WPS6568

Policy Research Working Paper 6568

Growth Still Is Good for the Poor

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The World Bank
Development Research Group
Macroeconomics and Growth Team
August 2013

Policy Research Working Paper 6568

Abstract

Incomes in the poorest two quintiles on average increase at the same rate as overall average incomes. This is because, in a global dataset spanning 118 countries over the past four decades, changes in the share of income of the poorest quintiles are generally small and uncorrelated with changes in average income. The variation in changes in quintile shares is also small relative to the variation in growth in average incomes, implying that the latter accounts for most of the variation in income growth in the poorest quintiles. These findings hold across most regions and time periods and when conditioning on a variety of country-level factors that may matter for growth and inequality changes. This evidence confirms the central importance of economic growth for poverty reduction and illustrates the difficulty of identifying specific macroeconomic policies that are significantly associated with the relative growth rates of those in the poorest quintiles.

This paper is a product of the Macroeconomics and Growth Team, Development Research Group. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at akraay@worldbank.org.

Growth Still Is Good for the Poor

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Keywords: growth, inequality

JEL Classification Codes: O4, O11, I3

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1. Introduction

Absolute poverty has fallen sharply in the developing world over the past three decades. In 1980, 52 percent of the world's population lived below the World Bank's $1.25/day poverty line. By 1990, the incidence of poverty had fallen to 42 percent, and to 21 percent in 2010. Much of this reduction has been due to rapid growth in large and initially poor developing countries such as China and India. But in all regions of the world, rapid growth has been systematically associated with sharp declines in absolute poverty.

This success in poverty reduction has meant that low global absolute poverty lines, like the World Bank's $1.25/day standard, have become less relevant for many developing countries where today only a small fraction of the population lives below this austere threshold. This led the World Bank to put a new institutional emphasis on tracking "shared prosperity", in addition to monitoring absolute poverty. "Shared prosperity" is defined in terms of the growth rate of incomes in the bottom 40 percent of households, and the World Bank has made a public commitment to supporting policies that foster "shared prosperity" in the developing world.[1] Concerns about "shared prosperity" are also widespread in advanced economies, where many fear that growth no longer benefits the bottom half of the income distribution.[2]

This emphasis on "shared prosperity" naturally raises the question of the extent to which it differs from simply "prosperity", where the latter could be defined as overall aggregate income growth. In this paper, we address this question, updating and elaborating on our earlier work in Dollar and Kraay (2002). In that paper, we studied the relationship between growth in average incomes of the poorest 20 percent of the population, and growth in average incomes, using a large cross-country panel dataset on average incomes and inequality. Our main findings in that paper were that (i) incomes in the poorest quintile on average increase equiproportionately with average incomes, reflecting the lack of a systematic correlation between growth and changes in the first quintile share, and (ii) this relationship is very strong, reflecting the fact that most of the variation in growth in incomes in the poorest quintile

[1] See World Bank (2013).

[2] As an example of this, in a recent speech at Knox College in Galesburg, Illinois on July 24, 2013, President Barack Obama described the US economy as *"... a winner-take-all economy where a few do better and better, while everybody else just treads water"*. More systematically, a recent Pew Global Survey found that a strong majority of respondents in 14 advanced economies felt that the gap between rich and poor was increasing in recent years. The fraction holding this view ranged from a low of 58 percent in Japan to a high of 90 percent in Spain (Pew Research Center, 2013).

reflected growth in average incomes, rather than changes in the share of income accruing to the poorest quintile.

Over the past 15 years since we began work on that paper, the quality and quantity of available household survey data on income distribution have improved dramatically, providing rich new information that can be used to revisit the evidence on the relationship between overall growth and growth in the poorest quintiles. We work with a large cross-country dataset of high-quality survey-based measures of average incomes and income distributions, drawing on the POVCALNET database[3] of the World Bank for developing countries, and the Luxembourg Income Study (LIS) data[4] for advanced economies. Using this combined dataset, which covers 118 countries for which household surveys are available for at least two years since the 1970s, we revisit the relationship between growth in average incomes and growth in the poorest quintiles. Updating the work in Dollar and Kraay (2002), we consider growth rates of the poorest 20 percent of the population, and given the new emphasis on "shared prosperity", we also consider growth rates of the poorest 40 percent of the population.

Echoing our earlier work, this expanded and updated dataset reveals a very strong equiproportionate relationship between average incomes in the poorest quintiles, and overall average incomes. In our preferred benchmark specification, covering 299 non-overlapping within-country growth episodes at least five years long, the slope of the relationship between growth in average incomes in the poorest quintiles and growth in overall average incomes is very close to – and not significantly different from – one. Moreover, a standard variance decomposition indicates that 62 percent (77 percent) of the cross-country variation in growth in incomes of the poorest 20 percent (40 percent) of the population is due to growth in average incomes. These findings for the most part hold across different regions and over time, and across a variety of different robustness checks. This basic result underscores the central importance of overall growth for improvements in living standards among the poorest in societies.

Although the portion of the variation in growth in incomes in the poorest quintiles due to changes in inequality is -- on average -- both small and uncorrelated with growth in average incomes, it is nevertheless important to understand its other correlates. In particular, if one combination of macroeconomic policies and institutions that support a given aggregate growth rate also leads to an increase in the share of incomes accruing to the poorest quintiles, while another combination did the opposite, then the former would be preferable from the standpoint of promoting shared prosperity. We

[3] See PovcalNet Database (2013).
[4] See Luxembourg Income Study (LIS) Database (2013).

therefore investigate how growth in incomes of the poor correlates with a variety of country-level variables commonly thought to matter for growth (e.g. financial depth, financial openness, inflation rate, budget balance, trade openness, life expectancy, measures of internal and external conflicts, population growth, life expectancy and civil liberties), as well as a number of variables often considered to matter directly for inequality (e.g. primary school enrollments, inequality in educational attainment, government expenditure in education and health, and agricultural productivity).

In the spirit of data description, we use Bayesian Model Averaging to systematically document the partial correlations between these variables and growth in incomes of the poor, conditional on growth in average incomes, for all possible combinations of these variables. We find at best very modest evidence that any of the policies and institutions reflected in these variables are significantly correlated with growth in incomes of the poor, beyond any direct effect of these variables on growth itself. These findings illustrate the difficulty in using cross-national data to identify specific macro policy reforms that disproportionately support growth in the poorest income quintiles. Moreover, the particularly strong relationship between growth in incomes of the bottom 40 percent and growth in average incomes, and the lack of evidence of systematic correlates of the difference between the two, underscores the central importance of rapid growth in average incomes as a means to achieving "shared prosperity".

The rest of this paper proceeds as follows. Section 2 describes our empirical framework, as well as the cross-country panel of household survey data on which our results are based. Section 3 presents our core results on the bivariate relationship between incomes of the poor and average incomes, and subjects them to a variety of robustness checks. Section 4 considers the additional impact of a variety of policy and institutional variables on the income share of the poor. Section 5 concludes.

2. Empirical Strategy and Data

2.1. Basic Setup

Our starting point is the identity that relates incomes of the poor to average incomes:

$$Y^P = S^P Y \tag{1}$$

where Y^P denotes average income in either the bottom 20 or 40 percent of the income distribution; S^P denotes the income share of the first quintile divided by 0.2 ($\frac{Q_1}{0.2}$) or the share of the bottom two

quintiles divided by 0.4 ($\frac{Q_1+Q_2}{0.4}$); and Y denotes overall average income. As discussed below, in roughly half of the surveys in our dataset, the relevant welfare measure is consumption expenditure, while in the other half it is income. However, for terminological convenience we will refer only to income. Also, while our dataset is an unbalanced and irregularly-spaced panel of country-year observations where survey data are available, for notational convenience we will suppress country and year subscripts. Taking log differences over time results in the following expression for growth in incomes of the poor:

(2) $$\Delta \ln Y^P = \Delta \ln S^P + \Delta \ln Y$$

That is, increases in incomes of the poor can mechanically be decomposed into increases in average incomes, and increases in the share of income accruing to the poor.

In order to investigate these two factors, we begin by estimating a series of regressions of growth in incomes of the poor on growth in average incomes. The slope coefficient from this regression is

(3) $$\frac{COV\ (\Delta \ln Y^P,\ \Delta \ln Y)}{V(\Delta \ln Y)} = 1 + \frac{COV\ (\Delta \ln S^P\ ,\ \Delta \ln Y)}{V(\Delta \ln Y)}$$

where the equality follows from the definition of growth in incomes of the poor. When this estimated slope coefficient is equal to one, incomes of the poor increase on average at the same rate as overall average incomes. This is because the income share of the poorest does not vary systematically with changes in average income, i.e. $\frac{COV\ (\Delta \ln S^P,\ \Delta \ln Y)}{V(\Delta \ln Y)} = 0$. If however the estimated slope coefficient is greater (less) than one, incomes of the poor rise faster (slower) than average incomes, reflecting a positive (negative) correlation between growth and the income share of the poor.

A related question has to do with the relative importance of these two sources of growth in average incomes of the poor. We document this using a standard variance decomposition, which defines the share of the variation of growth in incomes of the poorest due to growth in average incomes as:

(4) $$S = \frac{V\ (\Delta \ln Y) + \ COV\ (\Delta \ln S^P,\ \Delta \ln Y)}{V(\Delta \ln S^P + \Delta \ln Y)}$$

In the data, we shall see that $COV\ (\Delta \ln S^P\ , \Delta \ln Y)$ is small in most specifications, and so this variance share primarily reflects the relative variances of average incomes and incomes of the poor. When the variation in changes in the poorest quintile shares is small, then the share of the variation in growth in incomes of the poor due to growth in average incomes will be close to one.[5] We report this variance decomposition in all of the tables of results that follow, as a useful summary of the relative importance of growth and changes in inequality in driving growth in incomes of the poor.

In the last part of our empirical results, we report a series of regressions of growth in average incomes of the poor on growth in average incomes, augmented by various combinations of variables intended to capture a range of policies and institutions that may matter for growth and changes in inequality. The estimated slope coefficients capture the partial correlations between these variables and growth in the income share of the poorest, conditional on growth in average incomes. Given the identities above, this is equivalent to regressing changes in a particular measure of inequality, the income share of the poor, on growth in average incomes and a set of additional variables. If these additional variables are not significant, this means that they are not systematically associated with changes in the income share of the poor, conditional on overall growth.

