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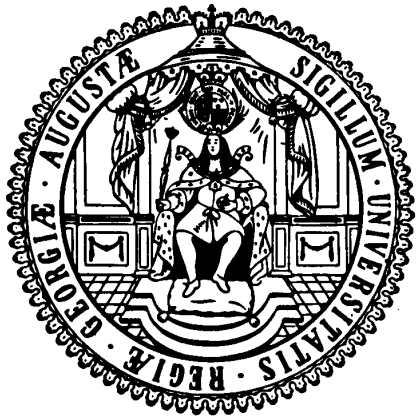

Discussion Papers

No. 288

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December 2021

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Does economic growth reduce multidimensional poverty? Evidence from low- and middle-income countries

Pooja Balasubramanian, Francesco Burchi and Daniele Malerba [1]

Abstract

The long-standing tradition of empirical studies investigating the nexus between economic growth and poverty has concentrated on monetary poverty. This paper engages in the little-explored debate on the relationship between growth and multidimensional poverty, by employing two novel, individual-based multidimensional poverty indices: the G-CSPI and G-M0. It relies on an unbalanced panel dataset of 95 low- and middle-income countries between 1990 and 2018: this is thus far the largest sample and time-span used for this purpose.

Using a first-difference econometric strategy, the empirical analysis indicates that a 10% increase in GDP decreases multidimensional poverty by approximately 4-5%. However, results differ depending on the sub-period considered: the elasticity is insignificant before 2000, while it is negative and largely significant afterwards. This is probably due to the changes that occurred in the international scenario at the beginning of the 21st century. Finally, a comparative analysis reveals that the elasticity of income-poverty to growth is between five to eight times higher than that of multidimensional poverty. Our results indicate that economic growth is an important instrument to alleviate multidimensional poverty, but its effect is substantially lower than that on monetary poverty.

Keywords: multidimensional poverty, economic growth, income poverty, econometric analysis, cross-country analysis.

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1. Introduction

There is a long-standing debate on whether, to what extent, and under which conditions economic growth alone can reduce poverty. This is a critical policy question, as countries should discern whether it is important to prioritize growth, and eventually which kind of growth, to alleviate poverty. Simultaneously, this question is central, as it directly addresses the connections between two different Sustainable Development Goals (SDGs) of the 2030 Agenda: Goal 1, or to "end poverty in all its forms everywhere"; and Goal 8, or to "promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all."

The rich empirical literature on this topic has not reached clear, firm conclusions. The results largely depend on various factors: a) the methodology adopted (e.g., cross-country versus a within-country time-series analysis); b) the country of focus (e.g., high-income versus middle- and low-income countries); and c) the way poverty is measured. As the latter point is of particular importance, we will briefly summarize the existing evidence based on two different ways of conceptualizing and measuring (income) poverty: relative versus absolute.

Several studies have adopted a relative measure of poverty by focusing on the bottom quantiles of the distribution to assess the elasticity of poverty to growth at a global level, or specifically, to detect the percentage change in income-poverty due to a one percent increase in economic growth. Dollar and Kraay (2002) and other scholars (e.g., Roemer and Gugerty, 1997; Gallup et al., 1999) have found an elasticity around the unity. Therefore, the bottom quintiles' income, on average, increases in proportional terms as much as the average income. In a more recent work, Dollar, Kleineberg, and Kraay (2016) replicated Dollar and Kraay's (2002) methodology with a larger pool of countries and data points, and again discovered an elasticity of one for the bottom 20% as well as the bottom 40%. Alternatively, Timmer (1997) discovered a lower elasticity of approximately 0.8.

While this approach to the analysis of the growth-poverty nexus has largely driven the policy debate, scholars have simultaneously raised some concerns. First, the actual economic conditions of the bottom quintile greatly vary across countries; in particular, this group is likely to include many people in the middle class in richer countries, and those in extreme absolute poverty in the poorest countries (Foster and Székely, 2008). Second, scholars have expressed concern about the interpretation of these results and their possible use in the policy arena: increasing the income among the poorest quintiles equi-proportionally to that of the average income means, in fact, an increase in the *absolute* gap between these quantiles and the rest of the population (Ravallion, 2001; Klasen, 2006).

Foster and Székely (2008) also relied on a relative measure of poverty, but adopted a different approach, such as Atkinson's (1970) equally distributed equivalent income functions to track low incomes.

Specifically, the authors used a general means sensitive to low income. Their findings contradict those previously highlighted, in that the elasticity is always less than one, and decreases drastically as more weight is attached to lower incomes.

Another strand in literature employs absolute measures of poverty. A majority of these studies follow the purported "poverty measure approach," which incorporates a headcount ratio (or poverty gap) based on the international line for extreme poverty; this is currently fixed at 1.90 USD a day adjusted for purchasing power parity (e.g., Ravallion and Chen, 1997; Ravallion, 2001; Bruno et al., 1996; Adams, 2004). These cross-country studies indicate that the poverty-growth elasticity using the headcount ratio is typically less than -2; a 1% GDP growth leads to a decrease of more than 2% of the proportion of the poor.

There is now a consensus that it is necessary to account for the changes in inequality over time to examine the poverty-growth elasticity (World Bank, 2000, 2005a; Bourguignon, 2003; Klasen, 2006 Adams, 2004). For the income poverty-growth elasticity in particular, the role of inequality is quite straightforward, in that economic growth can reduce income-related poverty when inequality decreases. Further, many studies have discovered that changes in absolute income inequality affect the poverty-growth elasticity (Adams, 2004; World Bank, 2000, 2005; Fosu, 2015).

This paper engages in this broad debate on the nexus between economic growth and poverty by endorsing a multidimensional view of poverty. As a result of several decades of academic and policy debate (e.g., Sen, 1985, 2000; United Nations Development Programme—UNDP, 2010), the 2030 Agenda now recognizes the fact that poverty is a multidimensional phenomenon. The SDG 1 is divided into two main targets: Target 1.1 refers to monetary poverty, while Target 1.2 calls for halving "the proportion of men, women, and children of all ages living in poverty in all its dimensions." Therefore, it is of the utmost importance to understand the role of economic growth in alleviating multidimensional poverty. Indeed, what may successfully decrease income poverty may not reduce multidimensional poverty, and vice versa. The empirical literature investigating this question is extremely scarce. Most of these studies have qualitatively described the trends in GDP and those in multidimensional poverty at the country level and discussed the relationship between the two phenomena without adopting any formal statistical inference (Djossou, Kane, and Novignoon, 2017; Tran, Alkire, and Klasen, 2015). Only a few studies have used cross-country data for at least two points in time to investigate the simple correlation between changes in GDP and changes in different composite indices of multidimensional poverty. Using a sample of 27 Sub-Saharan African countries, Alkire et al. (2017) found no significant relationship between economic growth and changes in multidimensional poverty. In a sample of 51 low- and middle-income countries, Burchi et al. (2019) discovered a weak, negative correlation between economic growth and changes in multidimensional poverty.

To the best of our knowledge, only Santos, Dabus, and Delbianco (2019) have attempted to assess the relationship between economic growth and multidimensional poverty. These authors relied on an unbalanced panel of 78 countries for the period spanning 1999 to 2014 and primarily used a first-difference estimator (FDE) to observe that growth negatively affects the global multidimensional poverty index (MPI) (Alkire and Santos, 2014), but this elasticity is less than one. These authors also noted that this impact is lower than that detected for income poverty.

Our paper contributes to this less-explored question by examining the effect of growth on two novel indices of multidimensional poverty: the global correlation sensitive poverty index (G-CSPI) and the global M0 (G-M0) (Burchi et al., 2021; Burchi et al., 2022). These two indices have one common important feature: they are calculated at the individual level and not at the household level, although they cover only the population aged 15 to 65. Subsequently, they complement each other, as the G-CSPI is distribution-sensitive—as it accounts for the inequality among the poor—but cannot be decomposed to assess the relative contribution of each dimension, while the opposite occurs with the G-M0. In this manner, we can check the robustness of our results and in the case of similar results, draw more reliable conclusions.

We use an estimation strategy similar to that employed by Santos, Dabus, and Delbianco (2019) on a wider range of countries (95) over a longer period of time, between 1990 and 2018. We can also rely on far more data points, especially for countries in Latin America. This paper has the following objectives: 1) to estimate the poverty-growth elasticity and examine whether this elasticity also depends on changes in inequality; 2) to examine whether this elasticity varies across time, and 3) to compare the elasticity for income and multidimensional poverty.

In summary, our analysis reveals that, as expected, economic growth has a statistically significant, negative effect on multidimensional poverty, but with an elasticity much lower than 1. We discover that a 10% increase in GDP decreases multidimensional poverty by 4.9% or 3.7%, depending on whether we use the G-CSPI or G-M0 as the dependent variable. However, the results vary depending on whether we focus on the pre- or post-2000 period: in the first case, the elasticity is statistically insignificant, while in the second case it is significant, negative, and strong. We attribute this to the change in the policy arena, with the introduction of Millennium Development Goals (MDGs) and an increased emphasis on poverty alleviation, social goals, and inclusive growth. Finally, growth has a substantially higher capacity to decrease income-based than multidimensional poverty. The elasticity of income poverty to growth is between five and eight times higher than that of multidimensional poverty, depending on the measure of multidimensional poverty employed.

