Growth and Poverty Revisited from a Multidimensional Perspective

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Abstract

The actual impact of economic growth on poverty reduction is of fundamental importance to the development agenda. This paper offers new empirical evidence on growth and poverty measured from a multi- dimensional perspective using the global Multidimensional Poverty Index. Results from a First Difference Estimator Model suggest that while economic growth reduces multidimensional poverty, this impact is well below a one-to-one relationship and lower than the impact of growth on income poverty. Results from a cross- section model additionally suggest that countries with higher levels of exports, higher share of industry and services and higher control of corruption have lower multidimensional poverty.

JEL codes: D31, I32, O15, O54

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1. Introduction

The actual impact of economic growth on poverty reduction has been a matter of interest and study for decades, at least since it became evident that the 'trickle down' theory was not being verified or the process was excessively slow. 'Although the output of the world economy has expanded at an unprecedented rate in the past quarter century, the benefits of growth have only reached the world's poor to a very limited degree' (Ahluwalia, Carter and Chenery, 1979, p. 299).

The relationship between economic growth and poverty has been empirically studied for income poverty; most frequently, the dependent variable has been the change in some internationally comparable measure of income poverty, such as the headcount ratio of people living with less than $1/day or some other member of the FGT family of poverty measures (Foster, Greer, & Thorbecke, 1984) or the Watts index (Watts, 1969). This approach, called by Foster and Székely (2008) the poverty measures approach, includes Fields (1989), Squire (1993), Ravallion (1995, 1997, 2001), Ravallion and Datt (2002), Bhalla (2002), Ravallion and Chen (1997, 2003, 2007), Adams (2004), and Kraay (2006).

The relationship has also been studied using what Foster and Székely (2008) call the income standards approach, namely a function that summarises the income distribution into a single 'representative' level of income, focusing on the bottom of the distribution. This is the approach followed by Roemer and Gugerty (1997), Gallup, Radalet, and Warner (1998) and Dollar and Kraay (2002), who use the average income of the bottom quintile. In turn, Foster and Székely (2008) use Atkinson's equally distributed equivalent income.

For measuring economic growth, studies have most commonly used either growth in real GDP per capita using data from National Accounts, or growth in mean income or consumption using data from household surveys. Typically, studies use an unbalanced panel of country-year observations and estimate a regression of the change in the poverty rate over the income per capita variable. Similar estimations have been performed using state or province level data by Ravallion and Datt (2002) for India, and by Ravallion and Chen (2003, 2007) for China. In all cases an elasticity of poverty (or the low income standard) to economic growth is obtained, indicating in what proportion poverty can be reduced (or low incomes increased) by a 1 per cent average annual growth rate.

At the core of this literature is the idea of pro-poor growth, but the concept has been embedded with different meanings. In some papers, it has been implicitly understood that economic growth is pro- poor if the elasticity of low incomes to growth is at or above unity (Roemer & Gugerty, 1997; Gallup et al., 1998; and Dollar & Kraay, 2002), suggesting that the incomes of the poor (where the poor are defined here in a relative way, say the bottom quintile) rise, on average, equi- or more than proportionately with average incomes. However, this implies that in absolute terms the rich still benefit much more from growth than the poor (Ravallion, 2001). In other papers, it has been understood that growth is pro-poor if growth reduces some (income) absolute poverty measure.[1] Datt and Ravallion (1992), Kakwani and Pernia (2000) and Bhalla (2002) propose decompositions of the total change in poverty into a growth component and a redistribution component. Growth is pro-poor whenever it has reduced poverty more than what it would have reduced it under distribution-neutral growth. Ravallion and Chen (2003) propose a growth-incidence curve, which depicts the growth rate in per capita income for each quantile, with quantiles ranked by income. The rate of pro-poor growth is the mean growth rate for the poor.

What have the empirical findings been in terms of growth elasticity? Papers using the average income of the bottom quintile have generally found an elasticity of unity (Dollar & Kraay, 2002; Gallup et al., 1998; Roemer & Gugerty, 1997). In contrast, using the equally distributed equivalent income, Foster and Székely (2008) find that as greater weight is given to lower incomes the elasticities drop dramatically becoming insignificantly different from zero. Papers using the poverty measure have also found a wide range of elasticities ranging between −1.5 and −3 for studies that comprise several developing countries and use the extreme poverty headcount ratio.

Inequality has been the factor usually pointed to as mediating the impact of growth on poverty. There is evidence from cross-country studies as well as from studies for India

[1] Note that a rise in the average income of the – say – bottom quintile does not necessarily imply a reduction in an absolute poverty measure. First, if the poverty line is within the income range of the bottom quintile, a rise in the average income of the bottom quintile may not actually reach the people below the poverty line. Second, suppose the measure used is the income poverty headcount ratio (which can violate monotonicity), then, if despite experiencing a rise in incomes, the poor remain below the poverty line, the poverty measure will not be reduced.

and China suggesting that higher initial income inequality entails a lower elasticity of poverty to average incomes (Ravallion, 1997; Ravallion & Chen, 2007; Ravallion & Datt, 2002; Timmer, 1997; World Bank, 2000). At the same time, there is cross-country evidence on lack of correlation between growth and changes in inequality (Dollar & Kraay, 2002; Kraay, 2006; Ravallion, 1995; Ravallion & Chen, 1997;). However, 'no correlation does not mean no impact' (Ravallion, 2001). First, there is sizeable error in the measurement of income inequality. Second, while average inequality may change little over time within countries, there are people moving up and down the distribution.

Other variables have also been considered as influencing the impact of growth on poverty reduction, including inflation, government consumption, openness, level of financial development, rule of law, level of taxation, pattern of growth (urban versus rural for example) and level of education, to mention a few. Evidence has been diverse and we comment on that when discussing our results.

While the available evidence of the link between poverty and growth is limited to the case of income poverty, it is increasingly acknowledged that poverty is intrinsically multidimensional. This has been revealed by participatory studies (Narayan, Chambers, Shah, & Petesch, 2000; UNDP, 2013), and conceptually developed by frameworks such as the capability approach (Sen, 1999, 2009), the human rights approach or the basic needs approach. The academic literature on poverty measurement has advanced on this front.[2] The Millennium Development Goals (MDGs) as well as the Sustainable Development Goals (SDGs) also favour a multidimensional view of poverty. Some of the studies of economic growth and income poverty recognised the relevance of multidimensionality: 'a proper evaluation would track a wide array of attainments and capabilities to determine how they are altered during the growth process' (Foster & Székely, 2008, p. 1143–1144); 'broadly, pro-poor growth can be defined as one [such] that no person in society is deprived of the minimum basic capabilitie" (Kakwani & Pernia, 2000, p. 3).

Growth is not an end in itself. But it makes it possible to achieve other important objectives of individuals and societies. It can spare people en masse from poverty and

[2] See Alkire et al. (2015), chapter 2 for a review of multidimensional poverty measures and related techniques.

drudgery. Nothing else ever has. It also creates the resources to support health care, education, and the other Millennium Development Goals to which the world has committed itself. (CGD, p. 1)

However, in the Report it is also acknowledged that ‘some kinds of growth reduce poverty more effectively than others’ (CGD, p. 14).

This study contributes new empirical evidence on economic growth and poverty reduction, measuring it from a multidimensional perspective. While it is ‘hardly feasible’ to incorporate all the relevant capabilities in the measurement of pro-poor growth (Kakwani & Pernia, 2000), it is possible to synthesise at least a few key capabilities in a standalone poverty measure. This is the case of the global Multidimensional Poverty Index (MPI) developed by the Oxford Poverty and Human Development Initiative (OPHI) in collaboration with the United Nations Development Programme (Alkire & Santos, 2014; UNDP, 2010). The MPI has been reported in the UNDP Human Development Reports since 2010. The MPI follows the Alkire and Foster (2011) methodology of multidimensional poverty measurement. The evidence in this paper may shed light over the link between the first (ending poverty in all its forms) and eighth (promoting inclusive growth) SDGs.

The paper is organised as follows. Section 2 describes the global Multidimensional Poverty Index and briefly reviews the income poverty measures, which are used in alternative estimates for comparison purposes. Section 3 presents the econometric approaches used. Section 4 describes the data. Section 5 discusses the results. Section 6 concludes. Additional information is contained in a Section A and B available in the Supplementary Materials.

2. Poverty Measures

2.1 The Global Multidimensional Poverty Index

The global MPI has the structure of Alkire and Foster's (2011) M_0 measure, also named the Adjusted Headcount Ratio. We briefly describe it, following Alkire and Foster et al. (2015).

Let $x_{ij} \in \mathbb{R}_+$ be the achievement of each person $i = 1, \dots, n$ in each indicator $j = 1, \dots, d$, let z_j be the **deprivation cutoff** of indicator j and let w_j be indicator j's weight, such that $\sum_j w_j = 1$. Deprivation of person i in indicator j is defined as $g_{ij}^0 = 1$ when $x_{ij} < z_j$ and $g_{ij}^0 = 0$ otherwise. A deprivation score is computed for each person, given by the weighted sum of deprivations $c_i = \sum_{j=1}^{d} w_j g_{ij}^0$. With this score, the poor are identified using a second cutoff, the **poverty cutoff**, denoted by k, which represents the proportion of minimum deprivation a person must experience in order to be identified as poor. In other words, someone is poor when $c_i \geq k$. The deprivations of those not identified as poor are censored such that $g_{ij}^0(k) = g_{ij}^0$ when $c_i \geq k$ and $g_{ij}^0(k) = 0$ otherwise. The censored deprivation score is given by $c_i(k) = \sum_{j=1}^{d} w_j g_{ij}^0(k)$.