2.2. Measuring Growth in Average Income and Income of the Poor

Our starting point is a large dataset of 963 country-year observations for which household surveys are available, covering a total of 151 countries between 1967 and 2011. This dataset is the merger of data available in two high-quality compilations of household survey data: the World Bank's POVCALNET database, covering primarily developing countries, and the Luxembourg Income Study (LIS) database, covering primarily developed countries. The POVCALNET database is the dataset underlying the World Bank's widely known global poverty estimates. Its data on average incomes and income distribution are based on primary household survey data. In most cases, surveys are representative for the whole country.[6] Roughly half of the surveys in the POVCALNET database report income and its distribution, while the other half report consumption expenditure and its distribution. As noted earlier,

[5] See Klenow and Rodriguez-Clare (1997) for a more formal justification of this variance decomposition in a growth context. This variance share is closely related to the R-squared from a basic regression of growth in average incomes of the poor on growth in average incomes, i.e. $R^2 = S^2\ \frac{V\ (\Delta \ln Y^P)}{V\ (\Delta \ln Y)}$.

[6] In the case of Argentina and Uruguay, survey data is only available for urban areas; however, due to high urbanization rates (over 90%) this seems to be an acceptable proxy for the national income distribution.

however, for terminological convenience we will refer only to income. All survey means are expressed in constant 2005 US dollars adjusted for differences in purchasing power parity.

For countries that are not covered in POVCALNET, we rely on the LIS database.[7] This expands our sample by adding 19 OECD economies. For these countries we construct mean income and income shares of the poorest directly from the micro data at the household level. The underlying surveys are nationally representative and intended to be comparable over time. We focus on the LIS measure of household disposable income, which is expressed in the raw data in current local currency units. We convert the survey means to constant 2005 USD and then apply the 2005 purchasing power parity for consumption from the Penn World Table, in order to be consistent with the POVCALNET data. Figure 1 gives an overview of the annual data availability from these two sources. LIS survey data starts earlier, going back to 1967, while POVCALNET observations start in the 1980s. Both databases have better country coverage in more recent years.

For our empirical analysis, we organize the data into "spells", defined as within-country changes in variables of interest between two survey years. Specifically, we calculate average annual log differences of average incomes, incomes of the poor, and quintile shares for each spell, recognizing that different spells cover periods of different length, depending on the availability of household survey data. We work with three sets of spells corresponding to different time horizons. The first set consists of all possible consecutive non-overlapping spells, beginning with the first available survey for each country. This largest sample consists of 735 spells in 123 countries, with a median spell length of 2 years. A drawback of this sample is that the time period covered by many spells is quite short, and moreover a small number of countries with high frequency availability of surveys are over-represented in this sample. In order to be able to study the relationship between incomes of the poor and average incomes over longer horizons, we work with two additional sets of spells. The second consists of all possible consecutive non-overlapping spells by country, but imposing a minimum length of five years for each spell. This results in a set of 299 spells and a smaller set of 117 countries. The median spell length is 6 years. The third sample considers only the longest available spell for each country. This results in 118 spells with a median spell length of 16 years.[8]

[7] A handful of countries have surveys available both through POVCALNET and LIS. For these countries we use only the POVCALNET data, i.e. we do not switch within countries between POVCALNET and LIS.

[8] In all three sets of spells, we trim extreme observations using the following criteria: (i) we trim the distribution of growth rates of income shares of the bottom 20 and 40 percent at the first and 99th percentile in each sample, and

The minimum-five-year-spell sample is our preferred sample. As noted above, the all-spells sample overweighs those countries in which surveys are more frequent; furthermore, the year-to-year changes in inequality may have a less favourable signal-to-noise ratio than those observed over longer intervals. The long-spell sample has the disadvantage that it does not include any within-country variation in growth rates. We report results for both the all-spells and long-spells to ensure the robustness of the results, but focuse primarily on the minimum-five-year-spell sample. Appendix Table A1 summarizes the country coverage and data availability.

Table 1 provides summary statistics on annual growth in overall average incomes, the first quintile share, and the sum of the first two quintile shares. The basic story is clear from the summary statistics. Consider for example Panel 1: for the 299 observations in the minimum-five-year-spell sample, the mean growth rate of average income is 1.4 percent per year and the mean change in the share of the bottom 40 percent is 0 percent per year. This implies that the growth rate of income of the bottom 40 percent is also 1.4 percent per year on average. Furthermore, the correlation of the change in the bottom 40 percent share and mean income growth is 0.007, which is insignificantly different from zero. Finally, growth rates in average incomes vary considerably more across spells than growth rates of the income share of the bottom 40 percent: the standard deviations of these two growth rates are 4.7 versus 2.5 percent. This implies that the bulk of the variation in growth in incomes of the poor is attributable to growth in average incomes.

The second panel of Table 1 reveals some interesting heterogeneity by disaggregating the five-year spells by geographical region (the assignment of countries to geographical regions is noted in Appendix Table A1). Unsurprisingly growth rates in average incomes vary greatly across regions, ranging from near zero percent per year in the Middle East North Africa sample, to a high of 3.4 percent per year in East Asia. East Asia also stands out in the sense that rising incomes are correlated across spells with rising inequality: the correlation of the growth rate of the first (first two) quintile shares with growth in average incomes is around -0.5. Nevertheless, growth in average incomes of the poor according to either definition (i.e. the sum of the first and fourth, and first and seventh columns of Table 1) is substantially higher in this region compared with any other.

(ii) we trim the distribution of the difference between the growth rate of the survey mean and the corresponding growth rate of private consumption from the national accounts, also at the first and 99th percentiles. This results in the small changes in the number of countries represented in each sample noted in the main text. In addition to data cleaning, one country (Bhutan) is dropped from the minimum-five-year-spell sample as data is only available for four years. However, the minimum five-year criterion is not imposed in the long-spells sample, which therefore includes one more country than the five-year spells sample.

The last two panels in Table 1 disaggregate the summary statistics by decade and by region, again focusing on the five-year spells. A practical challenge for data description here is that only a small fraction of spells fall entirely within a single decade, and so it is not obvious how to assign the remaining spells to decades. To circumvent this problem, for each spell we define three variables measuring the fraction of years in the spell falling in each of three decades. For example, a spell lasting from 1989 to 1994 would have one-fifth of its years in the 1980s and four-fifths in the 1990s, and none in the 2000s. We then report weighted summary statistics by decade, weighting each spell by the fraction of observations falling in each decade. The importance of overall growth for incomes of the poor can be seen by comparing the statistics for the 1980s and the 2000s: for the observations in the 1980s, mean income growth averaged -0.3 percent while there was a slight shift in favor of the income of the bottom 40 percent, resulting in zero income growth for the bottom 40 percent. In the 2000s, growth accelerated to an average of 3.0 percent; again there was a small shift in favor of the bottom 40 percent and their income grew at 3.4 percent per year.

3. Main Results

Our baseline empirical specification consists of a simple OLS regression of growth in incomes of the poor on mean income growth. Table 2 documents these results for the three samples with different spell lengths as described above. Panel A provides the results for the poorest quintile and Panel B for the poorest two quintiles. For all three samples, we cannot reject the null hypothesis that the slope coefficient is equal to one, indicating the absence of a statistically significant relationship between growth in average incomes and growth in the income shares of the poorest. This holds both when the poor are defined as those in the bottom 20 percent, and in the bottom 40 percent, the latter corresponding to the "shared prosperity" measure advocated by the World Bank. In our preferred sample of spells at least five years long, the estimated slope coefficient is 1.06 for the bottom 20 percent, and 1.00 for the bottom 40 percent, indicating that average growth is reflected on average one-for-one in growth in incomes of the poor. In the samples of all spells, and long spells, the estimated slopes are slightly smaller than one, but again not significantly so.

The top panel of Figure 2 shows the relationship between growth in average incomes (on the horizontal axis) and growth in incomes in the poorest two quintiles (on the vertical axis), focusing on our preferred sample of spells at least five years long. Consistent with the results in Table 2 , the slope of the fitted relationship is nearly indistinguishable from the 45-degree line. Moreover, it is clear that this relationship is very strong. The R-squared from the corresponding regression in Table 2 is 0.78, and the

share of the variance of growth in average incomes in the bottom 40 percent due to growth in average incomes is 77 percent. The bottom panel of Figure 2 shows the same relationship, in the three sets of spells. In all three sets of spells, the estimated slopes are close to one, and the corresponding R-squareds are large, ranging from 67 to 78 percent.

We next investigate how this relationship varies across geographical regions and over time. Table 3 shows that our basic finding of a tightly estimated equiproportional relationship between growth in incomes of the poor, and growth in average incomes, holds in most regions, and particularly so for average incomes in the bottom 40 percent of the population. The main exception is the East Asia and Pacific region, where the estimated slopes are substantially smaller than one (and significantly so in the case of incomes of the bottom 40 percent). This indicates that in this region, spells with faster growth in average incomes were more likely to also have decreases in the income share of the poorest quintiles. However, this does not imply that those in the poorest quintiles fared particularly poorly in such spells. Recall from Table 1 that average incomes in East Asia grew fastest among all regions at 3.4 percent per year, and incomes in the poorest 40 percent rose at 3.2 percent per year on average, faster than in any other region.

In Table 4 we investigate how the relationship between growth in average incomes and growth in incomes of the poor varies over time and by region. Combining all countries, the slope of the estimated relationship is close to one across the 1980s, 1990s, and 2000s, and in all three cases is not significantly different from one. The strength of the estimated relationship, and the corresponding share of the variance of growth in incomes of the poor due to overall growth, also does not vary much across decades, ranging from a low of 58 percent in the 2000s to a high of 66 percent in the 1980s for the poorest quintile. For the bottom 40 percent, the corresponding figures range from 75 to 77 percent. When we break the results down by region there is some interesting variation. The combined East and South Asia region has a slope coefficient substantially lower than 1.0 in both the 1990s and the 2000s (and significantly so in the 1990s). Here the fastest growing countries, notably China, have had increases in income inequality so the growth of income of the bottom 40 percent lags behind average income growth. Latin America shows the opposite tendency in the 2000s, with a slope coefficient significantly greater than 1.0. This means that in faster-growing Latin American countries, income shares of the bottom quintiles also increased more, so that growth in the bottom 20 and 40 percent outstripped growth in average incomes. This gap is substantial. Referring back to Table 1, growth in average incomes in Latin America in the 2000s was 1.2 percent per year on average, while the income share of the poorest

40 percent grew at 1.1 percent per year on average, for an overall growth rate for the poorest 40 percent of 2.3 percent per year. Still, income growth of the bottom 40 percent in Asia was at an even higher rate of 3.7 percent per year during the 2000s, because the overall average growth rate in Asia was so high.

