Human Capital and Shared Prosperity: Some Cross-Country Evidence*

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Abstract

Many low-income countries, such as Haiti, have high ambitions and socio-economic needs to achieve substantial income growth, especially for the poorest income quintiles. This raises the question of policy prioritization which is often hard to address since reliable country-specific micro data is scarce in most low-income countries. While studies investigating determinants of GDP growth have been numerous, less is known about factors influencing household incomes at the lowest segments of the income distribution. Focusing on the specific case of Haiti, a country with one of the lowest income levels, we propose an approach to handle this challenge: we estimate income drivers for the poorest two income quintiles from cross-country regressions. Our results suggest that maintaining macroeconomic stability as well as investing in human and physical capital would not only be associated with faster overall economic growth, but also with even faster income growth for the poorest segments of the population. There thus need not be a trade-off between inequality and growth. Economies could foster faster growth while also increasing inclusiveness, ensuring that everyone can live up to their potential.

Keywords: Haiti, growth, inequality, education, infrastructure, macroeconomic stability, panel data
JEL Classifications: O11, D31, O54

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Introduction

Haiti has a vision to become an emerging economy by 2030, but remains for the moment one of the poorest and most unequal countries in the world. The country's GDP per capita fell by 0.7 percent per year on average between 1971 and 2013. While overall income growth is a necessary condition to reduce extreme poverty, as in many low-income economies, it will not be sufficient in the case of Haiti. Even when experiencing periods of economic growth, the country has not been able to share equally the proceeds of this better performance among its population. Policies to ensure more inclusiveness are hence needed.

More generally, policy focus would be needed to meet the World Bank Twin Goals of promoting shared prosperity and ending extreme poverty by 2030.[1] Meeting these Twin Goals under inequality-neutral growth would require very optimistic assumptions about growth rates going forward.[2] This calls for a prioritizing of policies that are expected to be especially pro-poor. But what would be the measures most promising to deliver this faster growth for lower income groups? Once identified, could they be ranked to assist the setting of priorities?

Meanwhile, the standard view that overall economic growth would sooner or later benefit every segment of the population is being questioned. Recent research has been showing that an economy could grow for sustained periods of time, while leaving large sections of its population behind and sometimes even worse off. Inequality itself could be detrimental to economic growth, potentially trapping economies in a vicious circle of ever slowing economic growth and widening inequalities.

Detailed country data and in-depth analysis would usually be required to begin selecting a set of policy priorities, a challenge for low-income countries such as Haiti. Long time-series needed to identify such relationships are often not available.[3] As an alternative, taking the opportunity of a growing availability of more standardized country data on income distribution, this paper examines the drivers of the income of the two poorest quintiles, drawing on the panel data of 117 countries over the period 1967 to 2011 used in Dollar et al. (2016).

The results suggest that maintaining macroeconomic stability as well as investing in human and physical capital would not only accelerate overall economic growth, but benefit more particularly the poorest segments of the population. This paper confirms the central role overall economic growth should play in any strategy to reduce poverty. Its results suggest, however, that in addition policymakers may have instruments to tweak the distribution of the benefits of faster economic growth in favor of the households at the bottom of the income distribution, ensuring that everyone

[1] The World Bank has adopted the Twin Goals of ending extreme poverty (defined as a fall of the percentage of people living with less than $1.25 a day to no more than 3 percent globally by 2030) and promoting shared prosperity (defined as income growth of the bottom 40 percent of the population in every country).
[2] Ravallion (2013).
[3] See Singh and Weber (1997), for example, for a discussion on the influence of the composition of public spending on growth in Switzerland based on time-series going back to the 1950s.

can live up to their potential. This paper shows that there thus not need be a trade-off between inequality and growth. Economies can foster faster growth while also increasing inclusiveness.

