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Comparing Global Trends in Multidimensional and Income Poverty and Assessing Horizontal Inequalities

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Abstract

The 2030 Agenda has provided two new impulses in the struggles for poverty alleviation, a central goal of the international development community. First, poverty is no longer viewed only in monetary terms, but rather as a multidimensional phenomenon. Second, the need to reduce poverty for different social groups and not just at aggregate, national level is explicitly recognized. Against this background, the paper has a threefold aim: (1) to assess the trends in multidimensional poverty in low- and middle-income countries; (2) to compare trends in income and multidimensional poverty; (3) to explore rural-urban differences in poverty, also over time. The analysis relies on a new indicator of multidimensional poverty, the Global Correlation Sensitive Poverty Index (G-CSPI), which incorporates three dimensions: education, decent employment and health. This indicator presents several methodological advantages compared to existing measures. For example, the G-CSPI is an individual rather than household-level measure of poverty.

Regarding the aggregate trends, the paper shows that both income poverty and multidimensional poverty have fallen between 2000 and 2012. However, the decline in (extreme) income poverty, in percentage terms, is twice as large as the decline in multidimensional poverty. There is significant heterogeneity in the results across regions. Multidimensional poverty declined the most in Asia, thereby converging towards the relatively low levels of Latin America and Europe, while sub-Saharan Africa's slow progress has led to a widening gap with the other regions. These findings point to the existence of poverty traps and indicate that more efforts are needed to eradicate poverty.

Regarding the urban-rural comparison, our analysis shows that poverty is everywhere predominantly a rural phenomenon: the rural G-CSPI is more than four times higher than the urban G-CSPI. This difference has remained nearly constant over time.

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1 Introduction

Poverty reduction is since a long time one of the most important policy goals for the international development community. The first Target of the first Millennium Development Goal (MDG) called for halving the proportion of people with an income below the international extreme poverty line in the period 1990-2015. The centrality of poverty is confirmed in the 2030 Agenda; with the Sustainable Development Goal (SDG) 1 all countries committed to "end poverty in all its forms everywhere".

However, two major changes have taken place with the 2030 Agenda. The first one is that poverty is no longer viewed only in monetary terms, but rather as a multidimensional phenomenon. While Target 1.1 concentrates on the eradication of income poverty, now measured as the proportion of people living on less than $1.90 a day, Target 1.2 goes beyond the income dimension, and calls for a reduction of "poverty in all its dimensions according to national definitions". The latter target is a direct consequence of the debate that has taken place both within academia and in some international organizations in the last two to three decades (Narayan-Parker & Patel, 2000; Sen, 1985, 1987, 1999; UNDP, 1997, 2010). The most notable critiques of the view of poverty as lowness of income have been raised by Amartya Sen. The Nobel prize economist argued that income is only one of the possible instruments to avoid or escape poverty, and that we should rather directly focus on deprivations in key domains of people's life, such as education, health, employment, nutrition or participation in political life. This is because the relationship between income (or commodities) on the one hand, and these poverty dimensions on the other hand is not straightforward, but mediated by several factors at individual (e.g. age, gender, health, metabolism), social (e.g. formal and informal rules, power relations), and environmental level (climate) (Robeyns, 2005; Sen, 1985).[1] Moreover, this way we can account for non-market attributes, namely characteristics such as education or social participation that people may value and for which markets are either non-existing or imperfect (Thorbecke, 2007). Other critiques to the monetary approach to poverty pertain to the difficulty of measuring income or consumption – especially in rural contexts of developing countries.

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[1] For example, Robeyns (2005) argues that the *utility* derived from owning a good, such as a bicycle depends on the possibility to make use of its main characteristics, that is, the possibility to move around freely. As she states "If there are no paved roads or if a government or the dominant societal culture imposes a social or legal norm that women are not allowed to cycle without being accompanied by a male family member, then it becomes much more difficult or even impossible to use the good to enable the functioning" (p. 99).

Some scholars have finally raised serious doubts about the international (extreme and moderate) poverty lines identified by the World Bank (Reddy, 2011; Reddy & Pogge, 2010), therefore contesting the quality of the data on poverty incidence and depth. For all these reasons, the broadening of poverty understanding recognized in the SDG1 is highly appreciated.

The other fundamental change in the 2030 Agenda concerns the focus on horizontal inequalities. For many goals, the international community committed not just to improve the situation at national level, but specifically for different social and demographic groups. In the case of poverty, for example, Target 1.2 states: "by 2030, reduce at least by half the proportion of *men*, *women* and *children of all ages* living in poverty in all its dimensions according to national definitions" (emphasis added). More in general, *leaving no one behind* is a key principle behind the whole Agenda.

This paper addresses three interrelated research questions, all concerning trends in poverty and the evolution of some horizontal inequalities in poverty level in low- and middle income countries. First, it assesses whether, to what extent, and where multidimensional poverty has fallen since 2000, the beginning of the MDGs era. Second, it compares trends in income and multidimensional poverty, and the role of economic growth Third, it examines the trends in rural-urban disparities, to verify whether the problem of "urban bias" is still as acute as highlighted in the 1980s by Lipton (1977).

A considerable bulk of work has addressed the first research question, focusing on income poverty. Based on the international estimates carried out by the World Bank, the incidence of extreme poverty in the world has fallen from 35.9% in 1990 to 10.0% in 2015. In the same period a reduction in poverty has been registered in all the world regions, with East Asia and Pacific being the best performing region with a reduction from 61.6% in 1990 to 2.3% in 2015. On the other hand, sub-Saharan Africa had a much slower pace in poverty reduction, and is nowadays by far the region with the largest extreme poverty incidence (54.3% in 1990 and 41.1% in 2015).

Little evidence is, instead, available with regard to other dimensions of poverty. Most of the studies have focused on specific countries, such as Vietnam (Mahadevan & Hoang, 2016; Tran, Alkire, & Klasen, 2015), Indonesia (Hanandita & Tampubolon, 2016), South Africa (Fransman

& Yu, 2018) or Ecuador (Mideros, 2012). Only recently, one study has provided an in-depth analysis of the evolution of multidimensional poverty, using the global Multidimensional Poverty Index (MPI), elaborated by the Oxford Poverty and Human Development Initiative (OPHI) at the University of Oxford (Alkire & Santos, 2010). This index combines three dimensions: education, health, and standard of living – measured mostly by ownership of specific assets. The three dimensions are aggregated through the Alkire-Foster method (Alkire & Foster, 2011), and accounts for both poverty incidence and poverty intensity. Based on this index, Alkire, Roche, and Vaz (2017) have examined poverty trends in 34 countries, with the starting period being around 2000. The authors find that multidimensional poverty has significantly declined (at least at the 1% significance level) in 31 countries, while in two countries (Jordan and Senegal) the reduction was not statistically significant. The only exception is Madagascar, which registered a statistically significant increase in poverty between 2004 and 2008/9.

The work of Alkire et al. (2017), while being very original and informative, has important drawbacks, which relate to the soundness of the figures generated through the global MPI. First, the three dimensions used are not adequately justified on the basis of a clear and sound approach (Wisor et al., 2016). Second, some indicators are not available for some countries. In the work of Alkire et al. (2017), not all the 34 countries are evaluated on the basis of exactly the same indicators (for example, India is not). Third, the MPI adopts a dual cut-off procedure: first, a cut-off is used to identify who is deprived in each dimension, and then a second cut-off is needed to identify who is multidimensionally poor. The MPI uses 0.33 as second cut-off: this means that if a household is deprived in at least 33% of the weighted indicators, it is considered poor. The problem is that this value cannot be theoretically justified. Fourth, the MPI is insensitive to inequality among the poor, which is an important property that every poverty index should have (Dotter & Klasen, 2014; Jenkins & Lambert, 1997; Rippin, 2014, 2017). It means that the MPI implicitly overestimates the poverty-eradication efforts of countries trying to lift those individuals out of poverty that are closest to the artificial cut-off of 33% of deprivations. Fifth, a specific weakness of the MPI when used for trend analysis is that its variation over time is, due to the dual cut-off method, almost entirely due to changes in the headcount ratio and only minimally to changes in the poverty intensity (Dotter & Klasen, 2014; Tran et al., 2015). Why

make the effort and calculate an index that goes beyond a simple headcount ratio when, due to its construction, it provides very little information besides the headcount? Finally, the comparison between the trends in income and multidimensional poverty, presented for example in Alkire et al. (2017, p. 239), is not straightforward. This is because the MPI is calculated dominantly on the Demographic and Health Surveys, which have a very different sample size and sampling strategy than the surveys used for the calculation of monetary poverty – mostly living standard measurement surveys and household budget surveys. Even more relevant is the fact that the two types of surveys are actually conducted in different years. Therefore, it is hard to say if diverging country trends in monetary and multidimensional poverty are genuinely due to the different nature/form of poverty examined.

For all the above reasons, the findings of Alkire et al. (2017) and more in general those analyzing poverty trends with the MPI should be taken with great caution.[2] In order to investigate the trends in multidimensional poverty alone and in comparison with those for monetary poverty in this paper we rely on a new index of multidimensional poverty, called Global Correlation Sensitive Poverty Index (G-CSPI). This index combines deprivations in three dimensions: decent work, education and health, derived using the new Constitutional Approach (Burchi, Rippin, & Montenegro, 2018, Forthcoming). Compared to the MPI, the final index requires only the dimensional cut-offs and is able to account not just for poverty incidence and poverty intensity, but also for inequality among the poor (see Section 2 for details). The G-CSPI is available in total for more than 500 surveys since the late 1980s. In this paper we focus on the 1998-2015 period, for which we have data for at least two points in time for about 60 countries (see Section 3 for details).[3] In most of the cases the survey used to calculate the G-CSPI is exactly the same used to measure income poverty, while in few other cases is a different survey, but still conducted in the same year. Therefore, we are able to assess whether and to what degree the different components of poverty have declined, without most of the drawbacks present in the previous studies.

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[2] In the 2018 "Poverty and Shared Prosperity" report, the World Bank proposed a new measure of multidimensional poverty and calculated it for 119 countries for the years around 2013 (World Bank, 2018). For each of these 119 countries the indicator was calculated only for one point in time, therefore no analysis of poverty trend was carried out.

[3] It is important to highlight that this study does not include data from two large countries, such as China and India.

Another objective of the paper consists in comparing the poverty incidence in rural areas with that in urban areas in a historical perspective. Back in 1970s, Lipton (1977) argued that many governments especially in developing countries tend to allocate disproportionally more resources to urban as compared to rural areas for political economy reasons. This resulted inevitably in significantly larger poverty figures in rural areas. Has the situation changed since then? Also in this case, the literature has relied almost entirely on measures of monetary poverty. Sahn and Stifel (2003), for example, focus on 24 African countries in the period between the end of 1980s and the end of 1990s, and find no evidence of changes in the rural-urban disparities in asset-based poverty. Based on poverty figures estimated ad-hoc by the World Bank,[4] IFAD's 2016 Rural Development Report (IFAD, 2016) reports the trends in extreme poverty by urban and rural areas in different world regions in the period 1999-2011. What emerges is that only in one region, Asia and Pacific, we can firmly conclude that the gap has been reduced. A substantial problem in assessing the trends in the urban/rural ratio of poverty incidence is that the World Bank, through Povcalnet system, does not provide statistics on urban and rural poverty based on the international poverty line due to lack of spatial deflators for most of the countries. Rural and urban estimates of poverty are available only based on national poverty lines, which are calculated in different ways across countries.

The above problem is substantially alleviated when measuring poverty in the multidimensional space. As long as the choice of the dimensions, indicators and cut-offs are made taking into consideration minimum achievements that are valid for both urban and rural areas, a straight comparison between urban and rural areas can be made. On a sample of 34 countries, Alkire, Chatterje, Conconi, Seth, and Vaz (2014, p. 3) find that "both rural and urban regions reduced MPI although rural areas as a whole reduced MPI significantly faster than urban areas – as might be expected given the higher rates of poverty in rural areas". Also in this case, the same critiques of the MPI highlighted above can be made. With our innovative dataset we are in a better position for examining whether there is a convergence in the levels of the G-CSPI between rural and urban areas.

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[4] As explained in the next sentences, the World Bank prefers not to provide separate figures for rural and urban poverty based on the international poverty lines. However, in the case of this report produced by IFAD, the World Bank provided these estimates.

The remainder of the paper is structured in the following way. Section 2 introduces our measure of multidimensional poverty. Section 3 describes our sample of countries, period of analysis as well as the methodology employed. Section 4 includes the analysis of the historical trends in multidimensional poverty alone and in comparison with income poverty, and provides some preliminary hints on their relationship with economic growth. Section 5 investigates the trends in rural and urban poverty. Our concluding remarks are presented in Section 6.

2 The Global Correlation Sensitive Poverty Index (G-CSPI)

In order to construct our measure of multidimensional poverty – the Global CSPI (G-CSPI) – for several countries and different points in time, we relied, as data source, on the International Income Distribution Database (I2D2). The I2D2 is the result of a tremendous initiative of the World Bank to standardize several demographic, socioeconomic and income/consumption variables across countries, drawing on nationally representative household surveys, such as Household Budget Surveys, Household Income and Consumption Surveys, Labor Force Surveys, and multi-topic surveys (for example, the Living Standards Measurement Study Surveys).

While all the details on the index are discussed in Burchi, Rippin, et al. (2018), here below we report the most important features.

