2.5 and \$4 per person per day regional poverty lines has not been properly documented. No description has ever been published about the source of the underlying official poverty lines used in the analysis or the robustness of the regional estimates. Gasparini, Cicowiez, and Escudero (2013) explain that these lines are obtained as the unweighted median value of the official national poverty lines of all countries in the LAC region converted to US dollars using 2005 PPPs.¹¹ Moreover, even when including a relatively large set of countries from LAC, several countries were excluded from the estimation of the \$2.5 and \$4 per person per day poverty lines in 2005 PPPs. For instance, Brazil, which represents approximately 38 percent of LAC's population, was not considered in the pool of countries used to estimate the currently-used regional poverty lines. Similarly, Haiti, the poorest country in LAC, was also excluded from regional estimates of extreme and moderate poverty lines.¹² The exclusion of these important countries could materially affect the poverty status of millions of Latin Americans (Jolliffe and Prydz 2015).

Finally, poverty measurement has experienced a steady increase during recent years and many countries in the region, such as Chile, Colombia, and Paraguay, have updated their official poverty lines. In principle, the update of poverty lines using national CPI from the year of data collection to the 2011 reference year should not produce marked changes in poverty measurement.

⁸ Unfortunately, regressions estimated are not documented.

⁹ For a detailed description of the new ICP data see Ferreira et al. (2015).

¹⁰ In order to avoid being perceived as manipulating the World Bank's goal of eliminating global poverty (based on the \$1.25 per person per day poverty line in 2005 PPPs) by 2030, one could directly elude updating the line and continue measuring poverty based on 2005 PPPs and the \$1.25 per person per day poverty line. However, the superiority of the 2011 PPPs with respect to the 2005 PPPs is used by Ferreira et al. (2015) as an argument to reject this option and to estimate global -and therefore regional- poverty using the most up-to-date relative prices.

¹¹ See Table 4.2 in Gasparini, Cicowiez, and Escudero (2013) for a list of the poverty lines.

¹² The Dominican Republic was also set aside from estimations.

However, that has not been the case in the past; Chen and Ravallion (2010) show important changes when moving away from extrapolated 1993 PPP factors toward 2005 PPPs. To overcome this limitation, Jolliffe and Prydz (2015) base their estimates on more up-to-date national poverty lines (i.e., on average from 2008). However, their results are obtained using an estimation of the *implicit* national poverty lines from combining official poverty headcounts at national poverty lines, as reported by the World Development Indicators (WDI), with the corresponding consumption and income distributions from the World Bank’s PovcalNet database. One caveat of this exercise is that the combination of official poverty rates from the WDI with *unofficial* harmonized micro-data sets from PovcalNet may result in poverty lines that deviate from the official ones. The poverty lines we use in this paper as inputs for updating comparable regional poverty lines allow for the replication of countries’ official poverty estimates in LAC and is one of the main contributions of this paper. In addition, by using more up-to-date information, our estimates are less sensitive to errors in the CPI than the ones that arise from updating the \$2.5 and \$4 per person per day poverty lines at 2005 PPPs using national CPIs.

3 Data

We use three different data sets in this paper: (i) country-specific official extreme and moderate poverty lines from NSOs in the region, (ii) household per capita income distribution from harmonized household surveys, and (iii) the most up-to-date PPPs from the 2011 ICP round.

3.1 Country-specific official poverty lines

In order to control for geographical discrepancies in the cost of living within countries when computing the regional poverty lines, we make use of the most up-to-date data on *subnational* official poverty lines obtained from NSOs or governmental agencies from 18 countries in LAC.¹³ The countries considered in this paper include: Argentina, Bolivia, Brazil,¹⁴ Chile, Colombia,

¹³ The level of subnational disaggregation varies from country to country. For some countries poverty lines are determined at the level of cities (e.g., Colombia), while for others they are determined at the regional level (e.g., Brazil) or there is just one line at the national level (e.g., Nicaragua). Almost all poverty lines are in per capita terms in LAC; the only exceptions are Argentina where poverty lines also consider household composition and Uruguay where the non-food component of the poverty line accounts for economies of scale.

¹⁴ The Brazilian case is different from the rest; the country does not have an official poverty line and rate. Currently, the government accepts the thresholds of 70 and 140 *reais* as their national extreme and moderate poverty lines, respectively, based on the benefit provided by its main social programs: *Brasil sem miseria* and *Bolsa Familia*. However, for the purpose of this paper, we use older subnational poverty lines calculated by Institute for Applied

Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, and Uruguay.¹⁵

The data set on poverty lines gathered through official sources is the major contribution of this paper to the estimation process of regional comparable poverty estimates. The pioneering work of Ravallion, Datt, and van de Walle (1991) gathered a compilation of 33 non-official national poverty lines for the whole world, while Ravallion, Chen, and Sangraula (2009) used data on 88 poverty lines extracted from the World Bank's program of country *Poverty Assessments* that have been carried out since 1990 worldwide. In contrast, this paper comprises the most comprehensive and up-to-date database on official poverty lines for LAC countries. We collect more than 80 *subnational* urban poverty lines distributed in 18 countries in LAC, accounting for regional disparities within countries by capturing subnational heterogeneities in the standard of living.

3.2 *Income distribution from harmonized household surveys*

In order to estimate poverty measures that are comparable across countries, we need to increase the cross-country comparability of the welfare measures. Therefore, the second source of information is the SEDLAC data set,¹⁶ which is used as the primarily source of comparable welfare aggregates across the LAC countries and represents approximately 518 million individuals, or 85 percent of LAC's population in 2013.

The main objective of this comprehensive data set of household surveys is to increase cross-country comparability of a range of socioeconomic measures, including household total income, from more than 300 household surveys within 18 countries in the LAC region from the 1970s to the present. Following the practice of most countries in the region, in this paper we measure poverty based on household per capita income at the individual level. Given that the main purpose of the SEDLAC project is to enhance cross-country comparability of household surveys, these

Economic Research (IPEA, for its acronym in Portuguese) several years ago, which are updated on a yearly bases based on the CPI (IPEA 2014).

¹⁵ Cuba and the República Bolivariana de Venezuela are not included in this study due to the lack of microdata from SEDLAC project in both countries and the lack poverty lines in the case of Cuba. The estimation of the international poverty lines is robust to the inclusion of the República Bolivariana de Venezuela.

¹⁶ Bourguignon (2015) presents a detailed evaluation of the SEDLAC data set. SEDLAC is a harmonized database of LAC's households' surveys compiled by the poverty group at the World Bank in partnership with the Center for Distributive, Labor, and Social Studies (CEDLAS, for its acronym in Spanish) at the Universidad Nacional de La Plata in Argentina.

results are not comparable to official socioeconomic indicators released by the NSOs or government agencies.¹⁷

3.3 The most up-to-date Purchasing Power Parity from the 2011 ICP round.

In order to be able to compare the standard of living of households across countries in LAC, household welfare needs to be expressed in common units. Pursuing that purpose, the ICP launched in May 2014 an update of its PPP data based on information of goods and services for almost every country in the world.¹⁸ The updated PPP data allow for the comparison of household welfare across countries by providing a real exchange rate from local currency to US dollar in a particular year (2011 in this case).¹⁹ The 2011 update of PPPs increased its coverage, collecting prices from 199 countries in the world, up from 146 in the previous update, and included several methodological and operational improvements with respect to 2005. See Ferreira et al. (2015) for a detailed description of the 2011 PPP data.