The remainder of the paper is structured as follows: Section 2 describes the econometric methods, Section 3 illustrates the data and the multidimensional poverty indices, and Section 4 presents the different models' results. Finally, Section 5 concludes, and discusses potential future research areas.

2. Data

2.1 Multidimensional poverty indices

The study uses two novel indices of multidimensional poverty: the G-CSPI and the G-M0 (Burchi et al., 2021; Burchi et al., 2022). They incorporate three fundamental dimensions of poverty: education, work, and health. Individuals unable to read and/or write are considered deprived in education; the unemployed and individuals with low-quality, low-paying jobs are defined as deprived in the work dimension. Finally, individuals without access to safe potable water and/or adequate sanitation are considered as deprived in the health dimension.[2] Unlike the MPI (Alkire and Santos, 2014) and the World Bank's (2018) recent multidimensional poverty measure, which are both calculated at the household level, the G-CSPI and the G-M0 are constructed at the individual level. This is a critical feature, as it does not require any assumptions about the distribution of resources or capabilities among household members. Simultaneously, it is important to highlight that these indices cover only the population in aged 15 to 65, which corresponds to approximately 64% of the population in low- and middle-income countries (Burchi et al., 2022).

We use two distinct indices because they employ two different poverty measures, which have advantages and disadvantages when compared to each other. The G-CSPI incorporates the three components of poverty: incidence, intensity, and inequality. In particular, unlike the MPI, the G-CSPI accounts for inequality among the poor, and thus, is coherent with the overarching principle of the 2030 Agenda "leaving no one behind". The G-M0 uses the adjusted headcount ratio (or M0) as a poverty measure like the MPI, which is not sensitive to inequality.[3] The G-M0 also has an important feature that is missing from the G-CSPI: it can be decomposed by dimension to assess the relative contribution of each dimension to multidimensional poverty. By using both indices, we can more robustly assess the poverty-growth elasticity.

The G-CSPI and the G-M0 have been computed for many countries and different points in time by using the International Income Distribution Database (I2D2). Moreover, they have already been adopted to examine trends over time in multidimensional poverty for 54 countries (Burchi et al., 2022).

In this paper, we apply the G-CSPI and the G-M0—as well as the multidimensional poverty headcount ratio—to the period between 1990 and 2018. This is because poverty estimates before 1990 are only

[2] Burchi et al. (2021) provide detailed information on the dimensions, indicators, thresholds, weights, and overall construction of the G-CSPI.

[3] We use the G-M0 with a multidimensional cut-off (k) equal to one: therefore, any individual deprived in at least one of the three dimensions is considered multidimensionally poor. As the G-CSPI also uses the same threshold, the headcount ratio for both indices is the same.

available for a few countries, while 2018 is the latest year for which these data are available. The final, full sample consists of 95 countries with multidimensional poverty data for at least two different years between 1990 and 2018. Thus, this is the study with the largest sample that tries to assess the elasticity of multidimensional poverty to growth across countries.[4]

2.2 Data structure and other variables

The dataset is organized into spells, which are defined as the period between two survey years (Cox, 2007). The dependent variable i.e., the proportional annual change in multidimensional poverty measures, is calculated as the average annual log differences for each spell. We use four different categories of spells, based on their length.

First, we consider the entire sample, which includes all possible consecutive, non-overlapping spells. Spells can vary, from a one-year gap between two observations up to 21 years. Based on an earlier paper by Adams (2004), our second specification considers short-term spells, in which the minimum gap between two poverty observations is two years. These specifications both provide a short-term analysis of changes in multidimensional poverty. The third specification also follows Adams (2004) and Dollar and Kraay (2006) to provide an intermediate change in poverty, defined as intermediate spells, in which we consider a five-year minimum gap between two poverty measures. Finally, our fourth specification is the long-term spell, in which we only consider the change in poverty measures between the last and the first available year for each country. For this specification, we will have only one observation per country.

The independent variables are also measured as the average annual difference in the logarithms. The main independent variable is the gross domestic product (GDP), measured in US dollars at constant 2010 prices; data are taken from the World Development Indicators. The second independent variable used is inequality, measured through the Gini coefficient, with data sourced from the United Nations University-World Institute for Development Economics Research (UNU-WIDER) World Income Inequality Database (WIID), which contains repeated cross-country information. This database includes also estimates of inequality for years in which no household survey was conducted, obtained through interpolation or extrapolation.[5]

As a final analysis, we intend to compare the multidimensional poverty-growth elasticity with the income poverty-growth elasticity for the same sample of countries and years. We use the squared poverty gap index

[4] As stated in the Introduction, the study by Santos et al. (2019) relied on a smaller sample of 78 countries.

[5] An open question remains regarding the type of inequality to consider as we focus on multidimensional and not income, inequality (Sen, 1992). As cross-country data are unavailable over a long period for inequality in other dimensions (e.g., education, health, or nutrition), we use income inequality in line with Santos at al. (2019).

for income poverty as it is comparable to the G-CSPI for multidimensional poverty, as both indices are distribution-sensitive (Burchi et al., 2022). The results obtained with the G-M0 are instead compared with those obtained using the poverty gap index for income-based poverty. We focus on extreme income poverty, based on the international poverty line of $1.90 per day, adjusted for the 2011 purchasing power parity. To obtain the largest possible quantity of income poverty data, we use the World Bank's POVCALNet dataset, which also includes interpolated estimates of poverty for years when no survey was conducted.

2.3 Sample

The full sample of 95 countries is distributed across five world regions: Eastern Europe and Central Asia, Latin America and the Caribbean, East Asia and the Pacific, Sub-Saharan Africa, and South Asia. Table 1 provides information on the number of countries representing each region, the number of survey years available (total number of observations), and the first and last year for which we have information within each region. There are 34 countries from Sub-Saharan Africa, while only 6 represent South Asia. Considering the number of survey years, Latin America and the Caribbean cover the largest time span (1990–2018). A substantial variation exists in the number of poverty observations across countries, with some Latin American and Caribbean countries having up to 20 observations, while many countries in Sub-Saharan Africa have only two observations. Table 11 provides the details regarding the number of years available for each country.

3. Methodology

The paper assesses the poverty-growth elasticity across 95 countries by relying on an unbalanced panel dataset. In our case, we aim to explain the change in multidimensional poverty over a certain period by the (previous) change in the GDP per capita. Thus, following the literature - also to ensure comparability with similar studies -, we employ the FDE to address the omitted-variable bias, which could be derived from the presence of time-invariant unobservable factors.[6]

To explain these issues in analytical terms, the empirical model links our composite measure of multidimensional poverty (G-CSPI and G-M0) and GDP per capita, and can be written as

$$logP_{it} = \alpha_i + \beta logGDPpc^*_{it} + \gamma_t + \varepsilon_{it} \quad (1)$$

[6] Given that we cannot exclude that the error terms of the growth estimates in different points in times are correlated, the FDE is preferable to the fixed effect estimator. In fact, under these conditions, the FDE provides more efficient estimates as it accounts for the difference in the error terms over a specific period (Song & Stemann, 1999).

where P_{it} is the chosen measure of multidimensional poverty in country *i* (*i* = 1, …, *n*) at time *t* (*t* = 1, …, *t*); α_i is the fixed effect that explains the unobserved time-invariant characteristics of each country *i*; β is the elasticity of poverty relative to the GDP per capita ($GDPpc_{it}^{*}$); γ_t controls for the change over time *t*, in which time reflects the year. Finally, ε_{it} reflects the measurement error in the poverty variable. Ideally, we expect to measure the true mean $GDPpc_{it}^{*}$, but we have an estimate that closely reflects the true GDP per capita, and can be written as

$$logGDPpc_{it} = logGDPpc_{it}^{*} + v_{it} \quad (2)$$

where v_{it} is the time-varying error term for the growth estimate. By substituting Equation (2) in (1) and taking the first difference, the fixed-effects term α_i does not remain, and we obtain an FDE that can be written as follows:

$$\Delta \log P_{it} = \gamma + \beta_1 \Delta \log GDP_{it} + \Delta\varepsilon_{it} - \alpha_2 \Delta v_{it} \quad (3)$$

where $\log GDP_{it} = \log GDP_{it}^{*} - v_{it}$, and v_{it} is the measurement error for the growth variable for each country in time *t*. Using the FDE, we can omit the unobserved time invariant variable α_0. Moreover, $\Delta\varepsilon_{it}$ is the change in the error term for each country; the rate of change in multidimensional poverty is regressed on the rate of change in the mean GDP per capita. We can directly interpret β_1 as the growth elasticity of poverty. In a further specification, we also add the percentage change in inequality as measured with the Gini coefficient.

Following Santos, Dabus, and Delbianco (2019), we assume there is a lag between changes in GDP per capita and Gini on the one hand and changes in multidimensional poverty on the other hand. While income poverty has a direct, mechanical relationship with GDP (aggregate income) and inequality, the same does not apply for multidimensional poverty. Ultimately, the effects of economic growth on multidimensional poverty may manifest over time. For this reason, multidimensional poverty estimates of a spell are associated with the percentage annual changes of GDP per capita and Gini coefficient in the five years preceding the initial year of that spell. For instance, if the initial year of a spell is 2014, we use the annual proportional change in GDP per capita and Gini for the period spanning 2009 to 2013.