The M_0 measure is the product of two fundamental sub-indices: **poverty incidence**, the proportion of people who are multidimensionally poor, and **poverty intensity**, given by the average (weighted) deprivations among the poor. The proportion of poor people is given by

$$H_M = q_M / n, \qquad (1)$$

where q_M is the number of people identified as multidimensionally poor and n is the total population. Poverty intensity is given by

$$A = \sum_{i=1}^{n} c_i(k) / q_M. \quad (2)$$

MPI, as M_0, is the product of these two sub-indices:

$$M_0 = H_M \times A = \frac{1}{n} \sum_{i=1}^{n} \sum_{j=1}^{d} w_j g_{ij}^0(k). \qquad (3)$$

The M_0 measure has several convenient properties, namely, **dimensional monotonicity**, that is, if a poor person becomes deprived in an additional indicator, M_0 will increase;

population subgroup decomposability, enabling the computation of the subgroups' percentage contribution to overall poverty; **dimensional break-down**, enabling the computation of the contribution of deprivations in each indicator to overall poverty; and **ordinality**, that is, poverty values are not changed by changes in the ordinal variables' scales.

Table 1 presents the components of the global MPI, ten indicators that are organised into three dimensions – health, education and living standards – following the same dimensions and weights as the Human Development Index (HDI).[3] Most of them are directly related to the MDGs and, therefore, to the SDGs. Health and education indicators reflect achievements of all household members. Then, each person's deprivation score is constructed based on a weighted average of the deprivations they experience using a nested weight structure: equal weight across dimension and equal weight for each indicator within dimensions. People are identified as multidimensionally poor if their deprivation score meets or exceeds a 33.33% poverty cutoff.

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

Dimension	Indicator	Deprived if…	Relative Weight
Education	**Years of Schooling**	No household member has completed five years of schooling	16.7%
	Child School Attendance	Any school-aged child is not attending school in years 1 to 8	16.7%
Health	**Mortality**	Any child has died in the family	16.7%
	Nutrition	Any adult or child for whom there is nutritional information is malnourished*	16.7%
Living Standard	**Electricity**	The household has no electricity	5.6%
	Sanitation	The household's sanitation facility is not improved (according to MDG guidelines) or it is improved but shared with other households**	5.6%
	Water	The household does not have access to safe drinking water (according to MDG guidelines) or safe drinking water is more than a 30-minute walk from home, roundtrip.***	5.6%
	Floor	The household has dirt, sand, or dung floor.	5.6%
	Cooking Fuel	The household cooks with dung, wood, or coal.	5.6%
	Assets	The household does not own one of the following assets: radio, TV, telephone, bicycle, motorbike, or refrigerator and does not own a car or truck.	5.6%

Source: Alkire and Santos (2014).
*Adults are considered malnourished if their BMI is below 18.5. Children are considered malnourished if their z-score of weight-for-age is below minus two standard deviations from the median of the reference population. This was estimated following the algorithm provided by the WHO Child Growth Standards (WHO 2006). Link.
**A household is considered to have access to improved sanitation if it has some type of flush toilet or latrine, or ventilated improved pit or composting toilet, provided that they are not shared.
***A household has access to safe drinking water if the water source is any of the following types: piped water, public tap, borehole or pump, protected well, protected spring or rainwater, and it is within a distance of 30 minutes' walk (roundtrip).

[3] For a more detailed description of the indicator definitions, see Alkire and Santos (2014).

This cutoff captures the **acutely poor**, usually those who do not meet minimum internationally agreed standards in multiple indicators of basic functionings simultaneously. In practice, the cutoff implies that a person must be deprived in at least two (education or health) to six (living standard) indicators in order to be identified as multidimensionally poor. Alkire and Santos (2014) find the country rankings to be robust to changes in the poverty cutoff, within a relevant interval (of 20% to 40%).

2.2 Income Poverty Measures

For comparison, we also estimate the same regressions with the most commonly used income poverty measure as dependent variables, the income headcount ratio, also called income poverty incidence or income poverty rate, defined as

$$H_I = q_I/n, \quad (4)$$

where q_I is the number of people identified as income poor. We use the purchasing power parity (PPP) poverty rate of \$1.25 PPP/day, the proportion of people living with less than \$1.25 PPP a day. This is an internationally comparable measure of extreme poverty, so the extreme income poverty rate H_I is comparable to the acute multidimensional poverty rate H_M.

Another frequently used measure is the income poverty gap, defined as

$$P_G = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{z-y_i}{z}\right) \quad (5)$$

where z is the income poverty line, in this case \$1.25 PPP/day, and y_i is the income of person $i = 1, \dots n$. Just like the MPI, the income poverty gap is also composed of two sub-indices: income poverty incidence and the income gap ratio. The income gap ratio is defined as

$$I_G = \frac{1}{q}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right) \quad (6)$$

In words, it is the average normalised income shortfall among the poor. It can be easily verified that

$$P_G = H_I * I_G \quad (7)$$

The poverty gap ratio is somewhat comparable to the MPI (Alkire et al. 2015). While the first is multidimensional poverty incidence adjusted by poverty breadth or intensity, the second can be seen as income poverty incidence adjusted by the depth of poverty.

3. Econometric Models

To study the impact of economic growth on multidimensional poverty we use two different econometric approaches, which we describe in what follows.

3.1 First Difference Estimator Model

We follow Ravallion and Chen (1997) and Adams (2004) in using a first difference estimator (FDE) approach. Specifically, the link between poverty and mean GDP per capita can be stated as

$$logP_{it} = \alpha_i + \beta log\mu_{it}^{*} + \gamma_t + \varepsilon_{it} \qquad (8)$$

where P_{it} is the measure of poverty in country i (with $i = 1, \dots n$) at time t (with $t = 1, \dots, T$), α_i is a fixed-effect reflecting time differences between countries in distribution, β is the elasticity of poverty with respect to GDP per capita (μ_{it}^{*}), γ_t is a trend rate of change over time t, and ε_{it} is a white-noise error term that includes errors in the poverty measure. In practice, one does not observe the true mean μ_{it}^{*}, but rather have an estimate given by:

$$\log \mu_{it} = \log \mu_{it}^{*} + v_{it} \qquad (9)$$

where v_{it} is a time-varying error term that is assumed to be white noise. Replacing (9) in (8) and taking the first difference, the fixed effect term α_i is eliminated and one obtains:

$$\Delta logP_{it} = \gamma + \beta \Delta log\mu_{it} + \Delta\varepsilon_{it} - \beta\Delta v_{it} \qquad (10)$$

In Equation (10) the rate of poverty reduction is regressed on the rate of growth in mean GDP per capita and thus β can be directly interpreted as the growth elasticity of poverty. This is the basic equation estimated by Ordinary Least Squares (OLS), corrected for heterocedasticity. Note that, as described in Section 4, the data sources of the MPI estimates and of the GDP per capita and other considered explanatory variables are different; therefore the $Cov(\varepsilon_{it}, v_{it}) = 0$. Thus, the OLS estimates are consistent.

We estimate different versions of this model with alternative measures of the dependent poverty variable, as described in Section 2, and alternative independent or explanatory variables as detailed below. The definition of the variables and data sources is detailed in Section 4.

3.2 A Cross-Section Estimator Model

A cross-section linear regression model is also estimated, using OLS:

$$P_i = \varphi_0 + \varphi_1 X_{1i} + \varphi_2 X_{2i} + \cdots + \varphi_k X_{ki} + U_i \qquad (11)$$

where P_i is poverty for country $i = 1, \ldots n$, and X_{ji}, with $j = 1, \ldots k$ are the independent or explanatory variables. As usual, φ_0 is the intercept, each φ_j is the parameter of variable j to be estimated, and U_i is the error term. As with the FDE approach, we estimate different versions of the model in equation (11), with alternative poverty measures, independent or explanatory variables, as detailed in the Data Section below. All specifications are estimated with OLS corrected for heteroscedasticity with the Huber-White Sandwich estimator.

4. Data

The data are secondary and macro or country level. The full sample is a total of 110 countries with MPI estimates for at least one year between 1999 and 2014, comprising a total of 215 observations. All MPI estimates come from OPHI (available here).[4] Table B.1 in Appendix B of the Supplementary Materials lists the countries, years, and surveys used for the MPI data, as well as the MPI, H_M, and A estimates and the source of each estimate. All in all, 32 countries have one MPI estimate between 1999 and 2014, 53 countries have two estimates, 23 countries have three MPI observations and two countries have four MPI observations. Thus, we have an unbalanced panel of 78 countries with two or more MPI observations over time, and a total of 105 pairs of observations. The average distance between any two MPI observations is 5.2 years.

We have included all countries for which there was an OPHI MPI estimate at the time we started the study in order to have as much country coverage as possible. However, the sample is predominantly of developing countries and includes most of the poorest countries in the world. Of the 110 countries, 39 are in Sub-Saharan Africa (SSA), 8 are in South Asia (SA) (including India), 10 are in East Asia and the Pacific (EAP)

[4] Thus, MPI estimates used in this paper proceed from the over-time-harmonised MPI estimates reported in Table 6.1 − Summer 2016 (Alkire et al., 2016), from the Table 1.1 of 2011, 2013, 2014 and 2015 rounds of MPI estimates (all available here) as well as from the MPI 2010 round of estimates reported in Table 10 of Alkire and Santos (2014).

(including China), 19 are in Latin America and the Caribbean (LAC) (including Haiti), 10 are Arab States (AS), and 24 are in Europe and Central Asia (ECA).

The GDP per capita of countries in the sample ranged in 1980 from $185 (in constant 2005 US$), to $81,947; with an average value of $2,735. The average MPI of the countries of the sample is 17% and the average proportion of people living with less than $1.25 a day (PPP) between 2000 and 2014 is 25%. In other words, the sample is biased towards poorer countries, reflecting the data for which MPI has been computed, but is a reasonable sample to study the link between growth and multidimensional poverty. Including richer countries would entail including countries with very low MPI estimates, but in any case these estimates are not available.