2.1 Poverty dimensions and their weights

In order to identify the most important dimensions of poverty to be able to compare different countries, we used a new approach, called the Constitutional Approach (Burchi, De Muro, & Kollar, 2014, 2018). It relies on Rawls' method of political constructivism, and uses the constitution together with all the relevant documents to interpret it as an ethically suitable informational basis for identifying shared poverty dimensions. In line with this approach and based on a large list of constitutions from all the world regions, three dimensions were identified as the most important ones: education, decent work and health (Burchi, Rippin, et al., 2018). Cross checking this ideal list with the information available in the I2D2 database, we came up with the following set of dimensions:

1) **Education**;
2) **Decent work;** and
3) **Access to drinkable water and adequate sanitation** (proxy for health).

Direct information on health status was not available. However, substantial empirical evidence supports the idea that lack of access to safe drinkable water and basic sanitation is a crucial impediment for a good health status (Checkley et al., 2004; Fink, Günther, & Hill, 2011; Fogden, 2009). Under this assumption, we have data on the dimensions that emerged as the most important ones based on the Constitutional Approach. As they emerged as being of similar relevance, we used an equal weighting scheme: each dimension was assigned a weight equal to 1/3.

2.2 Indicators of poverty and thresholds

The main variable used to measure education is literacy. If a person is not literate, she/he is poor in the education dimensions. When a survey did not have data on literacy for at least 66.66% of the sample population, education was measured with the number of years of schooling: all individuals with less than 4 years of schooling were classified as poor in education.[5] Finally, in case of a lack of data for at least 66.66% of the sample population even on years of schooling, we utilized the variable "educational level"[6]. An individual who has not completed primary education was, in this case, considered as poor in the educational dimension.

Decent work is measured by combining two variables from the I2D2 dataset, one indicating the labor status and one the employment status. The first variable indicates whether a person is "employed", "unemployed" or "not-in-labor force". The second variable contains 5 categories: paid employee, non-paid employee, employer, self-employed, and other worker. By construction, the categories "non-paid employees" and "self-employed" indicate lower pay and lower quality of the job. "Unemployed" individuals and individuals who are "self-employed" or "non-paid employees" were classified as poor in the work dimension; all the others as non-poor. Finally, to construct the last indicator we merged information on access to drinkable water and to adequate sanitation. Based on some empirical evidence (Fuller, Westphal, Kenney, & Eisenberg, 2015), all individuals with no access to any of the two facilities were treated as poor in this dimension, while those with access to at least one of them were considered non-poor.

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[5] This threshold was obtained by comparing the number of years of schooling with the literacy rate in a sample of countries with information on both variables.

[6] This threshold was obtained by comparing educational levels with the literacy rate in a sample of countries with information on both variables.

2.3 The CSPI as aggregation function

As mentioned before, one of the weaknesses of the MPI is the dual cut-off method that is utilized to identify the multidimensionally poor. The MPI is a specific measure of the broader class of M_0 multidimensional poverty measures developed by Alkire and Foster (2011). The M_0 poverty measures are simply the sum of weighted deprivations suffered by the poor divided by the maximum possible number of deprivations (i.e. the extreme case in which all individuals suffer from all deprivations):[7]

$$M_0 = \frac{\sum_{i=1}^{n} \sum_{j=1}^{d} g_{ij}^{0}(k)}{n} = \frac{\sum_{i=1}^{n} c_i(k)}{n} \quad (1)$$

where $i=1,...,n$ is the number of individuals, $j=1,...,d$ the number of dimensions, k the dual cut-off (1/3 in the case of the MPI) and $\sum_{j=1}^{d} g_{ij}^{0}(k)=c_i(k)$ the sum of weighted deprivations suffered by individual i in case individual i is poor (i.e. in case his/her sum of weighted deprivations is at least k).

It is easy to see that M_0 is the product of the (censored) poverty headcount $\widetilde{H}$ and the (censored) average deprivation share among the poor A:

$$M_0 = \frac{q}{n} \frac{\sum_{i=1}^{n} c_i(k)}{q} = HA \quad (2)$$

where q is the number of the poor (i.e. those individuals with a sum of weighted deprivations of at least k).

One problem with the decomposition is that the two components $\widetilde{H}$ and $\widetilde{A}$ are truncated from below as they are required by definition to be greater than the dual cut-off k. Dotter and Klasen (2014) demonstrate that this truncation implies that any variation of M_0, between countries as well as over time, is almost exclusively driven by the headcount. In other words, instead of meticulously calculating M_0, one could simply use the headcount as generated by the dual cut-off method as the loss of information is negligible.

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[7] Please note that unlike Alkire and Foster (2011), we do not make the assumption of equal weights and we assume that the sum of the weights is one instead of d. This is why formula (1) looks different than the formula introduced by Alkire and Foster in their 2011 paper.

Another problem is the fact that M_0 neglects inequality. Already in 1976 Amartya Sen required any reasonable poverty index to be decomposable according to what Jenkins and Lambert (1997) called the *three I's* of poverty: poverty *incidence*, *intensity* and *inequality*. The inability of the class of poverty measures to capture inequality among the poor is usually justified by claiming that any poverty measure that is able to capture inequality cannot be decomposed according to the poverty contributions of the different poverty dimensions. The very same claim is used to justify the fact that the M_0 class of poverty measures is unable to capture any kind of correlations between poverty dimensions. Again it is argued that any poverty measure able the capture correlations between poverty dimensions cannot be decomposed according to poverty dimensions. The existence of the CSPI proves that both claims are false: the CSPI captures the inequality among the poor as well as the correlations between poverty dimensions while at the same time being fully decomposable according to poverty dimensions.

The CSPI is a representative of the P_{CS} class of multidimensional poverty measures that defines inequality across poverty dimensions as the correlation-sensitive spread of simultaneous deprivations across the population. This is a more holistic definition of this type of inequality that combines considerations of distributive justice as well as efficiency (Burchi, Rippin, et al., 2018; Rippin, 2014, 2017).[8] More precisely, the CSPI is based on the fuzzy identification method $\varphi_f : \hat{\varphi}_f\left(x_i, z\right) = \sum_{j=1}^{d} g_{ij}^0 = c_i$. In other words, the P_{CS} class of poverty measures does not only differentiate between those who are poor and those who are not, but in addition differentiates among the poor themselves according to their degree of poverty severity – which in the case of the CSPI is simply the sum of the weighted deprivations.

Consequently, the CSPI is the squared sum of weighted deprivations suffered by the poor divided by the maximum possible number of weighted deprivations:

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[8] As Datt (2018) points out, the P_{CS} class of multidimensional poverty measures does not rule out a violation of distribution-sensitivity per se. The reason is precisely the more holistic definition of inequality across poverty dimensions that not only accounts for distributive justice but also for efficiency. As, for instance, Duclos, Sahn, and Younger (2006) point out, in case the degree of complementarity between poverty dimensions is very high, a reasonable poverty index should allow for a violation of distribution-sensitivity in order to ensure an efficient distribution of scarce resources (Burchi, Rippin, et al., 2018).

$$CSPI = \frac{\sum_{i=1}^{n}\hat{\varphi}_f\left(x_i, z\right)\sum_{j=1}^{d} g_{ij}^0}{n} = \frac{\sum_{i=1}^{n}\left[\sum_{j=1}^{d} g_{ij}^0\right]^2}{n} = \frac{\sum_{i=1}^{n} c_i^2}{n} \qquad (3)$$

Please note that the CSPI assumes a weak substitute relationship between poverty dimensions (an assumption that can easily be altered by choosing a different identification function φ_f) and consequently ensures distribution-sensitivity. At the same time, the squaring is achieved in two subsequent steps (the identification and the aggregation step), ensuring that the CSPI is as decomposable as M_0 which includes its decomposability according to the poverty contributions of the different poverty dimensions (Burchi, Rippin, et al., 2018; Dotter & Klasen, 2014; Jolliffe, 2014; Rippin, 2014, 2017; Silber, 2011).

Hence, the CSPI can be decomposed into the product of poverty *incidence* (expressed by the headcount *H*), poverty *intensity* (expressed by the average deprivation share among the poor *A*) and poverty *inequality* (expressed by a Generalized Entropy measure of inequality *GE*):

$$CSPI = \frac{q}{n}\left[\frac{\sum_{i=1}^{n} c_i}{q}\right]^2\left[1 + 2\left[\frac{1}{2q}\frac{\sum_{i=1}^{n} c_i}{\frac{1}{q}\sum_{i=1}^{n} c_i}\right]\right] = HA^2 \; (1+2GE) \qquad (4)$$

The theoretical differences between the CSPI and M_0 have significant implications:[9]

First, the CSPI is less sensitive to the (controversial) choice of weights than M_0.

Second, other than M_0 the CSPI is distribution-sensitive: whenever there is a redistribution that reduces the deprivation of a less poor household at the cost of a poorer household, the CSPI increases (as any reasonable poverty index should), whereas M_0 remains unchanged (in case both households remain poor even after the transfer) or even decreases (in case the less poor household falls below the cut-off level *k* as the result of the reduction in its deprivation).

Third, due to the fact that M_0 discards deprivations, its dual cut-off method approximates the intersection method in the most affluent countries (leading to impractically low poverty rates) and the union method in the poorest countries (leading to impractically high poverty rates). The

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[9] Please refer to Rippin (2017) for a detailed discussion.

CSPI, however, does not discard any information on deprivations, and therefore allows for better targeting of poverty reduction policies.\

Fourth, the fuzzy identification method of the CSPI introduces a very easy way to classify the poor according to their suffered deprivations: the *deprivation affected* (with a sum of weighted deprivations below 33 per cent), the *poor* (with a sum of weighted deprivations between 33 and 66 per cent) and the *extremely poor* (with a sum of weighted deprivations above 66 per cent up). UNDP uses a rather similar classification by calculating the censored MPI headcount for the i) "share of the poor people in the population", ii) "share of severely poor in the population", and the iii) "share of vulnerable in the population" (UNDP, 2013, p. 3). The only difference is that the censored headcounts of M_0 have to be calculated separately whereas in the case of the CSPI they are a natural by-product of the identification method and thus do not affect the poverty rates, i.e. serve for descriptive purposes only. In other words, the CSPI provides this information naturally, one single poverty rate that is simply decomposed. Whenever M_0 is required to provide this information, it needs to be calculated three times, for three different *k*-values, with each *k*-value leading to an entirely different poverty rate.

Fifth, different from M_0, the average poverty intensity of the CSPI is not truncated from below, allowing for much more variation and, consequently, much more information, in particular when it comes to analysing trends (Dotter & Klasen, 2014).

Sixth, different from M_0, the CSPI can be decomposed into all *three I's* of poverty, including inequality. This implies that any poverty reduction policy that targets the CSPI has to automatically deal with all three I's of poverty, allowing for more informed and detailed policy making.

For all the above reasons, we employ the CSPI for the aggregation of our three dimensions of poverty into one single multidimensional poverty index. This aggregation function has been already used in several studies on multidimensional poverty and vulnerability (Espinoza-Delgado & Klasen, 2018; Milan, Oakes, & Campbell, 2016; Rippin, 2016; Tosi, 2015).

2.4 Unit of analysis

While the World Bank measures of poverty (both the monetary and the recently introduced multidimensional measures) and the MPI are computed at the household level, the unit of

analysis of the G-CSPI is the individual, more specifically, individuals between 15 and 65 years of age. Therefore, we do not need to make assumptions about intra-household distribution of resources/capabilities and, among other things, we can identify whether two individuals living in the same household have a different poverty status.

It is important, however, to make a clarification. Information on the dimension of access to drinkable water and sanitation (proxy for health) is *collected* at the household level and not at the individual level. However, it is difficult to imagine that some household members could be excluded from the use of these facilities. Therefore, it is reasonable to assign the same value (0 or 1) to all the household members and treat the information as if it was collected at the individual level.

3   Data and Methodology

Using the I2D2 database, we were able to compute the G-CSPI and all its components (poverty incidence, intensity and inequality) for more than 550 surveys, covering, in total, about 108 countries. Due to a substantial amount of missing values in the original household surveys or due to the peculiar nature of some surveys,[10] few surveys do not contain all the relevant decomposed poverty figures: by rural-urban areas and by gender status. Therefore, the number of total observations used in the analysis slightly differs between the section analyzing the general trends in multidimensional poverty and the subsequent sections exploring trends by urban-rural areas or gender status. The number of observations will be made explicit in each section.

Data from our dataset were then merged with data from *Povcalnet* and additional datasets on income poverty, inequality, population, and GDP. As I2D2 and Povcalnet do not follow the same method to identify the survey year, in the case of a survey running in two consequent years, we adjusted the Povcalnet survey year to the one in I2D2.

As the original dataset at our disposal is an unbalanced panel, to look at aggregate trends we had to take a few decisions to ensure data comparability. The first decision concerned the time-frame: we originally decided to focus on the period starting from around 2000 until the most recent survey years, as this represents the period of the MDGs. Although the reference period for MDG 1 on poverty starts in 1990, the MDG agenda was agreed only in 2001. It is, therefore,

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[10] For example, national surveys in Argentina cover only urban areas, therefore rural figures are not available.

important to see the trends in poverty after this major event in the international arena. Moreover, this choice is related to data availability: choosing this time-frame allows us to utilize nearly all the data at our disposal, as information on previous periods is scarce.