In a second step, we analyze whether the results vary across time. We divide the overall time period considered in the paper into two sub-periods: 1990-2000 period and for the 2001-2018 period. We assign the spells to the two time spans based on the fraction of the length of the spell falling in the particular time-span. We then estimate Equation 3 separately for the 1990-2000 period and for the 2001-2018 period. We

have based this method on Dollar and Kraay (2016), who have used the same approach in the case of monetary poverty.

We divided the whole time period in these two specific sub-periods because we expect the beginning of the 21st century to be a turning point. During the first part of the 1990s, the IMF and World Bank's structural adjustment programs were still ongoing, and their effects were visible at least until the end of the decade. This period was generally characterized by low growth and little poverty reduction, with several countries even experiencing a worsening of poverty, (Oberdabernig, 2010; Bretton Woods Project, 2009; Klasen, 2004). From 2000 onward, the international scenario changed considerably, with the signing of the Millennium Summit and a consensus on MDGs. This placed significantly more attention on eradicating income poverty, as well as improving non-monetary dimensions of well-being, primarily health and education. The process continued with the 2030 Agenda, in which poverty alleviation and "inclusive growth" play a major role. Therefore, we expect that growth would reduce poverty more after 2000.[7]

4. Results

4.1 Descriptive Statistics

Table 2 illustrates the descriptive statistics for the main variables of interest: the annual proportional changes in multidimensional poverty, income poverty (with and without interpolated data), GDP per capita, and inequality. The table is divided into four panels. The first panel includes observations for all spells (n = 539). The second panel focuses on a smaller sample of 367 observations comprised of two-year spells.

Panel 3 has 202 observations and displays the sample of five-year spells. The number of observations for each country in this sample ranges from two to five, with a mean of three, and has a relatively small variation compared to the other categories of spells. We consider the five-year spell as a robust representation that might not be biased based on the number of data points available for each country. Finally, we use the Panel 4 sample to assess long-term trends in the cross-country poverty-growth nexus, with each of the 95 observations representing one country in our dataset. In this case, the number of data points is irrelevant, but the length of the spells for each country is important; the mean length of the long-term spell is 5 years, and it ranges from 2 to 20 years.

In line with the findings of Burchi et al. (2022), all measures of multidimensional poverty have decreased across the four spells. The average annual change in G-CSPI for the five-year spell is -0.024. In comparison, income-based poverty as measured by the squared poverty gap displays a decrease of 0.085, with a larger variance (0.248 standard deviation). The changes in lagged five-year mean GDP per capita reveal an

[7] Please note that Santos, Debus, and Delbianco's (2019) study covers only 1999 to 2014, and thus, it cannot assess whether growth's effect on multidimensional poverty differed before and after the beginning of the MDG era.

increasing trend, with an annualized mean equal to 0.26. The Gini coefficient decreased by 0.2 percentage points annually for the five-year spell.

Before discussing the results of the econometric models, we analyze the patterns of changes in GDP per capita and changes in multidimensional poverty for the sample of five-year spells through a scatter plot (Figure 1). As expected, the vast majority of the spells (135 out of 202, equivalent to 67%) are located in the upper-left panel, which indicates an increase in lagged GDP per capita associated with a decrease in G-CSPI. However, a considerable number of spells (43 out of 202, equivalent to 21%) is located in the upper-right quadrant, where an increase in GDP is associated to an increase in multidimensional poverty. Finally, only few observations fall in each of the other two panels.

Table 3 displays the direction of change in multidimensional poverty and GDP by region. We find that, in line with the full sample, for Latin America and Caribbean (LAC) and Europe and Central Asia (ECA), around two thirds of 5-year spells show a decrease in poverty and an increase in GDP. This percentage is even higher in Eastern Asia and Pacific (EAP) (83%) and South Asia (100%), while it is lower for Sub-Saharan Africa (SSA) (55%). For more than a quarter of spells, SSA witnesses a rise in both GDP and poverty, pointing to the scarce ability of economic growth alone to reduce multidimensional poverty in the region. This is particularly problematical because SSA is the region with highest levels of multidimensional poverty (Burchi et al., 2022).

4.2 Regression results from the FDE model

The regression results are divided into three distinct analyses; first, we discuss the association between the changes in multidimensional poverty and economic growth (Santos, Dabus, and Delbianco, 2019), and consider the robustness of the poverty-growth elasticity by controlling for changes in inequality. Second, we investigate whether the cross-country poverty-growth elasticity significantly varies over time. Finally, we compare multidimensional and income-based poverty-growth elasticity.

4.2.1 Multidimensional poverty-growth elasticity

Table 4 presents the first-difference estimates of the relationship between changes in the lagged log GDP per capita and the changes in the G-CSPI and G-M0. The analysis is conducted for four different specifications based on the time gap (spells) between two consecutive and non-overlapping years for which we have poverty data. Models 1 through 4 consider the G-CSPI and growth elasticity for all four spells. The analysis is replicated in Models 5 through 8 using the G-M0.

The poverty-growth elasticity is statistically significant and negative for all spell types. The elasticity for the five-year spell (Models 3 and 7) is -0.49 with the G-CSPI and lower, and -0.37 with the G-M0. In both cases, it is statistically significant at the 0.05 level. This means that a 10% increase in GDP decreases

multidimensional poverty by 4.9% (or 37%). The R-squared demonstrates that the lagged GDP per capita explains between one and five percent of the variation in both poverty measures (G-CSPI and G-M0). These results are slightly smaller in magnitude than those obtained in the only other empirical study on this topic (Santos, Dabus, and Delbianco, 2019), which noted an elasticity of -0.56 though the coefficient is significant only at the 0.10 level.

We further checked the estimates' robustness using one single component of the two indices: their headcount ratio (Table 6). In this case, the multidimensional poverty-growth elasticity is also significant and negative, while the magnitude is lower, or -0.24 for the model using the intermediate spell.

4.2.3 Poverty-growth-inequality triangle

In Table 5, we test the sensitivity of the poverty-growth elasticity to the inclusion of changes in the Gini coefficient in all the models. We focus on the five-year spell to observe that the poverty-growth elasticity is -0.48 and -0.37 for the G-CSPI and the G-M0, respectively. Thus, the elasticities remain substantially unchanged compared to those presented in Table 4, although they are now significant only at the 0.1 level.[8] The poverty-inequality elasticity is instead insignificant, and the changes in inequality do not contribute to explaining the changes in multidimensional poverty. This confirms the results of Santos et al. (2017). We can identify two possible explanations for this. On the one hand, the inequality-multidimensional poverty relationship may not be straightforward as the Gini coefficient is over-sensitive to the situation in the middle of the distribution, while our measures of multidimensional poverty capture absolute extreme poverty. On the other hand, it might be that inequality in dimensions other than monetary ones may have more significant/direct effects on multidimensional poverty: however, this would be difficult to estimate due to data limitations.

4.2.4 Heterogeneity analysis

In this section, we investigate whether and to what extent the examined elasticity varies across time by dividing the entire period into two sub-periods: 1990 to 2000 and 2001 to 2018. Figure 2 plots the poverty-growth elasticity for the two time spans using the five-year spell using the G-CSPI. We observe that the poverty-growth elasticity for spells falling in the 1990 to 2000 span does not significantly differ from zero. In contrast, we note a significant, negative poverty-growth elasticity (-0.44, $p = 0.007$) for the time span between 2001 and 2018. The analysis has also been replicated using the G-M0, generating very similar results (Figure 3).

[8] The same occurs with the multidimensional headcount ratio (Table 7).

The substantially different findings for the two sub-periods align with our expectations, driven by the major policy changes that have occurred since the early 2000s in particular. The pre-2000 relationship can be driven by the effects of the Washington Consensus and neo-liberal economic policies; literature has indicated that many countries experienced not only sluggish economic growth and unemployment, but also increases in poverty and inequality (Klasen, 2005; The Bretton Woods Project, 2009; Braunstein, 2012; Thomson, Kentikelenis and Stubbs, 2017; Seyedsayamdost, 2018). The findings concerning the post-2000 period, instead, support the hypothesis that the change in the international policy regime, particularly represented by the signature of the MDGs first and the SDGs afterwards has pushed governments to improve their performance in terms of human development goals, poverty reduction and to make growth more inclusive.

4.2.2. Income poverty-growth elasticity

Finally, we compare the poverty-growth elasticity for income and multidimensional poverty. We use the squared poverty gap index, which is comparable to the G-CSPI; similarly, we can compare the G-M0 measure to the income poverty gap. We compare the results for the income and multidimensional poverty headcount ratios for 93 countries. The slightly lower sample compared to the previous models is due to the unavailability of income poverty data - obtained from the World Bank's interpolated POVCALNET dataset – for Afghanistan and Cambodia. We also conducted a robustness analysis on a restricted sample using non-interpolated income poverty data.[9] We estimate only the models with five-year spells (our preferred models).

We discovered that the income poverty-growth elasticity is much larger in magnitude than the multidimensional poverty-growth elasticity regardless of the multidimensional poverty measurement (Table 8). The estimated elasticity of the changes in the income squared poverty gap to economic growth is -2.36, compared to -0.47 using the G-CSPI; and -2.23, compared to -0.36 using the G-M0. Therefore, the results are five to six times greater, and become even eight times larger using the headcount ratios. These results parallel those obtained by Santos, Dabus, and Delbianco (2019) using a smaller sample.