Why not use exchange rates to express welfare measures in common units across countries? The main difference between the PPP data and the nominal exchange rate is that the former is created as an index of prices of the same basket of goods in the same period of time, whereas the latter is the price of a local currency in terms of a foreign one (i.e., the rate by which both currencies are exchanged). The nominal exchange rate reflects prices of only tradable goods and, hence, a significant proportion of goods and services consumed by the population are not taken into account (Ferreira et al. 2015). Thus, the exchange rate is not appropriate to compare levels or changes over time of any economic indicator, as it does not express the current cost of living of an economy based on the prices of a fixed basket of commonly purchased goods and services.

¹⁷ NSO's statistics and SEDLAC numbers serve different purposes. The first ones are the best possible representation of individual countries, while the second ones represent regional comparable indicators. Therefore, numbers presented in this paper should not be interpreted as a claim of methodological superiority over official poverty estimates.

¹⁸ The ICP includes nearly 200 countries. Some countries did not participate in the program. As stated in the official report, Afghanistan, Argentina, Lebanon, Libya, South Sudan, and the Syrian Arab Republic are the only large economies that did not take part in the 2011 ICP round.

¹⁹ One of the new features of the 2011 ICP round is the availability of global PPP values in addition to USD PPP. For this paper, we still consider the USD PPP values.

4 An empirical approach for regional poverty counting in LAC

This section details the technical approach proposed to derive a new set of poverty lines and to obtain an estimate of the proportion of Latin Americans who live on an income lower than those lines.

4.1 Updating the LAC regional poverty line

Figure 1 shows the relationship between official per capita extreme (panel a) and moderate (panel b) poverty lines and log per-capita household income from harmonized household surveys in the SEDLAC database in 2011.²⁰ The figure reports the nominal value of poverty lines – at 2011 PPP values²¹ – for 18 countries in LAC at the highest possible level of geographical disaggregation.²² Given that the 2011 ICP round collected prices in LAC only for urban areas (World Bank 2014a),²³ we ignored all rural poverty lines and compensated by deflating all rural incomes to urban prices.²⁴ Unlike Ravallion, Chen, and Sangraula (2009) and Ferreira et al. (2015), no strong economic gradient emerges above some critical level of per capita household income. Also, unlike Jolliffe and Prydz (2015), there is no strong positive relationship between both indicators.²⁵ The lack of an economic gradient when only LAC countries are considered suggests that there is no reference group to quantify an absolute poverty line. These results are also valid for different regression specifications (see Table 1) using poverty lines both at the subnational, as well as at the national (i.e., population-weighted average of subnational lines) level. Therefore, we consider all available information, rather than only the poorest economies below an economic gradient – as done by Ravallion, Chen, and Sangraula (2009) – to estimate the regional comparable poverty lines in LAC.

²⁰ The existing relationship in the graph may be considered spurious if poverty lines were calculated based the same households surveys used in the graph. This is not the case for the countries covered in this paper; all poverty lines have been computed in different household surveys from the ones used in the figure.

²¹ For those cases for which the poverty lines were not reported at 2011 PPP values, we deflated the closest value using national CPIs. Although countries have already published lines for 2012 and 2013, and in some cases also for 2014, we prefer to use the figures corresponding to the same year as the latest 2011 PPP round.

²² For the case of Chile, Ecuador, Haiti, and Nicaragua, the official poverty lines are published at the national level and there is no distinction between urban and rural areas or subnational regions.

²³ Approximately 80 percent of LAC's population lives in urban areas.

²⁴ The SEDLAC harmonization uniformly deflates all welfare aggregate to urban prices multiplying rural incomes by 15 percent. This practice might not be consistent with real price differences within each country, but we maintain it in this paper in order to make comparisons with the current methodology used to estimate regional poverty lines.

²⁵ A similar result is found by Gasparini, Cicowicz, and Escudero (2013) for poverty lines in 2005 PPPs.

For each country, we first deflate the official poverty lines to the annual average of monthly consumer price indices of 2011 and then convert them to PPP using the 2011 ICP update.²⁶ Table 2 presents population-weighted averages of extreme and moderate urban official poverty lines for all countries in LAC in 2011, and Figure 2 shows the density function of all subnational official poverty lines. Extreme poverty lines fall within a limited range between \$2 and \$4.4 per person per day, while moderate poverty lines are more disperse, ranging from \$4 to \$12.2 per person per day. This implies that the moderate poverty lines of some countries are lower in PPP terms than the extreme poverty line of other countries. For instance, the population-weighted average extreme poverty line of Paraguay (\$4.4 a day) is slightly higher than the population-weighted average moderate poverty lines of Nicaragua, Ecuador, and Brazil.

The relatively large dispersion of the moderate poverty lines is also evident in Figure 3, which presents the cumulative distribution function (CDF) of the total number of official extreme and moderate poverty lines at the subnational level. The figure shows that the rank of the subnational regions based on the extreme official poverty lines is different from the rank based on moderate official poverty lines, suggesting a large variation of the Orshansky coefficients in LAC. Additionally, the slope of the CDF based on extreme poverty lines is steeper than the one based on moderate poverty lines, which suggest that there is more heterogeneity in the normative cost of living when non-food items are added to the overall household consumption bundle.

Additional key messages emerge from Figure 3. First, there is a substantial overlap between subnational poverty lines – both extreme and moderate – across countries in LAC. Taking Brazil as an example, Leste-Urban Area has the lowest moderate poverty line (\$3.5 per person per day) in LAC, which is considerably lower than the moderate poverty line of Region Pampeana in Argentina (\$4.8 per person per day). By contrast, the metropolitan Area of Porto Alegre in Brazil has a moderate poverty line of \$5.5 per person per day, which is above the median moderate poverty line in LAC (\$5.3 per person per day) and considerably higher than moderate poverty lines in subnational areas of Argentina. Second, there are highly populated subnational regions that contribute substantially to the overall population in LAC. For instance, Mexico and Brazil, which are characterized by larger circles in the figure, represent roughly 60 percent of LAC's population. Third, there is large heterogeneity in terms of the number of subnational poverty lines by countries.

²⁶ The annual average was chosen because the PPP figures reflect prices for the entire calendar year.

For instance, Colombia has 23 regional poverty lines, whereas Chile, Ecuador, Haiti, and Nicaragua have only one national poverty line. Finally, there are some extreme values of national poverty lines that could substantially increase the mean value of all poverty lines in LAC. For instance, Montevideo-Uruguay's moderate poverty lines is \$14.9 per person per day, which is considerably higher than the rest of the moderate poverty lines in LAC.

Since the number of subnational poverty lines varies by country and the extreme values of official poverty lines and size of the population of the subnational regions play an important role (according to Figure 3), we take into consideration these factors when estimating regional extreme and moderate poverty lines. Therefore, since the *mean* is more sensitive to outliers, we use the *median* of subnational urban poverty lines for some specifications to account for extreme values. In addition, we also consider other specifications that weight all poverty lines by the number of individuals residing in their corresponding urban subnational regions to account for the size of the population of each region and the number of poverty lines by countries.

Table 3 presents a number of specifications and the corresponding regional comparable extreme and moderate poverty lines in LAC. The first and second columns present the mean of extreme and moderate poverty lines, while the last two columns show the corresponding median values. The first two rows consider the mean and median of all subnational poverty lines shown in Figure 3, while the following two rows are based on national averages of subnational poverty lines shown in Table 2. The first and third row show the mean and median of official poverty lines weighted by the population of *subnational* regions within each country, while the second and fourth rows show the unweighted mean and median poverty lines. The last two rows present the mean and median of the underlying poverty lines used to estimate the currently-used \$2.5 and \$4 per person per day poverty lines updated to 2011 PPPs using national CPIs, both unweighted and weighted by the *national* population of each country.