The paper proceeds as follows: Section I provides some characteristics of Haiti; Section II discusses the literature on income drivers; Section III presents our approach, the data, and the results for our panel of countries; Section IV describes the simulation results for Haiti; and the final section concludes.

I. Haiti's Context

Haiti's geography, resources, and history provide it with several opportunities: the country has comparative advantages, including its proximity and access to major markets; a young labor force and a dynamic diaspora; and substantial geographic, historical, and cultural assets. Areas of economic potential for Haiti include agribusiness, light manufacturing and tourism. On this basis, Haiti has a vision to become an emerging economy by 2030. This objective would require ambitious double digit growth rates, a significant break from the past, based on an expansion of agriculture, construction, manufacturing, and tourism.

Haiti's growth performance over the last four decades has been disappointing, however, and poverty remains endemic. A history of vested interests, political instability, and natural disasters has prevented the country from realizing its aspirations, trapping the country in a low equilibrium and keeping it as one of the poorest and most unequal countries in the world (Gini index of 61 in 2012). GDP per capita fell by 0.7 percent per year on average between 1971 and 2013. As a result, the overall poverty headcount amounted to about 59 percent and extreme poverty to 24 percent in 2012, indicating that almost 6.3 million Haitians cannot meet their basic needs and 2.5 million cannot even cover their food needs.

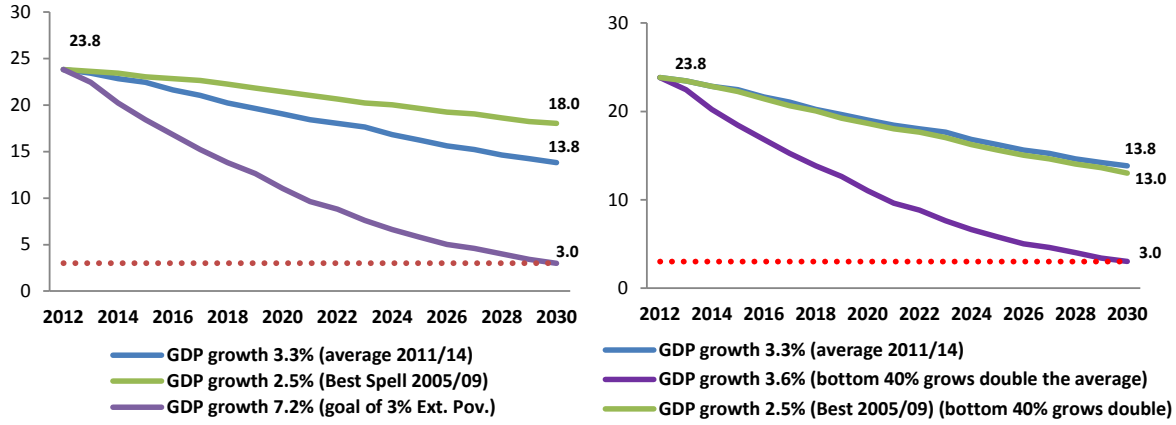
Even when experiencing periods of economic growth, Haiti has been unable to share equally the proceeds of this better performance among its population. Simulations show that if growth in Haiti up to 2030 were to follow its historical performance, extreme poverty would hardly decline (Barton-Dock and Singh, 2015). Even under a sustained performance of one percent real per capita growth rate observed in Haiti over the 2005-09 period, poverty reduction would still fall significantly short of reaching the goal of extreme poverty of 3 percent or less by 2030 (Figure 1). Assuming unchanged income distribution, per capita GDP would need to grow by about 7 percent per year for extreme poverty to fall to 3 percent by 2030. This would require a two- to three-fold acceleration in Haiti's growth rate with respect to its best performing years: a very ambitious outcome. While overall income growth is a necessary condition to reduce extreme poverty, it will not be sufficient.