We further compare our findings with those from their study by observing the results using only non-interpolated estimates of income poverty (Table 9). The multidimensional poverty-growth elasticity in this case becomes insignificant whilst the income poverty elasticity becomes even slightly larger, around -2.5. This further supports the conclusion that growth is much more relevant for decreasing poverty in the

[9] For this specific analysis, unlike previous studies, we can compute the multidimensional and income poverty- growth elasticities for the same countries and the same years without data imputation.

monetary space rather than in other dimensions. Finally, the elasticities remain unchanged, even after controlling for changes in inequality (Table 10).

5. Conclusion

In this paper, we revisited the poverty-growth relationship using two novel multidimensional poverty indices: the G-CSPI and G-M0. We used an unbalanced panel dataset of 95 low- and middle-income countries over nearly three decades (1990–2018). This is thus far the largest sample and time span used to assess the role of economic growth in reducing multidimensional poverty.

We used the FDE as an econometric strategy in line with previous studies. The empirical analysis indicates that economic growth decreases multidimensional poverty. Specifically, we observed that the elasticity of multidimensional poverty to growth is 0.49 and 0.37 using the G-CSPI and the G-M0, respectively; for example, a 10% increase in GDP decreases multidimensional poverty by approximately 4% to 5%. These elasticities are slightly lower than those detected by Santos, Dabus, and Delbianco (2019) from a smaller sample of countries and a shorter timeframe. Contrary to some previous studies of monetary poverty (Bourguignon, 2003; Ravallion, 2005; Fosu, 2015), the multidimensional poverty-growth elasticity remains nearly the same, even after controlling for changes in inequality.

Then, we checked whether the results change depending on the specific period examined. Our estimates point to highly different results for the period before and after 2000. Economic growth had no statistically significant effect on multidimensional poverty in the last decade of the 20th century; in contrast, this effect was negative and largely significant for the period spanning 2001 to 2018. These findings support our initial expectations, in that radical changes occurred in the international agenda with the new millennium, and especially with the beginning of the MDG era and the consequent major emphasis on alleviating poverty and social goals, which compelled countries toward a more "inclusive" type of economic growth.

Finally, we compared the poverty-growth elasticity for income and multidimensional poverty. The estimates reveal that, the elasticity of income-based poverty to growth is between five to eight times higher than that of multidimensional poverty, depending on the specific measure of poverty used. These findings substantially reflect those of Santos, Dabus, and Delbianco (2019).

In conclusion, our results indicate that economic growth is an important instrument to alleviate multidimensional poverty, but its effect is substantially lower than that on monetary poverty. Therefore, countries aiming for progress in SDG 1, Target 1.2—or specifically, to "reduce at least by half the proportion of men, women, and children of all ages living in poverty in all its dimensions"—must identify other policies or interventions to reduce poverty in these other dimensions. This is particularly urgent in the present day given the already emerging and forecast impacts of the COVID-19 pandemic on both income and multidimensional poverty. For these reasons, future researchers should focus on an investigation of

other factors and policies, starting from social policies that could have a substantial impact on multidimensional poverty.

References

Adams, R. H. (2004). Economic Growth, Inequality and Poverty: Estimating the Growth Elasticity of Poverty. *World Development, 32*(12), 1989-2014. doi:https://doi.org/10.1016/j.worlddev.2004.08.006

Alkire, S., & Santos, M. E. (2014). Measuring Acute Poverty in the Developing World: Robustness and Scope of the Multidimensional Poverty Index. *World Development, 59*, 251-274. doi:10.1016/j.worlddev.2014.01.026

Alkire, S., C. Jindra, G.R. Aguilar, and A. Vaz, (2017) "Multidimensional Poverty Reduction among Countries in Sub-Saharan Africa," Forum for Social Economics, 46, 178-191.

Atkinson, A. B. (1970): "On the Measurement of Inequality." *Journal of Economic Theory* 2: 244-263.

Bourguignon, F. (2003). The Poverty-Growth-Inequality Triangle. Retrieved from https://www.econstor.eu/bitstream/10419/176147/1/icrier-wp-125.pdf.

Braunstein, E. (2012). Neoliberal development macroeconomics: A consideration of its gendered employment effects. *United Nations Research Institute for Social Development.*

Braunstein, E., Bouhia, R., & Seguino, S. (2019). Social Reproduction, Gender Equality and economic growth. *Cambridge Journal of Economics, 44*(1), 129-156. doi:10.1093/cje/bez032

Bruno, M., Ravallion, M., & Squire, L. (1996). Equity and growth in developing countries: old and new perspectives on the policy issues. *Policy Research Working Paper* 1563, World Bank.

Burchi, F., Espinoza-Delgado, J., Rippin, N., & Montenegro, C.E. (2021). An Individual-Based Index of Multidimensional Poverty for Low- and Middle-Income Countries. *Journal of Human Development and Capabilities, 22*(4), 682-705. doi:10.1080/19452829.2021.1964450

Burchi, F., Malerba, D., Montenegro, C.E., & Rippin, N. (2022). Assessing Trends in Multidimensional Poverty during the MDGs. *Review of Income and Wealth*.

Burchi, F., Malerba, D., Montenegro, C.E. & Rippin, N. (2019). *Comparing Global Trends in Multidimensional and Income Poverty and Assessing Horizontal Inequalities*. Deutsches Institut für Entwicklungspolitik Discussion Paper. Deutsches Institut für Entwicklungspolitik. Bonn.

Cox, N.J. (2007). Speaking Stata: Identifying Spells. *The Stata Journal, 7*(2), 249-265. doi:10.1177/1536867x0700700209

Dollar, D., Kleineberg, T., & Kraay, A. (2016). Growth Still is Good for the Poor. *European Economic Review, 81*, 68-85. doi:https://doi.org/10.1016/j.euroecorev.2015.05.008

Djossou, G. N., Kane, G. Q., & Novignon, J. (2017). Is Growth Pro-Poor in Benin? Evidence Using a

Multidimensional Measure of Poverty. *Poverty & Public Policy, 9*(4), 426-443.

Elkins, M. (2018). Are Poverty Reduction Strategy Papers Associated with Reductions in Poverty and Improvements in Well-Being? *The Journal of Development Studies, 54*(2), 377.

Filmer, D., Hammer, J. S., & Pritchett, L. H. (2000). Weak Links in the Chain. *World Bank Research Observer, 15*(2), 199-224. doi:10.1093/wbro/15.2.199

Foster, J.E., & Székely, M. (2008). Is Economic Growth Good for the Poor? Tracking Low Incomes Using General Means. *International Economic Review, 49*(4), 1143-1172. doi:https://doi.org/10.1111/j.1468-2354.2008.00509.x

Fosu, A. K. (2015). Growth, inequality and poverty in Sub-Saharan Africa: recent progress in a global context. *Oxford Development Studies*, *43*(1), 44-59.

Gallup, J., Radelet, S., & Warner, A. (1999). Economic Growth and the Income of the Poor, Consulting Assistance on Economic Reform II. *Harvard Institute for International Development, Discussion Paper, 36.*

Grosse, M., Harttgen, K., & Klasen, S. (2008). Measuring Pro-Poor Growth in Non-Income Dimensions. *World Development, 36*(6), 1021-1047.

Harttgen, K., Klasen, S., & Misselhorn, M. (2010). Pro-Poor Progress in Education in Developing Countries? *Review of Economics and Institutions, 1*(1), 1-48. doi:10.5202/rei.v1i1.6Klasen, S. (2004). In search of the holy grail: how to achieve pro-poor growth? *Toward pro poor policies-aid, institutions, and globalization*, 63-94.

Klasen, S. (2006). Macroeconomic Policy and Pro-Poor Growth in Bolivia. *Ibero America Institute for Econ. Research (IAI) Discussion Papers 143*. Retrieved from https://ideas.repec.org/p/got/iaidps/143.html.

Klasen, S., & Lange, S. (2016). How Narrowly Should Anti-Poverty Programs Be Targeted? Simulation Evidence from Bolivia and Indonesia. *Courant Research Centre: Poverty, Equity and Growth - Discussion Papers 213*. Retrieved from https://ideas.repec.org/p/got/gotcrc/213.html.

Oberdabernig, D. A. (2010). The effects of structural adjustment programs on poverty and income distribution. *In Seminar in International Economics, Vienna* (Vol. 4).

Ravallion, M. (1995). Growth and poverty: Evidence for developing countries in the 1980s. *Economics letters, 48*(3-4), 411-417.

Ravallion, M., & Chen, S. (1997). What can new survey data tell us about recent changes in distribution and poverty?. *The World Bank Economic Review, 11*(2), 357-382.

Ravallion, M. (2001). Growth, Inequality and Poverty: Looking Beyond Averages. *World Development, 29*(11), 1803-1815. doi:https://doi.org/10.1016/S0305-750X(01)00072-9

Ravallion, M., & Chen, S. (2003). Measuring Pro-Poor Growth. *Economics Letters, 78*(1), 93-99.

doi:https://doi.org/10.1016/S0165-1765(02)00205-7

Ravallion, M. (2005). A poverty-inequality trade off?. The Journal of Economic Inequality, 3(2), 169-181.

Roemer, M., & Gugerty, M. K. (1997). *Does economic growth reduce poverty?*. Cambridge, MA: Harvard Institute for International Development.

Santos, M.E., Dabus, C., & Delbianco, F. (2019). Growth and Poverty Revisited from a Multidimensional Perspective. *The Journal of Development Studies, 55*(2), 260-277. doi:10.1080/00220388.2017.1393520

Sen, A. K. (1985). *Commodities and Capabilities*. Netherlands: North-Holland.