Given that surveys were carried out not necessarily in the same years in the different countries, our second choice consisted in dividing the selected timeframe into three separate periods. We considered as "baseline" the period 1998-2003: for countries with more than one survey in this period we considered the average value.[11] The same procedure was applied to the "intermediate" period, between 2004 and 2008; and to the "endline" period, between 2009 and 2015. For simplicity, in the empirical analysis we refer to these three periods, as 2000, 2006 and 2012, respectively. We do not apply the same methodology used by the World Bank, which scales up values from different survey-years to a common year (Jolliffe & Prydz, 2016). Their methodology relies on the strong assumptions that income distribution remains unchanged between one country's household survey and the next one and that individual incomes increase according to the overall economic growth rate. Given also the lower, and lagged, responsiveness of multidimensional poverty to economic growth (Santos, Dabus, & Delbianco, 2019), we therefore decided to use the average values for each period.[12]

From a data perspective, the derived dataset includes estimates of multidimensional poverty for 71 countries for at least two of the three periods (2000, 2006 and 2012). As mentioned in the previous section, there is no data for India and China. Of the remaining population of low- and middle-income countries, the sample represents around half of the total population.[13] For 37 countries, we have information on all the three periods; for 48 countries estimates for at least 2000 and 2012 are available; 49 countries have estimates for at least 2000 and 2006.[14]

4 Trends in multidimensional and income poverty

In this section we analyze the trends in multidimensional and income poverty with two main goals in mind. First, we are interested in verifying whether, at the aggregate level, poverty has

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[11] Weighted by population.

[12] An alternative solution would have been to obtain values for the same years for each country, by interpolation.

[13] Using the World Bank classification from 2000.

[14] For five countries there is information just for one period. In addition, some data points have been removed because the surveys were not comparable with the other surveys conducted in the same country. In total, throughout the paper we focus on 60 countries: the list of survey years used for each period for every country is reported in Table A1.

fallen dramatically since the introduction of the MDGs as argued by most of the scholars. Second, the analysis also aims at studying the heterogeneity of these trends between sub-periods, countries, regions and income groups. In particular, it is of interest to pinpoint country cases where the poverty-reduction performance has to be re-assessed as a consequence of the use of our index.

In order to study the trends in multidimensional poverty in Section 4 – similar steps will be followed also in Sections 5 and 6, to allow comparability between sections - we focus mainly on the G-CSPI index because it is the most comprehensive index of the class of G-CSPI indices (see Section 2). However, when looking at the general trends we also take into account the G-CSPI headcount, specifically the sum of the CSPI headcounts of the poor and the extremely poor (or headcount ratio of people deprived in at least two dimensions) (Burchi, Rippin, et al., 2018). This is especially relevant for the comparison between multidimensional and income poverty, given the fact that the headcount ratio is by far the most used and known index of income poverty.[15] Moreover, given the richness of the analysis and the multiplicity of the objectives of the paper, we never analyze separately the specific contribution of the other two "I"s: poverty intensity and poverty inequality. These components, indeed, enter the overall G-CSPI directly.

4.1 Global trends in the G-CSPI

Figure 1 shows the aggregate trend in multidimensional poverty between 2000 and 2012. The figure shows that both the G-CSPI and its headcount ratio have decreased following the MDGs agreement in 2000. When considering the group of countries with data for the first and third periods, the population-weighted aggregated value of the G-CSPI has decreased by 16.7%, from 0.23 to 0.19.[16] In the same period, the headcount ratio has decreased only slightly more, by 17.4% (from 0.33 to 0.27). The unweighted trends (Table A3 in the Appendix) show similar trajectories: both the G-CSPI and the headcount ratio have decreased equally in proportional terms, both by around 19.5% between 2000 and 2012. Given that the mean unweighted poverty is slightly higher than the mean weighted poverty and the former decreases more than the latter in the period examined, it can be inferred that the most populous countries are less poor than the average, but are also performing below average in terms of poverty reduction. As this sub-

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[15] Theoretically, the overall G-CSPI should be compared with the squared poverty gap: however, the latter is hardly ever used.
[16] The estimates below are weighted by population size (for the entire period) for the country.

section focuses on global, aggregate trends, we leave the explanation of these country-specific trajectories to the next sub-sections.

Figure 1: G-CSPI changes between 2000 and 2012 (n=48)
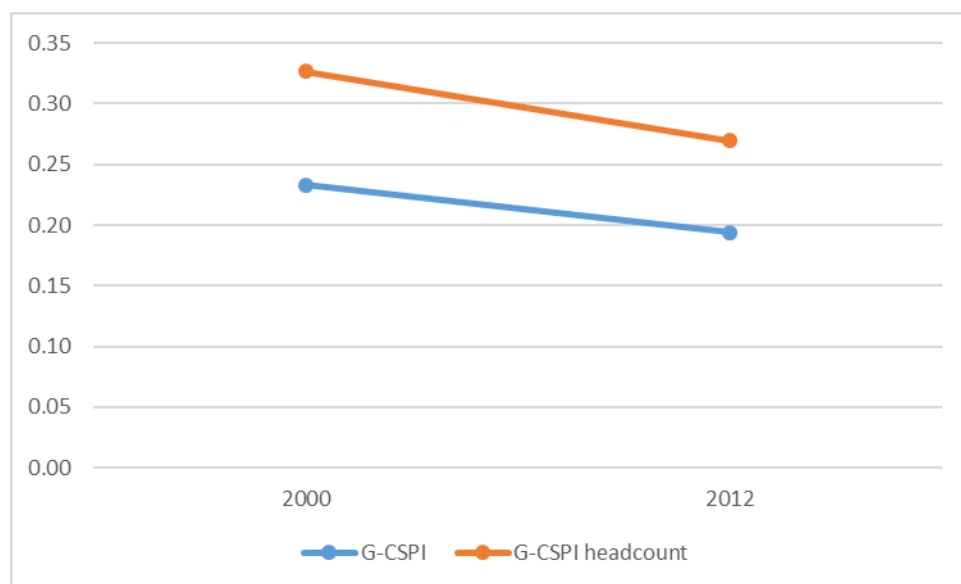
Source: Authors' elaboration based on own processed data.

To better understand this general long-term trend, the sub-sample of countries with available data for all three periods is used to analyze differences in two time intervals: from 2000 to 2006; and from 2006 to 2012.[17] However, the findings from this analysis should be interpreted with caution when comparing them to the previous figure, as the sample of countries with data for all three periods is composed of better-off countries. The G-CSPI value for 2000 is in fact lower for this sub-sample (n = 37) compared to the sample of countries with data for the first and third periods (n = 48). Therefore, caution needs to be used when comparing the two sets of data. Figure 2 below shows that, whilst multidimensional poverty has decreased in both sub-periods, the decrease between 2006 and 2012 has been just slightly more pronounced. The G-CSPI headcount ratio has decreased by 10% in the first interval, and by 14% in the second, while the overall G-CSPI by 8% in the first interval and by 13% in the second. In summary, the reduction of multidimensional poverty has been continuous between 2000 and 2012, with a minimally larger decrease in the later time interval. This could be due to the time needed to materialize policies stemming from the MDGs agreed in 2000.

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[17] Therefore, the figure/table is not directly comparable with the previous figure/table.

Figure 2: G-CSPI changes between 2000 and 2012 (n = 37)
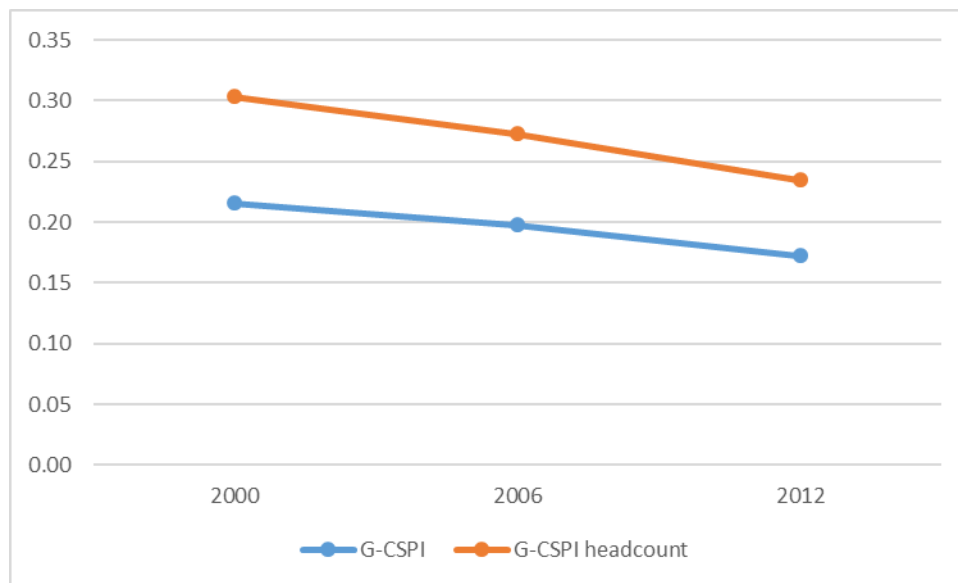
Source: Authors' elaboration based on own processed data

4.2 Heterogeneity by region, income group and country

The overall trends in multidimensional poverty previously presented might conceal significant heterogeneity in relation to both regions and income levels. Knowing whether multidimensional poverty has changed more in certain regions than in others, for example, is relevant to identify successful cases, and for the targeting of policy interventions designed by national governments and other actors involved in development cooperation.[18]

Figure 3 shows that between 2000 and 2012 the G-CSPI value has decreased in all regions, but with substantial differences.[19] While both South Asia and East Asia experienced large reductions (29% and 38% respectively), multidimensional poverty remained nearly constant in Sub-Saharan Africa (overall decrease of 3%). Therefore, as the three regions had similar starting values of the G-CSPI in 2000, the sub-Saharan region is the one witnessing the highest multidimensional poverty in 2012. On the other hand, G-CSPI values in East Asia & and the Pacific and South Asia are converging to those of Eastern Europe & Central Asia, and Latin America & the Caribbean. The latter two regions, in fact, had a G-CSPI value of 0.08 in 2000, decreasing to 0.05 and 0.06 respectively (a proportional decrease of 35% and 30% respectively). One point to

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[18] For simplicity we look at the trends by region and income level using just the countries with observations for the first and third periods, to have the largest sample size.
[19] The paper uses the regional classification from the World Bank.

consider is that the sample includes numerous countries from Latin America & the Caribbean (16) and SSA (18), while the number of countries for East Asia and South Asia is low (both regions have three countries in the sample at hand).

Figure 3: G-CSPI changes between 2000 and 2015, by region (n = 48)
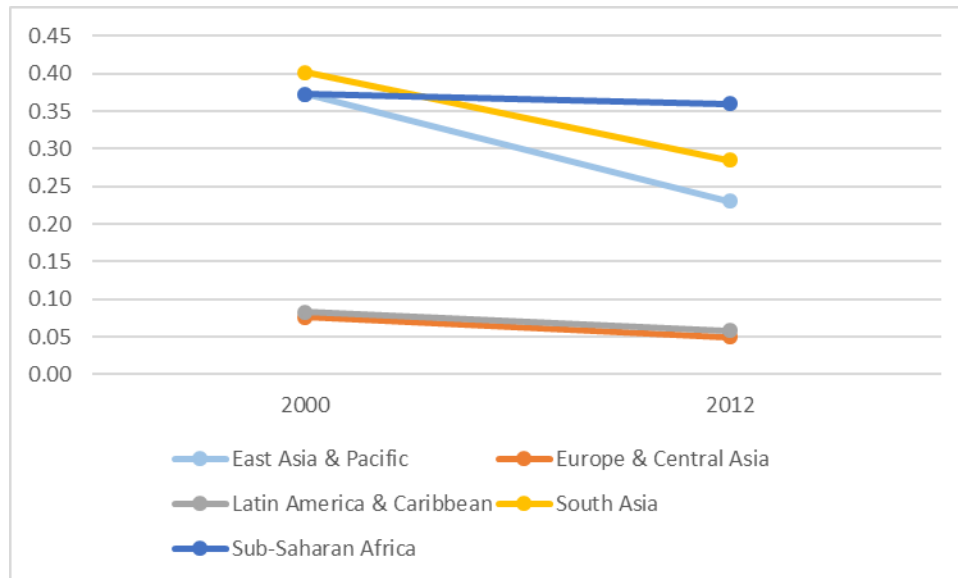
Source: Authors' elaboration based on own processed data

Similar to the previous findings on regional heterogeneity, also all income groups have witnessed decreases in multidimensional poverty.[20] Lower middle-income countries experienced the largest decrease, as shown in Figure 4, from 0.18 to 0.12 (a reduction of 36%). Upper middle-income countries show a slightly worse performance, with a decrease of 32%. On the other hand, low income countries decreased poverty just by 12%. The convergence between lower and upper middle-income countries, and the substandard performance of poorer economies are linked to the regional trends seen previously. In fact, the low-income group is composed mainly of sub-Saharan countries. Compared to the previous, inter-regional analysis, the number of countries included in the three income groups is more balanced. Nonetheless, the sample of countries consists mostly of low-income (22) and lower middle-income countries (16), with the remaining ten being upper middle-income countries.

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[20] This distinction is based on the classification of the World Bank in 2000, the first period used in this study.