Regional extreme poverty lines based on the most up-to-date official extreme poverty lines are approximately \$2.8 per person per day on average, while regional moderate poverty lines are approximately \$5.9 per person per day on average. However, there is variation across different specifications in the table. Extreme and moderate regional poverty lines based on mean values of the official poverty lines tend to be higher than those based on median values (approximately ten percent on average), which provides evidence of the impact that outliers have on regional averages of poverty lines. Similarly, unweighted poverty lines tend to be higher than the population-

weighted poverty lines, which is evidence of the existing heterogeneity in terms of the size of the subnational population and the number of poverty lines by country.

The last two rows show the mean and median values of the currently-used \$2.5 and \$4 per person per day in 2005 PPP poverty lines –reported in Gasparini, Cicowiez, and Escudero (2013) – updated to 2011 PPPs based on CPI data of each country. The extreme poverty lines are approximately \$3.3 per person per day on average, while the moderate poverty lines are approximately \$6.4 per person per day on average. These numbers are different in some cases from those reported in the first four rows of the table. However, there are several issues regarding these currently-used poverty lines converted to 2011 PPPs. First, Jolliffe and Prydz (2015) show that poverty lines updated using CPI information are sensitive to the inflation data used to update the lines. For instance, the authors find that the global extreme poverty line is \$1.70 per person per day when updated to 2011 values using official CPIs from the World Bank’s WDI database, whereas it increases to \$1.82 when updated using inflation data from PovcalNet. Second, the \$2.5 and \$4 per person per day poverty lines are based on official poverty lines from main cities and, therefore, are estimated from a smaller sample of official poverty lines which can significantly affect poverty line estimates (Jolliffe and Prydz 2015 and Ferreira et al. 2015). In addition, since these poverty lines are based on information from major cities, they are likely to be higher than the poverty lines based on a larger sample of subnational poverty lines that include smaller cities. Third, Brazil, Haiti, and the Dominican Republic are excluded from the estimates, which is also likely to affect the estimates as Brazil is the largest economy in LAC and Haiti is the poorest country. Finally, the limited available information on the collection of the underlying official poverty lines, and the method used to estimate the currently-used \$2.5 and \$4 per person per day poverty lines in 2005 PPPs, makes it difficult, if not practically impossible, to replicate them.

One approach to validate the poverty lines shown in Table 3 is to estimate a *normative* Engel coefficient, which is defined as the ratio between the extreme and the moderate regional poverty lines. The *positive* Engel coefficient is generally understood as the proportion of total expenditure spent on food, which is expected to decrease as the level of income or development increases (Engel 1857; Clements and Chen 2010; Anker 2011). A *normative* Engel coefficient, in contrast, can be understood as the ratio between the minimum expenditure on food required to not be considered as extremely poor and the minimum expenditure on non-food items required to not be considered as moderately poor. By analogy with the *positive* Engel coefficient, the *normative*

coefficient, when calculated endogenously in the household survey, is also expected to decrease as the level of development of the country increases.

Figure 4 shows the *normative* Engel coefficient of the most up-to-date urban poverty lines in LAC (scatter plot). All specifications of the poverty lines in the first four rows of Table 3 present an Engel coefficient of approximately 0.47, which is significantly lower than the *normative* Engel coefficient of 0.62 determined by the currently-used poverty lines in LAC at the 2005 PPP values (i.e., \$2.5 and \$4 per person per day). There are two possible explanations for this result. On the one hand, it is conceivable that the currently-used poverty lines in 2005 PPP values might be overestimating extreme poverty and/or underestimating moderate poverty. In other words, the extreme and moderate poverty lines are relatively close to each other – in contrast to the empirical findings of this paper using more up-to-date poverty lines – which seems to be biasing the estimations of poverty. On the other hand, the difference in *normative* Engel coefficients between the two sets of lines could be a reflection of the increasing development of the LAC region during the last decade (World Bank 2014b and World Bank 2015), which is manifested in the ratios of extreme and moderate poverty lines.

4.2 *Regional poverty estimates in LAC in 2011 PPPs and comparison with currently-used poverty rates in 2005 PPPs*

The primary objective of this paper is to provide inputs for updating the currently-used extreme and moderate poverty lines in order to estimate the regional poverty rate in LAC. Figure 5 presents the sensitivity of extreme and moderate poverty headcounts to updates in the poverty lines and PPPs values. Using the set of extreme poverty lines shown in the first four rows of Table 3 (between \$2.5 and \$3.2 per person per day), the extreme poverty rate would have ranged from 7.7 percent to 11.9 percent in 2013. Similarly, using the moderate poverty lines (between \$5 and \$6.8 per person per day), the moderate poverty rate would have varied from 24.2 percent to 35.9 percent in the same year.

The figure also shows an alternative approach that could be used for updating the regional poverty line: the “continuous headcount approach” (Jolliffe and Prydz 2015). This method consists on finding the value of the regional poverty line in 2011 PPPs that results in the same regional poverty rate as the one estimated using the 2005 PPPs. According to this alternative approach, in order to maintain the same poverty rate with the new extreme poverty line as the one obtained with the previous extreme poverty line of \$2.5 per person per day (i.e., 11.5 percent), the new extreme

poverty line would have to be slightly higher than \$3 per person per day using 2011 PPP values. Similarly, if we want to obtain the same poverty rate with the new moderate poverty line as the one obtained with the currently-used moderate poverty line of \$4 per person per day (i.e., 24.3 percent), the new moderate poverty line would have to be approximately \$5 per person per day.²⁷ However, according to Jolliffe and Prydz (2015), this approach presents two fundamental limitations. First, by fixing the poverty rate, we would be giving more weight to the LAC poverty headcount based on 2005 PPPs than the one based on 2011 PPPs. However, since the poverty rates would be different across countries, we would end up preferring the 2011 PPPs for country-specific comparison. Second, by keeping the poverty line fixed, we would not maintain the same standard of living in 2011 as in 2005.

One relevant question is whether these new regional poverty rates differ considerably with respect to the current LAC poverty rates based on 2005 PPPs. The difference between the poverty rate with the previous poverty line based on 2005 PPPs and the revised numbers in the first four rows of Table 3 is the result of two factors: (i) changes in the value of the regional poverty lines and (ii) changes in the per capita income distribution due to temporal and spatial adjustments, which are explained by changes in the CPI and PPP values, respectively. If the nominal value of the new moderate poverty line were the same as the previous extreme poverty line (i.e., \$2.5 per person per day), LAC's extreme poverty rate in 2013 would have been approximately 7.8 percent at 2011 PPP values instead of 11.5 percent at 2005 PPP values. Similarly, if the nominal value of the new moderate poverty line were the same as a currently-used \$4 per person per day, LAC's moderate poverty rate in 2013 would have been approximately 17 percent at 2011 PPP values instead of 24.3 percent at 2005 prices.²⁸

²⁷ It is worth mentioning that if we wanted to obtain the same poverty rate as the one obtained with the \$4.4 per person per day (27.5 percent, see footnote 24), this new line would have to be approximately \$5.5 per person per day.

²⁸ \$4 per person per day was the moderate line used for measuring moderate poverty in LAC. However, Gasparini, Cicowiez, and Escudero (2013) show that the actual mean of national poverty lines in 2005 PPPs is \$4.4 per person per day. Therefore, if the nominal value of the new moderate poverty line were \$4.4 per person per day, LAC's moderate poverty rate at 2011 PPP values would have been approximately 20.2 percent instead of 27.5 percent at 2005 PPPs in 2013.