Sen, A.K. (1992). *Inequality Re-Examined*. Clarendon Press. Oxford, UK.

Sen, A.K. (2000). Development as Freedom. New York: First Anchor Books Edition.

Seyedsayamdost, E. (2018). Millennium Development Goals: Impact on National Strategies and Spending. *Development Policy Review, 36*(S1), O59-O88. doi:https://doi.org/10.1111/dpr.12314

Song, S.H., & Stemann, D. (1999). Relative Efficiency of First Difference Estimator in Panel Data Regression with Serially Correlated Error Components. *Statistical Papers, 40*(2), 185-198. doi:10.1007/BF02925517

The Bretton Woods Project. (2009). *Poverty Reduction Strategy Papers (PRSPs): A rough guide*

Thomson, M., Kentikelenis, A., & Stubbs, T. (2017). Structural Adjustment Programmes Adversely Affect Vulnerable Populations: A Systematic-Narrative Review of their Effect on Child and Maternal Health. *Public Health Reviews, 38*(1), 13. doi:10.1186/s40985-017-0059-2

Timmer, C.P., 1997. How well do the poor connect to the growth process? CAER II Discussion Paper No. 17, HIID, Harvard.

Tran, V. Q., Alkire, S., & Klasen, S. (2015). Static and dynamic disparities between monetary and multidimensional poverty measurement: Evidence from Vietnam. In Measurement of poverty, deprivation, and economic mobility. Emerald Group Publishing Limited.

UNDP (2010). Human Development Report 2010. The Real Wealth of Nations: Pathways to Human Development. New York: UNDP

World Bank (2000). World Development Report, Oxford University Press, New York

World Bank (2005). World Development Report: Equity in Development. New York: Oxford University Press.

World Bank (2018). Poverty and shared prosperity 2018: Piecing together the poverty puzzle. Washington, DC: World Bank Publications.

Figures and Tables

Figures

Figure 1: Scatterplot of five-year annualized change in GDP per capita and G-CSPI (*n = 202)*

Figure 2: Multidimensional poverty-growth elasticity before and after 2000 (based on the G-CSPI)

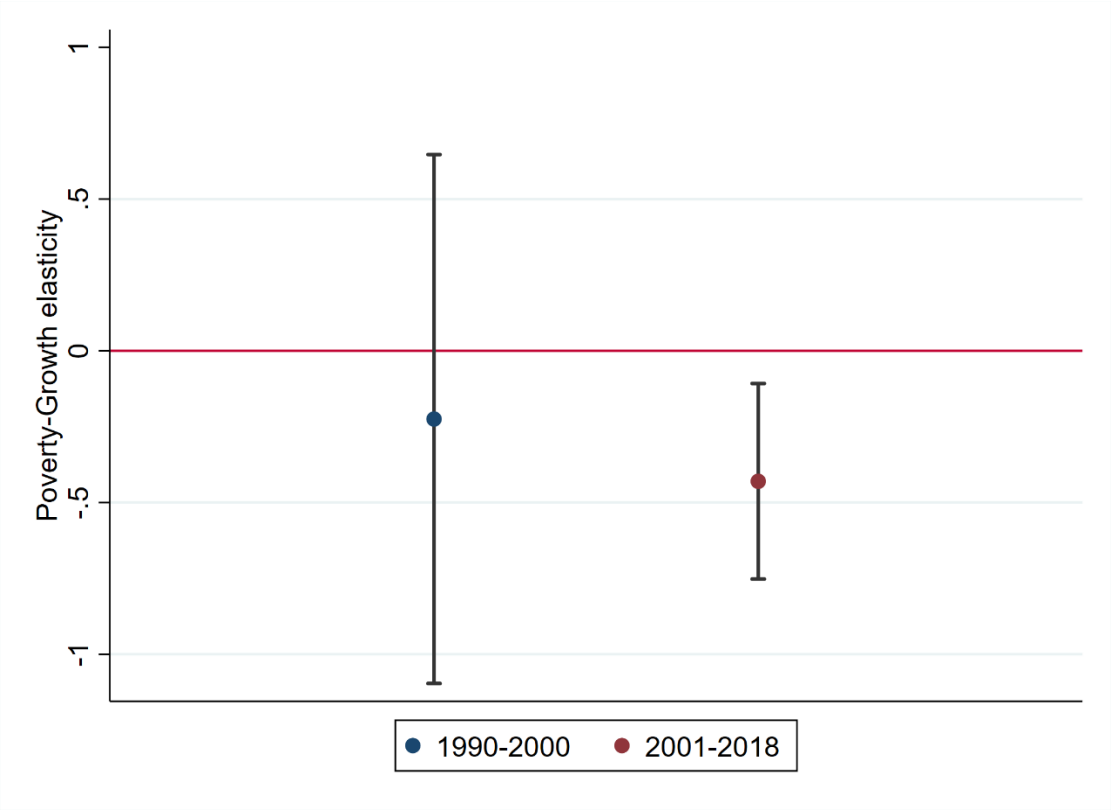
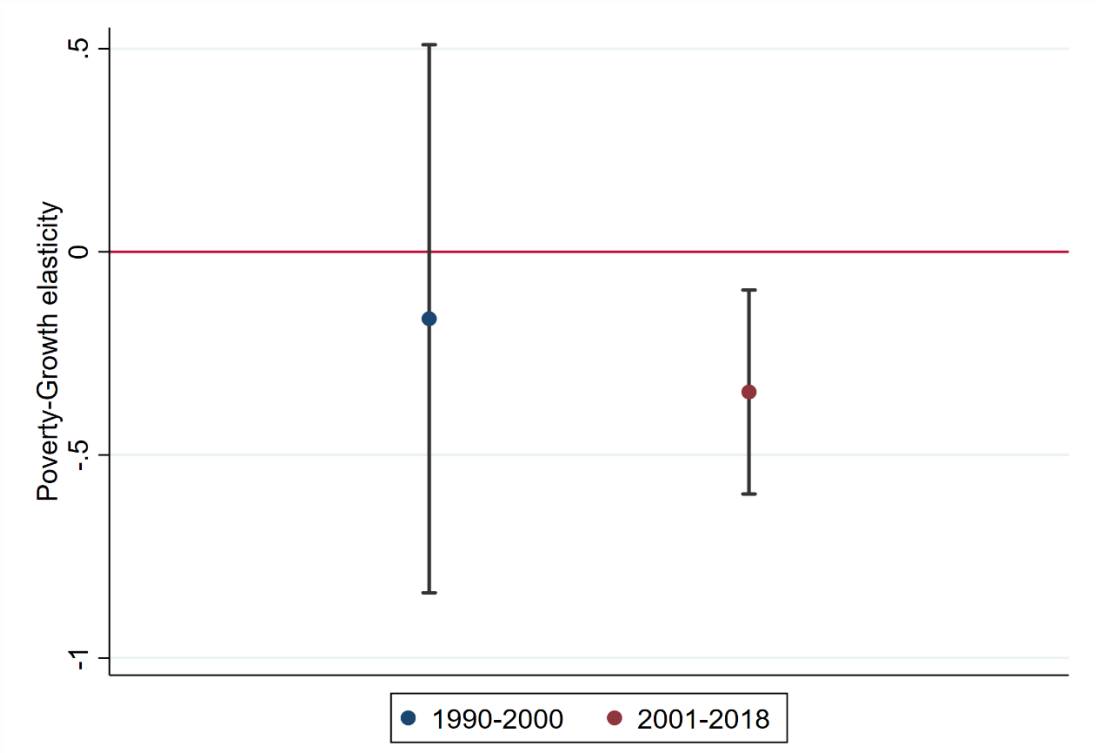


Figure 3: Multidimensional Poverty-Growth elasticity by decade (based on the G-M0)



Tables

Table 1: Basic information on the sample

Regions	Number of Countries	Total No. Observations	First Year	Last Year
East Asia & the Pacific	13	50	1990	2016
Eastern Europe & Central Asia	22	146	1995	2018
Latin America & Caribbean	20	288	1990	2018
South Asia	6	29	2001	2017
Sub-Saharan Africa	34	121	1991	2017
Total	95	634		