In all of our results so far, we have relied exclusively on household survey data to construct measures of average income growth and growth in incomes of the poor. However, many past studies, including our own work in Dollar and Kraay (2002), relied on national accounts growth rates to measure overall average income growth. A large literature has discussed substantial differences between growth in survey mean income and corresponding aggregates in the national accounts in some countries (see for example Deaton (2005) and Deaton and Kozel (2005) for the case of India in particular). These differences are illustrated in Figure 3, which plots average annual growth in household survey mean income (on the vertical axis), and growth in the same period taken from the national income accounts (on the horizontal axis).[9] From this figure, substantial differences in these two alternative measures of growth in average living standards are clearly apparent in the large deviations from the 45-degree line for many spells. Without taking a stand on relative merits of national accounts versus household surveys as a measure of average living standards, we perform some simple robustness checks to see how our findings change if we rely on national accounts growth rates instead of household survey mean growth rates.

The results are presented in Table 5. The first panel reproduces our benchmark specification in the slightly smaller samples of spells for which both national accounts growth and household survey growth rates are available. Dropping these few spells makes very little difference for our benchmark results, which are quite similar to those in Table 2. The second panel reports results replacing household survey growth with the corresponding national accounts growth rate (and of course also using the national accounts growth rate plus the growth rate of the relevant quintile shares to compute growth in incomes of the poor). The estimated slope coefficients are slightly larger than when using the survey means, suggesting there is a more positive correlation between changes in the poorest quintile shares and national accounts growth rates than household survey mean growth rates. However, in all but one case, this relationship is not statistically significant, as the estimated slopes are not significantly different from one. The one exception is using the minimum five-year spells, and considering incomes of the bottom 20 percent. In the third panel of Table 5, we follow the approach suggested in Chen and

[9] As we have noted earlier, the household survey data are a mix of income and consumption surveys. This raises the question of which national accounts aggregate is the closest corresponding measure. Here we compare with real private consumption growth in all countries, following Ravallion and Chen (2008).

Ravallion (2008), using a simple average of the household survey mean and national accounts growth rates.[10] Since household survey mean growth rates vary much more than consumption growth rates in the national accounts, they dominate these average growth rates. As a result, this mixed method leads to findings that are very similar to those in the first panel of Table 5.

Overall, our findings show that the poor on average benefit equiproportionally from overall growth, and these findings hold across most regional and temporal disaggregations of the data, and across a variety of further robustness checks. In most cases this relationship is also fairly tightly estimated, particularly for income growth in the poorest 40 percent, where our benchmark findings suggest that nearly 80 percent of the variation in growth in average incomes of the poorest 40 percent is attributable to growth in average incomes. At the same time, however, it is important to recognize that these are in a sense "non-results", because they simply confirm that growth is distribution-neutral on average, and that changes in relative incomes tend to be substantially smaller than growth in overall average income.

4. Policies, Institutions, and Growth in Incomes of the Poor

The previous section has shown that average incomes of the poor tend to rise at the same rate as overall average incomes, implying that policies and institutions that stimulate higher growth benefit the poor equiproportionately on average. Moreover, we have seen that most of the cross-country variation in growth in incomes of the poor reflects growth in average incomes, rather than changes in the share of income captured by the poorest quintiles. Nevertheless, it is possible that growth from different sources or in different institutional contexts has a differentiated effect on the growth in incomes of the poor, to the extent that such policies and institutions are correlated with the part of the variation in growth in incomes of the poor that is due to changes in the income share of the poor. This information would be valuable for policy-makers seeking to pursue the goal of reducing inequality by promoting "pro-poor" growth or "shared prosperity".

In this section, we augment our basic specification to include two sets of variables that serve as proxies for a variety of policies and institutions that might matter for growth, and those that might be relevant for changes in relative incomes. The growth correlates include a measure of financial

[10] Chen and Ravallion (2008) show that under certain strong assumptions (a lognormal distribution of growth rates and equal variance of measurement error across the two sources), treating national accounts data on consumption as a prior, and household surveys as data, the natural posterior estimate of mean living standards is an equally-weighted geometric average of the two. In log-differences this implies a simple average of the two growth rates.

development (M2 as percentage of GDP), the Sachs-Warner indicator of trade openness, the Chinn-Ito Index of financial openness, the inflation rate, the general government budget balance, life expectancy, population growth, the Freedom House measure of civil liberties and political rights, assassinations and revolutions per capita, as well as dummies for internal conflicts and war participation. Most of these variables have been identified as important correlates of growth in one or more of three prominent meta-analyses of growth determinants (Fernandez, Ley and Steel (2001a), Sala-i-Martin (2004) and Ciccone et al. (2010)). They are also time-varying, so that we can relate within-country changes in these variables to within-country changes in incomes of the poor.

In a second set we include five variables that are intended to proxy for "pro-poor" policies that may matter for the distribution of income, and that have been found to be significant correlates of inequality in the much smaller existing cross-country literature on determinants of inequality. These consist of primary enrollment rates, a measure of educational inequality[11] (as emphasized by De Gregorio et. al. (2002)), public spending on health and on education (reflecting the emphasis on redistributive spending in Milanovic (2000), De Gregorio (2002) and Checchi (2008)), and finally the share of agriculture in GDP (as emphasized for example in Datt and Ravallion (2002)).[12] Table A1 provides a detailed description of the definitions and sources of all of these variables.

Two comments about these variables are in order. First, distinguishing between those variables that might matter for growth and those that might matter for inequality is inevitably somewhat arbitrary. For example, Jaumotte et al. (2013) find that some variables closely related to some of our growth variables (for example, de facto measures of trade and financial openness) are also significantly correlated with changes in quintile shares in a large cross-country dataset, even though we classify them among our set of growth variables. Second, we emphasize that many papers in the empirical literature on inequality consider the cross-sectional relationship between levels of Gini coefficients and various explanatory variables. In our specifications, we will be considering a different measure of inequality (poorest quintile shares), and moreover we are looking at how changes within countries over time in

[11] Specifically, we use data on educational attainment by different levels of attainment from the Barro-Lee dataset to construct a (grouped) Lorenz curve summarizing the distribution of the total number of years of education across individuals, and from this calculate a corresponding Gini coefficient.

[12] We also considered several other variables found to be significant correlates of inequality in some papers in the literature, but did not include them in our analysis because data coverage was very poor for many of the developing countries in our sample. These included indicators of labour market regulation and progressivity of tax systems (Checchi et. al. (2008)), public sector employment (Milanovic (2000)), and social transfers (Milanovic (2000), De Gregorio et. al. (2002)).

these inequality measures relate to changes within countries over time in these various candidate explanatory variables.[13]

In the spirit of data description, we use Bayesian Model Averaging (BMA) to systematically document the partial correlations between various combinations of these covariates and growth in incomes of the poor. This approach follows a growing literature which relies on BMA to show the robustness of empirical findings in the cross-country growth literature across many model specification choices.[14] The basic idea of BMA is to consider the large set of 2^K empirical models defined by all possible combinations of the set of $K = 17$ variables added to our benchmark specification, rather than to base conclusions on just a few pre-selected models. Let j ϵ {1,2,…,2^K} index the universe of potential models, and let X_j denotes the particular set of regressors added to our benchmark specification in model j. Each model j thus represents a variation of our benchmark specification, regressing growth in average incomes, ΔY^P, on growth in average incomes, ΔY, and the change in the corresponding potential determinants of average incomes and/or the poorest quintile share, ΔX_j, i.e.:

$$\Delta Y^P = \alpha_{0j} + \alpha_{1j}\Delta Y + \alpha_{2j}\Delta X_j + \varepsilon_j \,. \tag{5}$$

The estimated slope coefficients in α_{2j} capture the partial correlations between growth in incomes of the poor and the variables included in model j, conditional on growth in average incomes. And given the definition of average income of the poor, this is of course equivalent to regressing growth in the first (or first two) quintile shares on growth in average incomes, and on the set of variables included in model j.

BMA provides an algorithm for assigning posterior probabilities to each model reflecting their relative likelihoods. These likelihoods in turn reflect the "fit" of the model as summarized by the R-squared, but with a model size penalty that rewards more parsimonious models with fewer regressors. These posterior model probabilities can then be used to combine inferences across different models in a way that reflects their relative likelihood. For each variable, we calculate the Posterior Inclusion Probability (PIP), which is the sum of the posterior model probabilities for each model in which the given

[13] In this sense, this part of our analysis is most closely related to Jaumotte et al. (2013) who estimate country-year panel fixed-effects regressions that explain changes in inequality as a function of changes in the explanatory variables.

[14] See Fernandez, Ley and Steel (2002) for the seminal application of this technique to cross-country growth empirics.

variable is included. High values of the PIP indicate that this variable appears in models that are relatively more likely. In addition, we calculate the posterior probability-weighted average of the estimated slope coefficient for each variable, averaging across all models, and averaging only across those models in which the variable is included.[15]

Table 6 and Table 7 show the results, for growth rates in incomes of the poorest 20 percent and 40 percent, respectively. In both tables we focus on the sample of spells at least five years long. The rows of the table correspond to the seventeen variables included in the BMA analysis. In the first five columns we summarize the distribution of the estimated slope coefficients over all $2^{17} = 131{,}072$ models considered by the BMA procedure. Consider for example the first row, which reports the distribution of the estimated coefficient on growth in average incomes. The median estimated coefficient is very close to one, at 1.01 for the bottom 20 percent, and 0.963 for the bottom 40 percent. The range from the minimum to the maximum estimated coefficient is quite narrow (0.91 to 1.10 for the bottom 20 percent, and 0.88 to 1.03 for the bottom 40 percent). Moreover, this slope coefficient is not significantly different from one in any of the specifications considered for the bottom 20 percent and in only 3.5 percent of the specifications for the bottom 40 percent. This indicates that our basic finding of a one-for-one average relationship between growth in incomes of the poor and growth in overall incomes is robust to the inclusion of nearly all combinations of the 17 control variables in the model.

Turning to the additional variables, in most cases the distribution of estimated slope coefficients is centered around zero, and most commonly includes many negative as well as positive values. A useful summary in this respect can be found in the sixth and seventh columns of the tables, which report the proportion of specifications in which the estimated slope coefficient is significantly positive, or significantly negative. Of the 17 control variables, only three are significant in more than five percent of the models in which they are included in Table 6 and in Table 7. This indicates that the large majority of these variables are not significantly partially correlated with changes in income share of the poorest quintiles, conditional on overall growth, and conditional on nearly all possible combinations of other variables included in the model.