4.3 *Country-specific poverty estimates in LAC in 2011 PPPs and comparison with currently-used poverty rates in 2005 PPPs*

It is also key to analyze whether the new poverty rates in LAC countries differ considerably with respect to the current country-specific poverty rates based on 2005 PPPs. In this section we select a poverty line in Table 3 as an example to illustrate the value of the poverty rates in LAC countries. As we showed in Section 4.1, the difference in the number of subnational poverty lines by country, the presence of outliers, and the size of the subnational population have a material effect on the value of the poverty line. Therefore, the following analysis uses the extreme and moderate poverty lines that result from weighting all subnational poverty lines by the number of individuals residing in their corresponding urban subnational region to account for the size of the population and control for the different number of subnational poverty lines across countries. The analysis also considers the specification based on the *median* of subnational urban poverty lines to account for outliers. The corresponding extreme and moderate poverty lines that result from those controls are \$2.5 and \$5.3 per person per day, respectively (first row of columns 3 and 4 of Table 3). This is the most conservative set of updated regional poverty lines. Therefore, poverty rates that emerge from these two lines can be seen as the lower bound of the changes resulting from updating the PPPs.

Table 4 presents the country-specific poverty estimates in 2013 based on these selected extreme and moderate poverty lines and the 2011 PPPs. Poverty headcounts vary considerably across countries in LAC. For instance, Chile has the lowest extreme and moderate poverty rate in LAC, with approximately 1.4 percent and 8.0 percent of the population living with a per capita income lower than \$2.5 and \$5.3 per person per day in 2013, respectively. On the other extreme, Honduras has the highest extreme and moderate poverty rate; approximately 27.3 percent and 56.6 percent of the population live with a per capita income lower than \$2.5 and \$5.3 per person per day in 2011, respectively.

The last row of Table 4 shows the extreme and moderate poverty rates in LAC as whole based on the \$2.5 and \$5.3 per person per day poverty lines and the 2011 PPPs. By 2013, approximately 7.8 percent of the population lived with a per capita household income lower than \$2.5 per person per day in 2011 PPPs, representing 40.2 million individuals. Similarly, approximately one in four Latin Americans qualified as moderately poor in 2013, living with a per capital household income lower than \$5.3 per person per day in 2011 PPPs.

To explore these results further, Figure 6 presents the comparison between country-specific extreme and moderate poverty rankings based on the \$2.5 and \$5.3 per person per day poverty lines and the 2011 PPPs with the corresponding estimates based on the \$2.5 and \$4 per person per day poverty lines and the 2005 PPPs. Any deviation from the 45 degree line denotes differences between the poverty rankings. The figure shows that, with few exceptions, most notably the Dominican Republic, country-specific extreme and moderate poverty rankings are generally stable.

4.4 A decomposition approach to understand changes introduced by new poverty lines and PPPs

Poverty headcounts calculated using 2011 PPP values differ from those calculated using 2005 PPP values, not only because the value of the poverty lines are different, but also because the base year (i.e., 2005 or 2011) and the relative costs of living between countries (i.e., 2011 PPP round or 2005 PPP round) are different. For instance, an extreme poverty line of \$2.5 per person per day in 2005 PPP values is drastically different from an extreme poverty line of \$2.5 per person per day in 2011 PPP values. As explained above, the \$2.5 per person per day poverty line at 2011 PPP values is lower, in real terms, than the \$2.5 per person per day poverty line at 2005 PPP values. The difference between the headcounts calculated with both poverty lines is due not only to the general inflation in prices that all the countries experienced, but also to the fact that (i) the relative prices between countries – reflected in the PPP values – changed from 2005 and 2011, and (ii) the set of underlying official poverty lines used to calculate the regional lines also changed.

Thus, the difference between the poverty headcounts using both the poverty lines in 2005 PPP values and the ones in 2011 PPP values can be decomposed into three components. The first component is the change of the level of the nominal value of the poverty line. In the case of the extreme poverty line, the nominal value of the line did not change (i.e., it remained in \$2.5 per person per day), but it did change from \$4 per person per day to \$5.3 per person per day for the case of the moderate poverty line. The second component is the effect of changing the base period from 2005 PPP values to 2011 PPP values. That is, the welfare aggregate of each country is deflated to either 2005 or 2011 PPP values using its corresponding CPI. As the CPI of each country evolved differently over time, the welfare distribution of the LAC region as a whole would differ depending on whether the base year is 2005 or 2011. Finally, the third component is the effect of changing the spatial deflator (i.e., relative prices) from 2005 PPP to 2011 PPP. Most of the

countries in LAC—with the exception of Guatemala, Panama, Peru, and El Salvador—experienced a depreciation of their currencies as the 2011 PPP values are higher than the 2005 PPP values.

To understand the effect of each component mentioned above, we estimated the Shapley value of the marginal effect of each component in the change of poverty headcount. That is, by leaving two of the components constant, we change one of the components from its corresponding value in 2005 PPP values to its value in 2011 PPP values. Then, we repeat this process five more times until we have calculated all the possible combinations.²⁹

Figure 7 shows the results of the Shapley decomposition for the changes in both extreme and moderate poverty using the welfare aggregate of the most recent household survey for each country (i.e., circa 2013). In the case of moderate poverty, the decomposition shows a substantial poverty-increasing effect of 9.7 percent from changing the nominal value of the poverty line and leaving unchanged the other two components. However, the currently-used \$4 per person per day poverty line at 2005 PPP values and the \$5.3 per person per day poverty line at 2011 PPP values are expressed in different spatial and temporal units. With respect to the PPP effect (i.e., the spatial adjustment effect), poverty headcount would increase by 3.0 percent, everything else constant, and the base period effect (i.e., the temporal adjustment effect), would reduce poverty by 10.6 percent. The net change is approximately 2.1 percent in 2013.

Unlike the majority of countries in Africa and South Asia, where the changes in poverty measurement using the 2011 PPP values reinforced poverty reduction (Dykstra, Kenny, and Sandefur 2014), the poverty measurement with the 2011 PPP values lead to an increase in poverty rates in LAC.

5 Conclusions

Most of the countries in the world monitor their own citizens' welfare and measure their living conditions on a regular basis. However, poverty measurement methodologies vary considerably across countries, which makes cross-country comparison and aggregations into regional and global trends difficult. In an attempt to assess the world population's welfare, international organizations

²⁹ The number of possible combinations is equal to the factorial (n!) of the number of components. See the annex for more technical details.

and researchers have promoted standardized methods to determine comparable cross-country poverty estimates by harmonizing a spatially-deflated welfare aggregate and by estimating a unique poverty line. At the regional level, \$2.5 and \$4 per person per day at 2005 PPP values have become the poverty lines widely used in LAC. Using these lines, 12 percent of the population in the region qualified as extremely poor in 2013, while 24 percent qualified as moderately poor during the same year.

This paper provides inputs to guide the update of regional extreme and moderate poverty lines for measuring poverty in LAC as a whole, and it is the first attempt to explicitly propose and document these inputs in the region. The recently released 2011 PPPs represent an excellent opportunity to estimate regional extreme and moderate poverty lines in LAC. In order to achieve this objective, we collected the most comprehensive and up-to-date available information on extreme and moderate official poverty lines combined with the standardized microdata available under the SEDLAC project. Unlike previous global estimates, we do not find a strong relationship between per capita income and the value of the poverty line. Therefore, we did not exclude any countries from regional estimates in LAC.

This paper sets regional extreme and moderate poverty lines ranging from \$2.5 to \$3.2 and from \$5 to \$6.8 per person per day, respectively. Depending on the regional poverty line selected, we find that approximately 8.0 percent to 12.0 percent of LAC's population qualified as extremely poor in 2013, while approximately 25.0 percent to 33.0 percent of the population qualified as moderately poor.