Table 2: Descriptive statistics—Annualized changes in selected variables

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Panel 1: All spells					
Change G-CSPI	539	-0.026	0.143	-1.314	0.696
Change G-CSPI Headcount	539	-0.014	0.098	-1.198	0.45
Change G-M0 (k=1)	539	-0.019	0.114	-1.24	0.545
Change five-year GDPpc	539	0.028	0.028	-0.082	0.152
Change five-year Gini	539	-0.003	0.014	-0.051	0.055
Change Income Headcount (int)	534	-0.088	0.687	-5.848	8.167
Change Pov. Gap (int)	534	-0.103	0.937	-7.218	12.467
Change Sq. Pov. Gap (int)	534	-0.121	1.214	-8.125	16.768
Panel 2: Two-year spells					
Change G-CSPI	367	-0.028	0.105	-0.916	0.389
Change G-CSPI Headcount	367	-0.014	0.064	-0.607	0.25
Change G-M0 (k=1)	367	-0.021	0.079	-0.638	0.273
Change five-year GDPpc	367	0.028	0.028	-0.081	0.152
Change five-year Gini	367	-0.003	0.013	-0.046	0.055
Change Income Headcount (int)	363	-0.081	0.325	-1.764	4.083
Change Pov. Gap (int)	363	-0.092	0.449	-2.558	6.234
Change Sq. Pov. Gap (int)	363	-0.104	0.599	-3.568	8.384
Panel 3: Five-year spells					
Change G-CSPI	202	-0.024	0.055	-0.234	0.154
Change G-CSPI Headcount	202	-0.011	0.033	-0.173	0.117
Change G-M0 (k=1)	202	-0.017	0.042	-0.194	0.118
Change five-year GDPpc	202	0.026	0.026	-0.07	0.118
Change five-year Gini	202	-0.002	0.012	-0.029	0.055
Change Income Headcount (int)	199	-0.073	0.165	-0.596	0.968
Change Pov. Gap (int)	199	-0.079	0.207	-0.725	1.454
Change Sq. Pov. Gap (int)	199	-0.085	0.248	-0.865	1.834
Panel 4: Longest spells					
Change G-CSPI	95	-0.022	0.072	-0.283	0.482
Change G-CSPI Headcount	95	-0.01	0.037	-0.201	0.186
Change G-M0 (k=1)	95	-0.016	0.050	-0.23	0.301
Change five-year GDPpc	95	0.029	0.028	-0.057	0.152
Change five-year Gini	95	-0.002	0.011	-0.046	0.052
Change Income Headcount (int)	93	-0.112	0.404	-3.857	0.172
Change Pov. Gap (int)	93	-0.129	0.507	-4.829	0.332
Change Sq. Pov. Gap (int)	93	-0.145	0.611	-5.802	0.441

Notes: The observations in each panel denote annualised changes in poverty, inequality and growth variables.

Table 3: Direction of change in multidimensional poverty and GDP, by region (five-year spells)

Variable		*GDP increase*									
		No	*Yes*	*No*	*Yes*	*No*	*Yes*	*No*	*Yes*	*No*	*Yes*
		2	22	7	49	1	20	6	35	0	9
	No	6.1%	66.7%	9.7%	68.1%	4.2%	83.3%	9.4%	54.7%	0.0%	100.0%
Poverty		1	8	1	15	0	3	6	17	0	
increase	*Yes*	3.0%	24.2%	1.4%	20.8%	0.0%	12.5%	9.4%	26.6%	0.0%	0.0%
	Region	**ECA**		**LAC**		**EAP**		**SSA**		**SA**	

Table 4: Multidimensional poverty-growth elasticity (poverty measures: G-CSPI and G-M0)

VARIABLES	**G-CSPI**				**G-M0**			
	(1) All spells	(2) Two-year spells	(3) Five-year spells	(4) One spell per country	(5) All spells	(6) Two-year spells	(7) Five-year spells	(8) One spell per country
Change five-year GDPpc	-0.429**	-0.522***	-0.486***	-0.381*	-0.306**	-0.387***	-0.372***	-0.298*
	(0.171)	(0.177)	(0.183)	(0.198)	(0.136)	(0.141)	(0.139)	(0.154)
Constant	-0.015**	-0.018**	-0.013**	-0.011	-0.011**	-0.013**	-0.009*	-0.007
	(0.008)	(0.007)	(0.006)	(0.007)	(0.005)	(0.005)	(0.004)	(0.005)
Observations	539	367	202	95	539	367	202	95
R-squared	0.009	0.021	0.052	0.021	0.008	0.020	0.053	0.027

Robust standard errors are noted in parentheses.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 5: Multidimensional poverty-growth-inequality triangle (poverty measures: G-CSPI and G-M0)

VARIABLES	**G-CSPI**				**G-M0**			
	(1) All spells	(2) Two-year spells	(3) Five-year spells	(4) One spell per country	(5) All spells	(6) Two-year spells	(7) Five-year spells	(8) One spell per country
Change five-year GDPpc	-0.425**	-0.514***	-0.480***	-0.372*	-0.303**	-0.380***	-0.368***	-0.289*
	(0.169)	(0.180)	(0.182)	(0.189)	(0.135)	(0.143)	(0.136)	(0.146)
Change five-year Gini	0.167	0.302	-0.238	0.462	0.147	0.260	-0.170	0.452
	(0.568)	(0.638)	(0.533)	(0.663)	(0.447)	(0.520)	(0.475)	(0.551)
Constant	-0.015*	-0.017**	-0.014**	-0.010	-0.011**	-0.012**	-0.009*	-0.007
	(0.007)	(0.007)	(0.006)	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)
Observations	539	367	202	95	539	367	202	95
R-squared	0.010	0.022	0.055	0.026	0.008	0.022	0.055	0.036

Robust standard errors are noted in parentheses.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 6: Multidimensional poverty-growth elasticity using the headcount ratio

VARIABLES	Headcount ratio			
	(1) All spells	(2) Two-year spells	(3) Five-year spells	(4) One spell per country
Change five-year GDP pc	-0.205*	-0.269**	-0.261**	-0.230*
	(0.116)	(0.120)	(0.106)	(0.132)
Constant	-0.007*	-0.008**	-0.005	-0.003
	(0.004)	(0.003)	(0.003)	(0.003)
Observations	539	367	202	95
R-squared	0.005	0.016	0.042	0.030

Robust standard errors are noted in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 7: Multidimensional poverty-growth-inequality triangle (using the multidimensional headcount ratio)

VARIABLES	Headcount ratio			
	(1) All spells	(2) Two-year spells	(3) Five-year spells	(4) One spell per country
Change five-year GDPpc	-0.201*	-0.263**	-0.257**	-0.220*
	(0.114)	(0.121)	(0.102)	(0.122)
Change five-year Gini	0.159	0.247	-0.132	0.470
	(0.376)	(0.457)	(0.447)	(0.499)
Constant	-0.007*	-0.008**	-0.005	-0.003
	(0.004)	(0.003)	(0.003)	(0.003)
Observations	539	367	202	95
R-squared	0.006	0.018	0.045	0.049

Robust standard errors are noted in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 8: Multidimensional poverty-growth elasticity vs. income poverty-growth elasticity (five-year spells)

VARIABLES	(1) G-CSPI	(2) Squared Poverty Gap	(3) G-M0	(4) Poverty Gap	(5) G-CSPI Head Count	(6) Poverty Head Count
Change five-year GDPpc	-0.470**	-2.362***	-0.364**	-2.299***	-0.263**	-2.173***
	(0.201)	(0.658)	(0.151)	(0.538)	(0.115)	(0.433)
Constant	-0.0142**	-0.0234	-0.00952**	-0.0208	-0.00541*	-0.0194*
	(0.00638)	(0.0186)	(0.00455)	(0.0148)	(0.00313)	(0.0117)
Observations	199	199	199	199	199	199
R-squared	0.049	0.073	0.051	0.100	0.043	0.142

Robust standard errors are noted in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 9: Multidimensional poverty-growth elasticity vs. income-based poverty-growth elasticity (five-year spells):

VARIABLES	(1) G-CSPI	(2) Squared Poverty Gap	(3) G-M0	(4) Poverty Gap	(5) G-CSPI Head Count	(6) Poverty Head Count
Change five-year GDPpc	-0.217	-2.428**	-0.200	-2.555***	-0.208	-2.717***
	(0.307)	(1.094)	(0.239)	(0.918)	(0.191)	(0.751)
Constant	-0.020**	-0.039	-0.013**	-0.0244	-0.006	-0.008
	(0.009)	(0.026)	(0.006)	(0.022)	(0.005)	(0.018)
Observations	151	151	151	151	151	151
R-squared	0.007	0.078	0.010	0.119	0.018	0.187

Robust standard errors are noted in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 10: Multidimensional poverty-growth elasticity vs. income-based poverty-growth elasticity (five-year spells), with changes in inequality as control

VARIABLES	(1) G-CSPI	(2) Squared Poverty Gap	(3) G-M0	(4) Poverty Gap	(5) G-CSPI Head Count	(6) Poverty Head Count
Change five-year GDPpc	-0.457**	-2.317***	-0.354**	-2.261***	-0.255**	-2.152***
	(0.198)	(0.663)	(0.145)	(0.545)	(0.104)	(0.445)
Change five-year Gini	-0.274	-0.928	-0.203	-0.772	-0.162	-0.416
	(0.643)	(1.658)	(0.573)	(1.384)	(0.538)	(1.036)
Constant	-0.015**	-0.026	-0.010**	-0.023	-0.006*	-0.020*
	(0.007)	(0.018)	(0.005)	(0.014)	(0.003)	(0.012)
Observations	199	199	199	199	199	199
R-squared	0.052	0.075	0.054	0.102	0.046	0.143

Robust standard errors are noted in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 11: Detailed list of countries and survey years