[15] We implement BMA using a standard g-prior for the parameters of each individual regression model, and a prior that assigns a equal probability of μ/K that each individual variable is included in a given model (see for example Fernandez, Ley and Steel (2001a) for a seminal application to cross-country growth empirics). We set $g = 0.01$ and $\mu = 0.25K$. Since the total number of models is not very large, we implement BMA by exhaustively estimating all possible models, rather than use common numerical algorithms to visit only a subset of relatively more likely models.

The three exceptions in Table 6 and in Table 7 are relative growth in agriculture, changes in life expectancy, and inflation. Consistent with existing findings in the literature, faster growth in agriculture is significantly associated with increase of the income share of the poorest 20 percent in 29 percent of the specifications considered. For the poorest 40 percent, faster growth in agriculture enters significantly in 11 percent of the specifications. This reflects the reality that many of the poor in developing countries work in agriculture, so that faster growth in this sector is likely to disproportionately benefit the poor. The results for changes in life expectancy and changes in inflation are somewhat puzzling. In about 25 (42) percent of specifications, increases in life expectancy are significantly associated with reductions in the income share of the poorest 20 (40) percent, while the results suggest in 39 (32) percent of specifications that increases in inflation are associated with a higher income share of the poorest 20 (40) percent. We should not take these puzzling results too seriously however, because the findings hold only for a relatively small set of models, moreover ones with low probabilities.

The last three columns of Table 6 and Table 7 incorporate the information generated by BMA about the relative likelihood of the many different models corresponding to different combinations of control variables. By construction, the posterior inclusion probability is equal to one for growth in average incomes, since we include it in every specification. The posterior inclusion probabilities for the other 17 variables are all low, and are below five percent for all except one variable in Table 6 (population growth), and for all except two variables in Table 7 (population growth, internal conflict). This reflects the fact that adding various combinations of control variables to our basic specification does not do much to improve the explanatory power of the model. The BMA algorithm in turn interprets this as low model probabilities for those models that add regressors over the benchmark specification.[16] Another way to see this directly is to consider the distribution of R-squareds in the last row of Table 6 and Table 7. It is striking that the highest R-squared observed across all models is only 0.68 (in the case of the bottom 20 percent), and only 0.79 (in the case of the bottom 40 percent). This is only slightly better than the R-squareds of the corresponding benchmark regressions of growth in incomes of the poor on growth in average incomes alone reported in Table 2, which are 0.65 and 0.78 respectively.

[16] The precise magnitudes of these posterior inclusion probabilities are somewhat sensitive to the choices of prior parameters in the BMA analysis. Specifically, smaller values of the prior parameter g make the posterior model probabilities more sensitive to improvements in model fit as measured by R-squared. We set $g = 0.01$ which is actually larger than benchmark values recommended in the BMA literature such as $g = \frac{1}{N} = 1/299$ or $g = \frac{1}{K^2} = 1/17^2$. See Feldkirchner and Zeugner (2009) and Fernandez, Ley and Steel (2001b).

Overall, these results suggest that a large set of plausible macro variables are remarkably unsuccessful in explaining growth in incomes of the poor, beyond any effect that they might have on aggregate growth. This finding in turn implies that historical experience in a large sample of countries does not provide much guidance on which combinations of macroeconomic policies and institutions might be particularly beneficial for promoting "shared prosperity" as distinct from simply "prosperity".

5. Conclusions

Incomes of the bottom 20 percent and bottom 40 percent of the income distribution generally rise equiproportionally with mean incomes as economic growth proceeds. We establish this result in a data-set spanning 118 countries and four decades, updating and expanding the results of Dollar and Kraay (2002). The result holds across decades, including in the 2000s -- hence the conclusion that "growth still is good for the poor." The shares of the bottom 20 percent and bottom 40 percent are measures of income inequality, and the foundation of our result is that changes in this particular measure of inequality generally are small and uncorrelated with economic growth. The finding is good news in the sense that we can expect economic growth to lift people out of poverty and lead to shared prosperity on average. The result also helps us understand how the rapid growth in the developing world in recent decades has led to such dramatic poverty reduction.

A second important finding is that the income shares of the bottom 20 percent and bottom 40 percent show no systematic tendency to decline over time; that is, there is no worldwide trend towards greater inequality, using these measures on a country-by-country basis. During 299 minimum-five-year spells, the average annual growth rate in the income share of the bottom 40 percent is 0.000. Furthermore, there is no tendency for that result to change over time. The average change was 0.003 in the 1980s, -0.003 in the 1990s, and 0.004 in the 2000s.

Our third result is that around three-quarters of the variation across countries and over time in growth rates of income of the bottom 20 percent or 40 percent can be explained by variation in growth rates of mean income, while the remainder comes from changes in quintile shares. The fact that changes in quintile shares are zero on average does not mean that there are not some striking changes in inequality in particular countries at particular time periods. We attempt to explain these changes in inequality with variables used in the empirical growth literature, such as measures of macroeconomic stability, trade openness, and political stability. We also include variables that might plausibly increase the income share of the poor (measures of agricultural productivity and government spending in health

and education). This part of our work essentially provides non-results: none of the macro country-level variables we consider robustly correlates with changes in the income shares of the poorest quintiles.

So, if we are interested in "shared prosperity", we have both good news and bad news. The good news is that institutions and policies that promote economic growth in general will on average raise incomes of the poor equiproportionally, thereby promoting "shared prosperity". The bad news is that, in choosing among macroeconomic policies, there is no robust evidence that certain policies are particularly "pro-poor" or conducive to promoting "shared prosperity" other than through their direct effects on overall economic growth.

A final interesting puzzle is raised by the recent experiences of Latin America and Asia. In parsing the data by region and time period, there are almost no cases in which growth is significantly pro-poor or pro-rich. The exceptions are Latin America in the 2000s, in which income growth of the bottom 40 percent is 1.2 times mean growth; and Asia in the 1990s and 2000s, where income growth of the bottom 40 percent is only about 0.6 of mean growth. In both cases the coefficients are statistically different from 1.0. So, it would be interesting to understand better how Latin America achieved such inclusive growth while Asia is going in the opposite direction. At the same time it is important to keep in mind that growth of income of the bottom 40 percent has been much faster in Asia than in Latin America because the overall growth rate has been so much higher.

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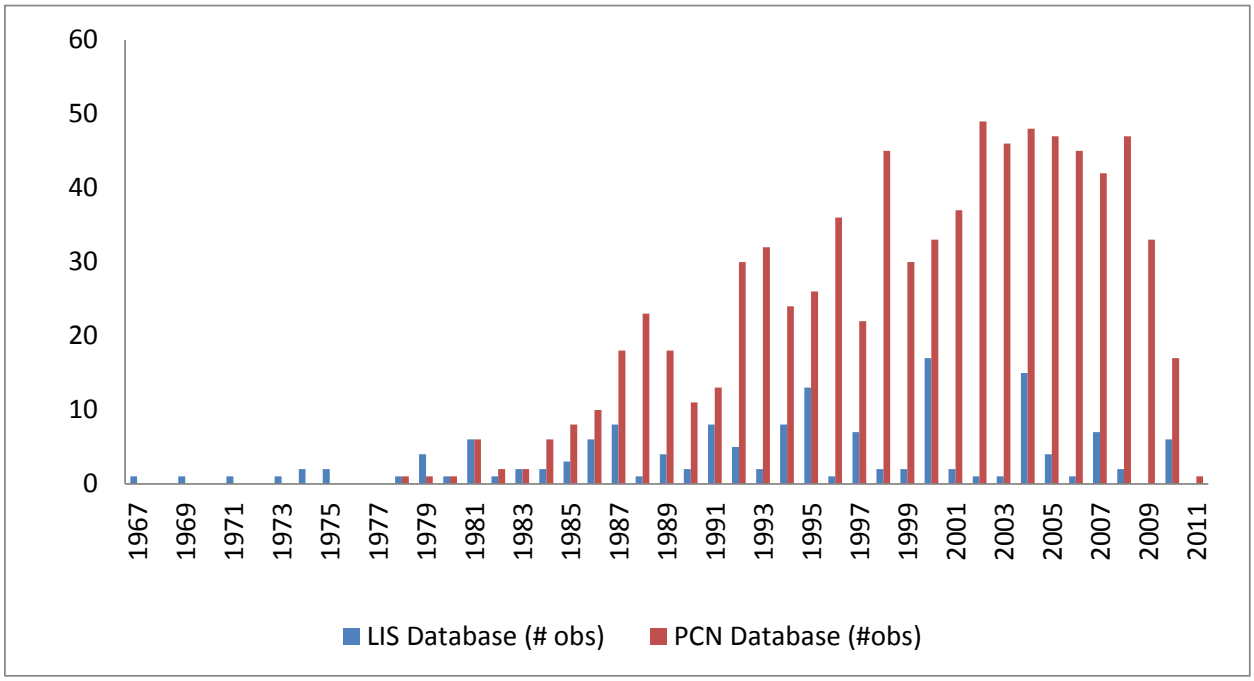
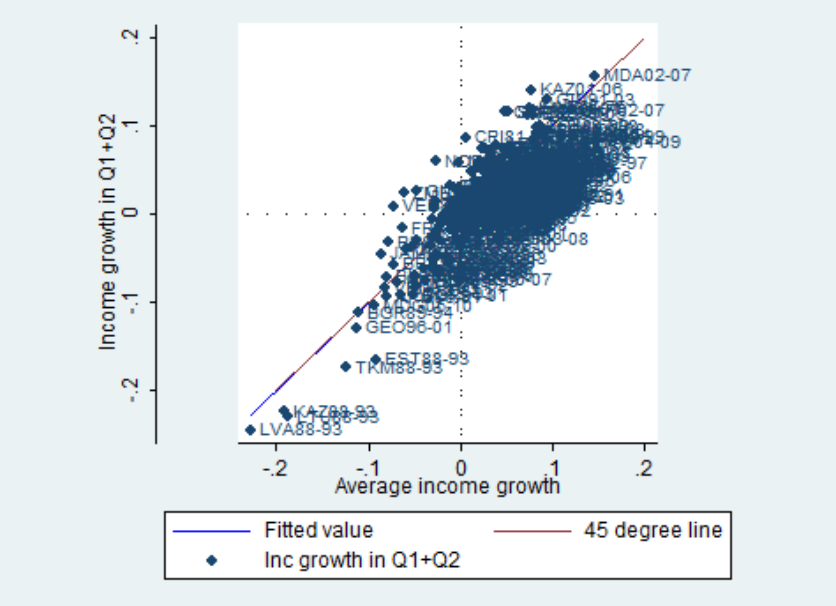
Figure 1: Availability of Household Survey Data (POVCALNET and LIS)