We believe that the approach described in this paper, together with the results and underlying data, will serve as valuable inputs for guiding the regional debate on poverty measurement in LAC. Additional research going forward includes updating the middle-income line currently set at \$10 per person per day at 2005 PPPs, which reflects a level of income at which the probability of falling back into poverty (based on \$4 per person per day) is less than 10 percent (Ferreira et al. 2012).

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Annex A. Shapley decomposition of change in regional poverty methodology from PPP 2005 to PPP 2011

A poverty rate P_s could be defined as non-linear function φ with components s —poverty line, CPI, and PPP. There are two possible values for: $\{a, r\}$, where a and r refer to the proper set of components used to estimate the poverty headcount using either alternative (a) or currently-used (r) poverty lines. Thus, the poverty rate is defined as $P_s = \varphi(y_s, z_s)$; where z_s represents the poverty line of the set of components s , while $y_s^t = \pi(y, cpi_s, ppp_s)$ is a vector of household incomes in time t that has been deflated using the set of components s .

Under this framework, equation (1) shows that the difference between P_a and P_r is not wholly due to changes in the poverty line, but also to spatial and temporal deflation using PPP and CPI, respectively.

$$P_a - P_r = \varphi(y_a, z_a) - \varphi(y_r, z_r) \quad (1)$$

Given that the differences between the two welfare distributions y_a and y_r are fully characterized by the use of different country specific CPI and PPP, equation (1) could be expressed as:

$$P_a - P_r = \varphi(\pi(y, cpi_a, ppp_a), z_a) - \varphi(\pi(y, cpi_r, ppp_r), z_r) \quad (2)$$

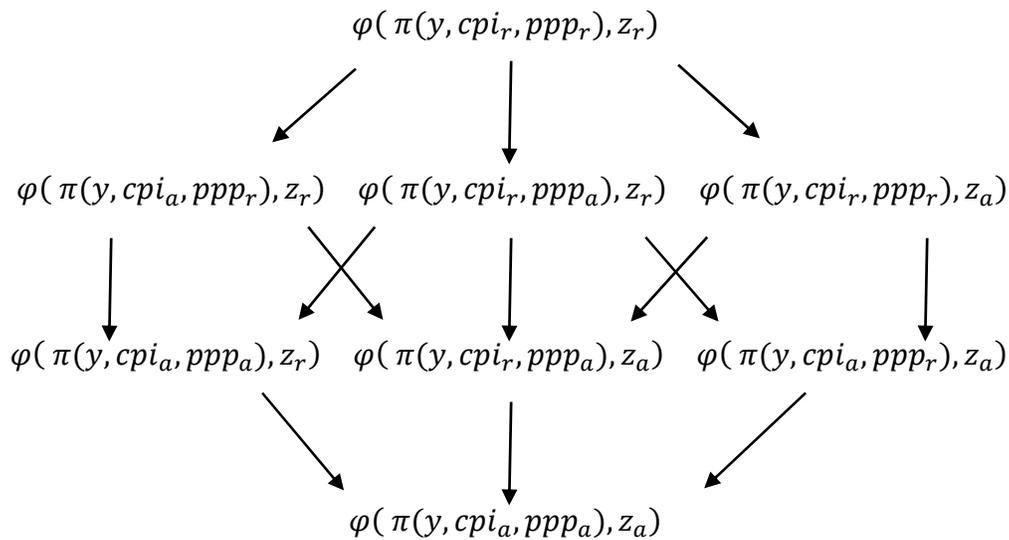
Notice that the poverty headcount function φ is not additively separable among its components, which means that the sum of the marginal effects of all the components is not equal to the total change. Therefore, in order to understand the contribution of each of the components, a decomposition procedure for distributional analysis based on the Shapley value suggested by Shorrocks (2012) is applied to estimate the relative weight of each component of the difference in equation (2).

The Shapley-Shorrocks procedure consists of constructing a counterfactual headcount based on different combinations of components by substituting each component at a time. Then, the poverty headcount obtained by modifying only one component at a time, say the PPP component ($\varphi(\pi(y, cpi_a, ppp_b), z_a)$), would play the role of a counterfactual headcount of the PPP component, which can be interpreted as the poverty headcount obtained if the PPP had changed while the other components remained constant. Thus, the marginal contribution of the PPP would be the differences between the counterfactual headcount and the observed headcount,

$\varphi(\pi(y, cpi_a, ppp_a), z_a)$. As explained above, given that the poverty headcount is a function of three components, the procedure above is done six times to account for all possible combinations.³⁰

Given that the marginal effects of each component do not sum up to the total change between the headcounts obtained with the currently-used and the alternative poverty lines, the decomposition suffers from path dependency. Additionally, the order in which each component is changed affects the marginal effects of each component. To solve that issue, the Shapley-Shorrocks value of a particular component is the average of all possible marginal effects that results for changing that particular component. The graph below shows each path that allows computing these marginal effects for the three components.

Figure A.1. Shapley Decomposition Paths



For instance, in the case of the poverty line component, the Shapley value $(\frac{dPr,a}{dz_{r,a}})$ is the average of poverty headcount differences when just the poverty line switches from z_r to z_a for all the possible paths. Thus, the sum of each marginal effect is equal to total change in poverty headcounts. Algebraically,

³⁰ The number of changes is equal to $n!$, where n is the numbers of components.

$$\begin{aligned}
\frac{dP_{ra}}{dz_{ra}} &= \frac{2}{6} [\varphi(\pi(y, cpi_r, ppp_r), z_a) - \varphi(\pi(y, cpi_r, ppp_r), z_r)] \\
&+ \frac{1}{6} [\varphi(\pi(y, cpi_a, ppp_r), z_a) - \varphi(\pi(y, cpi_a, ppp_r), z_r)] \\
&+ \frac{1}{6} [\varphi(\pi(y, cpi_r, ppp_a), z_a) - \varphi(\pi(y, cpi_r, ppp_a), z_r)] \\
&+ \frac{2}{6} [\varphi(\pi(y, cpi_a, ppp_a), z_a) - \varphi(\pi(y, cpi_a, ppp_a), z_r)]
\end{aligned} \tag{3}$$

Table 1. Parametric estimation of regional poverty lines in LAC, 2011

Coefficients	Extreme poverty lines			Moderate poverty lines		
	OLS		Q-reg p(50)	OLS		Q-reg p(50)
	Subnational	National	Subnational	Subnational	National	Subnational
	[1]	[2]	[3]	[4]	[5]	[6]
Log per capita income	0.002	.482	-0.070	0.155	.859	-0.160
	[0.235]	[.539]	[0.126]	[0.493]	[1.278]	[0.220]
Constant	2.810*	.23	2.972***	4.980	1.33	6.821***
	[1.444]	[1.44]	[0.772]	[3.023]	[7.80]	[1.348]
Obs.	74	16	74	74	16	74
R-squared	0.000	0.065	-	0.001	0.039	-
Forecast for lowest income (Haiti)	2.82	2.47	2.49	5.70	5.32	5.71

Data source: Calculations based on official poverty lines from NSOs' in the region. Note: Standard errors between brackets. * Significant at 10%, ** significant at 5%, and *** significant at 1%. The table shows Ordinary Least Square (OLS) and Quantile Regressions (QR)—50th percentile—of poverty lines as dependent variable and log household per capita income as regressor. Columns 1 and 4 show the OLS regression of all subnational extreme and moderate poverty lines shown in Figure 3 while columns 2 and 5 are based on national averages of subnational poverty lines shown in Table 2. Columns 3 and 6 show QR of all subnational poverty lines. The last row show the estimated value of the regression for Haiti, the poorest country in LAC. All regressions exclude outliers – i.e., the highest and lowest value of each poverty line. For instance, regressions for extreme poverty lines in columns 1 through 3 exclude Leste-urban in Brazil and Metropolitan Area in Paraguay (see Figure 3), as these values are the lowest and the highest, respectively.