Country Name	Region	Years	Number of obs
Albania	Eastern Europe & Central Asia	2002, 2005, 2008	3
Armenia	Eastern Europe & Central Asia	1998,2001-2006, 2008, 2009, 2011	10
Azerbaijan	Eastern Europe & Central Asia	2008	1
Bulgaria	Eastern Europe & Central Asia	1995, 2001, 2003	3
Bosnia and Herzegovina	Eastern Europe & Central Asia	2001	1
Belarus	Eastern Europe & Central Asia	1995-2010, 2013-2015	19
Georgia	Eastern Europe & Central Asia	2003-2005, 2010-2012	6
Jordan	Eastern Europe & Central Asia	2002	1
Kazakhstan	Eastern Europe & Central Asia	2001-2004, 2006-2008	7
Kyrgyz Republic	Eastern Europe & Central Asia	2011, 2013	2
Kosovo	Eastern Europe & Central Asia	2002, 2010, 2011	3
Lithuania	Eastern Europe & Central Asia	1998-2001, 2003, 2004	6
Moldova	Eastern Europe & Central Asia	1998, 2000-2012	14
North Macedonia	Eastern Europe & Central Asia	1999, 2000, 2002-2005	6
Montenegro	Eastern Europe & Central Asia	2010	1
Poland	Eastern Europe & Central Asia	1997-2004	8
Romania	Eastern Europe & Central Asia	2001-2004, 2007-2011	9
Russian Federation	Eastern Europe & Central Asia	2003	1
Serbia	Eastern Europe & Central Asia	2003-2005, 2007-2009	6
Turkey	Eastern Europe & Central Asia	2002-2005	4
Ukraine	Eastern Europe & Central Asia	2002-2012	11

Uzbekistan	Eastern Europe & Central Asia	2000, 2002	2
Argentina	Latin America & the Caribbean	1998-2017	20
Bolivia	Latin America & the Caribbean	1992, 1993, 1997, 1999-2003, 2005-2009, 2011-2016	18
Brazil	Latin America & the Caribbean	1990, 1992, 1993, 1995-1999, 2001-2009, 2011, 2012, 2014-2016	22
Chile	Latin America & the Caribbean	1990, 1992, 1996, 1998, 2000, 2003, 2006, 2009, 2011, 2013, 2015	11
Colombia	Latin America & the Caribbean	1999, 2001, 2006-2016	13
Costa Rica	Latin America & the Caribbean	1994, 1997, 2000-2010, 2012, 2015, 2016	16
Dominican Republic	Latin America & the Caribbean	2000-2011, 2013	13
Ecuador	Latin America & the Caribbean	1994, 1995, 1998, 2003, 2005-2010, 2012-2017	16
Guatemala	Latin America & the Caribbean	2000, 2004, 2006, 2011	4
Guyana	Latin America & the Caribbean	1992	1
Honduras	Latin America & the Caribbean	1991-1999, 2002-2016	24
Jamaica	Latin America & the Caribbean	1990, 1996, 1999	3
Mexico	Latin America & the Caribbean	1992. 1994, 1996, 1998, 2000, 2002, 2004-2006, 2008, 2010, 2012, 2014	13
Nicaragua	Latin America & the Caribbean	1993, 1998, 2005, 2009	4
Peru	Latin America & the Caribbean	1997-2016	20
Paraguay	Latin America & the Caribbean	1990, 1995, 1997, 1999, 2001-2016	20
El Salvador	Latin America & the Caribbean	1991, 1995, 1996, 1998-2009, 2012, 2014-2016	19
Trinidad and Tobago	Latin America & the Caribbean	1990, 2000	2
Uruguay	Latin America & the Caribbean	1992, 1995-1998, 2000-2012, 2014-2016	21
Venezuela, RB	Latin America & the Caribbean	1995, 1998-2003, 2005	8
Fiji	East Asia & the Pacific	1996	1
Micronesia, Fed. Sts.	East Asia & the Pacific	2000, 2005	2
Indonesia	East Asia & the Pacific	1995, 1996, 1999, 2000	4
Cambodia	East Asia & the Pacific	1997, 2003, 2006, 2008	4
Lao PDR	East Asia & the Pacific	2002, 2007	2
Myanmar	East Asia & the Pacific	2005	1
Mongolia	East Asia & the Pacific	2002, 2007, 2009, 2010	4
Philippines	East Asia & the Pacific	1997, 2006, 2009	3
Solomon Islands	East Asia & the Pacific	2005	1
Thailand	East Asia & the Pacific	1990, 2000, 2006	3
East Timor	East Asia & the Pacific	2001, 2007	2
Tonga	East Asia & the Pacific	1996	1
Vietnam	East Asia & the Pacific	1992, 1997, 2002, 2004, 2006, 2008, 2010, 2012, 2014	9
Benin	Sub-Saharan Africa	2003, 2011	2

Burkina Faso	Sub-Saharan Africa	1994, 2003, 2009	3
Botswana	Sub-Saharan Africa	2002, 2009, 2013	3
Cote d'Ivoire	Sub-Saharan Africa	2002	1
Cameroon	Sub-Saharan Africa	1996, 2001, 2007, 2010	4
Congo, Rep.	Sub-Saharan Africa	2005	1
Comoros	Sub-Saharan Africa	2004	1
Ethiopia	Sub-Saharan Africa	2000, 2004	2
Ghana	Sub-Saharan Africa	1991, 1998, 2005, 2012	4
Guinea	Sub-Saharan Africa	1994, 2002, 2007	3
Gambia, The	Sub-Saharan Africa	1998, 2003, 2010	3
Kenya	Sub-Saharan Africa	1997, 1999, 2005	3
Liberia	Sub-Saharan Africa	2007, 2014	2
Madagascar	Sub-Saharan Africa	1993, 1997, 1999, 2001, 2005, 2010	6
Mozambique	Sub-Saharan Africa	2002	1
Mauritania	Sub-Saharan Africa	2004, 2008	2
Malawi	Sub-Saharan Africa	2004, 2010, 2013	3
Namibia	Sub-Saharan Africa	1993, 2003, 2009	3
Nigeria	Sub-Saharan Africa	1993, 2003	2
Rwanda	Sub-Saharan Africa	2000, 2005, 2010, 2013	4
Sudan	Sub-Saharan Africa	2009	1
Senegal	Sub-Saharan Africa	2005	1
South Sudan	Sub-Saharan Africa	2009	1
Sao Tome and Principe	Sub-Saharan Africa	2000, 2010	2
Eswatini	Sub-Saharan Africa	1995, 2000, 2009	3
Chad	Sub-Saharan Africa	2003	1
Togo	Sub-Saharan Africa	2006	1
Tunisia	Sub-Saharan Africa	2005	1
Tanzania	Sub-Saharan Africa	1993, 2000, 2007	3
Uganda	Sub-Saharan Africa	1999, 2002, 2005, 2010, 2012	5
South Africa	Sub-Saharan Africa	2002, 2004-2007	5
Zaire	Sub-Saharan Africa	1995, 2004, 2005, 2012	4
Zambia	Sub-Saharan Africa	1998, 2002, 2004, 2010	4
Zimbabwe	Sub-Saharan Africa	2001, 2007	2
Afghanistan	South Asia	2007	1
Bangladesh	South Asia	2003, 2005, 2010, 2013	4
Bhutan	South Asia	2003, 2007, 2012	3
Sri Lanka	South Asia	2006, 2009, 2012	3
Nepal	South Asia	2003, 2010, 2013	3
Pakistan	South Asia	2001, 2004-2008, 2010, 2011, 2013	9

Table 12: Detailed descriptive statistics of the sample

Country Name	Region	Years	Obs	Change[10] in G-CSPI	Change in Squared Poverty Gap	Change in GDP per capita	Change in Gini
Albania	Eastern Europe & Central Asia	2002, 2005, 2008	3	-0.07	-0.08	0.06	0.00
Armenia	Eastern Europe & Central Asia	1998,2001-2006, 2008, 2009, 2011	10	-0.06	-0.28	0.09	-0.02
Azerbaijan	Eastern Europe & Central Asia	2008	1	-0.09	0.00	0.15	-0.05
Bulgaria	Eastern Europe & Central Asia	1995, 2001, 2003	3	0.02	-0.16	0.02	0.00
Bosnia and Herzegovina	Eastern Europe & Central Asia	2001	1	0.03	-0.34	0.07	0.05
Belarus	Eastern Europe & Central Asia	1995-2010, 2013-2015	19	-0.11	0.18	0.04	0.01
Georgia	Eastern Europe & Central Asia	2003-2005, 2010-2012	6	-0.09	-0.16	0.06	0.00
Jordan	Eastern Europe & Central Asia	2002	1	0.03	-0.12	0.01	0.00
Kazakhstan	Eastern Europe & Central Asia	2001-2004, 2006-2008	7	-0.05	-1.37	0.08	-0.01
Kyrgyz Republic	Eastern Europe & Central Asia	2011, 2013	2	-0.13	0.15	0.03	-0.02
Kosovo	Eastern Europe & Central Asia	2002, 2010, 2011	3	-0.05	-0.27	0.04	0.02
Lithuania	Eastern Europe & Central Asia	1998-2001, 2003, 2004	6	0.02	0.03	0.05	0.01
Moldova	Eastern Europe & Central Asia	1998, 2000-2012	14	0.01	-0.53	0.03	-0.01
North Macedonia	Eastern Europe & Central Asia	1999, 2000, 2002-2005	6	-0.03	0.06	0.02	0.01
Montenegro	Eastern Europe & Central Asia	2010	1	0.48	-5.80	0.03	-0.01
Poland	Eastern Europe & Central Asia	1997-2004	8	0.00	-0.31	0.05	0.00
Romania	Eastern Europe & Central Asia	2001-2004, 2007-2011	9	-0.03	-0.19	0.05	0.01
Russian Federation	Eastern Europe & Central Asia	2003	1	-0.28	-0.18	0.07	-0.02
Serbia	Eastern Europe & Central Asia	2003-2005, 2007-2009	6	-0.08	-0.43	0.05	0.03
Turkey	Eastern Europe & Central Asia	2002-2005	4	-0.04	0.00	0.02	0.00
Ukraine	Eastern Europe & Central Asia	2002-2012	11	-0.05	0.44	0.05	-0.01
Uzbekistan	Eastern Europe & Central Asia	2000, 2002	2	-0.04	0.05	0.03	-0.02
Argentina	Latin America & the Caribbean	1998-2017	20	-0.01	-0.10	0.01	-0.01