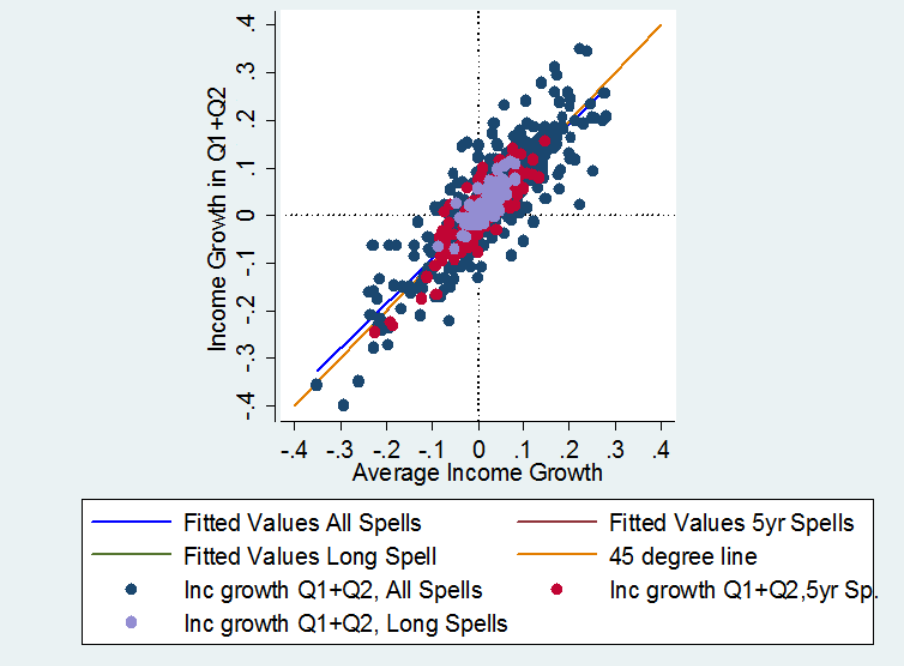
Notes: This figure shows number of household surveys available in each year, for the LIS and POVCALNET databases.

Figure 2: Growth rates of Incomes of Poorest 40 Percent

(a) Sample of medium spell length

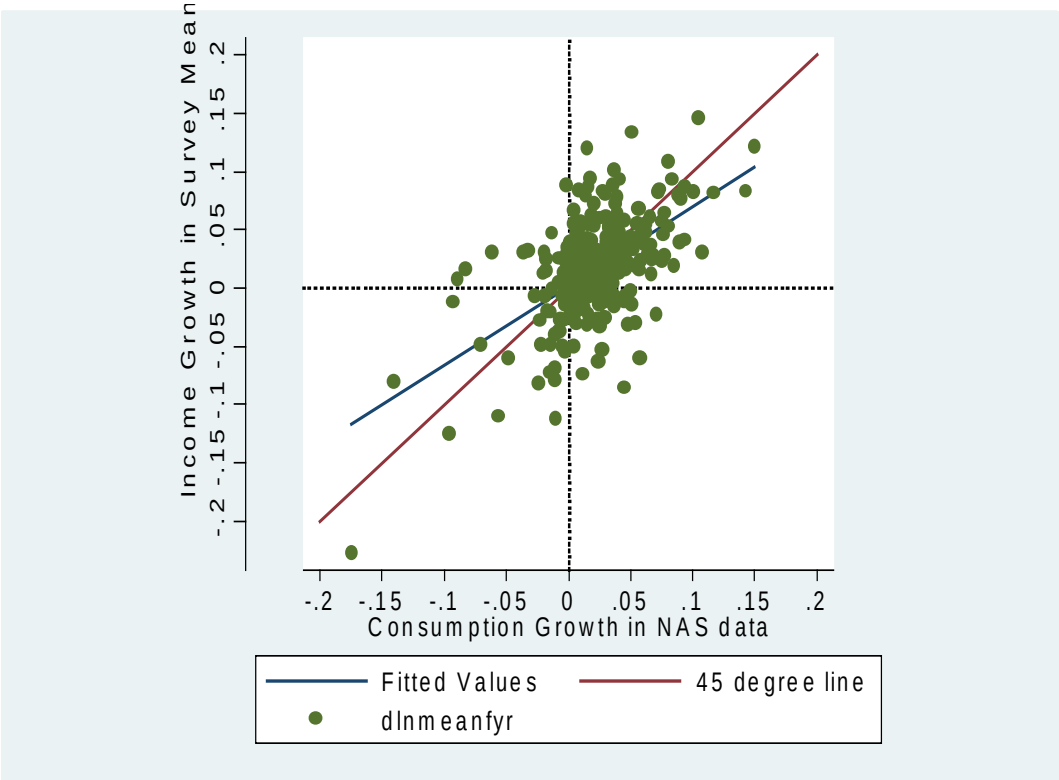


(b) Samples of short, medium and long spells



Notes: These figures show the correlation between growth in incomes of the poorest 40 percent and overall income growth. The top panel uses the sample of spells at least five years long. The bottom panel contrasts the findings in the three sets of spells: all available spells regardless of length, spells at least five years long, and the longest available spell for each country.

Figure 3: Comparison of National Accounts and Survey Mean Growth Rates



Notes: This figure compares growth in real private consumption from the national accounts (horizontal axis) with household survey mean growth rates (vertical axis). Growth rates are average annual log differences. The sample consists of spells at least five years long.

Table 1: Descriptive Statistics

	Survey mean growth rate			Growth rate in share (bottom 20%)			Growth rate in share (bottom 40%)		
	Mean	Std. deviation	Nb obs	Mean	Std. deviation	Corr with mean	Mean	Std. deviation	Corr with mean
Panel 1 : Growth rates, sample pooled over time and regions									
All spells	0.020	0.081	735	0.004	0.071	-0.010	0.003	0.046	-0.105
Min-five-year spells	0.014	0.047	299	0.001	0.036	0.073	0.000	0.025	0.007
Long spells	0.018	0.028	118	0.005	0.025	-0.051	0.004	0.018	-0.103
Panel 2 : Growth rates by regions min-5-year-sample									
Europe & Central Asia	0.010	0.086	44	-0.007	0.034	0.291	-0.006	0.024	0.265
Latin America & Caribbean	0.009	0.045	66	0.006	0.045	0.030	0.004	0.028	-0.141
Middle East & North Africa	0.003	0.024	14	0.007	0.022	0.123	0.005	0.018	0.144
High Income	0.012	0.029	78	-0.002	0.030	0.172	-0.004	0.020	0.057
Sub-Saharan Africa	0.016	0.040	55	0.008	0.044	-0.012	0.005	0.034	-0.032
South Asia	0.020	0.014	17	-0.001	0.016	-0.203	-0.002	0.015	-0.147
East Asia and Pacific	0.034	0.034	25	-0.002	0.029	-0.499	-0.002	0.021	-0.542
Panel 3 : Growth rates by decades min-5-year-sample									
1980-89	-0.003	0.049	86	0.003	0.034	0.067	0.002	0.027	0.012
1990-99	0.005	0.048	205	-0.003	0.037	0.087	-0.003	0.025	0.031
2000-10	0.030	0.040	174	0.004	0.034	-0.037	0.001	0.024	-0.093
Panel 4 : Growth rates by region and decades min-5-year-sample									
Europe & Centr. Asia 80-89	-0.122	0.086	8	-0.029	0.034	0.448	-0.020	0.023	0.584
Europe & Centr. Asia 90-99	-0.049	0.082	26	-0.015	0.038	0.219	-0.011	0.027	0.187
Europe & Centr. Asia 00-10	0.056	0.047	34	-0.001	0.030	0.082	-0.002	0.022	0.070
Latin America & Car. 80-89	0.003	0.054	18	0.016	0.045	-0.266	0.013	0.037	-0.376
Latin America & Car. 90-99	0.009	0.049	46	-0.008	0.045	-0.084	-0.005	0.028	-0.281
Latin America & Car. 00-10	0.012	0.037	35	0.019	0.040	0.398	0.011	0.020	0.348
High Income 80-89	-0.001	0.032	32	0.004	0.034	-0.059	0.002	0.026	-0.113
High Income 90-99	0.011	0.026	56	-0.009	0.025	0.322	-0.009	0.016	0.333
High Income 00-10	0.026	0.024	35	-0.004	0.016	-0.077	-0.005	0.012	-0.325
Middle East & Africa 80-89	-0.002	0.032	14	-0.006	0.032	0.210	-0.007	0.022	0.199
Middle East & Africa 90-99	0.009	0.036	50	0.016	0.042	0.079	0.012	0.030	0.087
Middle East & Africa 00-10	0.022	0.037	49	0.004	0.040	-0.115	0.001	0.032	-0.139
East and South Asia 80-89	0.018	0.028	14	0.004	0.013	-0.578	0.002	0.010	-0.340
East and South Asia 90-99	0.028	0.020	27	-0.009	0.017	-0.513	-0.007	0.014	-0.506
East and South Asia 00-10	0.036	0.034	21	0.002	0.034	-0.465	0.001	0.025	-0.526

Notes: This table reports descriptive statistics for growth rates in survey means and quintile shares. The first three columns report the mean, standard deviation, and number of spells. The next three columns report the mean and standard deviation of growth rates in the first quintile share, as well as its correlation with growth in average income. The last three columns provide the same information, but for the income share of the bottom 40 percent. Growth rates are calculated as average annual log differences over the length of each spell. Panel 1 combines all observations, for the three sets of spells. The remaining panels report results for sample splits by region, by decade, and by region-decade, only for the sample of spells at least five years long. See main text for description of how spells are assigned to decades. Note that in Panel 4 we combine Middle East North Africa and Sub-Saharan Africa into one group as well as East Asia and Pacific with South Asia due to small sample sizes within region-decade bins.