Table 2. Population-weighted average of official urban poverty lines in LAC, 2011

Country	Poverty lines in 2011 PPPs (\$/ per person per day)	
	Extreme	Moderate
	[1]	[2]
Argentina	2.33	5.04
Bolivia	4.02	7.62
Brazil	2.19	4.39
Chile	2.98	5.96
Colombia	2.52	5.91
Costa Rica	4.07	8.85
Dominican Republic	2.99	6.64
Ecuador	2.48	4.40
El Salvador	3.04	6.08
Guatemala	4.00	8.88
Haiti	2.01	3.95
Honduras	4.45	8.90
Mexico	3.78	8.11
Nicaragua	2.35	4.00
Panama	3.48	7.37
Paraguay	4.45	7.14
Peru	3.11	6.11
Uruguay	3.54	12.23
Venezuela, RB	3.45	6.90

Data source: Calculations based on official urban poverty lines from NSOs' in the region. Note: Poverty lines area population-weighted averages of subnational official extreme and moderate poverty lines. Chile, Ecuador, Haiti, and Nicaragua have only one national poverty line.

Table 3. Non-parametric estimates of regional poverty lines in LAC, 2011

Level of aggregation	Population weighted	Mean		Median	
		Extreme [1]	Moderate [2]	Extreme [3]	Moderate [4]
<i>Panel A: Updated regional poverty lines in 2011 PPPs</i>					
Subnational	Yes	2.8	5.9	2.5	5.3
Subnational	No	2.9	6.1	2.6	5.9
National	Yes	2.8	5.9	2.5	5.0
National	No	3.2	6.8	3.1	6.6
<i>Panel B: Currently-used regional poverty lines in 2011 PPPs</i>					
National	No	3.1	6.5	3.2	6.3
National	Yes	3.4	6.7	3.5	6.2

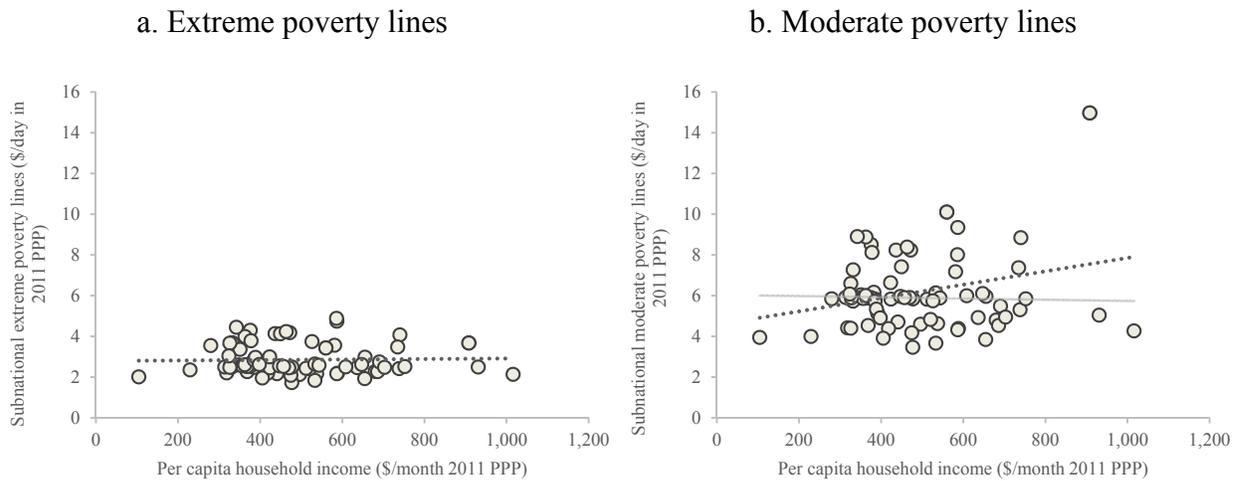
Data source: Panel A: calculations based on NSOs' information. Panel B: Calculations based on Gasparini, Cicowiez, and Escudero (2013). Note: The first two rows in panel A consider the mean and median of all subnational poverty lines shown in Figure 3, while the following two rows consider national averages shown in Table 2. The first and third row of the same panel show official poverty lines weighted by the population of subnational regions, while the second and fourth row show the unweighted lines. Lines in panel B come from the same underlying information used to estimate the currently-used \$2.5 and \$4 per person per day poverty lines in 2005 PPP, updated using country-specific CPIs.

Table 4. Extreme and moderate poverty rates in LAC using selected poverty lines in 2011 PPPs, 2013

Country	Poverty Headcount (%)	
	Extreme (\$2.5/day) [1]	Moderate (\$5.3/day) [2]
Argentina	2.6	9.7
Bolivia	10.4	27.0
Brazil	6.7	21.1
Chile	1.4	8.0
Colombia	9.8	31.1
Costa Rica	2.8	12.0
Dominican Rep.	5.3	28.8
Ecuador	7.4	30.8
El Salvador	6.8	33.3
Guatemala	19.1	51.7
Haiti	63.4	84.5
Honduras	27.3	56.6
Mexico	9.1	36.0
Panama	5.3	18.2
Paraguay	4.2	18.3
Peru	6.6	23.1
Uruguay	0.8	6.5
LAC	7.8	26.4

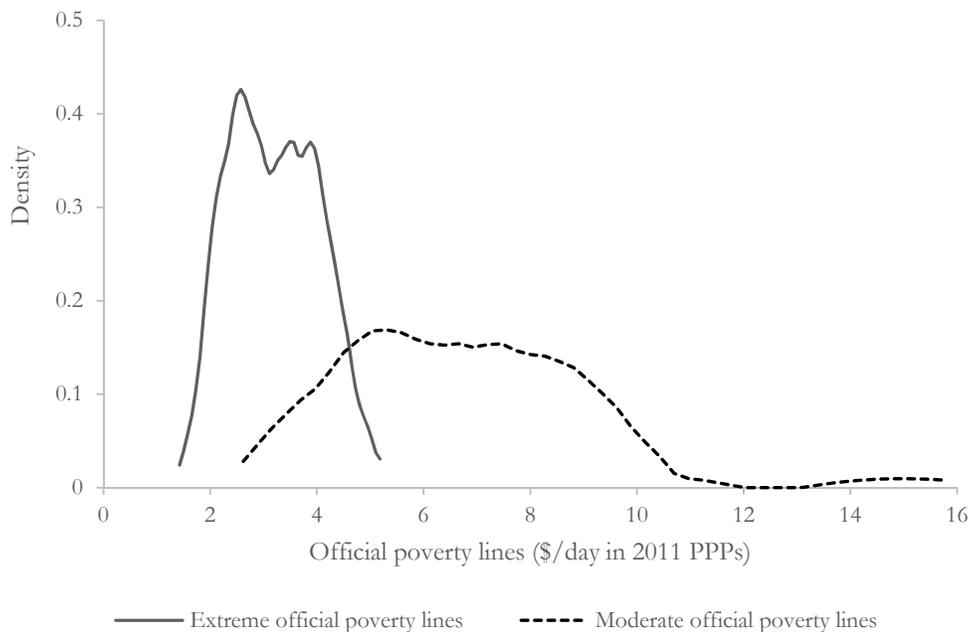
Data source: Authors' own calculations based on SEDLAC (CEDLAS and the World Bank). Note: Poverty rates are based on \$2.5 and \$5.3 per person per day extreme and moderate poverty lines, respectively (see Table 3).