Figure 4: G-CSPI changes between 2000 and 2015, by income group (n = 48)
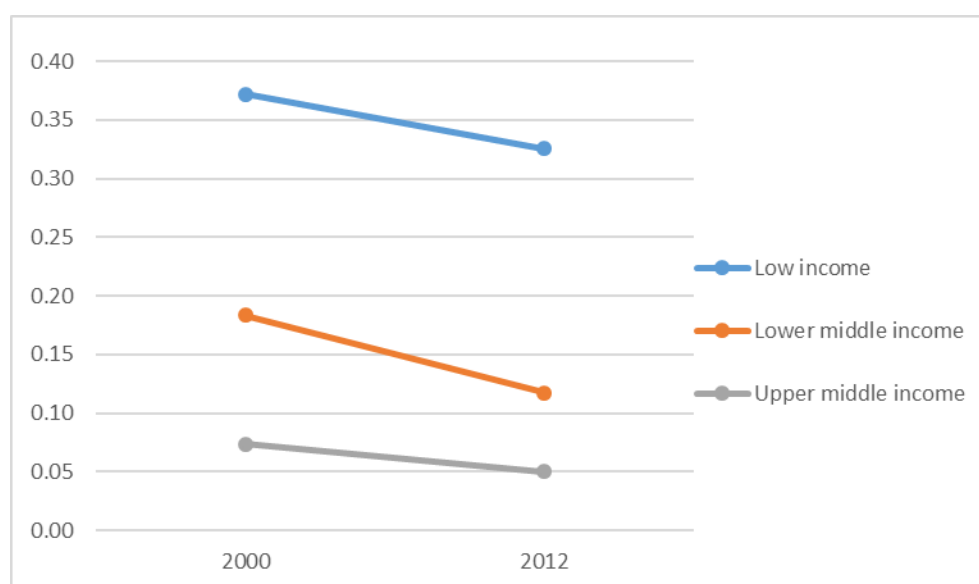
Source: authors' elaboration based on own processed data

To complete the picture on the general trends and their heterogeneity, Figures A1-A4 in the Appendix show the values by period and country, for both the G-CSPI and the G-CSPI headcount; Table 1, instead, summarizes country-level changes of the G-CSPI and its headcount by interval. One preliminary finding is the similarity in the trends for the G-CSPI and its headcount: for the long interval (2000-2012) all the changes in the G-CSPI go in the same directions as the changes in the headcount. Focusing separately on the two periods, instead there are few cases where the changes in the two indicators go in opposite directions, pointing to the importance of going beyond the headcount.[21] Looking at the size of the changes by single countries, the largest absolute increase in multidimensional poverty in the long interval (2000 to 2012) was experienced by Ethiopia, Ghana and Sao Tome and Principe (all more than 5 percentage points). The same countries also witnessed the largest increase in proportional terms. Switching now to the positive cases, Bhutan, Thailand and Chad registered the largest absolute decreases of the G-CSPI, all by more than 15 percentage points; Serbia, Belarus and Bhutan, instead, were the most successful countries in reducing the G-CSPI in relation to their initial value, with a decrease by more than 50%. Especially in the case of Serbia and Belarus, this large

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[21] These cases are Mozambique, Uruguay, and Guinea between the first and second period, and Costa Rica, Mongolia, and Bolivia for the interval between 2006 and 2012.

proportional decrease depends on a low G-CSPI value in 2000.[22] A general finding is that while multidimensional poverty in SSA was found to be relatively stable, this masks substantial heterogeneity, including countries that both significantly increased and decreased multidimensional poverty.

Splitting the analysis into the two intervals (2000-06 and 2006-12), Thailand witnessed the largest decreases, both in absolute and percentage terms, between 2000 and 2006. On the contrary, Ethiopia showed the largest absolute increase; while Hungary the largest proportional one. When considering the second interval (2006 to 2012), Afghanistan witnessed the largest absolute decrease, while Serbia proportionally decreased the most. Liberia was the second in both categories. Conversely, South Africa and Cambodia had the largest increase in both proportional and absolute terms.

Finally, considering the most populous countries that are crucial in driving the global trends and are relevant for global poverty eradication, Bangladesh has decreased in the second period especially, Pakistan in the first period. On the negative side, poverty has increased in Ethiopia.

Table 1: Changes in the G-CSPI, by country

	2000-2012		2000-2006		2006-2012	
	G-CSPI	G-CSPI headcount	G-CSPI	G-CSPI headcount	G-CSPI	G-CSPI headcount
Decrease	42	42	38	37	41	42
Increase	6	6	11	12	7	6
Total	48	48	49	49	48	48

Source: Authors' elaboration based on own processed data

4.3 Trends in decent employment, health and education

This section deals with the decomposition of the trends in the G-CSPI. As explained in Section 2, the G-CSPI is a measure of multidimensional poverty composed of three dimensions: decent employment, health and education. Therefore, it is crucial, especially from a policy perspective, to understand which dimensions drive the trends in multidimensional poverty discussed in the previous sub-section.

Figure 5 shows that poverty in all its dimensions has decreased in absolute terms between 2000 and 2012 (data for 2006 not used). Deprivations in education and health decreased by 24% and

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[22] In cases of very low values of the G-CSPI there are also more risks of measurement error.

18%, respectively; deprivation in decent employment, instead, decreased less, by 9%. As a consequence, also the relative contributions of the three dimensions to the overall G-CSPI changed. While the relative importance of health and education has decreased, that of employment has increased. In 2012 employment represents the largest contributor to the G-CSPI, with a share of around 44%, followed by health (35%) and education (21%).[23]

Figure 5: Changes in the G-CSPI dimensions (n = 48).
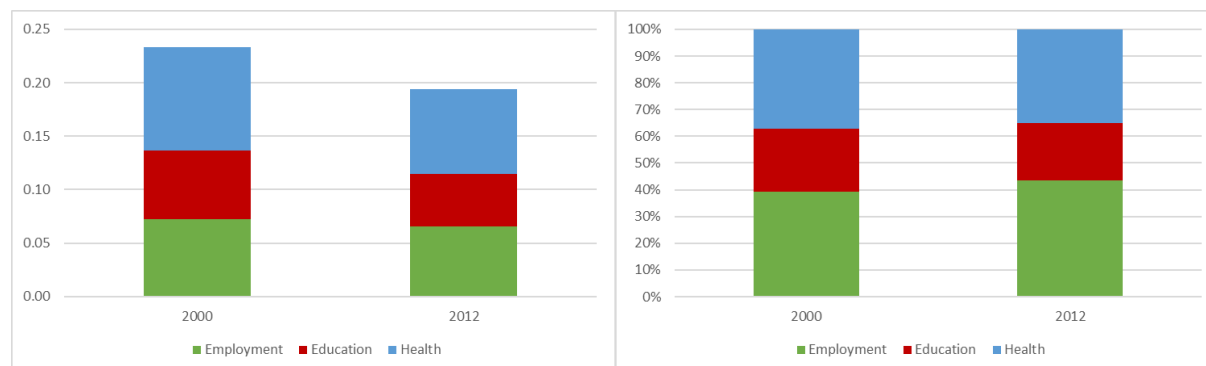
Source: Authors' elaboration based on own processed data

4.4 Comparison between trends in G-CSPI and income poverty

This sub-section compares multidimensional poverty (G-CSPI) with income poverty. This is particularly important for two main reasons. First, eradicating both types of poverty is crucial; and both are being explicitly addressed as part of the SDG1. It is therefore important to analyze both, rather than narrowly focusing on just one. Second, one of the main advantages of the data at hand is the possibility of comparing the two types of poverty (using the same survey data) for the same years, and thereby exploring how they develop relative to each other[24] In order to carry out this analysis, in comparison to Section 4.3 we had to drop observations (country/year) without information on monetary poverty.[25] The final sample consists of 42 countries with first and last period, and 32 countries with all 3 periods. For further clarification, the analysis uses the extreme international poverty line of US$1.90 a day, which is the poverty line used to track progress in SDG1.

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[23] When looking at the three periods (Figure A5 in the Appendix), further heterogeneity can be analyzed (keeping in mind the differences in the composition of the samples with respect to the previous figures). Deprivations in the employment and health dimension have decreased especially in the second period, while the share of the population without decent employment even increasing between 2000 and 2006.

[24] In order to achieve this, we keep the country-year observations with both income and multidimensional poverty.

[25] The countries dropped are Bangladesh, Cambodia, Guatemala, Kosovo, South Africa, and Uruguay.

When looking at the aggregate trends, Figure 6 shows that the headcount ratio of monetary poverty has declined more strongly than the G-CSPI headcount. The difference between the two widens between 2000 and 2012: in 2000, the G-CSPI headcount was about 6 percentage points higher than the monetary poverty headcount, while this difference was 9 percentage points in 2012.Therefore, while trends in multidimensional and monetary poverty are similar, some differences are found in relation to the magnitude of the changes.

Figure 6: Changes in monetary and multidimensional poverty 2000-2012, weighted (n = 42)
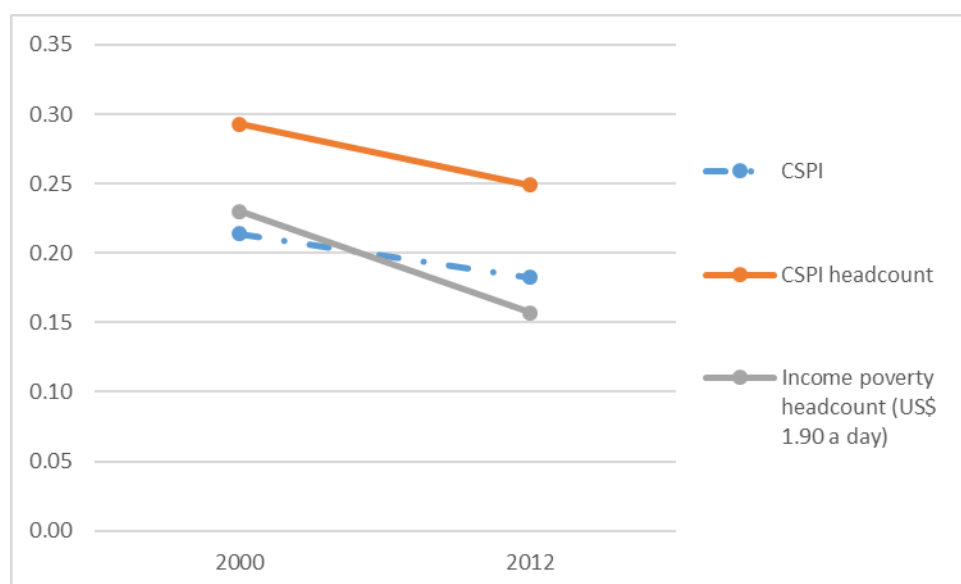
Source: Authors' elaboration based on own processed data

Finally, Table 2 summarizes the trends for single countries and not at the aggregate level. The sample used in the table consists of 42 countries, for which we have disaggregated data for 2000 and 2012, for both income poverty and the G-CSPI headcount. The table shows that the majority of countries (76%) have reduced both monetary and multidimensional poverty, while just two countries (Nigeria and São Tomé and Principe) have increased both. On the other hand, eight countries had contrasting trends of multidimensional and monetary poverty.

Table 2: Changes in G-CSPI vs income poverty between 2000 and 2012 (n = 42)

	Income poverty (US$ 1.90 a day) headcount		
	increase	decrease	countries
G-CSPI headcount increase	2 (4.8%)	4 (9.5%)	6 (14.3%)
decrease	4 (9.5%)	32 (76.2%)	36 (85.7%)
countries	6 (14.3%)	36 (85.7%)	42 (100%)

Source: Authors' elaboration based on own processed data

4.5 Linking poverty reduction to economic growth

Apart from looking at the comparison in trends between multidimensional and monetary poverty, it is also interesting to explore the role of economic growth. In fact, the literature has shown that economic growth is a crucial determinant of monetary poverty reduction (Adams, 2004). However, evidence of the role of economic growth for the reduction in multidimensional poverty is scarce. The preliminary analysis presented here aims at giving a first glance at comparing the relationships between economic growth (measured with GDP per capita) on the one hand, and multidimensional (the G-CSPI) and income (US$ 1.90 a day) poverty on the other hand.

In Figure 7 we investigate this relationship for the sample of countries (51)[26] with available data for 2000 and 2012 (or 2000 and 2006 if 2012 was not available) for both poverty measures and economic growth. As expected, the relationship is negative for both types of poverty. However, such relationship is more significant and larger in magnitude for income poverty as compared to multidimensional poverty. Indeed, a simple regression reveals that both the coefficient and the fit of the relationship are higher when income growth is regressed against income poverty as compared to multidimensional poverty. This depends first of all on the fact that income poverty is more directly linked to economic growth: an increase in the average income is likely to increase the income of at least some people below the poverty line and, therefore, reduce income poverty. The relationship between economic growth and other dimensions of poverty, such as education, health and employment, instead, is more indirect, as it depends, for example, on how the income generated through growth is used or on how the education and health system functions (for example, public or private). Sectorial policies, such as education or health policies

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[26] Some of the data points have been excluded as they were clear outliers in a statistical sense (Lithuania and Timor-Leste), which skewed the correlation analysis.

or active labor market policies may have a more direct impact on these dimensions of poverty or can enhance the effects of growth on multidimensional poverty. While an in-depth analysis of the growth-poverty elasticity falls outside the scope of this paper, these preliminary results seem to confirm findings from previous research using other multidimensional poverty indicators (Santos et al., 2019)..