There are arguments that the sample composition may lead to under or over estimating the impact of growth on poverty. On the one hand, given that the sample is biased towards poorer countries, their poverty reduction over time (both in absolute and relative terms) is likely to be greater than that of less poor countries, and thus we could be over-estimating the average impact of growth on poverty reduction. On the other hand, precisely because of their higher poverty, these countries may have been slower at growth, and thus we may be under-estimating the impact of growth.[5]

There are comparability issues in the data, as the MPI has been computed with different surveys and that there are some country-year observations for which some of the MPI indicators are missing (detailed in Table B.1 in Appendix B available in Supplementary Materials). However, analogous, if not more problematic, comparability issues have been acknowledged in studies of growth and income poverty (see, for example, Ravallion 1995; Ravallion and Chen 1997).

For comparative purposes, we estimate both the first difference and the cross section models (Equations 10 and 11) for four alternative poverty measures: the MPI, the headcount ratio of multidimensional poverty H (one of the MPI components), the income poverty gap at $1.25 a day (PPP), which is comparable to the MPI, and the income headcount ratio at $1.25 a day (PPP), which is comparable to the headcount ratio of multidimensional poverty.

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[5] In fact, the sample of countries used here only includes four of the 13 'success stories' of growth analysed in The Growth Report (CGD, 2008). The four included countries are Brazil, China, Indonesia and Thailand. However, it also includes India and Viet Nam, two countries also mentioned in The Growth Report, as strong candidates to be added to the list of successful cases.

Data on income poverty is from the World Development Indicators. For the FDE model, from the set of countries in the MPI panel, we were able to form a panel of 56 countries with 119 income poverty observations, replicating – as much as possible – the countries and years of the MPI observations.[6] Table B.2 in the Supplementary Materials lists the countries, years and income poverty estimates of this panel.

The explanatory variables are: GDP per capita (at constant 2005 US$); the growth rate in trade (as % of GDP); inequality (as measured by the Gini Coefficient); sector value added for agriculture, industry, services, and manufacturing (a sub-group of industry); government expenditure on education and health; and the control of corruption measure as a governance indicator. All explanatory variables were obtained from the World Development Indicators (WDI), except the Kaufmann, Kraay and Mastruzzi (2010), control of corruption index from the Worldwide Governance Indicators Database. This index reflects perceptions of the extent to which public power is exercised for private gain, ranging from -2.5 (weak control of corruption) to 2.5 (strong control of corruption). The index is not included in the FDE estimations due to insufficient observations for the panel.

In the case of the FDE model, for the explanatory variables, we take the change in the mean value over the five years previous to the poverty measure observation. For example, in the case of Bolivia, there are MPI observations for the year 2003 and for the year 2008. Thus, in Equation (10) for this country for example, the difference in the log of MPI in 2008 and the log of MPI in 2003 is regressed against the difference in the log of the mean GDP per capita between 2003 and 2007 (the five years prior to 2007) and the log of the mean GDP per capita between 1998 and 2002 (the five years prior to 2003). The same applies to other explanatory variables.

In the case of the cross-section model the dependent variable (MPI, H_M, P_G and H_I, alternatively) is defined as the mean of the observed poverty estimates between 2000 and 2014.[7] Then, each country's mean poverty measure is regressed against the mean

[6] For robustness analysis, we also formed an alternative panel from the total of 110 countries with MPI data, but not intending to replicate the MPI panel. Rather we selected the first and last observation of income poverty. In this way we formed a panel of 82 countries with two income poverty observations between 1980 and 2014, with an average distance between the two income poverty observations of 9.3 years.

7 The only exception is India, which has one MPI estimate for 1999. We also take this estimate to compute the mean MPI of India.

value – taken between 1980 and 2014 – of the explanatory variables (detailed in Table A.1 in Appendix A, in Supplementary Materials).[8] Using the mean poverty estimates – for countries for which this is possible – is more informative than a single specific value for understanding the link between growth – a long-term process – and poverty. One particular observation might be influenced by a particular recent episode of either outstanding expansion or recession. Additionally, by using the mean we also alleviate data problems that might influence one particular estimate, such as unavailability of a particular indicator in the case of the MPI. Table A.2 in Appendix A available in Supplementary Materials presents the summary statistics of the variables used.

5. Results

5.1 First Difference Estimator Model

Table 2 presents the first difference estimator results of the change in the MPI considering nine different specifications (numbered sequentially at the top of each column of the table), with different combinations of explanatory variables. Results of the first specification suggest that, without considering anything else, a 1 per cent increase in the growth rate leads – on average – to a 0.56 per cent reduction in the MPI and this is significant at the 10 per cent level. Including trade and sector composition of GDP (specifications 3-6), growth remains as a significant determinant, and the estimated elasticity of multidimensional poverty to growth does not change substantially, whereas neither trade nor sector composition appear to be significant.[9] Inequality (specification 2) is not significant, and the poverty elasticity to growth increases, but this is due to the restricted sample used here, determined by the availability of the Gini coefficient.[10] When we include government expenditure in education and health (specification 7-9), we find these variables not to be significant and – moreover – growth is no longer significant. We expected the government

[8] In order to compare the regression coefficients when using other poverty measures as the dependent variable, we express the MPI values in percentage points.

[9] The value added by agriculture (as a % of GDP) is not included because it is the complement to the value added by industry and services, and it is thus highly collinear with these other two shares. However, the coefficient of the agricultural share is positive, although non-significant, as it can be inferred from the results on the other two shares of GDP, and has been verified by including the agricultural share alone, alongside growth.

[10] When we run the regressions of the other specifications for the restricted sample of specification 2, we obtain a coefficient for the growth variable similar to the one obtained in specification 2.

expenditure variables to be significant, as one would expect them to have a direct link with the educational and health outcomes considered in the MPI. However, data on these variables is limited and presumably have measurement error.

Table 3 presents the first difference estimator results of the change in the multidimensional headcount ratio H_M, considering the same different specifications presented in Table 4. As described in Section 2, H_M is a sub-index of the MPI. The key difference between H_M and the MPI is the intensity component. Results are quite similar to those of the MPI, but the growth elasticity of multidimensional poverty as measured by H_M is higher in absolute value, 0.73, and significant at the 5% level, suggesting that it may be more difficult for economic growth to reduce poverty among the poorest poor. The same result regarding the inclusion of the inequality variable emerges. Non-significance of the expenditure variables also holds. Both with MPI and H_M regressions, the overall goodness of fit is quite low, suggesting that – unfortunately – most of the change in multidimensional poverty remains unexplained.[11]

Table 2: First Difference Estimator

Dependent Variable: Change in the Multidimensional Poverty Index (MPI)

	SPECIFICATION								
	1	2	3	4	5	6	7	8	9
Growth of GDPpc	-0.56*	-1.20**	-0.56*	-0.57*	-0.55*	-0.72**	-0.19	-0.18	-0.44
Gini		-0.10							
Trade (%GDP)			-0.02			0.04			0.29
Exports (%GDP)				0.08					
Imports (%GDP)				-0.10					
VA Industry (%GDP)					-0.54			-0.67**	
VA Services (%GDP)					-0.56			-0.83*	
VA Manufacturing (%GDP)						-0.25			-0.26**
Education Expenditure (%GDP)							0.04	0.04	0.02
Health Expenditure (%GDP)							-0.22	-0.09	-0.15
R2	0.03	0.12	0.03	0.04	0.06	0.06	0.02	0.05	0.07
N	100	65	100	100	96	94	77	76	74

***: Significant at the 1% level; **: Significant at the 5% level; *: Significant at the 10% level.

[11] To check for potential endogeneity we instrumented the first difference in the average GDP per capita with the second difference for the countries for which we have three or four MPI estimates (25 countries in total). We estimated the different specifications of the model and performed the Hausman test. In all specifications, we do not reject the null hypothesis at the 5 per cent that the IV estimated coefficients are not significantly different from the OLS ones. Thus, we understand that there is evidence of non-endogeneity.

Table 3: First Difference Estimator

Dependent Variable: Change in the Multidimensional Poverty Incidence (H_M H_M)

	SPECIFICATION								
	1	2	3	4	5	6	7	8	9
Growth of GDPpc	-0.73**	-1.41***	-0.73**	-0.74**	-0.71**	-0.84**	-0.34	-0.34	-0.52
Gini		0.43							
Trade (%GDP)			0.11			-0.08			0.27
Exports (%GDP)				0.03					
Imports (%GDP)				-0.13					
VA Industry (%GDP)					-0.46			-0.59**	
VA Services (%GDP)					-0.61			-0.70	
VA Manufacturing (%GDP)						-0.16			-0.19*
Education Expenditure (%GDP)							0.02	0.012	-0.01
Health Expenditure (%GDP)							-0.18	-0.07	-0.12
R2	0.05	0.14	0.06	0.06	0.07	0.07	0.01	0.04	0.05
N	102	67	102	102	98	96	78	77	75

***: Significant at the 1% level; **: Significant at the 5% level; *: Significant at the 10% level.

5.2 Multidimensional vs. Income Poverty

A natural question is whether growth has a different impact on multidimensional poverty than on income poverty. To address this, we have estimated the same specifications for two international measures of income poverty: the income poverty incidence or headcount ratio H_I of people who live on less than \$1.25 (PPP) a day and the poverty gap measure P_G also using the \$1.25 (PPP) a day poverty line.