Figure 1. Official poverty lines and log per capita household income in LAC, 2011



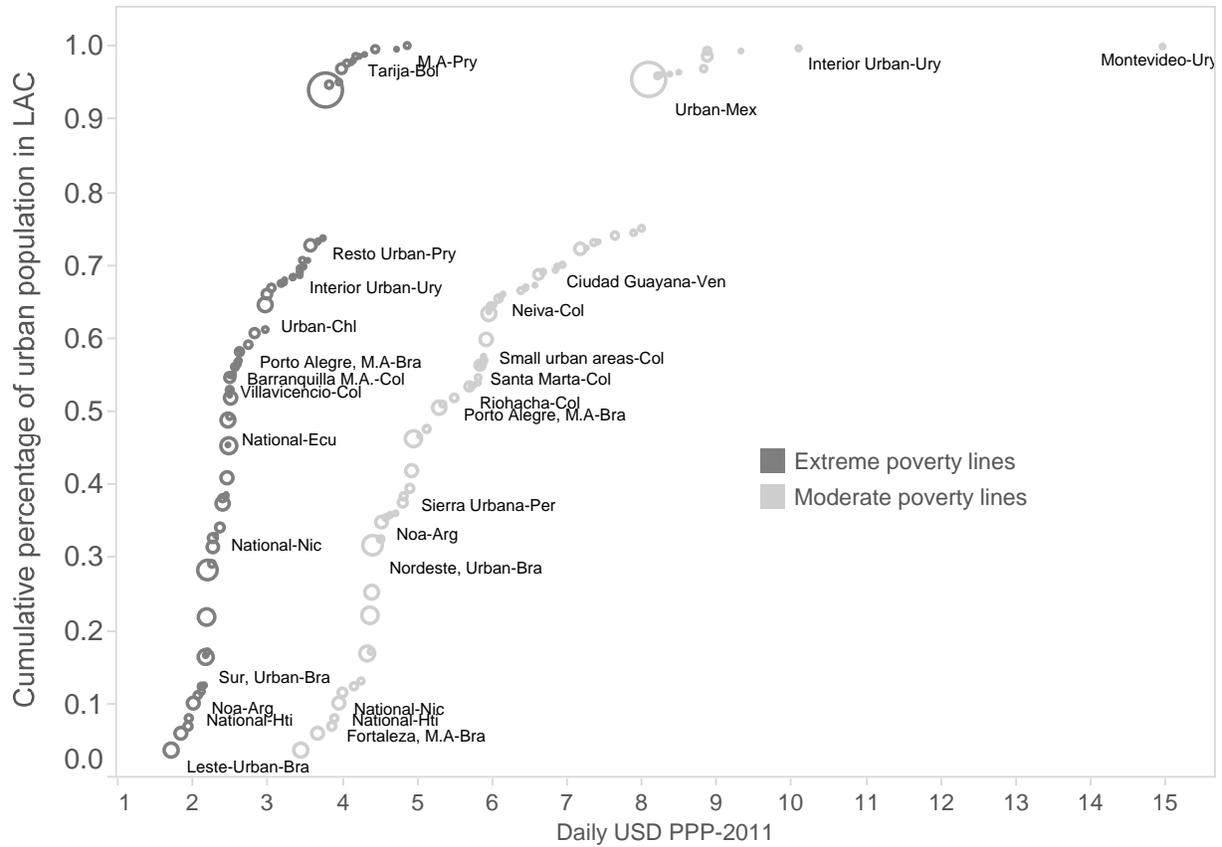
Data source: Calculation based on official extreme and moderate poverty lines from NSOs' in the region and SEDLAC (CEDLAS and the World Bank) data. Note: The dashed lines correspond to the unweighted OLS regression including all observations, while the solid gray line in panel b excludes outliers (i.e., Montevideo – Uruguay).

Figure 2. Density functions of official extreme and moderate poverty lines in LAC, 2011



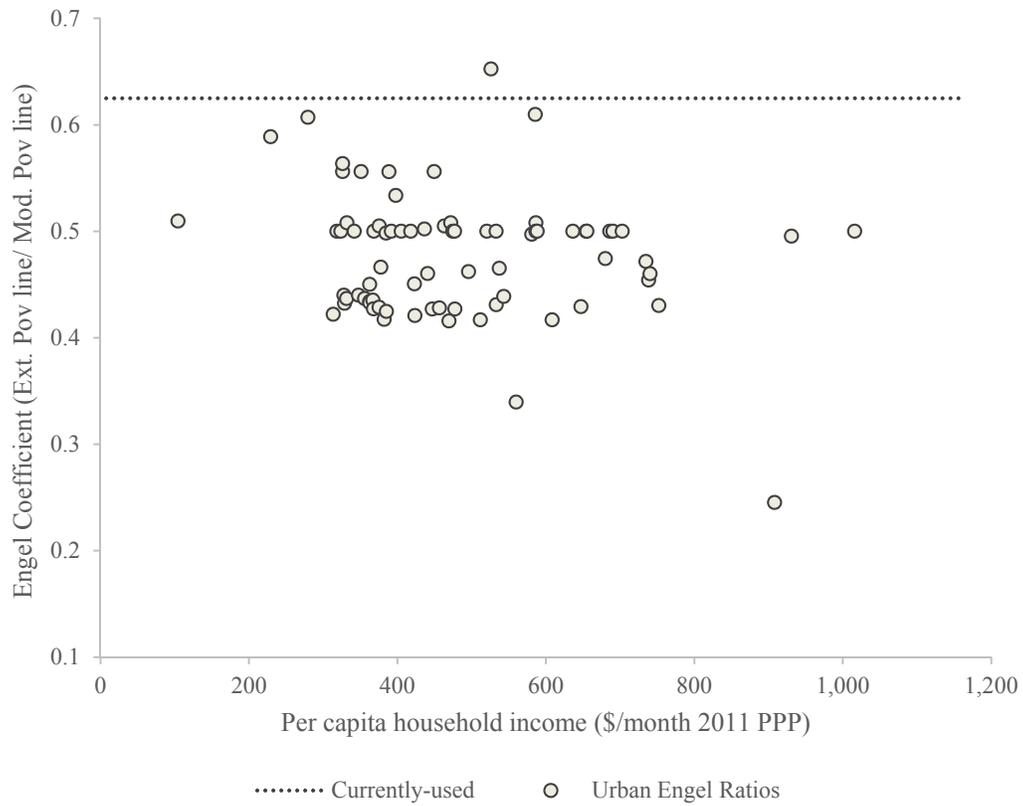
Data source: Calculations based on official poverty lines from NSOs' in the region. Note: The figure shows the density function of extreme and moderate official poverty lines in 2011 PPPs using Epanechnikov kernel.