Figure 7: Relationship between economic growth and changes in income poverty and G-CSPI (n=51)
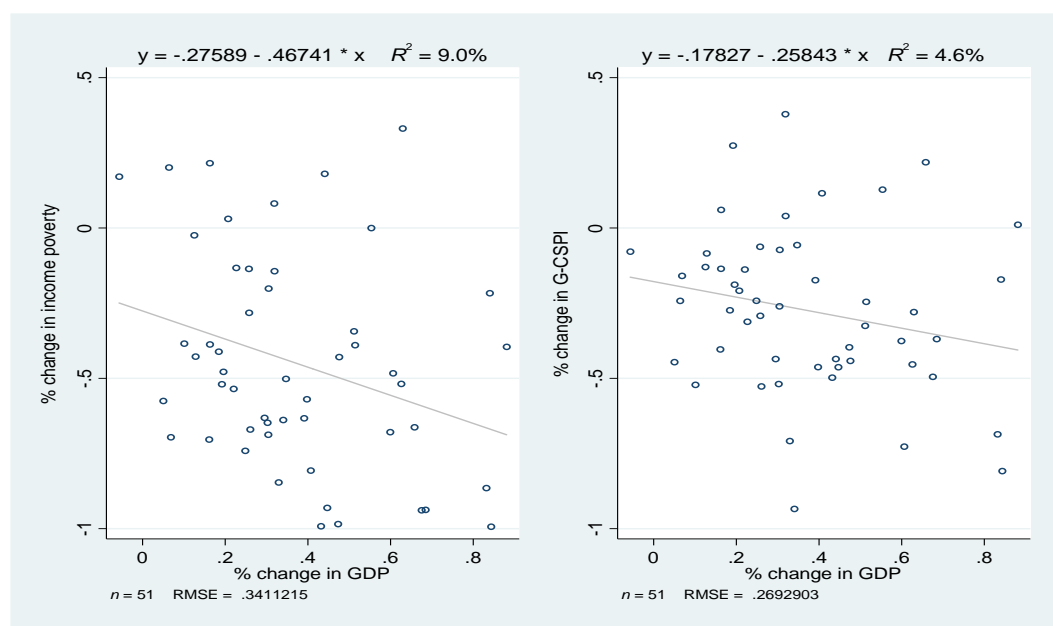
Source: Authors' elaboration based on own processed data

5 Rural-urban inequalities in poverty levels: is there still an urban bias?

In almost all developing countries, rural areas have been traditionally neglected by national governments. In 1977 Michael Lipton analyzed this phenomenon through political economy lenses, and proposed the "urban bias" thesis. He claimed that the influential elites live in urban areas and, more in general, the urban population has more voice and power resource to challenge governments. In contrast, collective action in rural areas is very difficult to enhance as population density in these areas is very low and people have usually lower education, are not well-connected, and therefore have less means to influence policy-making at national level. As a consequence, the governments adopt policies in favour of the urban sector, including special subsidies and lower taxation. Another key point of Lipton's thesis is that in pursuit of

industrialization, the objective was to keep urban wages low by depressing food prices (shifting resources from rural farmers to urban workers). This resulted in national resources being allocated disproportionally more in urban areas as compared to rural ones. While this thesis has been subject to criticisms (Currie, 1979; Jones & Corbridge, 2010; Varshney, 1993), disaggregated statistics have traditionally highlighted large differences in socio-economic conditions between rural and urban areas. In a similar fashion, Sen (1982) argued that famines usually do not hit urban areas. Against this background, it is important to understand whether there are still large differences in poverty levels between rural and urban areas and how such differences have evolved in the last decades. This is the purpose of this Section.

5.1 World trends in urban and rural multidimensional poverty

In line with the procedure followed in Section 4.1, we analyzed the trends in urban and rural poverty for all those countries for which we had country-level data for the initial period (around 2000) and at least one of the two following periods. The number of countries is only slightly lower compared to the previous section because in few cases the rural or urban sample had too many missing values.[27]

Figure 8 depicts the long-run (from 2000 to 2012) trends in the population-weighted mean G-CSPI for urban and rural areas for 45 countries.[28] The graph clearly shows that rural poverty is much higher (more than four times larger) than urban poverty around 2000, highlighting the existence of the urban bias. This result points to a rural-urban gap which is even larger compared to that estimated by Castañeda et al. (2018) for income poverty around the same period. In fact, they find that the incidence of extreme income poverty is about 3.3 times larger in rural areas compared to urban ones. In our analysis, in absolute terms rural poverty has fallen more than urban poverty: however, in relative terms, in both rural and urban areas the mean weighted poverty has declined slightly more in rural areas (14%) compared to urban areas (12%). The

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[27] In the whole Section 5 we do not compare rural and urban trends in the G-CSPI with the rural and urban trends in income poverty because, as explained in the Introduction, the World Bank does not calculate these figures based on the international poverty line. Income poverty data for rural and urban areas, computed based on the national poverty lines, are available only for a small number of countries and years and cannot be easily compared as the methods used to identify the poverty lines vary significantly from country to country.

[28] Weights are assigned to each country for each period based on the country share of (15-64 years old) population living in the specific region (urban or rural) in that year.

direct consequence is that the urban bias remains substantially unchanged. A more intuitive way to assess the changes in the urban bias, - or in other words to check whether there is convergence in poverty levels between rural and urban areas - is to focus directly on the changes in the rural/urban G-CSPI ratios. Indeed, a rural/urban G-CSPI ratio higher (lower) than 1 means that rural poverty is higher (lower) than urban poverty in a given point in time: an increase (decrease) in this ratio from a period to another indicates that poverty has become increasingly a rural (urban) problem.[29] As reported in Table 3, this ratio decreased by a negligible amount (0.097 or 2.22%). These results are in line with the study of IFAD (2016), which finds no evidence of rural-urban convergence in monetary poverty.

Figure 8: Trends in rural and urban G-CSPI poverty: population-weighted means for 2000 and 2012 (n=45)
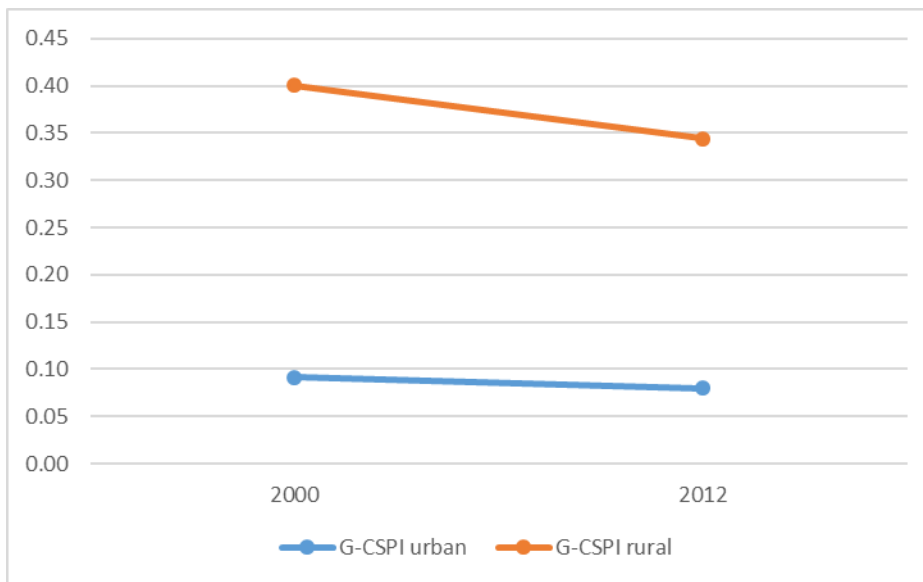
Source: Authors' elaboration based on own processed data

Table 3: trends in the urban bias between 2000 and 2012 (n=45)

	2000	2012
Rural/urban G-CSPI ratio	4.390	4.293

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[29] An exclusive focus on the changes in the urban-rural G-CSPI ratio does not reveal the direction of the changes in urban and rural poverty. For example, a reduction in the ratio can be due to a higher relative reduction in poverty in rural areas as compared to urban areas or to lower relative increase in poverty in rural areas as compared to urban areas.

Absolute changes in rural/urban G-CSPI ratio	-0.097
Percentage changes in rural/urban G-CSPI ratio	-2.22%

In order to understand these trends even better, we relied on a subset of 32 countries with information for both intervals (2000-2006 and 2006-2012). Figure 9 points to some initial convergence between urban and rural areas in poverty in the period 2000-2006, when rural poverty has fallen by about 6%, while urban poverty has substantially remained unchanged. In the period 2006-2012, rural poverty continued falling (-6.4%), while urban poverty declined slightly in absolute terms (-0.006), but substantially in percentage terms (-9.4%). As a consequence, the rural-urban G-CSPI ratio has declined in the first interval (from 5.50 to 5.12) and then slightly increased in the second interval (from 5.12 to 5.29).

Figure 9: Trends in rural and urban G-CSPI poverty: population-weighted means 2000, 2006 and 2012 (n=32)
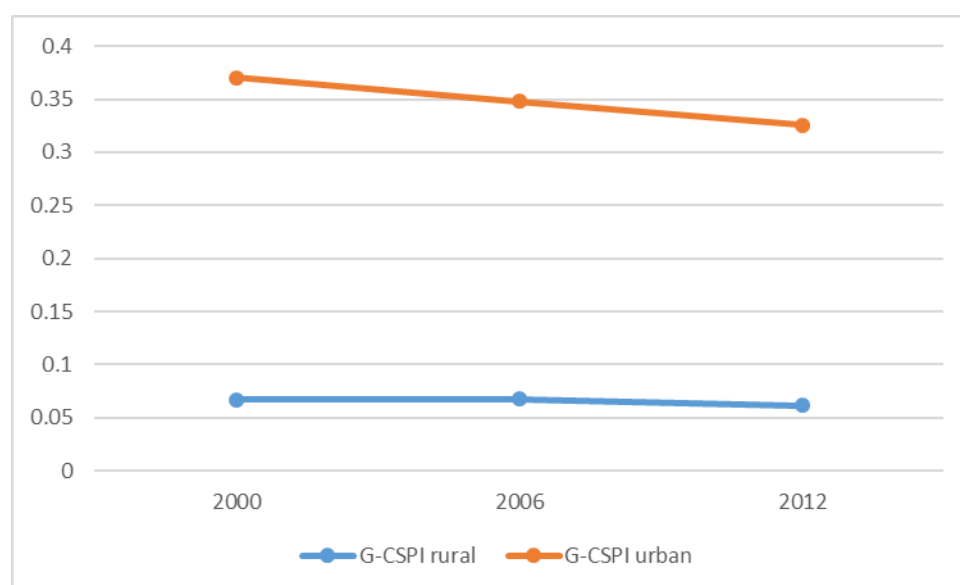
5.2 Country-level trends in urban and rural multidimensional poverty

Following the approach used in Section 4.2, in this sub-section we analyze rural and urban poverty trends in the long-term (between 2000 and 2012), when data are available, or in the

short-term (between 2000 and 2006, when 2012 data are not available). This increases our sample to 57 countries.

The graphs with the country-level trends are reported in Figure A7 in the Appendix. In order to visualize them better, the countries were split in three groups depending on their level of multidimensional poverty in rural areas. A quick look at the graphs reveals that urban and rural poverty follow a similar trend, or at least move in the same direction. Indeed, 38 countries experienced a decrease in poverty in both geographic areas, while six countries experienced an increase in both (Table 4). The latter trend occurred only in countries in Latin America (Colombia and Paraguay) and sub-Saharan Africa (Ethiopia, Ghana, Sao Tome' and Principe, and Zimbabwe[30]). Countries in the region of Eastern Europe and Central Asia followed a different pattern, with 5 out of 11 experiencing clearly different poverty trajectories in rural and urban areas. Rural poverty declined while urban poverty increased in Lithuania, Albania, and Kosovo; the opposite occurred in Bosnia and Herzegovina and in the Republic of Macedonia.

Finally, the static picture for the last available period confirms the point highlighted in the previous sub-section: the urban bias – simply conceived as higher poverty rates in rural areas compared to urban areas – still exists. Everywhere rural poverty exceeds urban poverty.

Table 4: Number of countries by direction of changes in rural and urban poverty (based on G-CSPI)

	Decline in **rural** poverty (CSPI Headcount ratio)	Increase in **rural** poverty (CSPI Headcount ratio)
Decline in **urban** poverty (CSPI H)	38	3
Increase in **urban** poverty (CSPI H)	10	6

Source: Authors' elaboration based on own processed data

5.3 Mapping the changes in rural/urban G-CSPI ratios

In order to investigate the country-specific patterns since the establishment of the MDG agenda, we use here one indicator, the ratio between rural G-CSPI and urban G-CSPI. By means of maps, we display the temporal changes in this indicator to verify whether geographical patterns can also be identified. First, we focus on the simple (absolute) difference between the rural/urban G-

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[30] For Zimbabwe, data allow to study only the trend between 2000 and 2006.

CSPI ratio between the last available period (around 2012 where available, otherwise around 2006) and the first period (around 2000).[31] In the map in Figure 10, countries where the rural areas have become even poorer compared to urban areas (the rural-urban poverty ratio has increased) are colored in blue (the darker, the higher the increase), while countries where rural areas have become less poor compared to urban areas (the ratio has declined) are colored in orange.

A first look at the map shows that the red/orange color prevails: indeed, for 34 out of the 57 countries, the rural-urban poverty ratio fell. A clear pattern is visible especially in sub-Saharan Africa, where 15 out of 21 countries reduced the rural-urban gap. Zooming into the southern part of this region permits to identify an even higher homogeneity across countries, with the only exception being South Africa.