Table 2: Regression Results in the Benchmark Specification

Dependent. var.: Growth in incomes of the poor	**(1)**	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
	Panel A: Bottom 20 percent			***Panel B: Bottom 40 percent***		
Avg. growth - All spells	0.992***			0.941***		
	(0.0509)			(0.0367)		
Avg. growth - Min 5 year spells		1.057***			1.004***	
		(0.0572)			(0.0435)	
Avg. growth - Long spells			0.955***			0.932***
			(0.118)			(0.0798)
Number of Observations	735	299	118	735	299	118
Number of Countries	123	117	118	123	117	118
R-squared	0.557	0.653	0.533	0.734	0.776	0.666
Share of variance due to growth	0.562	0.618	0.558	0.780	0.773	0.714
P-value of wald test, slope=1	0.874	0.324	0.704	0.111	0.933	0.396

Notes: *** (**) (*) denotes significance at the 1 (5) (10) percent level. Heteroskedasticity-consistent standard errors clustered at the country level reported in parentheses. This table reports results from OLS regressions of growth in incomes of the poor on growth in average incomes. Growth rates are calculated as average annual log differences over the indicated definitions of spells. Columns (1)-(3) define the poor as those in bottom 20 percent of income distribution, while Columns (4)-(6) refer to bottom 40 percent of income distribution. In addition to the regular regression outputs, we document the variance decomposition which summarizes the part of the variation in income of the poor that is due to variation in overall incomes. We also report the p-value corresponding to a Wald test of the null hypothesis that the estimated slope is equal to one.

Table 3: Results by Region

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent. var.: Growth in income of the poor	**Europe & Central Asia**	**Latin America & Caribbean**	**Middle East & North**	**High Income**	**Sub-Saharan Africa**	**South Asia**	**East Asia and Pacific**
Panel A: Bottom 20 percent							
Avg. growth -Min- 5yr-spells	1.113***	1.030***	1.112***	1.180***	0.986***	0.772***	0.569**
	(0.0580)	(0.147)	(0.130)	(0.186)	(0.166)	(0.137)	(0.196)
Number of Observations	44	66	14	78	55	17	25
R-squared	0.900	0.523	0.601	0.567	0.441	0.329	0.367
Share of variance due to growth	0.808	0.508	0.540	0.480	0.447	0.426	0.644
P-val. wald test, slope=1	0.0663	0.841	0.427	0.343	0.934	0.170	0.0556
Panel B: Bottom 40 percent							
Avg. growth -Min- 5yr-spells	1.074***	0.915***	1.110***	1.039***	0.972***	0.844***	0.662***
	(0.0403)	(0.104)	(0.100)	(0.138)	(0.120)	(0.153)	(0.137)
Number of Observations	44	66	14	78	55	17	25
R-squared	0.940	0.694	0.685	0.698	0.566	0.391	0.614
Share of variance due to growth	0.875	0.759	0.617	0.672	0.582	0.463	0.928
P-val. wald test, slope=1	0.0804	0.423	0.325	0.778	0.819	0.364	0.0354
Number of Countries	20	21	6	27	28	5	10
Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1							

Notes: *** (**) (*) denotes significance at the 1 (5) (10) percent level. Heteroskedasticity-consistent standard errors clustered at the country level reported in parentheses. This table reports results from OLS regressions of growth in incomes of the poor on growth in average incomes. Growth rates are calculated as average annual log differences over the indicated definitions of spells. Panel A defines the poor as those in bottom 20 percent of income distribution, while Panel B refers to bottom 40 percent of income distribution. In addition to the regular regression outputs, we document the variance decomposition which summarizes the part of the variation in income of the poor that is due to variation in overall incomes. We also report the p-value corresponding to a Wald test of the null hypothesis that the estimated slope is equal to one. The assignment of countries to geographical regions is documented in Appendix Table A1.

Table 4: Results Across Regions and Over Time

Dependent. var.: Growth in income of the poor	All regions			Europe and Central Asia			Latin America and the Caribbean			High Income Countries (from all regions)			Middle East and Sub-Saharan Africa			East Asia, Pacific and South Asia		
	1980	1990	2000	1980	1990	2000	1980	1990	2000	1980	1990	2000	1980	1990	2000	1980	1990	2000
Panel A: Bottom 20 percent																		
Avg. growth by decade	1.046***	1.067***	0.969***	1.176***	1.101***	1.052***	0.781***	0.924***	1.422***	0.936***	1.316***	0.948***	1.207***	1.090***	0.878***	0.722***	0.574***	0.546*
	(0.0881)	(0.0647)	(0.0834)	(0.0960)	(0.0701)	(0.0807)	(0.209)	(0.131)	(0.158)	(0.310)	(0.137)	(0.115)	(0.314)	(0.182)	(0.214)	(0.0913)	(0.143)	(0.276)
Number of Observations	86	205	174	8	26	34	18	46	35	32	56	35	14	50	49	14	27	21
R-squared	0.695	0.659	0.565	0.918	0.858	0.735	0.493	0.508	0.681	0.428	0.667	0.663	0.609	0.477	0.412	0.773	0.394	0.284
Share of variance due to growth	0.664	0.618	0.583	0.781	0.780	0.699	0.632	0.550	0.479	0.457	0.507	0.699	0.505	0.438	0.469	1.070	0.686	0.521
P-val. Wald test, slope=1	0.600	0.303	0.710	0.109	0.170	0.527	0.314	0.569	0.0158	0.838	0.0287	0.653	0.520	0.624	0.575	0.0161	0.0117	0.122
Panel B: Bottom 40 percent																		
Avg. growth by decade	1.006***	1.017***	0.943***	1.154***	1.061***	1.033***	0.745***	0.841***	1.191***	0.907***	1.212***	0.831***	1.138***	1.073***	0.880***	0.875***	0.659***	0.616***
	(0.0709)	(0.0508)	(0.0588)	(0.0639)	(0.0493)	(0.0626)	(0.172)	(0.0927)	(0.0783)	(0.247)	(0.114)	(0.0854)	(0.229)	(0.126)	(0.156)	(0.0855)	(0.127)	(0.177)
Number of Observations	86	205	174	8	26	34	18	46	35	32	56	35	14	50	49	14	27	21
R-squared	0.777	0.787	0.711	0.967	0.917	0.827	0.584	0.705	0.844	0.549	0.803	0.741	0.736	0.622	0.516	0.864	0.564	0.497
Share of variance due to growth	0.772	0.774	0.754	0.838	0.864	0.801	0.784	0.839	0.709	0.605	0.663	0.891	0.647	0.580	0.586	0.988	0.855	0.806
P-val. Wald test, slope=1	0.930	0.742	0.334	0.0470	0.235	0.603	0.163	0.102	0.0255	0.710	0.0755	0.0595	0.558	0.566	0.449	0.181	0.0203	0.0484

Notes: *** (**) (*) denotes significance at the 1 (5) (10) percent level. Heteroskedasticity-consistent standard errors clustered at the country level reported in parentheses. This table reports results from weighted OLS regressions of growth in incomes of the poor on growth in average incomes, in the indicated region-decade bins, with weights corresponding to the fraction of observations in each spell falling in the indicated decade. Growth rates are calculated as average annual log differences over spells at least five years long. Panel A defines the poor as those in bottom 20 percent of income distribution, while Panel B refers to bottom 40 percent of income distribution. In addition to the regular regression outputs, we document the variance decomposition which summarizes the part of the variation in income of the poor that is due to variation in overall incomes. We also report the p-value corresponding to a Wald test of the null hypothesis that the estimated slope is equal to one.

Table 5: Robustness Across Alternative Measures of Average Growth

	Survey-based			*National Accounts*			*Mixed Measure*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent. var.: Growth in income of the poor	Survey-based welfare measure (income or consumption)			Real private consumption per capita (national accounts data)			Mixing survey-based and national accounts' welfare measures		
Panel A: Bottom 20 percent									
Avg. growth - All spells	0.979***			1.009***			0.983***		
	(0.0534)			(0.0499)			(0.0616)		
Avg. growth - Min 5 year spells		0.971***			1.109***			1.036***	
		(0.0627)			(0.0536)			(0.0657)	
Avg. growth - Longest spells			0.854***			0.935***			0.856***
			(0.114)			(0.0973)			(0.128)
Number of Observations	710	282	106	710	282	106	710	282	106
R-squared	0.546	0.593	0.510	0.351	0.577	0.552	0.382	0.526	0.434
Share of variance due to growth	0.558	0.610	0.597	0.348	0.520	0.591	0.388	0.508	0.507
P-value of wald test, slope=1	0.689	0.649	0.202	0.858	0.0445	0.503	0.779	0.581	0.264
Panel B: Bottom 40 percent									
Avg. growth - All spells	0.930***			1.009***			0.935***		
	(0.0384)			(0.0373)			(0.0456)		
Avg. growth - Min 5 year spells		0.939***			1.064***			0.989***	
		(0.0477)			(0.0356)			(0.0488)	
Avg. growth - Longest spells			0.863***			0.942***			0.868***
			(0.0758)			(0.0700)			(0.0855)
Number of Observations	710	282	106	710	282	106	710	282	106
R-squared	0.727	0.737	0.655	0.566	0.719	0.688	0.576	0.673	0.582
Share of variance due to growth	0.781	0.785	0.759	0.562	0.675	0.730	0.616	0.681	0.671
P-value of wald test, slope=1	0.0731	0.203	0.0742	0.819	0.0730	0.408	0.159	0.816	0.124

Notes: *** (**) (*) denotes significance at the 1 (5) (10) percent level. Heteroskedasticity-consistent standard errors clustered at the country level reported in parentheses. This table reports results from OLS regressions of growth in incomes of the poor on growth in average incomes. Growth rates are calculated as average annual log differences over the indicated definitions of spells. Panel A defines the poor as those in bottom 20 percent of income distribution, while Panel B refers to the bottom 40 percent of income distribution. Columns 1-3 use household survey means, in the slightly smaller sample of spells where national accounts growth rates are also available. Columns 4-6 use national accounts growth rates as a measure of average income growth and to construct average income growth of the poor. Columns 7-9 use a simple average of survey mean and national accounts growth rates. We also report the p-value corresponding to a Wald test of the null hypothesis that the estimated slope is equal to one.