[10] The table presents annualized changes in G-CSPI, Squared poverty gap, GDP and GINI for the short-term spell

Bolivia	Latin America & the Caribbean	1992, 1993, 1997, 1999-2003, 2005-2009, 2011-2016	18	-0.01	-0.03	0.02	-0.01
Brazil	Latin America & the Caribbean	1990, 1992, 1993, 1995-1999, 2001-2009, 2011, 2012, 2014-2016	22	-0.03	-0.05	0.01	-0.01
Chile	Latin America & the Caribbean	1990, 1992, 1996, 1998, 2000, 2003, 2006, 2009, 2011, 2013, 2015	11	-0.01	-0.09	0.04	0.00
Colombia	Latin America & the Caribbean	1999, 2001, 2006-2016	13	0.00	-0.08	0.03	-0.01
Costa Rica	Latin America & the Caribbean	1994, 1997, 2000-2010, 2012, 2015, 2016	16	-0.01	-0.14	0.03	0.00
Dominican Republic	Latin America & the Caribbean	2000-2011, 2013	13	-0.01	-0.11	0.03	0.00
Ecuador	Latin America & the Caribbean	1994, 1995, 1998, 2003, 2005-2010, 2012-2017	16	-0.02	-0.11	0.02	-0.01
Guatemala	Latin America & the Caribbean	2000, 2004, 2006, 2011	4	0.01	-0.03	0.01	-0.01
Guyana	Latin America & the Caribbean	1992	1	0.00	-0.05	0.05	-0.01
Honduras	Latin America & the Caribbean	1991-1999, 2002-2016	24	-0.03	-0.03	0.01	-0.01
Jamaica	Latin America & the Caribbean	1990, 1996, 1999	3	-0.03	0.02	0.01	0.00
Mexico	Latin America & the Caribbean	1992. 1994, 1996, 1998, 2000, 2002, 2004-2006, 2008, 2010, 2012, 2014	13	-0.03	-0.06	0.01	0.00
Nicaragua	Latin America & the Caribbean	1993, 1998, 2005, 2009	4	-0.02	-0.12	0.02	-0.01
Peru	Latin America & the Caribbean	1997-2016	20	-0.03	-0.12	0.04	-0.01
Paraguay	Latin America & the Caribbean	1990, 1995, 1997, 1999, 2001-2016	20	-0.01	-0.18	0.01	0.00
El Salvador	Latin America & the Caribbean	1991, 1995, 1996, 1998-2009, 2012, 2014-2016	19	-0.01	-0.17	0.02	-0.01
Trinidad and Tobago	Latin America & the Caribbean	1990, 2000	2	-0.04	-0.04	0.05	-0.01
Uruguay	Latin America & the Caribbean	1992, 1995-1998, 2000-2012, 2014-2016	21	0.01	-0.04	0.03	0.00
Venezuela, RB	Latin America & the Caribbean	1995, 1998-2003, 2005	8	0.01	-0.01	-0.01	0.01
Fiji	East Asia & the Pacific	1996	1	-0.04	0.11	0.01	0.00
Micronesia, Fed. Sts.	East Asia & the Pacific	2000, 2005	2	-0.09	0.09	0.01	0.00
Indonesia	East Asia & the Pacific	1995, 1996, 1999, 2000	4	-0.10	0.30	0.02	0.00
Cambodia	East Asia & the Pacific	1997, 2003, 2006, 2008	4	0.02	-	0.06	-0.01

Lao PDR	East Asia & the Pacific	2002, 2007	2	-0.04	0.11	0.05	0.00
Myanmar	East Asia & the Pacific	2005	1	-0.07	0.31	0.11	0.00
Mongolia	East Asia & the Pacific	2002, 2007, 2009, 2010	4	-0.02	0.54	0.05	0.00
Philippines	East Asia & the Pacific	1997, 2006, 2009	3	-0.04	0.09	0.03	0.00
Solomon Islands	East Asia & the Pacific	2005	1	-0.01	0.17	0.02	-0.01
Thailand	East Asia & the Pacific	1990, 2000, 2006	3	0.00	0.32	0.04	0.00
East Timor	East Asia & the Pacific	2001, 2007	2	-0.12	-0.08	0.02	-0.01
Tonga	East Asia & the Pacific	1996	1	0.00	-0.10	0.02	0.00
Vietnam	East Asia & the Pacific	1992, 1997, 2002, 2004, 2006, 2008, 2010, 2012, 2014	9	-0.03	-0.21	0.05	0.00
Benin	Sub-Saharan Africa	2003, 2011	2			0.01	0.01
Burkina Faso	Sub-Saharan Africa	1994, 2003, 2009	3	-0.01	-0.11	0.03	-0.01
Botswana	Sub-Saharan Africa	2002, 2009, 2013	3	-0.11	-0.07	0.03	-0.01
Cote d'Ivoire	Sub-Saharan Africa	2002	1	-0.02	0.02	-0.01	0.00
Cameroon	Sub-Saharan Africa	1996, 2001, 2007, 2010	4	-0.01	-0.03	0.01	0.00
Congo, Rep.	Sub-Saharan Africa	2005	1	-0.04	-0.06	0.01	0.00
Comoros	Sub-Saharan Africa	2004	1	-0.07	0.06	0.00	-0.01
Ethiopia	Sub-Saharan Africa	2000, 2004	2	0.02	-0.06	0.03	-0.01
Ghana	Sub-Saharan Africa	1991, 1998, 2005, 2012	4	0.00	-0.03	0.03	0.00
Guinea	Sub-Saharan Africa	1994, 2002, 2007	3	0.02	-0.07	0.01	-0.01
Gambia, The	Sub-Saharan Africa	1998, 2003, 2010	3	-0.03	-0.19	0.00	-0.01
Kenya	Sub-Saharan Africa	1997, 1999, 2005	3	0.01	0.05	0.00	-0.01
Liberia	Sub-Saharan Africa	2007, 2014	2	-0.02	-0.04	0.02	0.00
Madagascar	Sub-Saharan Africa	1993, 1997, 1999, 2001, 2005, 2010	6	0.03	0.03	-0.01	0.00
Mozambique	Sub-Saharan Africa	2002	1	0.00	-0.05	0.05	0.00
Mauritania	Sub-Saharan Africa	2004, 2008	2	-0.04	-0.12	0.01	-0.01
Malawi	Sub-Saharan Africa	2004, 2010, 2013	3	-0.04	-0.02	0.02	0.00
Namibia	Sub-Saharan Africa	1993, 2003, 2009	3	-0.02	-0.09	0.02	-0.01
Nigeria	Sub-Saharan Africa	1993, 2003	2	-0.02	-0.02	0.02	-0.02
Rwanda	Sub-Saharan Africa	2000, 2005, 2010, 2013	4	-0.05	-0.06	0.05	0.00

Sudan	Sub-Saharan Africa	2009	1	0.08	-0.12	0.04	0.00
Senegal	Sub-Saharan Africa	2005	1	-0.02	0.01	0.02	0.00
South Sudan	Sub-Saharan Africa	2009	1	0.06	0.10	-0.06	0.00
Sao Tome and Principe	Sub-Saharan Africa	2000, 2010	2	-0.01	0.05	0.02	0.01
Eswatini	Sub-Saharan Africa	1995, 2000, 2009	3	-0.04	-0.12	0.02	0.00
Chad	Sub-Saharan Africa	2003	1	-0.04	-0.06	0.06	0.01
Togo	Sub-Saharan Africa	2006	1	-0.13	0.00	0.00	0.00
Tunisia	Sub-Saharan Africa	2005	1	-0.20	-0.13	0.04	-0.01
Tanzania	Sub-Saharan Africa	1993, 2000, 2007	3	-0.05	-0.06	0.02	0.00
Uganda	Sub-Saharan Africa	1999, 2002, 2005, 2010, 2012	5	-0.01	-0.06	0.03	0.00
South Africa	Sub-Saharan Africa	2002, 2004-2007	5	-0.07	-0.18	0.03	0.01
Zaire	Sub-Saharan Africa	1995, 2004, 2005, 2012	4	-0.20	-0.04	-0.01	0.00
Zambia	Sub-Saharan Africa	1998, 2002, 2004, 2010	4	-0.01	0.06	0.03	0.00
Zimbabwe	Sub-Saharan Africa	2001, 2007	2	0.00	0.10	-0.05	-0.02
Afghanistan	South Asia	2007	1	-0.04	-	0.06	0.00
Bangladesh	South Asia	2003, 2005, 2010, 2013	4	-0.04	0.09	0.04	0.00
Bhutan	South Asia	2003, 2007, 2012	3	-0.10	0.18	0.06	0.00
Sri Lanka	South Asia	2006, 2009, 2012	3	0.07	-0.19	0.05	0.00
Nepal	South Asia	2003, 2010, 2013	3	-0.01	0.25	0.03	-0.01
Pakistan	South Asia	2001, 2004-2008, 2010, 2011, 2013	9	-0.02	0.22	0.02	0.00