Figure 10: Map of the absolute changes in the rural/urban G-CSPI ratio
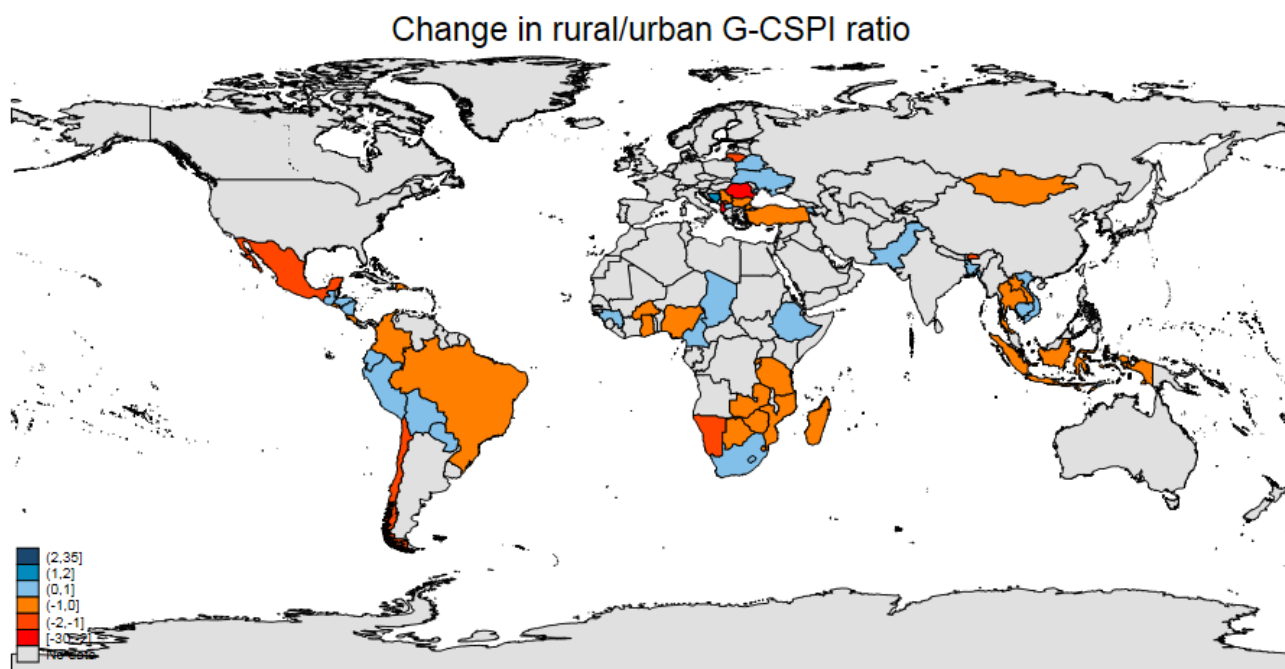
Source: Authors' elaboration based on own processed data

In a second stage we focus on the changes in the rural/urban G-CSPI ratio *relative* to the ratio in the first period. This additional exercise is particularly useful because the initial values of the

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[31] For 12 countries we use the changes between 2000 and 2006 as no estimates for 2012 were available. The countries are: Bulgaria, Bosnia and Herzegovina, Cabo Verde, Indonesia, Lao PDR, Lithuania, Macedonia, Mozambique, Timor-Leste, Vietnam, South Africa, Zimbabwe.

rural/urban G-CSPI ratio may influence the trends in this indicator. In particular, countries with low overall multidimensional poverty in 2000 are more likely to register higher rural/urban poverty ratios and, in turn, larger changes in the ratio across time. The new map (Figure A8 in the Appendix) largely mirrors the situation depicted in the previous map. Among the few differences, we notice an even more remarkable reduction in the urban bias in a few countries in SSA, namely Tanzania, Malawi, Zambia and Botswana. On the other side, a focus on the relative changes in Lithuania and Romania leads to a reduced emphasis on these countries' results in reducing the rural-urban poverty ratios.

6 Conclusions

Poverty alleviation has been historically one of the main policy goals of development cooperation. However, the e 2030 Agenda introduced two big changes: poverty is no longer defined only as lack of a sufficient amount of income, but rather as deprivation in several dimensions of life. Second, the Agenda looks beyond national averages and identifies poverty reduction targets for specific population groups, such as men and women. Against this background, the general aim of this paper was to analyze the trends in multidimensional poverty and the inequalities between groups – also defined as *horizontal inequalities*, as the urban-rural comparison - in poverty levels in low- and middle-income countries.

This paper relies on a new indicator of multidimensional poverty, called Global Correlation Sensitive Poverty Index (G-CSPI), calculated for more than 500 household surveys (Burchi, Rippin, et al., 2018). This indicator has various advantages compared to other existing indicators, including the well-known MPI. First, it is rooted in a clear conceptual framework, Amartya Sen's capability approach. Second, it encompasses three dimensions – education, decent employment and health – that are deemed as the most relevant ones when looking at the constitutions of several countries in the world. Third, it is a class of indices, which can be decomposed into three components: poverty incidence, poverty intensity and poverty inequality. While, for example, the MPI incorporates the first two components, it does not incorporate the latter. Fourth, the G-CSPI is an individual measure of poverty, while the MPI is constructed at household level. Therefore, we can directly explore within-household differences, e.g. by gender, without having to make risky assumptions about intra-household allocation of resources as the other indicators. More in detail, this paper had three main objectives. The first one was to assess

the trends in multidimensional poverty during the period of the MDGs. While World Bank studies show a massive reduction in income poverty, little was known with regard to deprivations in other dimensions. The second, and related aim of the paper, was to compare trends in multidimensional and income poverty. The third objective was to analyze the rural-urban differences in the values and trends in multidimensional poverty and examine whether the problem of urban bias is still as acute as claimed by Michael Lipton in 1970s.

Regarding the first two objectives, the paper shows for a sample of 48 countries that multidimensional poverty has fallen by about 17% throughout the time-frame examined. A comparison between the trends in (extreme) income poverty and multidimensional poverty– based on a sample of 42 countries for which information was available for both indicators – reveals the former has declined significantly more than the latter (32% vs. 15%). Moreover, the prevalence of multidimensional poverty (as measured by the headcount ratio of the G-CSPI)) is substantially higher than the prevalence of extreme income poverty (as measured by the headcount ratio for 1.90 USD a day). These findings highlight that – once we take other, non-monetary dimensions into account - the progress in poverty eradication has not been as remarkable as believed, and calls for stronger efforts in tackling the different forms of poverty. The findings on the aggregate trends, however, should be taken with caution, as many countries are not included in our sample, in particular China and India.

A focus on a sub-set of countries for which we had information for the three periods (2000, 2006 and 2012) suggests that the downward trend in multidimensional poverty – as measured by both the overall G-CSPI and the G-CSPI headcount ratio – was almost linear from 2000 to 2012. Results, however, differ especially between regions and income groups. While lower middle-income countries are reducing poverty fast, thereby closing the gap with the group of upper middle-income countries, poverty reduction in low-income countries has been slower, and these countries are falling further behind. In line with this, the value of multidimensional poverty in Asia converged towards that found in Latin America and Eastern Europe, while sub-Saharan Africa's slow progress has led to a widening of the gap with the other regions. This confirms findings from monetary poverty studies and points to the existence of poverty traps.

Some additional analyses reveal further important policy information. While deprivations in all the three dimensions of poverty have declined, those in the employment dimensions have

registered the smallest improvements. Moreover, the latter is the dimension that contributes the most to overall poverty: as a consequence, major attention should be given by policy makers to the functioning of the labor markets. A preliminary analysis indicates that economic growth correlates with poverty reduction, but this elasticity is much lower for our G-CSPI as compared to income poverty. This finding is in line with that of Santos et al. (2019), which used the MPI as a measure of multidimensional poverty (Santos et al., 2019). The direct policy implication is that, in order to address pockets of multidimensional poverty, a focus on the quantity aspect of growth is not sufficient. More attention has to be given to the quality of the growth process and, even more, to the potential of social protection schemes and, more broadly, social policies to alleviate the multiple deprivations the poor suffer from.

Regarding the third objective – to investigate rural-urban differences in poverty – our analysis confirms that poverty is everywhere predominantly a rural phenomenon. The rural G-CSPI is more than four times higher than the urban G-CSPI, indicating a rural gap even higher than that found for income poverty (Castañeda et al., 2018). In most of the countries rural poverty has declined faster (in percentage points) than urban poverty, but that was not the case for more populous countries. As a consequence, the urban bias (measured by the urban-rural G-CSPI ratio) *on average* did not change between 2000 and 2012. Differences, however, are present across regions. In particular, countries in sub-Saharan Africa – and in particular those located in the southern part of the region – have reduced poverty in rural areas substantially more than in urban areas. The same occurs in large countries like Brazil and Mexico and the Southeastern part of Europe.

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Appendix

Figure A1: G-CSPI changes by country, Europe and central Asia
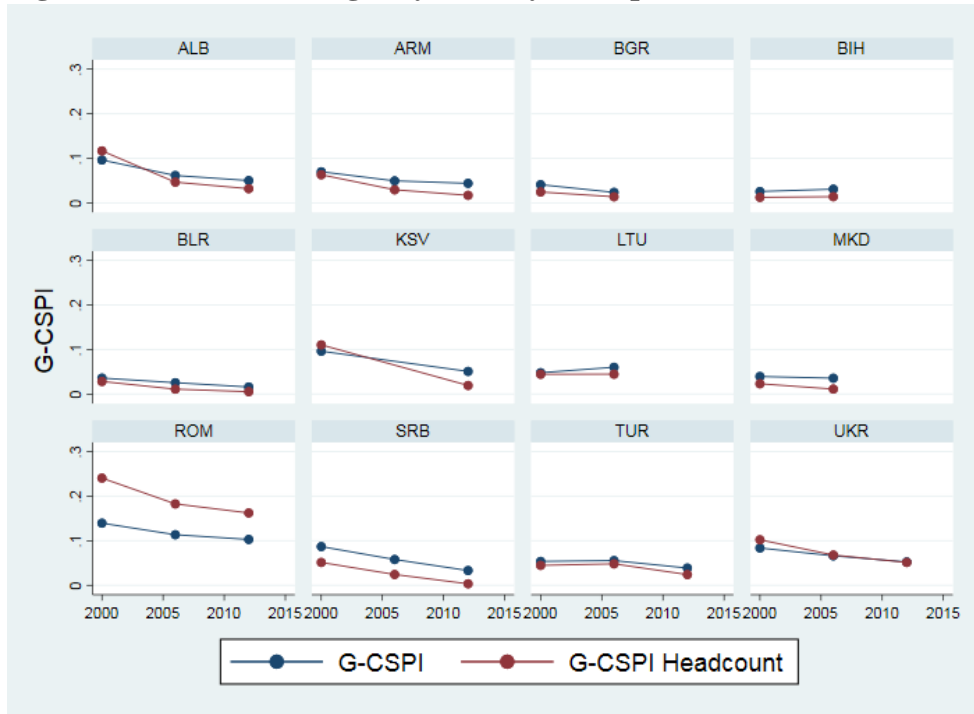
Source: Authors' elaboration based on own processed data

Figure A2: G-CSPI changes by country, Other Asia
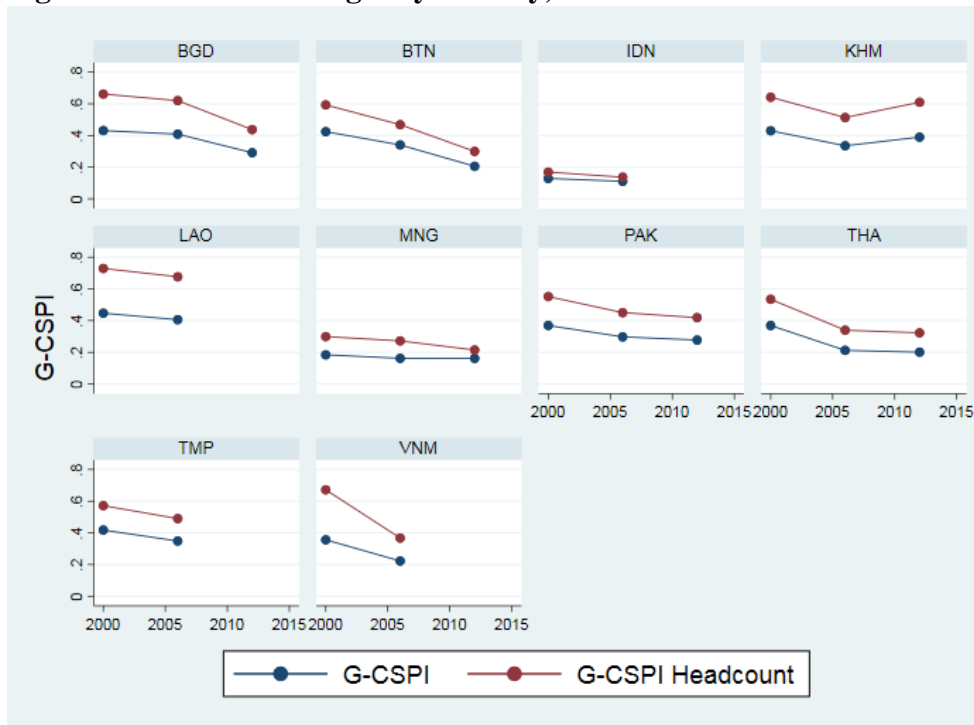
Source: Authors' elaboration based on own processed data