Table 6: Bayesian Model Averaging Results (Bottom 20 Percent)

Dependent Variable: Income Growth Bottom 20%	Distribution Of Estimated Slopes					Significance of Estimated Slopes		BMA		
	Min.	5th perc.	Median	95th perc.	Max.	Signif > 0	Signif < 0	Post. Inclusion prob.	Probability weighted slope	Expected slope cond. on incl.
Δ Average income	0.905	0.949	1.010	1.062	1.096	100.0%	0.0%	1.000	1.056	1.056
Δ Financial depth (M2 % GDP)	-0.002	-0.002	-0.001	0.000	0.001	0.0%	0.0%	0.000	0.000	-0.001
Δ Inflation rate	-0.071	0.057	0.198	0.450	0.547	38.9%	0.0%	0.000	0.000	-0.026
Δ Budget Balance	-0.196	-0.053	0.116	0.340	0.462	0.0%	0.0%	0.000	0.000	0.141
Δ Trade Openness	0.019	0.043	0.062	0.101	0.131	3.8%	0.0%	0.000	0.000	0.039
Δ Population growth	-0.021	-0.002	0.015	0.046	0.084	0.1%	0.0%	0.053	0.001	0.020
Δ Life expectancy	-0.037	-0.029	-0.015	-0.008	0.000	0.0%	25.6%	0.032	0.000	-0.002
Δ Assassinations per pop.	-0.130	-0.101	0.019	0.093	0.148	0.0%	0.0%	0.000	0.000	-0.076
Δ Revolutions per pop.	-0.015	0.006	0.071	0.111	0.140	0.0%	0.0%	0.000	0.000	0.014
Δ Civil Liberties / Democracy	-0.016	-0.010	-0.004	0.002	0.009	0.0%	0.0%	0.000	0.000	0.000
Δ Internal conflict (dummy)	-0.014	0.010	0.039	0.067	0.087	0.0%	0.0%	0.035	0.001	0.024
Δ War participation (dummy)	-0.162	-0.127	-0.083	-0.010	0.035	0.0%	0.0%	0.032	0.000	0.004
Δ Fin. openness (Chinn-Ito)	-0.010	-0.003	0.005	0.015	0.024	0.0%	0.0%	0.000	0.000	0.003
Δ Primary school enrollment rate	-0.003	-0.002	-0.001	0.000	0.001	0.0%	0.0%	0.000	0.000	0.000
Δ Education Gini	-0.869	-0.546	-0.265	0.141	0.560	0.0%	0.0%	0.000	0.000	-0.624
Δ Gov Expend Educ (% GDP)	-0.043	-0.029	-0.014	-0.001	0.009	0.0%	0.2%	0.000	0.000	-0.014
Δ Gov. Expend Health (% GDP)	-0.006	0.000	0.010	0.023	0.030	0.2%	0.0%	0.000	0.000	0.002
Δ Agriculture (% GDP)	0.067	0.102	0.138	0.187	0.228	29.0%	0.0%	0.000	0.000	0.154
Distribution of Sample Size	113	122	164	234	299					
Distribution of R-squared	0.487	0.525	0.569	0.629	0.676					

Notes: This table summarizes the results of the Bayesian Model Averaging exercise described in Section 4 of the paper. The first five columns summarize the distribution of the estimated slope coefficients across the 131,072 regression models defined by all possible combinations of the seventeen control variables listed in the first column. The next two columns report the fraction of estimated slope coefficients significantly greater (less than) zero across all models. The posterior inclusion probability is the sum of the posterior probabilities of all models including the indicated variable. The probability-weighted slope coefficient is the expected value of the slopes, weighting each by the posterior probability of the corresponding model in which it was estimated, and treating the estimated slope as zero in those models in which it is not included. The last column reports the same information, but conditional on the variable being included.

Table 7: Bayesian Model Averaging Results (Bottom 40 Percent)

Dependent Variable: Income Growth Bottom 40%	Distribution Of Estimated Slopes					Significance of Estimated Slopes		BMA		
	Min.	5th perc.	Median	95th perc.	Max.	Signif > 0	Signif < 0	Post. Inclusion prob.	Probability weighted slope	Expected slope cond. on incl.
Δ Average income	0.877	0.915	0.963	1.006	1.031	100.0%	0.0%	1.000	1.003	1.003
Δ Financial depth (M2 % GDP)	-0.002	-0.001	0.000	0.000	0.001	0.0%	0.0%	0.000	0.000	0.000
Δ Inflation rate	-0.046	0.044	0.137	0.275	0.338	32.1%	0.0%	0.000	0.000	-0.017
Δ Budget Balance	-0.193	-0.080	0.019	0.112	0.183	0.0%	0.0%	0.000	0.000	0.031
Δ Trade Openness	0.010	0.025	0.039	0.062	0.083	1.5%	0.0%	0.000	0.000	0.027
Δ Population growth	-0.024	-0.009	0.004	0.027	0.053	0.0%	0.0%	0.067	0.001	0.017
Δ Life expectancy	-0.028	-0.023	-0.012	-0.006	0.002	0.0%	41.5%	0.032	0.000	-0.001
Δ Assassinations per pop.	-0.058	-0.033	0.025	0.071	0.108	0.0%	0.0%	0.000	0.000	-0.013
Δ Revolutions per pop.	0.058	0.077	0.122	0.145	0.170	0.1%	0.0%	0.000	0.000	0.086
Δ Civil Liberties / Democracy	-0.005	-0.001	0.003	0.008	0.011	0.0%	0.0%	0.000	0.000	0.004
Δ Internal conflict (dummy)	0.016	0.029	0.046	0.065	0.072	2.5%	0.0%	0.082	0.003	0.041
Δ War participation (dummy)	-0.078	-0.050	-0.029	0.020	0.051	0.0%	0.0%	0.036	0.001	0.022
Δ Fin. openness (Chinn-Ito)	-0.007	-0.002	0.004	0.011	0.017	0.0%	0.0%	0.000	0.000	0.004
Δ Primary school enrollment rate	-0.002	-0.001	-0.001	0.000	0.001	0.0%	0.0%	0.000	0.000	0.000
Δ Education Gini	-0.644	-0.430	-0.246	0.044	0.282	0.0%	0.0%	0.000	0.000	-0.515
Δ Gov Expend Educ (% GDP)	-0.028	-0.020	-0.009	0.002	0.010	0.0%	0.4%	0.000	0.000	-0.008
Δ Gov. Expend Health (% GDP)	-0.005	0.000	0.007	0.016	0.022	0.4%	0.0%	0.000	0.000	0.002
Δ Agriculture (% GDP)	0.041	0.059	0.088	0.122	0.155	10.9%	0.0%	0.000	0.000	0.096
Distribution of Sample Size	113	122	164	234	299					
Distribution of R-squared	0.633	0.671	0.709	0.756	0.790					

Notes: This table summarizes the results of the Bayesian Model Averaging exercise described in Section 4 of the paper. The first five columns summarize the distribution of the estimated slope coefficients across the 131,072 regression models defined by all possible combinations of the seventeen control variables listed in the first column. The next two columns report the fraction of estimated slope coefficients significantly greater (less than) zero across all models. The posterior inclusion probability is the sum of the posterior probabilities of all models including the indicated variable. The probability-weighted slope coefficient is the expected value of the slopes, weighting each by the posterior probability of the corresponding model in which it was estimated, and treating the estimated slope as zero in those models in which it is not included. The last column reports the same information, but conditional on the variable being included.

Appendix:

Table A1: Data availability by country

Country	Region	Database	Total observations	First year available	Last year avail	Sample all spells (diff.)	Sample min-5-year-spells (diff.)	Sample longest spell (diff.)*
Albania	ECA	PCN	5	1997	2008	4	2	1
Algeria	MENA	PCN	2	1988	1995	1	1	1
Argentina	LAC	PCN	22	1986	2010	20	4	1
Armenia	ECA	PCN	10	1996	2008	8	1	1
Australia	HIINC	LIS	6	1981	2003	5	3	1
Austria	HIINC	LIS	6	1987	2004	5	2	1
Azerbaijan	ECA	PCN	3	1995	2008	2	2	1
Bangladesh	SA	PCN	8	1984	2010	7	4	1
Belarus	ECA	PCN	12	1988	2008	7	3	1
Belgium	HIINC	LIS	6	1985	2000	5	2	1
Belize	LAC	PCN	7	1993	1999	5	1	1
Bhutan	SA	PCN	2	2003	2007	1		1
Bolivia	LAC	PCN	11	1991	2008	8	2	1
Bosnia and Herzegovina	ECA	PCN	3	2001	2007	2	1	1
Botswana	SSA	PCN	2	1986	1994	1	1	1
Brazil	LAC	PCN	26	1981	2009	25	5	1
Bulgaria	ECA	PCN	8	1989	2007	6	3	1
Burkina Faso	SSA	PCN	4	1994	2009	3	2	1
Burundi	SSA	PCN	3	1992	2006	2	2	1
Cambodia	EAP	PCN	4	1994	2008	3	1	1
Cameroon	SSA	PCN	3	1996	2007	2	2	1
Canada	HIINC	LIS	11	1971	2007	10	5	1
Central African Republic	SSA	PCN	3	1992	2008	2	2	1
Chile	LAC	PCN	10	1987	2009	9	4	1
China	EAP	PCN	9	1981	2005	7	3	1
Colombia	LAC	PCN	12	1992	2010	11	3	1
Costa Rica	LAC	PCN	23	1981	2009	22	5	1
Cote d'Ivoire	SSA	PCN	9	1985	2008	8	3	1
Croatia	HIINC	PCN	7	1988	2008	5	1	1
Czech Republic	HIINC	PCN	3	1988	1996	2	1	1
Denmark	HIINC	LIS	5	1987	2004	4	2	1
Dominican Republic	LAC	PCN	16	1986	2010	15	4	1
Ecuador	LAC	PCN	13	1987	2010	10	4	1
Egypt, Arab Rep.	MENA	PCN	5	1991	2008	4	2	1
El Salvador	LAC	PCN	15	1989	2009	13	2	1
Estonia	HIINC	PCN	9	1988	2004	7	2	1
Ethiopia	SSA	PCN	4	1982	2005	3	3	1
Fiji	EAP	PCN	2	2003	2009	1	1	1
Finland	HIINC	LIS	5	1987	2004	4	2	1
France	HIINC	LIS	7	1979	2005	5	5	1
Gambia, The	SSA	PCN	2	1998	2003	1		
Georgia	ECA	PCN	12	1996	2008	10	2	1
Germany	HIINC	LIS	5	1994	2010	4	2	1
Ghana	SSA	PCN	5	1988	2006	4	2	1
Greece	HIINC	LIS	5	1995	2010	4	2	1
Guatemala	LAC	PCN	8	1987	2006	6	2	1
Guinea	SSA	PCN	4	1991	2007	2	1	1
Guinea-Bissau	SSA	PCN	3	1991	2002	1	1	1
Guyana	LAC	PCN	2	1993	1998	1	1	1
Honduras	LAC	PCN	20	1989	2009	14	4	1
Hungary	HIINC	PCN	10	1987	2007	7	2	1
India	SA	PCN	5	1978	2005	4	4	1
Indonesia	EAP	PCN	8	1984	2005	7	3	1
Iran, Islamic Rep.	MENA	PCN	5	1986	2005	4	2	1
Ireland	HIINC	LIS	6	1987	2004	5	2	1
Israel	HIINC	LIS	6	1986	2007	5	3	1
Italy	HIINC	LIS	11	1986	2010	10	4	1
Jamaica	LAC	PCN	7	1988	2004	6	3	1
Jordan	MENA	PCN	7	1987	2010	6	4	1
Kazakhstan	ECA	PCN	11	1988	2009	9	3	1
Kenya	SSA	PCN	4	1992	2005	2	1	1