Regression results using P_G are reported in Table 4, which can be compared to those obtained using the MPI in Table 2. Regression results using H_I are reported in Table 5, which can be compared to those obtained using H_M in Table 3. One can note two things. First, economic growth seems to be more effective at reducing income poverty than at reducing multidimensional poverty. The estimated average elasticity of the income poverty gap to economic growth (-2.78) is much higher – and with higher significance – than the corresponding to the MPI; similarly, the estimated growth elasticity of the income headcount ratio is much higher than that of the multidimensional headcount ratio.[12] Second, as with multidimensional poverty, the other included variables are in general insignificant, except for exports and imports in the case of the income poverty gap.[13]

[12] It is also worth noting that the estimated growth elasticity of income poverty is within the range found by previous studies.

[13] When the same models are estimated with the alternative income panel (not necessarily replicating the MPI panel), results are similar in terms of significance, but the estimated elasticities are lower, although they are still higher than those of multidimensional poverty.

Table 4: First Difference Estimator

Dependent Variable: Change in Income Poverty Gap (P_G)

	SPECIFICATION								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Growth of GDPpc	-2.78**	-3.68***	-2.57***	-2.94***	-2.60***	-3.03***	-3.09**	2.66***	-3.24*
Gini		0.55							
Trade (%GDP)			-0.09			0.07			0.31
Exports (%GDP)				-1.42***					
Imports (%GDP)				0.96**					
VA Industry (%GDP)					-0.05			0.21	
VA Services (%GDP)					-1.53			-1.73**	
VA Manufacturing (%GDP)						-0.28			-0.11
Education Expenditure (%GDP)							-0.52	-0.81*	-0.56
Health Expenditure (%GDP)							-0.64	-0.10	-0.52
R2	0.27	0.36	0.27	0.37	0.32	0.29	0.30	0.37	
N	59	38	59	59	58	58	49	49	

***: Significant at the 1% level; **: Significant at the 5% level; *: Significant at the 10% level.

Table 5: First Difference Estimator

Dependent Variable: Change in Income Poverty Incidence (H_I)

	SPECIFICATION								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Growth of GDPpc	-2.36***	-3.27***	-2.28***	-2.40***	-2.18***	-2.51***	-2.51**	-2.18**	2.56**
Gini		1.27							
Trade (%GDP)			-0.31			-0.19			0.19
Exports (%GDP)				0.63					
Imports (%GDP)				-1.15					
VA Industry (%GDP)					-0.25			0.16	
VA Services (%GDP)					-1.54*			-1.35**	
VA Manufacturing (%GDP)						0.08			-0.04
Education Expenditure (%GDP)							-0.51	-0.74*	-0.53*
Health Expenditure (%GDP)							-0.55	-0.23	-0.49
R2	0.23	0.32	0.24	0.29	0.27	0.24	0.28	0.34	0.28
N	61	40	61	61	60	60	49	49	49

***: Significant at the 1% level; **: Significant at the 5% level; *: Significant at the 10% level.

5.3 Cross Section Estimator Model

Tables 6 and 7 present the estimation results of the cross-section model for the mean between 2000 and 2014 of the MPI and H_M, with 12 different specifications for different combinations of explanatory variables. In the Supplementary Materials we present estimation results of the same models but using the income poverty measures H_I and P_G, in symmetry with the analysis of Section 5.1. Looking at the tables, one can extract the following results.

Economic growth is significantly associated with a reduction in multidimensional poverty. Without including any other explanatory variable, a mean growth rate one percentage point higher is associated with a 2.6 per cent points lower average MPI, and with 4.4 per cent points lower multidimensional headcount ratio. Note however that the reported coefficients are not elasticities.

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Table 6: Cross-section OLS estimates

Dependent Variable: Multidimensional Poverty Index (MPI)

	SPECIFICATION											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Growth of GDPpc	-2.59***	-2.78***	-2.23***	-2.40***	-1.81***	-1.22**	-1.99***	-2.05***	-1.78***	-2.45***	-1.14	-1.96***
Gini		0.073										
Trade (%GDP)			-0.177***			-0.170***	-0.13***				-0.137**	
Exports (%GDP)				-0.56***				-0.35***				
Imports (%GDP)				0.169*								
VA Industry (%GDP)					-0.86***				-0.85***			-0.86***
VA Services (%GDP)					-0.83***				-0.80***			-0.76***
VA Manufacturing (%GDP)						-1.22***					-1.15***	
Control of Corruption							-9.86***	-8.81***	-1.02			
Education Expenditure (%GDP)										-0.65	-0.31	-0.24
Health Expenditure (%GDP)										-4.32***	-1.34	-0.77
R2	0.09	0.11	0.20	0.28	0.52	0.40	0.29	0.33	0.52	0.21	0.41	
N	109	104	109	109	105	105	109	109	105	103	99	

***: Significant at the 1% level; **: Significant at the 5% level; *: Significant at the 10% level.

Table 7: Cross-section OLS estimates

Dependent Variable: Multidimensional Poverty Incidence (H_M H_M)

	SPECIFICATION											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Growth of GDPpc	-4.32***	-4.44***	-3.72***	-4.02***	-2.97***	-2.02**	-3.32***	-3.41***	-2.93***	-3.93***	-1.69	-3.04***
Gini		0.25										
Trade (%GDP)			-0.29***			-0.27***	-0.21***				-0.22	
Exports (%GDP)				-0.97***				-0.57***				
Imports (%GDP)				0.32**								
VA Industry (%GDP)					-1.43***				-1.40***			-1.43***
VA Services (%GDP)					-1.37***				-1.30***			-1.27***
VA Manufacturing (%GDP)						-2.02***					-1.90***	
Control of Corruption							-17.14***	-15.53**	-2.45			
Education Expenditure (%GDP)										-0.37	-.20	0.44
Health Expenditure (%GDP)										-7.93***	-3.07*	-2.04
R2	0.09	0.11	0.20	0.29	0.52	0.39	0.29	0.33	0.52	0.21	0.41	0.49
N	109	109	109	105	105	105	109	109	105	103	99	88

***: Significant at the 1% level; **: Significant at the 5% level; *: Significant at the 10% level.

As additional explanatory variables are in cluded, the growth coefficient remains significant but the coefficient decreases

When income inequality is included (Specification 2), this variable is not significant and the coefficient of growth increases, but as in the FDE model, this is because of the restricted sample used for which Gini data is available. As per other included variables, variables that are not significant in the FDE model, are significant in the cross-section one. This offers complementary information, which may be interpreted as the *country profile* that is associated with lower multidimensional poverty.

Results of Specification 3 and 4, where trade is included alongside growth, suggest that more trade is significantly associated with less poverty, and this does not reduce the significance of the growth variable, although the coefficient is slightly reduced. Moreover, we find exports to be the variable with a significant negative association with MPI and H_M, whereas imports appear with a positive significant association. These results differ from previous evidence that suggests that greater openness does not significantly affect either the incomes of the poor (Dollar and Kraay 2002, Foster and Székely 2008[1]) or the income poverty headcount ratio (Kraay 2006, Ravallion and Chen 2007), at least not directly, although trade may impact poverty indirectly given that openness is often found as a significant growth determinant.

Interestingly, our results are in line with the analysis of 13 success stories of sustained growth performed in the Growth Report (CGD, 2008), in which a common characteristic is that "they fully exploited the world economy"; integration to the global economy facilitates knowledge transmission as well as a large and stable demand for the goods of developing countries.[2] The report strongly recommends a "flourishing export sector" as a "critical ingredient of high growth, especially in early stages" (p. 49). Of course, the variables included here are just some indicative of the degree of integration of each country to the world economy, but they do not inform on the *type* of exports and imports.

[1] Foster and Székely (2007) find an impact significant at 10 per cent (t value of 1.6) only when using the arithmetic mean income but not significant when using means that give higher weight to lower incomes.

[2] The 13 success stories are Botswana; Brazil; China; Hong Kong, China; Indonesia; Japan; the Republic of Korea; Malaysia; Malta; Oman; Singapore; Taiwan, China; and Thailand. The report also mentioned India and Vietnam, as countries likely to join the group of 'success stories'.

Thus, we explore the impact of the types of growth in terms of the sector composition of GDP. Again, these variables are limited in the information they provide. We find that the mean value added by industry as well as the mean value added by services are significantly and negatively associated with the average MPI (Specifications 5). Besides, while the growth coefficient remains significant, it is reduced, suggesting that part of growth's association with poverty is through its sector composition. Given that these variables are the complement to the value added by agriculture to the GDP, the implication is that the agricultural share has a positive and significant association with multidimensional poverty.[3] In Specification 6 we find that the manufacturing sector, which is a subgroup of industry that excludes mining, construction, electricity, water, and gas, has a coefficient 1.4 times that of industry; suggesting that this sub-sector, which tends to be more labour-intensive than industry in general, has a stronger association with poverty than industry as a whole.

These results are along the same lines as Kraay (2006) who finds that countries with a higher relative productivity in agriculture are more likely to experience poverty-increasing changes in relative incomes. However, there is different evidence for India (Ravallion and Datt, 1996, 2002) and China (Ravallion and Chen, 2007). It is sensible to read these different results as complementary, in agreement with the Growth Report (CGD, 2008). Agricultural growth can have impressive impact on reducing poverty, especially at early stages of development, where most of the poor people live and work in the countryside. Yet "if history is any guide (...), no country has ever caught up with the advanced economies through farming alone (...), manufacturing and services led the way" (CGD, 2008, p. 60); importantly, growth in labour-intensive manufacturing also raises the incomes of the poor (p. 14).[4] While these statements refer to reducing income poverty, one would expect that, accompanied with adequate policies, improvements in fundamental dimensions such as education and health can also occur, reducing multidimensional poverty.