Figure A3: G-CSPI changes by country, sub-Saharan Africa

Source: Authors' elaboration based on own processed data

Figure A4: G-CSPI changes by country, Latin America and the Caribbean
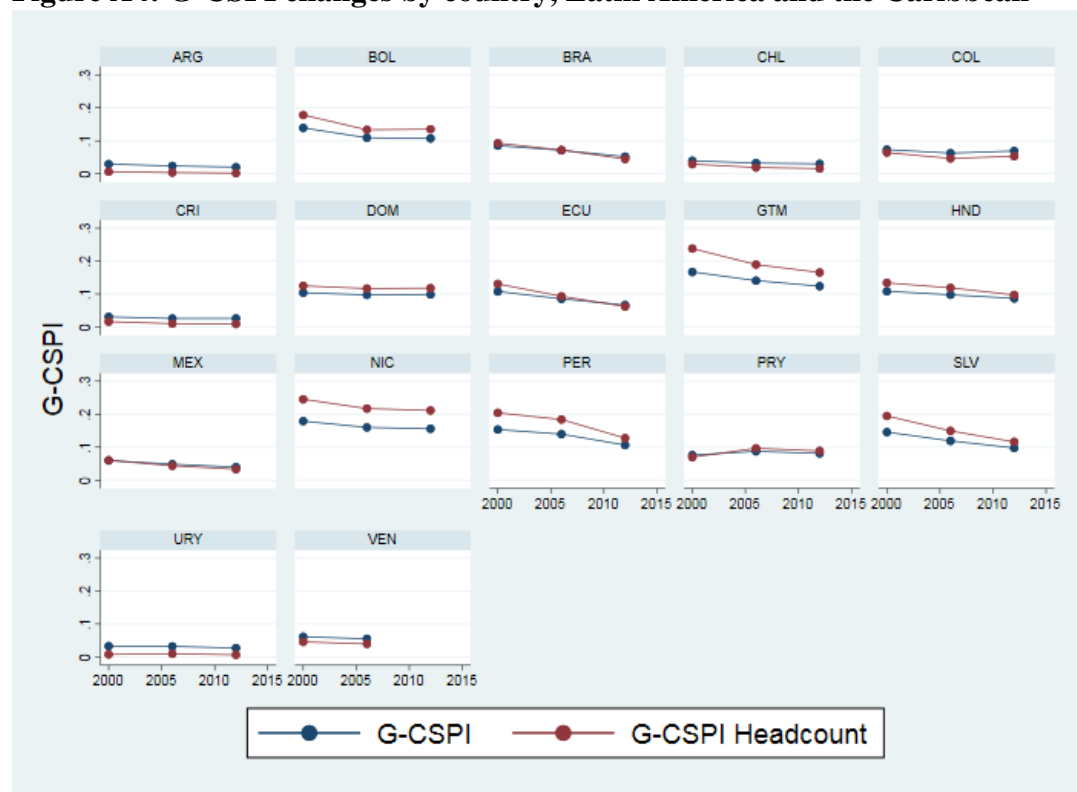
Source: Authors' elaboration based on own processed data

Figure A5: Changes in the G-CSPI dimensions, 2000-2006-2012 weighted (n = 37)
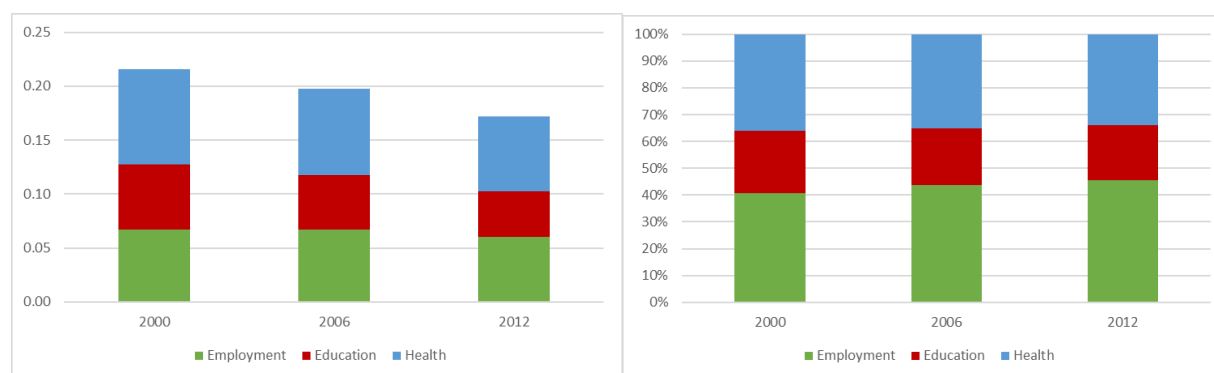
Source: Authors' elaboration based on own processed data

Figure A6: Changes in monetary and multidimensional poverty 2000-2006-2012, weighted (n = 32)
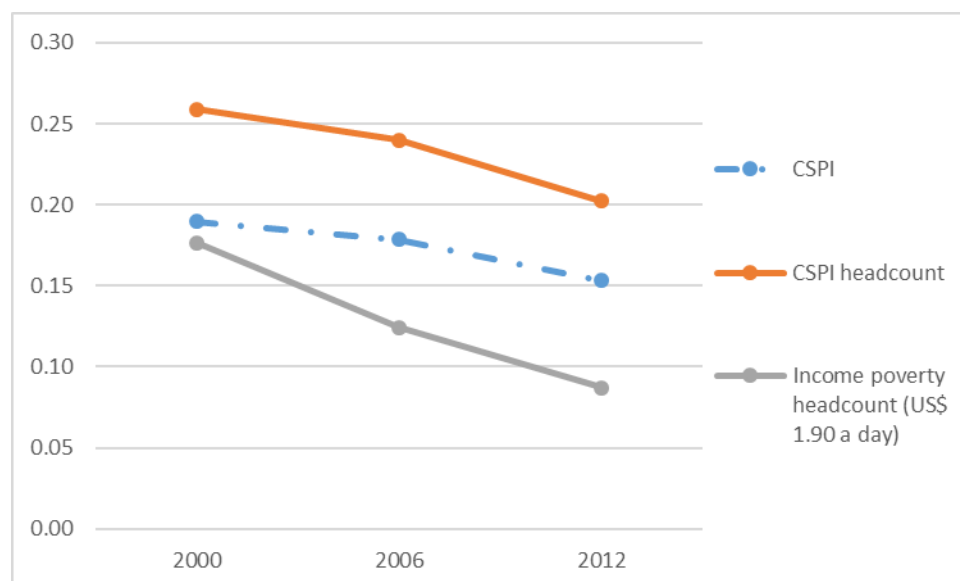
Source: Authors' elaboration based on own processed data

Figure A7: Trends in urban and rural G-CSPI by country (n = 57)
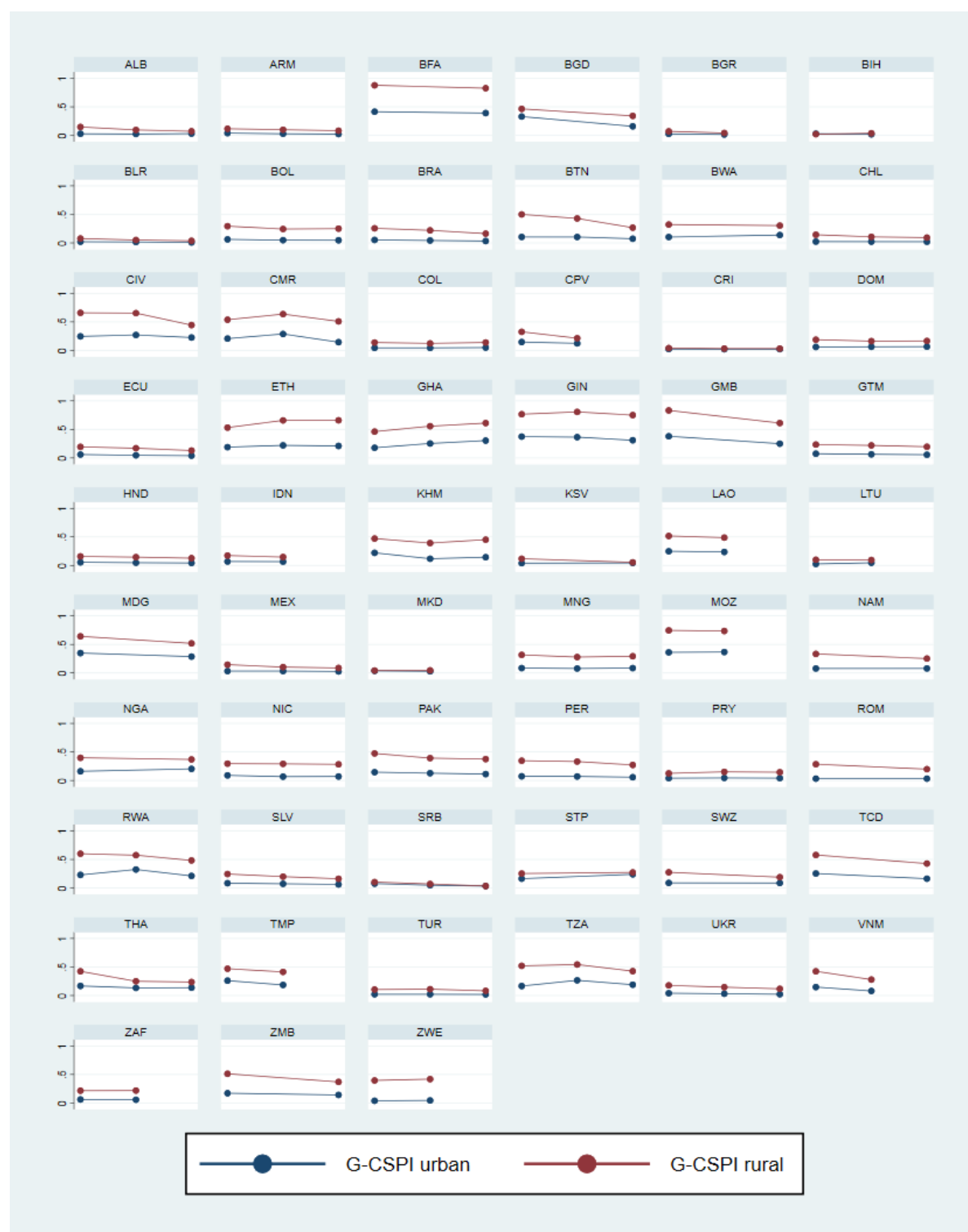
Source: Authors' elaboration based on own processed data

Figure A8: Map of the proportional changes in the rural/urban G-CSPI ratio

Proportional change in rural/urban G-CSPI ratio

Source: Authors' elaboration based on own processed data

Table A1: Survey-years used in this study for the calculation of the overall G-CSPI and income poverty, by country and period (n = 60)

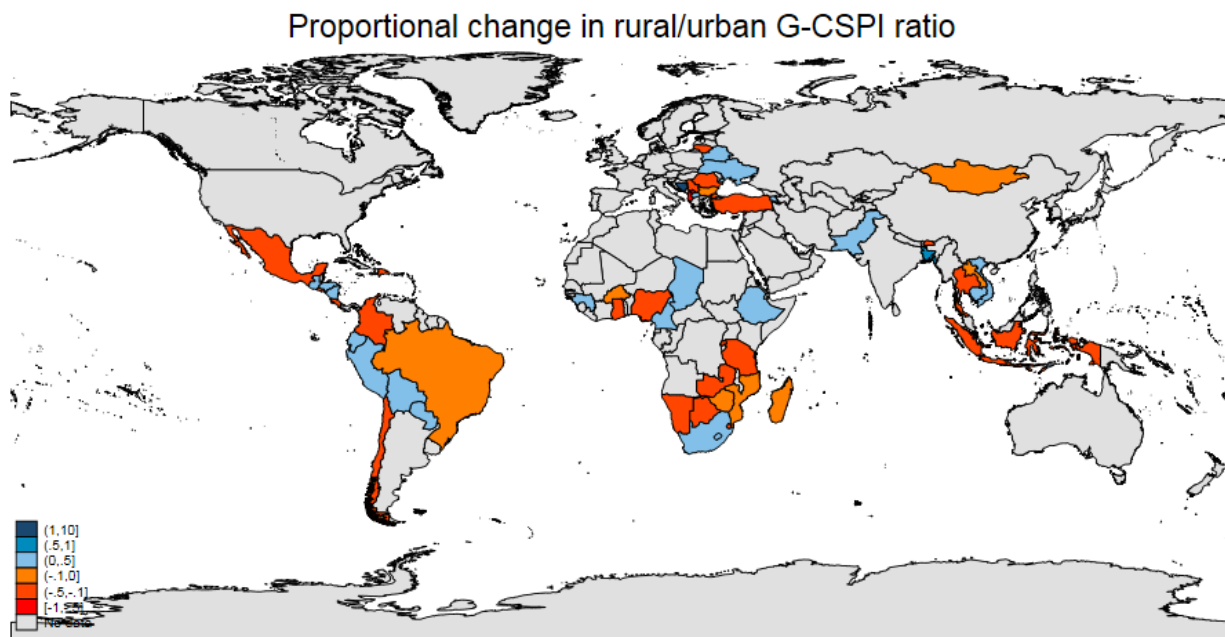|	G-CSPI									1.90USD income poverty		
	Period 1 (1998-2003)			Period 2 (2004-2008)			Period 3 (2009-2015)			Period 1 (1998-2003)	Period 2 (2004-2008)	Period 3 (2009-2015)
	Survey years	G-CSPI value	G-CSPI headcount	Survey years	G-CSPI	G-CSPI headcount	Survey years	G-CSPI	G-CSPI headcount	Survey years	Survey years	Survey years
Albania	2002	0.096	0.117	2005, 2008	0.061	0.047	2012	0.050	0.032	2002	2005, 2008	2012
Argentina	1998, 1999, 2000, 2001, 2002, 2003	0.029	0.007	2004, 2005, 2006, 2007, 2008	0.024	0.004	2009, 2010, 2011, 2012, 2013, 2014	0.020	0.002	1998, 1999, 2000, 2001, 2002, 2003	2004, 2005, 2006, 2007, 2008	2009, 2010, 2011, 2012, 2013, 2014
Armenia	1998, 2001, 2002, 2003	0.070	0.063	2004, 2008	0.049	0.029	2009, 2011	0.044	0.017	2001, 2002, 2003	2004, 2008	2009, 2011
Bangladesh	2003	0.431	0.662	2005	0.409	0.620	2010, 2013, 2015	0.292	0.438		2005	2010
Belarus	2001, 2002, 2003	0.036	0.028	2004, 2005, 2006, 2007, 2008	0.026	0.011	2009, 2010	0.016	0.005	2001, 2002, 2003	2004, 2005, 2006, 2007, 2008	2009, 2010
Bhutan	2003	0.424	0.593	2007	0.341	0.469	2012	0.206	0.300	2003	2007	2012
Bolivia	1999, 2000, 2001, 2002, 2003	0.139	0.178	2005, 2006, 2007, 2008	0.109	0.133	2009, 2011, 2012, 2014,	0.107	0.135	1999, 2000, 2001, 2002	2005, 2006, 2007, 2008	2009, 2011, 2012, 2014
Bosnia and Herzegovina	2001	0.026	0.012	2007	0.031	0.014		-	-	2001	2007	
Botswana	2002	0.187	0.273		-	-	2009	0.201	0.290	2002		2009
Brazil	1998, 1999, 2001, 2002, 2003	0.085	0.093	2004, 2005, 2006, 2007, 2008	0.071	0.072	2009, 2011, 2012, 2014	0.052	0.045	1998, 1999, 2001, 2002, 2003	2004, 2005, 2006, 2007, 2008	2009, 2011, 2012, 2014
Bulgaria	2001, 2003	0.041	0.025	2007	0.024	0.014		-	-	2001, 2003	2007	
Burkina Faso	2003	0.777	0.875		-	-	2009, 2014	0.700	0.821	2003		2009, 2014
Cabo Verde	2000	0.224	0.327	2007	0.160	0.220		-	-		2007	
Cambodia	2003	0.430	0.642	2006, 2008	0.335	0.514	2009	0.390	0.610			
Cameroon	2001	0.408	0.569	2007	0.456	0.664	2014	0.313	0.450	2001	2007	2014
Chad	2003	0.539	0.771		-	-	2011	0.376	0.582	2003		2011
Chile	1998, 2000, 2003	0.039	0.029	2006	0.032	0.019	2009, 2011, 2013	0.030	0.016	1998, 2000, 2003	2006	2009, 2011, 2013
Colombia	1999, 2001	0.073	0.064	2006, 2007, 2008	0.062	0.046	2009, 2010, 2014	0.069	0.053	1999, 2001	2008	2009, 2010, 2014