Policies to ensure more inclusiveness are hence needed. Increasing per capita growth of the bottom 40 percent by around one percentage point more than the best observed average growth rate (2005-09) would add considerable impetus to poverty reduction. In this scenario, per capita real GDP of the bottom 40 percent would grow twice as fast as the mean. Such a performance would cause

poverty to decrease by 5 percentage points more than in the distribution-neutral growth scenario, coming closer but still falling short from reaching the 3 percent target for extreme poverty by 2030. To achieve the 3 percent target, a combination of faster and more inclusive growth would be needed: growth of about 4 percent per year with the income of the bottom 40 growing at twice that speed. But what would be the measures most promising to deliver this faster growth for lower income groups? Once identified, could they be ranked to assist the setting of priorities?

Figure 1

Extreme poverty rate projections, 2013-2030
(percent of population)



Source: Barton-Dock and Singh (2015)

Note: The scenarios contemplate real GDP growth paths. The poverty rate projections are based on real per capita consumption obtained by applying a conversion factor of 0.87 to GDP growth (World Bank, 2014) and assuming a population growth of 1.4% per year (average of 2000-2012).

II. Review of the literature

While econometric exercises investigating determinants of GDP growth have been numerous, less is known about factors influencing household incomes at different segments of the income distribution. Empirical work by Dollar and Kraay (2002) and Dollar et al. (2016) broadly rejects the idea that other factors than mean income growth would influence incomes of the poor, thus suggesting that growth would be mostly distribution neutral. Similarly, Deininger and Squire (1996), Chen and Ravaillon (1997), and Easterly (1999) suggest that growth does not have an impact on inequality. According to this literature, on average across countries, household income of the bottom 20 or 40 percent of the income distribution grows at almost exactly the same rate as mean household income.[4]

[4] See, inter alia, Lübker et al. (2002) and Amman et al. (2006) for a critical assessment of the Dollar and Kraay (2002) paper.

As a result, the focus of research has been mainly put so far on identifying drivers of overall economic growth, with the idea that growth would benefit everyone including households at the bottom of the income distribution. As Stiglitz (2015) puts it, many economists argued that the best way to help the poor was to increase the size of the nation's economic pie, and any attention on the small slice of the pie given to the poor would be a distraction from the bigger picture.

If the benefits of economic growth took time to reach the poorest and inequality were to grow, the work of Kuznets (1955) provided reassurance that this widening in income gaps would be only temporary and nothing to worry about. Kuznets, on the basis of US data over the period 1913-1948, suggested that after an initial period of economic growth in which there could be an increase in inequality, as economies became richer they became also more equal. As Piketty (2015) points out, for Kuznets it was enough to be patient, and before long growth would benefit everyone.

Piketty's work shows unfortunately a more sobering picture. The sharp reduction in income inequality that was observed in almost all advanced countries between 1914 and 1945 – and that Kuznets picked up – stemmed essentially from the world wars and the violent economic and political shocks they entailed. Since the 1970s, income inequality has increased significantly in rich countries, especially in the United States, despite overall economic growth.

Even worse, not only overall growth may not reduce inequality, but inequality could hamper faster economic growth, as recently pointed out by a number of IMF studies (Berg and Ostry, 2011, Ostry, et al., 2014; Dabla-Norris et al., 2015).[5] Higher inequality could hamper economic growth by making it more difficult for lower-income households to stay healthy and accumulate physical and human capital (Aghion et al., 1999; Galor and Moav, 2004). Poor children may end up in lower-quality schools, leading to underinvestment in education and to lower labor productivity than it would have been in a more equitable world (Stiglitz, 2012). Increasing concentration of incomes could also reduce aggregate demand, undermining economic growth, because the wealthy spend a lower fraction of their incomes than middle- and lower-income groups (Dabla-Norris et al., 2015).

Even if mean growth explains a large portion of the income growth for the two poorest quintiles once pertinent factors are controlled for, there is still substantial noise. Just because the average elasticity of lower-income growth to mean income growth is close to 1 does not mean that some countries cannot have elasticities of 0.85, while others have one of 1.15.[6] Furthermore, a number of variables in addition to mean growth influence the income of the poorest, both negatively and positively.