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[3] In fact, we also estimated specifications considering the value added of each of the three sectors separately in turn, alongside growth, and found similar results to the case in which they are included together. The value added of agriculture has a positive and significant association with multidimensional poverty.

[4] In fact, for many developing countries, agro-industrial-oriented growth is becoming a promising path for development (Arias, Segura & Vargas, 2004; Guanziroli, 2007; Guanziroli, Buainain, & Di Sabbato, 2012; Mucavele, 2009).

We also find that countries where corruption is better controlled tend to have lower multidimensional poverty (Specification 7 and 8). However, control of corruption is no longer significant when included alongside the GDP sectorial composition (Specification 9), which seems to be due to the high correlation between control of corruption and the value added by the services sector (0.58).[5]

Although we expected government expenditure on education and health to be significant, this is not the case when these are combined with trade and sectorial composition of GDP (specifications 11-12). It may be the case that governments are not spending effectively, but more likely, it may be the case that these variables have measurement error.

In terms of the overall goodness of fit, Specification 5, which includes growth and the value added by industry and services, exhibits the highest R^2, of 0.53.[6] This is followed by Specification 6 with an R^2 of 0.40, including growth, trade, and the value added by manufacturing.

Table B.3 and B.4 of Appendix B in the Supplementary Materials present results of cross-section estimates when income poverty measures are used; these are similar to those of multidimensional poverty with the only difference that income inequality is significant.[7]

6. Concluding Remarks

In this paper we have asked whether economic growth contributes to the reduction of multidimensional poverty as measured by the global Multidimensional Poverty Index, as well as one of its components, the multidimensional headcount ratio. We have estimated a First Difference Estimator Model for 78 developing countries, and complemented these results estimating a cross-section OLS model. In all cases we considered

[5] It sounds reasonable that countries that have been able to achieve higher levels of control of corruption have also been able to increase their value added from the services sector.

[6] Specification 9 has the same R^2 but the control of corruption variable is non-significant and does not change the coefficients of industry and services.

[7] Additionally, as in the FDE case, we test for potential endogeneity. In this cross-section OLS model, we instrumented the average growth rate between 1980 and 2014 with the average growth rate between 1980 and 1989. We tried this for all the estimated specifications and performed a Hausman test. In all cases we do not reject the null hypothesis that there are no systematic differences between the OLS and the IV model, which reinforces the conclusion that there is no endogeneity.

alternative specifications of the set of explanatory and estimated each regression for income poverty measures for comparability purposes.

We find two main results, which are robust to the econometric model used. First, while economic growth seems to contribute to reduce multidimensional poverty, its impact is quite moderate, with an elasticity well below unity. This holds both for the multi-dimensional poverty incidence (H_M) and adjusted incidence (MPI). Specifically, the results suggest that a 1% increase in the economic growth rate leads to a 0.56% reduction in the MPI and a 0.73% reduction in the H_M. The cross-section results suggest that countries with an average growth rate 1% higher have a 0.60% lower MPI, and a 0.38% lower H_M. The second main result is that economic growth has a greater and more significant impact on income poverty than on multidimensional poverty. In other words, growth does not seem to be particularly pro-poor when poverty is measured from a multidimensional perspective.

From the cross-section regressions, we also find that countries that export more, with a higher share of industry, especially manufacturing, and services in GDP have lower average multidimensional poverty. Additionally, countries with a higher control of corruption also exhibit lower poverty.

The FDE model also suggests that it is easier for economic growth to reduce multidimensional poverty incidence than incidence adjusted by poverty intensity, which would suggest that it is more difficult for the poorest poor to benefit from economic growth than for those closer to the poverty threshold, which is an intuitive result.

In sum, 'promoting pro-poor growth requires a strategy that is deliberately biased in favour of the poor so that the poor benefit proportionally more than the rich' (Kakwani and Pernia, 2000, p. 3). The evidence here suggests that so far economic growth has been quite timid in reaching the multidimensionally poor. Following the Growth Report (CGD, 2008), one explanation might be that for most of the countries in the sample, growth has not been fast enough, nor sustained for long periods of time.[8] But even when this may be the case, it surely also has to do with the *type* of growth and the policies that surrounded it in each case. Thus, the eighth sustainable development goal –inclusive growth – poses a great challenge ahead. As the MPI continues to be estimated forward

[8] The Growth Report (CGD, 2008) refers to high and sustained growth as growth of 7 per cent or more per year over 25 years or longer.

and backwards, further studies will be possible. A lot more needs to be explored in terms of the growth pathways and patterns that are favourable to multidimensional poverty reduction.

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Appendix A: Variables definitions and Summary Statistics

The dataset is composed of a total of 110 countries with MPI estimates for at least one point between 1999 and 2014, adding to a total of 215 observations. All MPI estimates come from the Oxford Poverty and Human Development Initiative. Within this dataset, we have a sub-set of 107 MPI estimates for 50 countries, which have been strongly harmonised by OPHI for a study of changes in poverty over time. It also includes 108 estimates for another 60 countries that come from the several estimation rounds performed by OPHI between 2010 and 2015, during which MPI estimates were updated for all countries for which new datasets were available.[25] Table B.1 in Appendix B available in the Supplementary Materials lists the countries, years, and surveys used for the multidimensional poverty data and the source of each estimate.

While it is acknowledged, that comparability across countries in the MPI estimates is far from perfect, all the questions used to construct the MPI indicators are harmonised one-by-one by OPHI to ensure the strongest comparability possible (Alkire and Santos 2014). The estimates from the study of poverty over time are even further harmonised (Alkire, Jindra, Robles and Vaz, 2016).

The income poverty information comes from the World Development Indicators and it has been constructed replicating – as much as possible – the countries and years of the MPI observations. A total of 50 countries have two income poverty observations, 5 countries have three and one country have four. Table B.2 in Appendix B in the Supplementary Data lists the countries, years and income poverty estimates of this panel. 76% of the countries have income poverty observations for the same year of the MPI observation or at one year distance, for the rest the income poverty estimate is no further away than 4 years to the MPI observation. The average distance between every two observations of income poverty is 5.2 years, as in the MPI case.

[25] Thus, MPI estimates used in this paper proceed from the over-time-harmonisedd MPI estimates reported in Table 6.1 - Summer 2016 (Alkire, Jindra, Robles and Vaz, 2016), from the Table 1.1 of 2011, 2013, 2014 and 2015 rounds of MPI estimates (all available here), as well as from the MPI 2010 round of estimates reported in Table 10 of Alkire and Santos (2014).

Table A.1: Definition of explanatory variables

Variable	Definition
GDP per capita, constant 2005 US$	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2005 U.S. dollars.
Growth Rate	Annual growth rate of the GDP per capita.
Gini Coefficient	Gini coefficient.
Trade as a % of GDP	The sum of exports and imports of goods and services measured as share of GDP. Exports and Imports of goods and services include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.
Imports (as % of GDP)	The value of all goods and other market services received from the rest of the world, as a share of GDP. They include the same items mentioned in the trade variable.
Exports (as % of GDP)	The value of of all goods and other market services provided to the rest of the world, as a share of GDP. Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the same items mentioned in the trade variable.
Value Added of Industry (as % GDP)	The value of the value added by industry as share of GDP. Industry corresponds to ISIC divisions 10–45 and includes manufacturing (ISIC divisions 15–37). It comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3. Note: For VAB countries, gross value added at factor cost is used as the denominator.
Value Added of Services (as % GDP)	The value added by services as share of GDP. Services correspond to ISIC divisions 50–99 and they include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services. Also included are imputed bank service charges, import duties, and any statistical discrepancies noted by national compilers as well as discrepancies arising from rescaling. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The industrial origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3. Note: For VAB countries, gross value added at factor cost is used as the denominator.

Table A.1: Definition of explanatory variables (Continued)

Variable	Definition
Value Added of Agriculture (as % GDP)	The value added by agriculture as share of GDP. Agriculture corresponds to ISIC divisions 1–5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3. Note: For VAB countries, gross value added at factor cost is used as the denominator.
Value Added of Manufacturing (as % GDP)	The value added by manufacturing as share of GDP. Manufacturing refers to industries belonging to ISIC divisions 15–37. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3. Note: For VAB countries, gross value added at factor cost is used as the denominator.
Control of Corruption	This indicator has been designed and computed by Kaufmann, Kraay and Mastruzzi (2010). It reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. It ranges from -2.5 (weak control of corruption) y 2.5 (strong control of corruption). For further details, see this page.
Government expenditure on education, total (% of GDP)	General government expenditure on education (current, capital, and transfers) is expressed as a percentage of GDP. It includes expenditure funded by transfers from international sources to government. General government usually refers to local, regional and central governments.
Health expenditure, public (% of GDP)	Public health expenditure consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants (including donations from international agencies and nongovernmental organizations), and social (or compulsory) health insurance funds.

Source: The definition of all variables except for the Control of Corruption comes from the World Development Indicators Database.

Table A.1 details the definition of each of the explanatory variables used and Table A.2 presents the summary statistics of the variables used. For simplicity, we present the mean of the poverty measures between 2000 and 2014 and for the explanatory variables, mean of each variable taken between 1980 and 2014, as used in the cross-section regressions.