Country	Years			Years			Years			Years	Years	Years
Costa Rica	2000, 2001, 2002, 2003	0.031	0.016	2004, 2005, 2006, 2007, 2008	0.026	0.010	2009, 2010, 2012	0.026	0.009	2000, 2001, 2002, 2003	2004, 2005, 2006, 2007, 2008	2009, 2010, 2012
Côte d'Ivoire	2002	0.461	0.600	2008	0.498	0.651	2015	0.342	0.518	2002	2008	2015
Dominican Republic	2000, 2001, 2002, 2003	0.104	0.125	2004, 2005, 2006, 2007, 2008	0.097	0.117	2009, 2010, 2011, 2013	0.099	0.118	2000, 2001, 2002, 2003	2004, 2005, 2006, 2007, 2008	2009, 2010, 2011, 2013
Ecuador	1998, 2003	0.108	0.131	2005, 2006, 2007, 2008	0.085	0.093	2009, 2010, 2012, 2014	0.067	0.062	1998, 2003	2005, 2006, 2007, 2008	2009, 2010, 2012, 2014
El Salvador	1998, 1999, 2000, 2001, 2002, 2003	0.146	0.195	2004, 2005, 2006, 2007, 2008	0.119	0.150	2009, 2012, 2014	0.098	0.116	1998, 1999, 2000, 2001, 2002, 2003	2004, 2005, 2006, 2007, 2008	2009, 2012, 2014
Ethiopia	2000	0.478	0.743	2004	0.583	0.790	2011	0.565	0.751		2004	
Gambia, The	1998	0.636	0.734		-	-	2015	0.378	0.506	1998		2015
Ghana	1998	0.360	0.489	2005	0.431	0.581	2012	0.447	0.596	1998	2005	2012
Guatemala	2000	0.167	0.238	2004, 2006	0.141	0.189	2011	0.124	0.165	2000	2006	
Guinea	2002	0.633	0.776	2007	0.650	0.774	2012	0.586	0.711	2002	2007	2012
Honduras	1998, 1999, 2002, 2003	0.108	0.134	2004, 2005, 2006, 2007, 2008	0.098	0.119	2009, 2010, 2011	0.087	0.097	1998, 1999, 2002, 2003	2004, 2005, 2006, 2007, 2008	2009, 2010, 2011
Indonesia	1999, 2000	0.129	0.169	2005	0.111	0.137		-	-	1999, 2000	2005	
Kosovo	2002	0.096	0.110		-	-	2010, 2011	0.051	0.019			2010, 2011
Lao PDR	2002	0.447	0.729	2007	0.406	0.677		-	-	2002	2007	
Lithuania	1998, 2000, 2001, 2003	0.048	0.044	2004, 2008	0.060	0.045		-	-	1998, 2000, 2001, 2003	2004, 2008	
Macedonia, FYR	1999, 2000, 2002, 2003	0.039	0.023	2004, 2005, 2006	0.036	0.011		-	-	2000, 2002, 2003	2004, 2005, 2006	
Madagascar	1999, 2001	0.572	0.776		-	-	2012	0.474	0.715	1999, 2001		2012
Mexico	1998, 2000, 2002,	0.060	0.060	2004, 2005, 2006, 2008	0.049	0.044	2010, 2012	0.040	0.033	1998, 2000, 2002	2004, 2005, 2006, 2008	2010, 2012
Mongolia	2002	0.184	0.299	2007	0.162	0.272	2009, 2010, 2011	0.162	0.215	2002	2007	2010, 2011
Mozambique	2002	0.613	0.754	2008	0.612	0.784		-	-	2002	2008	
Namibia	2003	0.227	0.352		-	-	2009	0.177	0.250	2003		2009
Nicaragua	1998	0.179	0.245	2005	0.160	0.217	2009	0.156	0.212	1998	2005	2009
Nigeria	2003	0.289	0.409		-	-	2009	0.303	0.462	2003		2009
Pakistan	2001	0.369	0.552	2004, 2005, 2006, 2008	0.297	0.450	2010, 2011, 2013	0.277	0.419	2001	2004, 2005	2010, 2011, 2013
Paraguay	1999, 2001,	0.076	0.070	2004, 2005,	0.088	0.097	2009, 2010,	0.081	0.089	1999, 2001,	2004, 2005,	2009, 2010,

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	2002, 2003			2006, 2007, 2008			2011, 2012			2002, 2003	2006, 2007, 2008	2011, 2012
Peru	1998, 1999, 2000, 2001, 2002, 2003	0.154	0.204	2004, 2005, 2006, 2007, 2008	0.140	0.184	2009, 2010, 2011, 2012, 2013, 2014	0.107	0.128	1998, 1999, 2000, 2001, 2002, 2003	2004, 2005, 2006, 2007, 2008	2009, 2010, 2011, 2012, 2013, 2014
Romania	2001, 2002, 2003	0.139	0.240	2004, 2007, 2008	0.113	0.183	2009, 2010, 2011,2013	0.103	0.162	2001, 2002, 2003	2004, 2007, 2008	2009, 2010, 2011, 2013
Rwanda	2000	0.558	0.772	2005	0.531	0.739	2010, 2013	0.434	0.640	2000	2005	2010, 2013
São Tomé and Principe	2000	0.202	0.287		-	-	2010	0.256	0.395	2000		2010
Serbia	2003	0.087	0.051	2004, 2005, 2007, 2008	0.058	0.024	2009, 2010	0.033	0.003	2003	2004, 2005, 2007, 2008	2009, 2010
South Africa	2002	0.125	0.171	2004, 2005, 2006, 2007, 2008	0.084	0.093	2009, 2010	0.107	0.134		2005, 2008	2010
Swaziland	2000	0.220	0.314		-	-	2009	0.160	0.216	2000		2009
Tanzania	2000	0.443	0.683	2006, 2007	0.466	0.744	2009, 2011, 2014	0.351	0.545	2000	2007	2011
Thailand	2000	0.369	0.535	2006	0.212	0.340	2011	0.201	0.323	2000	2006	2011
Timor-Leste	2001	0.418	0.572	2007	0.349	0.490		-	-	2001	2007	
Turkey	2003	0.054	0.045	2004, 2005	0.055	0.048	2012	0.039	0.024	2003	2004, 2005	2012
Ukraine	2002	0.084	0.102	2004, 2005, 2006, 2007, 2008	0.066	0.068	2009, 2010, 2011, 2012, 2013	0.052	0.051	2002	2004, 2005, 2006, 2007, 2008	2009, 2010, 2011, 2012, 2013
Uruguay	1998, 2000, 2001, 2002, 2003	0.033	0.008	2004, 2005, 2006, 2007, 2008	0.032	0.010	2009, 2010, 2011, 2012, 2014	0.027	0.007		2005, 2006, 2007, 2008	2009, 2010, 2011, 2012, 2014
Venezuela, RB	1998, 1999, 2000, 2001, 2002, 2003	0.061	0.046	2005, 2006	0.055	0.040		-	-	1998, 1999, 2001, 2002, 2003	2005, 2006	
Vietnam	1998	0.356	0.672	2006, 2008	0.223	0.367		-	-	1998	2006, 2008	
Zambia	1998, 2002	0.382	0.583		-	-	2010, 2015	0.272	0.420	1998, 2002		2010, 2015
Zimbabwe	2001	0.267	0.431	2007	0.275	0.473		-	-			

Source: Authors' elaboration based on own processed data

Table A2: G-CSPI changes between 2000 and 2012, weighted

	2000	2012	Total % change	Countries
G-CSPI	0.23	0.19	-16.73%	48
G-CSPI headcount	0.33	0.27	-17.39%	48

Source: Authors' elaboration based on own processed data

Table A3: G-CSPI changes between 2000 and 2012, unweighted

	2000	2012	Total % change	Countries
G-CSPI	0.25	0.20	-19.77%	48
G-CSPI headcount	0.33	0.27	-19.40%	48

Source: Authors' elaboration based on own processed data

Table A4: G-CSPI changes between 2000 and 2012, weighted (n = 37)

	2000	2006	2012	Total % change	Countries
G-CSPI	0.22	0.20	0.17	-20.25%	37
G-CSPI headcount	0.30	0.27	0.23	-22.61%	37

Source: Authors' elaboration based on own processed data

Table A5: G-CSPI changes between 2000 and 2012, unweighted

	2000	2006	2012	Total % change	Countries
G-CSPI	0.21	0.20	0.17	-20.24%	37
G-CSPI headcount	0.28	0.26	0.22	-21.82%	37

Source: Authors' elaboration based on own processed data

Table A6: G-CSPI changes between 2000 and 2012, by region (n= 48)

Region	2000	2012	Total % change	Countries
East Asia & Pacific	0.37	0.23	-38.20%	3
Europe & Central Asia	0.08	0.05	-34.74%	8
Latin America & Caribbean	0.08	0.06	-29.79%	16
South Asia	0.40	0.28	-29.06%	3
Sub-Saharan Africa	0.37	0.36	-3.42%	18

Source: Authors' elaboration based on own processed data

Table A7 G-CSPI changes between 2000 and 2012, by income group (n = 48)

Income classification	2000	2012	Change	Countries
Low income	0.37	0.33	-12.48%	22
Lower middle income	0.18	0.12	-35.95%	16
Upper middle income	0.07	0.05	-31.73%	10

Source: Authors' elaboration based on own processed data

Table A8 G-CSPI changes between 2000 and 2012, by poverty dimensions (n = 48)

	2000	2012	change, %		2000	2012	change, %
	Deprivation				**% contribution**		
Employment	0.07	0.07	-8.79%	**Employment**	39%	44%	10.81%
Education	0.06	0.05	-23.95%	**Education**	24%	21%	-9.41%
Health	0.10	0.08	-17.88%	**Health**	37%	35%	-5.48%

Source: Authors' elaboration based on own processed data

Table A9: G-CSPI changes between 2000 and 2012, weighted

| | **2000** | **2006** | **2012** | **Total   %
change** | **countries** |
|---|---|---|---|---|---|
| **G-CSPI** | 0.19 | 0.18 | 0.15 | -19.09% | 32 |
| **G-CSPI headcount** | 0.26 | 0.24 | 0.20 | -21.87% | 32 |
| **Income poverty headcount** | 0.18 | 0.12 | 0.09 | -50.59% | 32 |

Source: Authors' elaboration based on own processed data

Table A10: G-CSPI changes between 2000 and 2012, unweighted

| | **2000** | **2006** | **2012** | **Total   %
change** | **countries** |
|---|---|---|---|---|---|
| **G-CSPI** | 0.21 | 0.19 | 0.16 | -21.66% | 32 |
| **G-CSPI headcount** | 0.28 | 0.26 | 0.21 | -24.03% | 32 |
| **Income poverty headcount** | 0.20 | 0.15 | 0.10 | -49.32% | 32 |

Source: Authors' elaboration based on own processed data