Country	Region	Database	Total observations	First year available	Last year avail	Sample all spells (diff.)	Sample min-5-year-spells (diff.)	Sample longest spell (diff.)*
Kyrgyz Republic	ECA	PCN	10	1988	2009	8	2	1
Lao PDR	EAP	PCN	4	1992	2008	2	2	1
Latvia	ECA	PCN	11	1988	2008	9	3	1
Lesotho	SSA	PCN	4	1987	2003	2	2	1
Lithuania	ECA	PCN	9	1988	2008	7	3	1
Luxembourg	HIINC	LIS	6	1985	2004	5	3	1
Macedonia, FYR	ECA	PCN	9	1998	2009	8	2	1
Madagascar	SSA	PCN	7	1980	2010	6	4	1
Malawi	SSA	PCN	2	1998	2004	1	1	1
Malaysia	EAP	PCN	9	1984	2009	8	4	1
Maldives	SA	PCN	2	1998	2004	1		
Mali	SSA	PCN	4	1994	2010	3	2	1
Mauritania	SSA	PCN	6	1987	2008	5	3	1
Mexico	LAC	PCN	13	1984	2010	10	3	1
Moldova	ECA	PCN	15	1988	2010	11	2	1
Montenegro	ECA	PCN	4	2005	2008	3		
Mozambique	SSA	PCN	3	1996	2008	2	2	1
Namibia	SSA	PCN	2	1993	2004	1	1	1
Nepal	SA	PCN	4	1985	2010	2	2	1
Netherlands	HIINC	LIS	6	1983	2004	5	3	1
Nicaragua	LAC	PCN	4	1993	2005	3	2	1
Niger	SSA	PCN	4	1992	2008	3	1	1
Nigeria	SSA	PCN	5	1986	2010	4	3	1
Norway	HIINC	LIS	6	1979	2004	5	3	1
Pakistan	SA	PCN	8	1987	2008	7	3	1
Panama	LAC	PCN	14	1979	2010	12	3	1
Paraguay	LAC	PCN	14	1990	2010	13	2	1
Peru	LAC	PCN	16	1986	2010	14	3	1
Philippines	EAP	PCN	9	1985	2009	8	4	1
Poland	HIINC	PCN	17	1985	2009	14	4	1
Romania	ECA	PCN	14	1989	2009	11	2	1
Russian Federation	ECA	PCN	13	1988	2009	11	3	1
Rwanda	SSA	PCN	4	1985	2011	3	3	1
Senegal	SSA	PCN	4	1991	2005	3	1	1
Serbia	ECA	PCN	8	2002	2009	6	1	1
Seychelles	SSA	PCN	2	2000	2007	1	1	
Slovak Republic	HIINC	PCN	9	1988	2009	7	2	1
Slovenia	HIINC	PCN	6	1987	2004	4	2	1
South Africa	SSA	PCN	5	1993	2009	4	2	1
Spain	HIINC	LIS	7	1980	2010	6	4	1
Sri Lanka	SA	PCN	5	1985	2007	4	4	1
Swaziland	SSA	PCN	3	1995	2010	2	2	1
Sweden	HIINC	LIS	8	1967	2005	7	6	1
Switzerland	HIINC	LIS	5	1982	2004	4	2	1
Tajikistan	ECA	PCN	5	1999	2009	4	2	1
Tanzania	SSA	PCN	3	1992	2007	2	2	1
Thailand	EAP	PCN	13	1981	2009	12	4	1
Timor-Leste	EAP	PCN	2	2001	2007	1	1	1
Trinidad and Tobago	HIINC	PCN	2	1988	1992	1		1
Tunisia	MENA	PCN	5	1985	2005	4	4	1
Turkey	ECA	PCN	9	1987	2008	8	3	1
Turkmenistan	ECA	PCN	3	1988	1998	1	1	
Uganda	SSA	PCN	7	1989	2009	6	3	1
Ukraine	ECA	PCN	13	1988	2009	11	3	1
United Kingdom	HIINC	LIS	7	1991	2010	6	3	1
United States	HIINC	LIS	10	1974	2010	9	6	1
Uruguay	LAC	PCN	18	1981	2010	17	5	1
Venezuela, RB	LAC	PCN	13	1981	2006	11	4	1
Vietnam	EAP	PCN	6	1993	2008	5	2	1
West Bank and Gaza	MENA	PCN	2	2007	2009	1		1
Yemen, Rep.	MENA	PCN	2	1998	2005	1	1	1
Zambia	SSA	PCN	6	1993	2006	4	2	1

Notes: Region codes refer to World Bank categories with the exception that all High income countries were pooled by pulling observations from the geographical regions: HIINC= High Income countries, ECA= Europe and Central Asia, MENA= Middle East & North Africa, LAC = Latin America and the Caribbeans, SSA=Sub-Saharan Africa, SA= South Asia and EAP=East Asia and Pacific. Database indicates whether the data come from POVCALNET (PCN) or LIS. Total observations, first year, and last year refer to the number and timing of household surveys in our combined dataset. The last three columns indicate the number of spells included in each of the three definitions of spells. Note that these spells refer to the sample used in the regression, following the removal of extreme observations as noted in the text. This is why there are some blank entries in the last three columns.

Table A2: Explanation of control variables

Variable	Source	Description / Adjustments
Survey means	POVCALNET, LIS	POVCALNET measures welfare by income or consumption as determined in the surveys. For LIS, we calculate survey means of disposable income directly from the micro survey data on household level.
Household per capita consumption	WDI	Household final consumption expenditure (constant LCU) divided by population.
Covariates used in Bayesian Model Averaging:		
Population growth	WDI	Population growth in percentage points
Life expectancy	WDI	Life expectancy in years
Financial depth; M2 as % of GDP	WDI	Money and quasi-money (M2) as percent of GDP
Inflation rate	WDI	Inflation measure is calculated by taking log-differences from the WDI reported GDP deflator (local currency units).
Budget balance	WEO and data from Easterly, Levine, Roodman (2004)	Data series on Budget Balance from Easterly, Levine, Roodman (2004) was used when available, after last available year, used WEO data.
Assassination; Revolution	Cross-National Time Series	Assassinations and revolutions as percentage per 100,000 habitants. Source: Banks, Arthur S., Wilson, Kenneth A. 2013. Cross-National Time-Series Data Archive. Databanks International. Jerusalem, Israel; see http://www.databanksinternational.com
Trade Openness	Wacziarg-Welch (2008); extended through 2010. http://www.anderson.ucla.edu/faculty_pages/romain.wacziarg/papersum.html	Wacziarg-Welch (2008) extension of the initial Sachs-Warner (1995) openness measure is available through 2001. We update the series to 2010 using underlying data on tariffs, black market premium and export marketing boards. A country is considered as closed if it has one of the following: Average tariff rates over 40 percent, black market exchange rate over 20 percent lower than the official exchange rate, or a state monopoly on major exports (export marketing board). 1. Tariffs: (Francis K.T. Ng "Trends in average applied tariff rates in developing and industrial countries, 1980-2006"; http://go.worldbnka.org/LGOXFTV550). No countries had tariffs beyond the 40 percent threshold at any time after 2000. 2. Black market premium: (Economic Freedom in the World 2012 report and database from the Fraser Institute (http://www.freetheworld.com)). Data reports a 0-10 ranking where 10 implies no black market premium and 0 implies a premium of 50 percent or more. The black market premium is defined as the percentage difference between the official and the black market exchange rate. We assume that a score of 0-6 implies a premium of 20 percent or greater. 3. Export marketing board: In 2001 Wacziarg-Welch identified 12 countries as having an export marketing board based on various underlying data and sources. Clemens et al. update the classification through 2005, identifying three further countries has having liberalized or abolished their export marketing boards (Senegal (2002), Chad and Papua New Guinea (2005)). In our update we assume that none of the remaining 9 countries (Central African Rep, Congo Dem. Rep, Congo Rep., Gabon, Russia, Togo, Ukraine) abolished or liberalized their export marketing board through 2010. As neither of these countries have tariffs over 40 percent or black market premiums over 20 percent, they would be considered

		"open" when liberalizing their export marketing board.
Internal conflict; war participation	UCDP-PRIO Dataset	Data from UCDP dataset allows constructing one dummy for internal conflict and one for war participation. In the latter, we consider a country to be participating in a war only if it is listed either as the country of location, or a major participant (side A or B), omitting countries that are listed as allies.
Civil liberties, political rights	Freedom House	Sum of the civil liberties and the political rights indicator, both measured on a 1-7 scale. http://www.freedomhouse.org/report/freedom-world-2012/methodology
Financial Openness	Chinn-Ito Index	The Chinn-Ito index (*KAOPEN*) is an index measuring a country's degree of capital account openness. *KAOPEN* is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).* http://web.pdx.edu/~ito/Chinn-Ito_website.htm
Primary schooling	WDI	Gross primary school enrollment rates (percent of population)
Gini coefficient on educational attainment	Barro-Lee dataset	The Barro-Lee dataset provides data on the percentage of the population that attained different levels of education: No education (0 years), complete primary (6 years), complete secondary (12 years), and complete tertiary (16 years). For non-complete primary, secondary, or tertiary we assume respectively 3 years, 9 years, and 14 years of schooling. With this information, we can construct a Lorenz curve measuring which percentage of population attained which percentage of total years of schooling. With this information, we construct a Gini coefficient that measures educational inequality analogous to the standard income inequality measure.
Government expenditure on health and education (percent of GDP)	IMF social spending data, WDI, IMF GFS	Government expenditure on health and education is retrieved from various sources. We prioritize the data from Nozaki et al. (2011), we use WDI data for countries where the WDI coverage is better than the former, and as a third source we use the IMF Government Finance Statistics (GFS) for countries where this source offers the best coverage. We merge data sources only across not within countries. Source: Nozaki Masahiro, Clements, Benedict and Gupta, Sanjeev. (2011). "*What Happens to Social Spending in IMF-Supported Programs?"*. http://www.imf.org/external/pubs/cat/longres.aspx?sk=25190.0
Agricultural productivity	WDI	WDI Indicator: NV.AGR.TOTL.ZS, "Agriculture, value added (% of GDP)". Constructing the log-difference provides a measure of change in agricultural productivity.