Table A.2: Descriptive Statistics of Used Variables

Variable	N Obs	Mean	Std. Dev.	Min	Max
Alternative P_i (explained) variables					
Mean MPI (2000–2014)	110	17.3	17.8	0.0	65.9
Mean Multidimensional Headcount Ratio (2000–2014)	110	31.9	29.6	0.0	91.8
Mean Income Poverty Gap ($PPP1.25/day) (2000–2014)	95	9.6	11.2	0.0	43.4
Mean Income Headcount Ratio ($PPP1.25/day) (2000–2014)	95	25.1	24.2	0.0	83.8
X_{ji} (explanatory) variables					
Mean Growth Rate (1980–2014)	109	1.9	2.0	-2.6	10.8
Mean Gini Coefficient (1980–2014)	104	41.1	9.3	24.8	66.5
Mean Trade (as % GDP) (1980–2014)	109	76.2	34.2	7.2	182.5
Mean Imports (as % GDP) (1980–2014)	109	42.9	19.6	4.5	129.1
Mean Exports (as % GDP) (1980–2014)	109	33.4	17.4	2.7	88.8
Mean Value Added of Agriculture (as % GDP) (1980–2014)	105	22.0	14.1	1.3	66.4
Mean Value Added of Industry (as % GDP) (1980–2014)	105	28.5	10.3	8.0	58.3
Mean Value Added of Manufacturing (as % GDP) (1980–2014)	105	14.2	6.6	3.0	34.5
Mean Value Added of Services (as % GDP) (1980–2014)	105	49.5	11.0	25.1	79.9
Mean Control of Corruption (1980–2014)	109	-0.5	0.5	-1.7	1.0
Mean Government Expenditure in Education (as % GDP) (1980-2014)	104	4.08	1.71	1.07	11.05
Mean Government Expenditure in Health (as % GDP) (1980-2014)	109	2.86	1.36	0.35	6.26

Appendix B: Poverty data, additional robustness analysis and guide to Stata Files

1. Tables of multidimensional and income poverty estimates used

Table B.1 in the Supplementary Materials lists the countries, years, and surveys used for the MPI data, as well as the MPI, H_M, and A estimates and the source of each estimate whereas Table B.2 lists the countries, years and estimates of income poverty.

2. Additional robustness analysis

2.1 Cross-section model for income poverty measures

Tables B.3 and B.4 present the cross-section OLS estimates using income poverty measures P_G, and H_I correspondingly, and the same different specifications estimated for multidimensional poverty, numbered sequentially at the top of each column of the table. Table B.3 can be compared with Table 6 in the paper and Table B.4 can be compared with Table 7 in the paper.

Results are similar to those of multidimensional poverty, namely, countries that export more, have a higher share of industry and services in the GDP and higher control of corruption have lower income poverty. Two things are worth noting though. First, income inequality, which is not significantly (linearly) associated with the multidimensional poverty measures, H_M is significantly and positively associated with the income poverty measures. Second, although the magnitudes of the estimated coefficients are slightly higher for the multidimensional poverty measures than for the income poverty measures, these are not elasticities. In fact, as described in Santos et al. (2016), the implied average elasticity values of the cross-section models for representative parts of the corresponding poverty measure distributions (namely 3rd quintile, as well as 2nd to 4th quintile) are higher for income poverty than for multidimensional poverty, in agreement with the FDE results.

2.2 Other Estimated Models

We have also performed two other sets of estimations for robustness analysis. First, given that all the poverty measures used a range between 0 and 100, we estimated the same nine cross-section specifications with a Tobit model. Second, we estimated the nine specifications with an OLS cross-section regression in which, rather than using the mean values, we take each estimate of the MPI for each country and year as a different observation. Results do not vary in terms of sign and significance with respect to the cross-section ones.

3. Stata datasets and do-files used

We are making available the datasets and do files used to obtain the results reported in the paper.

There are three datasets and five do files, which are numbered subsequently.

1. With dataset "JDS_complete_mpi_growth_data_wide.dta" one can run the do-file "JDS_1.wide_to_long.do" which converts the data from wide to long and creates the explanatory variables in the form in which they are defined and used in the FDE regressions.
2. With dataset "JDS_complete_mpi_growth_data_long.dta" (created in the previous step), and the do-file "JDS_2.FDE_regressions.do" one can run the FDE regressions with multidimensional poverty measures as dependent variables, reported in Tables 2 and 3 of the paper.
3. With dataset "JDS_complete_mpi_growth_data_long.dta" and do file "JDS_3.income_panel_prep.do" one can create the income panel dataset that intends to replicate in as much as possible the MPI panel dataset.
4. With dataset "JDS_data_incomepov_long.dta" (created in the previous step), and the do-file "JDS_4.FDE_Income.do" one can run the FDE regressions with income poverty measures as dependent variables, reported in Tables 4 and 5 of the paper.
5. Finally, with dataset "JDS_complete_mpi_growth_data_wide.dta" and do file "JDS_5.cross-section regressions.do", one can run the cross-section regressions for multidimensional poverty measures (reported in Tables 6 and 7 of the paper), and for income poverty measures (reported in Tables B.3 and B.4 of this Supplementary Materials).

Table B.1: Multidimensional poverty data used (Continued)

Country	Year	Survey	MPI	HM	A	Miss. Ind.	Source MPI Estimate
Congo, Democratic Republic of	2007	DHS	0.527	86.5	60.9	none	6
Congo, Democratic Republic of	2010	MICS	0.392	74	53	none	3
Congo, Democratic Republic of	2013	DHS	0.401	75	53.4	none	6
Congo, Republic of	2005	DHS	0.26	49.9	52.1	l	6
Congo, Republic of	2009	DHS	0.208	40.6	51.2	l	6
Congo, Republic of	2012	DHS	0.167	33.5	49.7	l	6
Cote d'Ivoire	2005	DHS	0.353	61.5	57.4	m	6
Cote d'Ivoire	2012	DHS	0.304	55.2	55.1	m	6
Croatia	2003	WHS	0.016	4.4	36.3	e	1
Czech Republic	2003	WHS	0.01	3.1	33.4	e	1
Djibouti	2006	MICS	0.139	29.3	47.3	none	1
Dominican Republic	2000	MICS	0.048	11.1	43.3	none	6
Dominican Republic	2002	DHS	0.04	9.3	43.1	none	6
Dominican Republic	2007	DHS	0.02	5.1	39.4	none	2
Dominican Republic	2013	DHS	0.02	5.1	39	none	
Ecuador	2003	WHS	0.009	2.2	41.6	d	1
Ecuador	2014	ECV	0.013	3.4	38.5	none	4
Egypt	2005	DHS	0.013	3.5	38.5	h	6
Egypt	2008	DHS	0.034	8.2	41.4	h	6
Egypt	2014	DHS	0.024	6	40.7	h	4
Estonia	2003	WHS	0.026	7.2	36.5	d	5
Ethiopia	2000	DHS	0.677	93.6	72.3	none	6
Ethiopia	2005	DHS	0.604	89.9	67.2	none	6
Ethiopia	2011	DHS	0.526	85.2	61.8	none	6
Gabon	2000	DHS	0.161	35.4	45.5	none	6
Gabon	2012	DHS	0.075	17.4	43.3	none	6
Gambia	2006	MICS	0.336	62.5	53.8	none	6
Gambia	2013	DHS	0.253	51.2	49.4	none	6
Georgia	2005	MICS	0.003	0.8	35.2	none	1
Ghana	2003	DHS	0.309	58.7	52.5	none	6
Ghana	2008	DHS	0.202	41.9	48.1	none	6
Ghana	2011	MICS	0.139	30.4	45.8	none	3
Guatemala	2003	WHS	0.127	25.9	49.1	d	1
Guinea	2005	DHS	0.557	86.7	64.2	none	6
Guinea	2012	DHS-MICS	0.472	77	61.4	none	6
Guinea-Bissau	2006	MICS	0.462	77.5	59.6	none	3
Guyana	2005	DHS	0.05	12.7	39.2	l	6
Guyana	2009	DHS	0.041	10.6	39	l	6
Haiti	2006	DHS	0.335	60.6	55.3	none	6
Haiti	2012	DHS	0.248	49.4	50.3	none	6
Honduras	2006	DHS	0.159	32.5	48.9	i	2
Honduras	2012	DHS	0.072	15.8	45.7	i	3
Hungary	2003	WHS	0.016	4.6	34.3	e	1
India	1999	DHS	0.304	57.3	53.1	none	6
India	2006	DHS	0.254	49	51.9	none	6
Indonesia	2007	DHS	0.095	20.8	45.9	l	6
Indonesia	2012	DHS	0.066	15.5	42.9	l	6

Table B.1: Multidimensional poverty data used (Continued)