Figure 3. Cumulative distribution of official extreme and moderate poverty lines in LAC, 2011



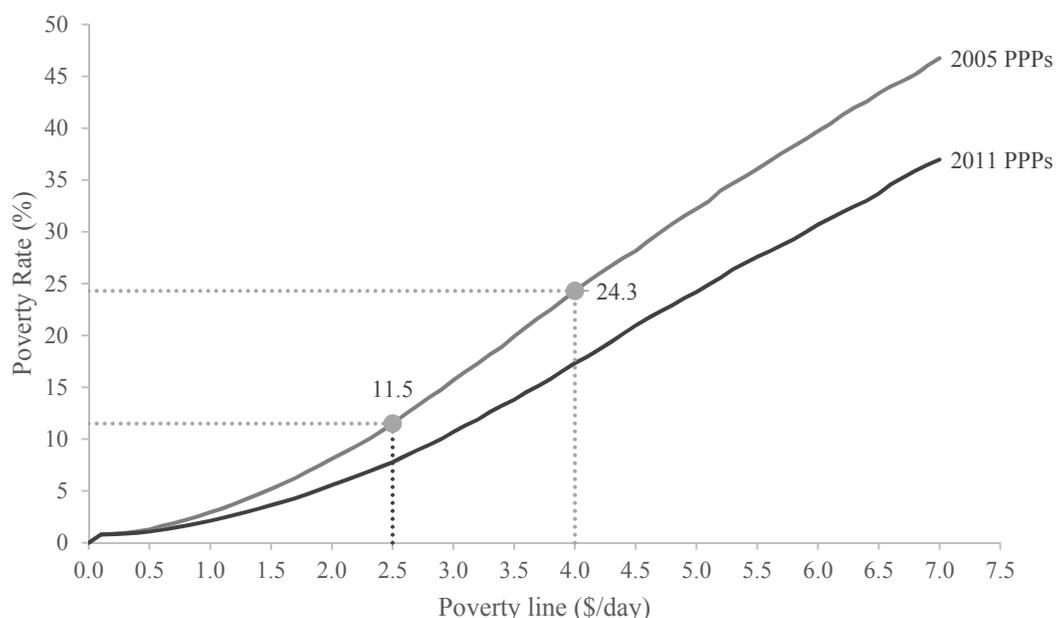
Data source: Calculations based on official poverty lines from NSOs' in the region. Note: Each circle represent a subnational region, with the diameter proportional to the subnational population.

Figure 4. Engel coefficient defined as the ratio between extreme and moderate poverty lines



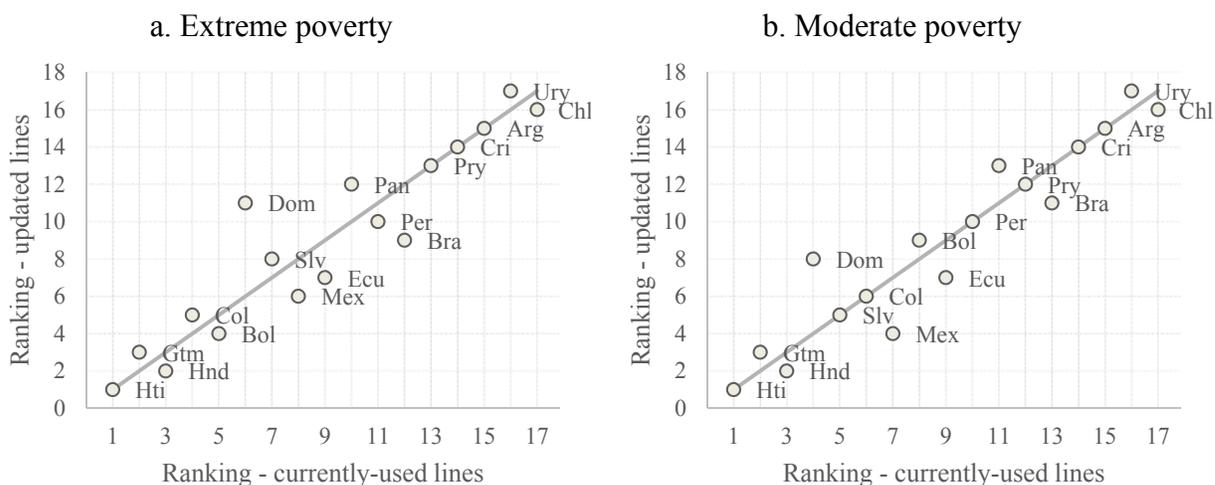
Data source: Calculations based on official poverty lines from NSOs' in the region. Note: The horizontal dashed line represents the Engel coefficient of the currently-used \$2.5 and \$4 per person per day poverty lines in 2005 PPPs.

Figure 5. Comparison of regional poverty rates based on 2005 and 2011 PPPs, 2013



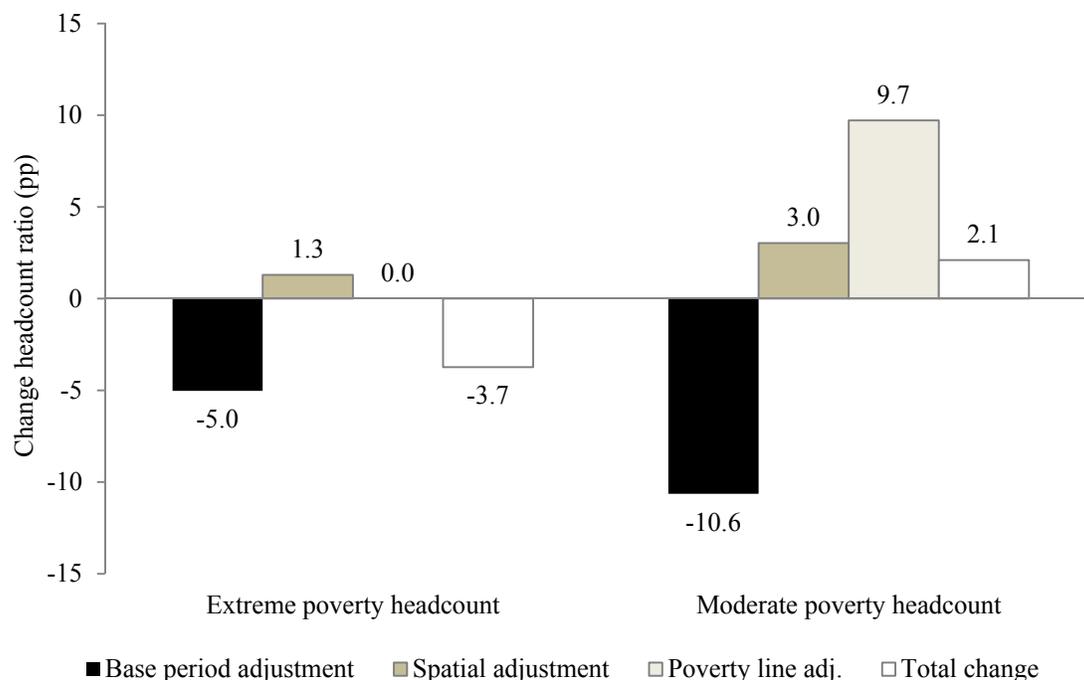
Data source: Calculations based on official poverty lines from NSOs' in LAC and SEDLAC (CEDLAS and World Bank) data. Note: The figure shows the poverty rate at different values of the poverty lines in 2005 and 2011 PPPs.

Figure 6. Country-specific poverty rate rankings based on 2005 and 2011 PPPs, 2013



Data source: Calculation based on official extreme and moderate poverty lines from NSOs' in the region and SEDLAC (CEDLAS and the World Bank) data. Note: The horizontal axis is based on poverty rates using the \$2.5 and 4\$ per person per day poverty lines in 2005 PPPs, while the vertical axis is based on poverty rates using the \$2.5 and \$5.3 per person per day poverty lines in 2011 PPPs, respectively (see Table 3).

Figure 7. Shapley decomposition of poverty headcounts differences using poverty lines based on 2005 PPPs and 2011 PPPS in LAC, 2013



Data source: Calculations based on official poverty lines from NSOs' in LAC and SEDLAC (CEDLAS and World Bank) data. Note: The figure shows the decomposition of the difference in the poverty rates from using 2011 PPPs and 2005 PPPs into three components. The first effect (i.e., "Base period adjustment"), is the effect of deflating the welfare aggregate from 2005 to 2011 PPP values. The second one (i.e., "Spatial adjustment."), is the effect of changing the spatial deflator (i.e., relative prices) from 2005 PPP to 2011 PPP. The third effect (i.e., "Poverty line adj."), is the change in the nominal value of the poverty line. The 2011 PPPs lines selected are \$2.5 and \$5.3 per person per day (see Table 3).



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