Country	Year	Survey	MPI	HM	A	Miss. Ind.	Source MPI Estimate
Iraq	2006	MICS	0.059	14.2	41.3	none	1
Iraq	2011	MICS	0.045	11.6	38.5	none	3
Jordan	2007	DHS	0.013	3.6	35.5	none	6
Jordan	2009	DHS	0.011	3	34.6	none	6
Jordan	2012	DHS	0.006	1.7	35	none	4
Kazakhstan	2006	MICS	0.002	0.6	36.9	none	1
Kazakhstan	2011	MICS	0.001	0.2	36.2	none	3
Kenya	2003	DHS	0.296	60.1	49.3	none	6
Kenya	2008	DHS	0.244	51.2	47.7	none	6
Kyrgyzstan	2006	MICS	0.019	4.9	38.8	a	1
Kyrgyzstan	2012	DHS	0.007	2	36.4	none	4
Lao People's Democratic Republic	2006	MICS	0.267	47.2	56.5	a	1
Lao People's Democratic Republic	2012	MICS/DHS	0.174	34.1	50.9	none	3
Latvia	2003	WHS	0.006	1.6	37.9		1
Lesotho	2004	DHS	0.238	50.8	46.8	none	6
Lesotho	2009	DHS	0.19	42.2	45	none	6
Liberia	2007	DHS	0.485	83.9	57.7	none	6
Liberia	2013	DHS	0.358	69.4	51.6	none	6
Macedonia, The former Yugoslav Republic of	2005	MICS	0.008	1.9	40.9	a	1
Macedonia, The former Yugoslav Republic of	2011	MICS	0.002	0.7	35.7	a	3
Madagascar	2004	DHS	0.374	67	55.8	none	6
Madagascar	2009	DHS	0.414	73.3	56.5	none	6
Malawi	2004	DHS	0.381	72.1	52.8	none	6
Malawi	2010	DHS	0.334	66.7	50.1	none	6
Maldives	2009	DHS	0.018	5.2	35.6	none	2
Mali	2006	DHS	0.559	86.3	64.8	none	6
Mali	2013	DHS	0.459	77.9	58.9	none	6
Mauritania	2007	MICS	0.355	62	57.2	none	6
Mauritania	2011	MICS	0.285	52.1	54.6	none	6
Mexico	2006	ENSANUT	0.015	4	38.9	none	1
Mexico	2012	ENSANUT	0.011	2.8	38.8	none	4
Moldova, Republic of	2005	DHS	0.007	1.9	36.7	none	2
Moldova, Republic of	2012	MICS	0.003	0.8	35.9	none	4
Mongolia	2005	MICS	0.065	15.8	41	none	1
Mongolia	2010	MICS	0.037	9.2	40.7	none	4
Montenegro	2006	MICS	0.006	1.5	41.6	a	1
Montenegro	2013	MICS	0.001	0.3	46.4	none	4
Morocco	2004	DHS	0.139	28.5	48.8	none	1
Morocco	2007	LSMS	0.048	10.6	45.3	b	2
Morocco	2011	PAPFAM	0.067	15.4	43.7	none	4
Mozambique	2003	DHS	0.505	82.3	61.3	none	6
Mozambique	2009	DHS	0.512	79.3	64.6	none	1
Mozambique	2011	DHS	0.393	70.3	55.9	none	6
Myanmar	2000	MICS	0.154	31.8	48.3	c	1
Namibia	2000	DHS	0.194	41.3	47.1	none	6
Namibia	2007	DHS	0.154	33.7	45.8	none	6
Namibia	2013	DHS	0.193	42	46	none	4

Table B.1: Multidimensional poverty data used (Continued)

Country	Year	Survey	MPI	HM	A	Miss. Ind.	Source MPI Estimate
Nepal	2006	DHS	0.35	64.7	54	none	6
Nepal	2011	DHS	0.217	44.2	49	none	6
Nicaragua	2001	DHS	0.211	40.7	51.9	none	
Nicaragua	2007	DHS	0.128	28	45.7	none	2
Nicaragua	2012	DHS	0.072	16.1	45	none	3
Niger	2006	DHS	0.696	93.5	74.4	none	6
Niger	2012	DHS	0.621	90	69	none	6
Nigeria	2003	DHS	0.368	63.6	57.9	none	6
Nigeria	2008	DHS	0.313	54.7	57.3	none	6
Nigeria	2013	DHS	0.311	54.4	57.2	none	6
Pakistan	2007	DHS	0.264	49.4	53.4	l	6
Pakistan	2013	DHS	0.235	45.2	51.8	l	6
Paraguay	2003	WHS	0.064	13.3	48.5	d	1
Peru	2005	DHS	0.085	19.5	43.7	none	6
Peru	2008	DHS-Cont	0.066	15.7	42.2	none	6
Peru	2012	DHS-Cont	0.043	10.5	41	none	6
Philippines	2003	DHS	0.089	19	47	m	5
Philippines	2008	DHS	0.064	13.4	47.4	g	2
Philippines	2013	DHS	0.052	11	47.3	n	4
Russian Federation	2003	WHS	0.005	1.3	38.9	d	1
Rwanda	2005	DHS	0.461	82.9	55.6	none	6
Rwanda	2010	DHS	0.33	66.1	49.9	none	6
Saint Lucia	2012	MICS	0.003	1	35.4	a	4
Sao Tome and Principe	2000	MICS	0.272	52	52.2	l	6
Sao Tome and Principe	2009	DHS	0.182	38.5	47.5	l	6
Senegal	2005	DHS	0.383	63.7	60.2	none	6
Senegal	2010	DHS	0.351	60.7	57.9	none	6
Senegal	2013	DHS Cont.	0.352	61.9	56.8	none	6
Serbia	2005	MICS	0.003	0.8	40	none	1
Serbia	2010	MICS	0	0.1	40.2	none	3
Serbia	2014	MICS	0.001	0.2	40.5	none	4
Sierra Leone	2005	MICS	0.489	81.5	60	none	6
Sierra Leone	2008	DHS	0.47	79.1	59.4	none	6
Sierra Leone	2010	MICS	0.388	72.5	53.5	none	3
Sierra Leone	2013	DHS	0.464	80.7	57.5	none	4
Slovakia	2003	WHS	0	0	0	d	
Slovenia	2003	WHS	0	0	0	d	
Somalia	2006	MICS	0.514	81.2	63.3	none	1
South Africa	2003	WHS	0.022	5.2	42	f	
South Africa	2008	NIDS	0.076	17.8	42.4	k	6
South Africa	2012	NIDS	0.043	10.5	40.8	k	6
Sri Lanka	2003	WHS	0.021	5.3	38.7	d	1
Suriname	2000	MICS	0.063	12.6	49.7	j	5
Suriname	2006	MICS	0.039	8.2	47.2	none	1
Suriname	2010	MICS	0.024	5.9	40.8	a	3
Swaziland	2007	DHS	0.184	41.4	44.5	none	5
Swaziland	2010	MICS	0.086	20.4	41.9	none	2

Table B.1: Multidimensional poverty data used (Continued)

Country	Year	Survey	MPI	HM	A	Miss. Ind.	Source MPI Estimate
Syrian Arab Republic	2006	MICS	0.021	5.5	37.5	none	1
Syrian Arab Republic	2009	PAPFAM	0.016	4.4	37.4	none	4
Tajikistan	2005	MICS	0.068	17.1	40	none	1
Tajikistan	2012	DHS	0.054	13.2	40.8	none	3
Tanzania, United Republic of	2008	DHS	0.371	65.6	56.6	l	6
Tanzania, United Republic of	2010	DHS	0.335	61.1	54.8	l	6
Thailand	2006	MICS	0.006	1.6	38.5	none	1
Togo	2006	MICS	0.284	54.3	52.4	none	1
Togo	2010	MICS	0.25	49.7	50.3	none	6
Togo	2014	DHS	0.239	48	49.7	none	6
Trinidad and Tobago	2006	MICS	0.02	5.6	35.1	none	1
Tunisia	2003	WHS	0.01	2.8	37.1	d	1
Tunisia	2012	MICS	0.004	1.2	38.5	none	3
Turkey	2003	DHS	0.028	6.6	42	h	1
Uganda	2006	DHS	0.42	77.9	53.9	none	6
Uganda	2011	DHS	0.343	66.8	51.4	none	6
Ukraine	2007	DHS	0.008	2.2	35.5	none	2
Ukraine	2012	MICS	0.004	1.2	34.8	none	4
United Arab Emirates	2003	WHS	0.002	0.6	35.3	none	1
Uruguay	2003	WHS	0.006	1.7	34.7	none	1
Uzbekistan	2006	MICS	0.008	2.3	36.2	l	1
Vanuatu	2007	MICS	0.129	30.1	42.7	l	1
Viet Nam	2002	DHS	0.084	17.7	47.2	none	1
Viet Nam	2011	MICS	0.017	4.2	39.5	none	2
Yemen	2006	MICS	0.283	52.5	53.9	none	1
Zambia	2001	DHS	0.397	72	55.1	none	6
Zambia	2007	DHS	0.332	64.8	51.2	none	6
Zambia	2014	DHS	0.281	56.6	49.8	d	4
Zimbabwe	2006	DHS	0.18	39.7	45.3	none	6
Zimbabwe	2011	DHS	0.145	33.5	43.2	h	6
Zimbabwe	2014	MICS	0.127	29.7	42.7	none	6
Syrian Arab Republic	2006	MICS	0.021	5.5	37.5	none	1
Syrian Arab Republic	2009	PAPFAM	0.016	4.4	37.4	none	4
Tajikistan	2005	MICS	0.068	17.1	40	none	1
Tajikistan	2012	DHS	0.054	13.2	40.8	none	3
Tanzania, United Republic of	2008	DHS	0.371	65.6	56.6	none	6
Tanzania, United Republic of	2010	DHS	0.335	61.1	54.8	l	6
Thailand	2006	MICS	0.006	1.6	38.5	l	1
Togo	2006	MICS	0.284	54.3	52.4	none	1
Togo	2010	MICS	0.25	49.7	50.3	none	6
Togo	2014	DHS	0.239	48	49.7	none	6
Trinidad and Tobago	2006	MICS	0.02	5.6	35.1	none	1
Tunisia	2003	WHS	0.01	2.8	37.1	none	1
Tunisia	2012	MICS	0.004	1.2	38.5	d	3
Turkey	2003	DHS	0.028	6.6	42	none	1
Uganda	2006	DHS	0.42	77.9	53.9	h	6
Uganda	2011	DHS	0.343	66.8	51.4	none	6

Table B.1: Multidimensional poverty data used (Continued)

Country	Year	Survey	MPI	H_M	A	Miss. Ind.	Source MPI Estimate
Ukraine	2007	DHS	0.008	2.2	35.5	l	2
Ukraine	2012	MICS	0.004	1.2	34.8	l	4
United Arab Emirates	2003	WHS	0.002	0.6	35.3	d	1
Uruguay	2003	WHS	0.006	1.7	34.7	d	1
Uzbekistan	2006	MICS	0.008	2.3	36.2	none	1
Vanuatu	2007	MICS	0.129	30.1	42.7	none	1
Viet Nam	2002	DHS	0.084	17.7	47.2	m	1
Viet Nam	2011	MICS	0.017	4.2	39.5	none	2
Yemen	2006	MICS	0.283	52.5	53.9	l	1
Zambia	2001	DHS	0.397	72	55.1	none	6
Zambia	2007	DHS	0.332	64.8	51.2	none	6
Zambia	2014	DHS	0.281	56.6	49.8	none	4
Zimbabwe	2006	DHS	0.18	39.7	45.3	none	6
Zimbabwe	2011	DHS	0.145	33.5	43.2	none	6
Zimbabwe	2014	MICS	0.127	29.7	42.7	none	6

Survey: DHS: Demographic and Heath Survey, MICS: Multiple Indicators Cluster Survey, WHS: World Health Survey, ENNyS: EncuestaNacional de Nutricion y Salud, ENSANUT: EncuestaNacional de Salud y Nutricion, ECV: Encuesta de Condiciones de Vida, PNDS: PesquisaNacional de Demografia e Saude, PAPFAM: Pan Arab Project for Family Health.

Miss. Ind: Missing Indicators: none, a: child mortality; b: child mortality and floor; c: child mortality, electricity and cooking fuel; d: child school attendance; e: child school attendance and child mortality; f: child school attendance and electricity; g: child school attendance and nutrition; h: cooking fuel; i: electricity; j: electricity, cooking fuel, assets; k: floor; l: nutrition; m: nutrition and cooking fuel; n: school attendance and nutrition.

Source of the MPI (H_M and A) Estimations: 1: OPHI estimates MPI 2011. Alkire, Roche, Santos, Seth (2011); 2: OPHI estimates 2013; 3: OPHI Estimates 2014; 4: OPHI Estimates 2015; 5: Alkire and Santos (2014); 6: Alkire, Jindra, Robles, Vaz (2016).

Table B.2: Income panel data used. Countries, years and poverty estimates

Country	Year	H_I	P_G
Albania	2008	0.2	0.03
Albania	2005	0.44	0.08
Armenia	2010	2.5	0.38
Armenia	2005	4.22	0.87
Bangladesh	2010	43.25	11.17
Bangladesh	2005	50.47	14.17
Benin	2011	51.61	18.82
Benin	2003	47.33	15.73
Bolivia, Plurinational State of	2008	10.48	5.28
Bolivia, Plurinational State of	2004	11.69	5.07
Brazil	2006	5.93	2.61
Brazil	2003	9.62	4.18
Burkina Faso	2009	44.46	14.59
Burkina Faso	2003	48.9	18.25
Cambodia	2010	11.25	1.7
Cambodia	2004	32.77	7.79
Central African Republic	2008	62.83	31.26
Central African Republic	2003	62.43	28.3
Chad	2011	36.52	14.18
Chad	2002	61.94	25.64
China	2011	6.26	1.32
China	2002	28.06	8.57
Colombia	2010	6.17	2.32
Colombia	2005	7.87	2.87
Congo, Republic of	2011	32.82	11.47
Congo, Republic of	2005	54.1	22.82
Dominican Republic	2012	2.25	0.6
Dominican Republic	2007	3.72	1.03
Dominican Republic	2002	5.27	1.78
Dominican Republic	2000	5.24	1.69
Ecuador	2012	3.95	1.8
Ecuador	2003	12	5.33
Egypt	2008	1.68	0.37
Egypt	2004	2.26	0.43
Ethiopia	2010	36.79	10.39
Ethiopia	2005	38.96	9.6
Ethiopia	1999	54.57	15.74
Guinea	2012	40.87	12.7
Guinea	2007	39.33	13.01
Honduras	2011	16.48	7.21
Honduras	2006	22.4	10.58
Indonesia	2011	16.2	2.68
Indonesia	2008	22.71	4.73
Iraq	2012	3.91	0.64
Iraq	2007	3.37	0.56
Jordan	2010	0.08	0.02
Jordan	2008	0.07	0.01

Table B.2: Income panel data used (Continued)

Country	Year	H_I	P_G
Kazakhstan	2010	0.06	0.01
Kazakhstan	2006	0.41	0.06
Kyrgyzstan	2011	5.11	1.18
Kyrgyzstan	2006	13.38	3.4
Lao People's Democratic Republic	2012	30.26	7.66
Lao People's Democratic Republic	2007	35.1	9.15
Lesotho	2010	56.22	29.17
Lesotho	2002	55.16	28.01
Macedonia, The former Yugoslav Republic of	2008	0.28	0.04
Macedonia, The former Yugoslav Republic of	2005	0.28	0.04
Madagascar	2010	87.67	48.55
Madagascar	2005	82.43	40.37
Malawi	2010	72.16	34.25
Malawi	2004	74.95	33.18
Mali	2010	50.61	16.45
Mali	2006	51.43	18.79
Mexico	2012	1.03	0.23
Mexico	2006	0.68	0.13
Moldova, Republic of	2011	0.23	0.03
Moldova, Republic of	2005	12.49	2.91
Montenegro	2011	0.21	0.08
Montenegro	2006	0.14	0
Mozambique	2009	60.71	25.84
Mozambique	2002	74.69	35.4
Namibia	2009	23.54	5.74
Namibia	2004	31.91	9.45
Nepal	2010	23.74	5.21
Nepal	2003	53.13	18.39
Nicaragua	2009	8.54	2.93
Nicaragua	2001	14.37	3.65
Niger	2011	40.81	10.42
Niger	2007	42.06	11.75
Nigeria	2010	62.03	27.46
Nigeria	2004	61.84	26.89
Pakistan	2010	12.74	1.94
Pakistan	2007	17.15	2.63
Peru	2012	2.89	0.78
Peru	2008	4.84	1.35
Peru	2005	7.83	2.32
Philippines	2012	18.96	4.02
Philippines	2009	18.1	3.62
Philippines	2003	22.88	5.88
Rwanda	2011	63.02	26.53
Rwanda	2006	71.97	34.71
Sao Tome and Principe	2010	43.53	13.94
Sao Tome and Principe	2000	28.18	7.87

Table B.2: Income panel data used (Continued)

Country	Year	H_I	P_G
Senegal	2011	34.06	11.08
Senegal	2005	33.5	10.8
Serbia	2010	0.05	0
Serbia	2005	0.59	0.17
Sierra Leone	2011	56.63	19.24
Sierra Leone	2003	59.44	22.71
South Africa	2011	9.42	1.19
South Africa	2009	13.67	2.27
South Africa	2006	16.72	3.06
Tajikistan	2009	6.47	1.27
Tajikistan	2004	20.7	4.69
Tanzania, United Republic of	2012	43.48	12.98
Tanzania, United Republic of	2007	67.87	28.1
Togo	2011	52.46	22.52
Togo	2006	53.15	20.33
Tunisia	2010	0.74	0.2
Tunisia	2005	1.38	0.33
Uganda	2012	37.78	11.96
Uganda	2005	51.72	19.22
Ukraine	2010	0	0
Ukraine	2007	0.06	0.03
Viet Nam	2012	2.44	0.55
Viet Nam	2002	40.07	11.21
Zambia	2010	74.32	41.78
Zambia	2006	68.51	37.02
Zambia	2003	64.6	27.13

Note: This set of countries and years, has been constructed replicating as much as possible the panel data of MPI estimates. Income poverty estimates in this table are taken from the World Development Indicators (available here).

Table B.3: Cross-section OLS Estimates
Dependent Variable: Income Poverty Gap (P_G P_G)

	SPECIFICATION											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Growth of GDPpc	-2.02***	-1.57**	-1.88***	-1.86***	-1.26***	-1.25***	-1.61***	-1.49***	-1.33***	-2.16***	-1.36**	-1.43***
Gini		0.28**										
Trade (%GDP)			-0.045			-0.043	-0.037				-0.03	
Exports (%GDP)				-0.33***				-0.17***				
Imports (%GDP)				0.195***								
VA Industry (%GDP)					-0.413***				-0.418***			-0.43***
VA Services (%GDP)					-0.444***				-0.478***			-0.50***
VA Manufacturing (%GDP)						-0.53***					-0.52***	
Control of Corruption							-4.81**	-4.63**	1.42			
Education Expenditure (%GDP)										-0.49	-0.36	0.11
Health Expenditure (%GDP)										-1.11	-0.06*	1.03
R2	0.13	0.18	0.15	0.26	0.40	0.25	0.19	0.24	0.40	0.16	0.24	0.40
N	95	95	95	95	91	91	95	95	95	92	88	88

***Significant at the 1% level **Significant at the 5% level *Significant at the 10% level

Table B.4: Cross-section OLS Estimates
Dependent Variable: Income Poverty Incidence (H_I H_I)

	SPECIFICATION											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Growth of GDPpc	-4.3***	-3.51***	-3.82***	-3.78***	-2.48**	-2.42**	-3.14***	-2.90***	-2.55**	-4.24***	-2.44**	-2.58***
Gini		-0.496**										
Trade (%GDP)			-0.145*			-0.138*	-0.124				-0.07	
Exports (%GDP)				-0.757***				-0.44***				
Imports (%GDP)				0.365**								
VA Industry (%GDP)					-1.09***				-1.09***			-1.11***
VA Services (%GDP)					-1.15***				-1.19***			-1.14***
VA Manufacturing (%GDP)						-1.33***					-1.26***	
Control of Corruption							-12.42***	-12.19***	1.62			
Education Expenditure (%GDP)										0.61	-0.50	0.59
Health Expenditure (%GDP)										-4.64***	-2.07	0.25
R2	0.13	0.16	0.17	0.27	0.50	0.29	0.22	0.28	0.50	0.20	0.30	0.49
N	95	95	95	95	91	91	95	95	95	92	88	88

***Significant at the 1% level **Significant at the 5% level *Significant at the 10% le