[5] Kraay (2015) has recently questioned the robustness of these results. See also Brueckner and Lederman (2015) who argue that the relationship is negative on average but heterogeneous across countries.

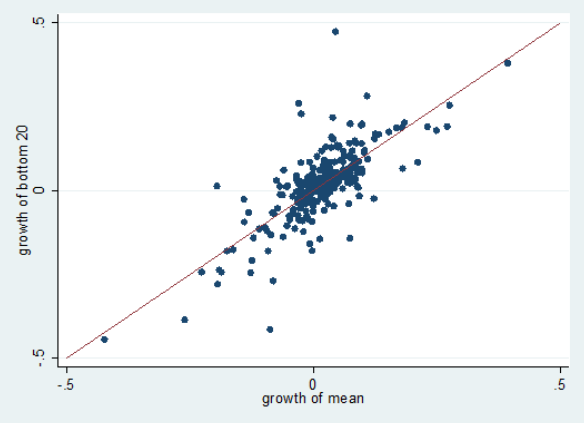
[6] In fact, the 95 percent confidence interval of the elasticity implied by Dollar and Kraay (2002: table 3, column 3) is 0.83 to 1.13.

Just eye-balling the data, one can notice that something is amiss. Figure 2 plots the data from Dollar et al. (2016) covering a sample of 299 growth spells over the period 1967 to 2011 (see below for further details). One notices that while overall the observations could fit on a 45 degree line, indicating a unitary elasticity, there is a lot of variation and noise, in particular, for the income growth of the bottom 20.

Understanding how some economies manage to deliver faster income growth for their poorest households than for their average citizens would be useful (above the 45 degree line). Some countries even manage to shelter their poorest who experience rising incomes when the overall economy is on a decline (upper left quadrant). These policies or conditions, if identified, could be scaled up or emulated in other countries. More troubling, many observations show that the income of the poorest have declined, even when the overall economy has grown (lower right quadrant). Understanding the factors behind these unfavorable developments would allow economies to prevent or contain them.

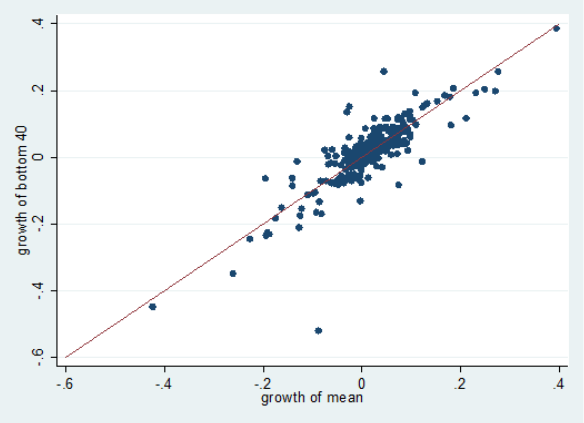
Figure 2

Mean growth and bottom 20 income growth, 1967-2011
(in percent)



Sources: Dollar et al. (2016) and LIS

Mean growth and bottom 40 income growth, 1967-2011
(in percent)



Sources: Dollar et al. (2016) and LIS

What could be factors influencing the elasticities between mean and lower-income growth? Dollar et al. (2016) find that average incomes in the poorest two quintiles on average increase at the same rate as overall average incomes. While they observe some striking changes in inequality in particular countries at particular time periods, they can't relate these changes to particular policies used in the empirical growth literature, such as measures of macroeconomic stability, trade openness, or political stability.

Klasen (2007) highlights that production factor demand matters: expanding sectors where poor live and using production factors that the poor possess will benefit them. Consistent with this idea,

Loayza and Raddatz (2010) show that the sectoral distribution of growth matters for poverty alleviation, with the largest contributions coming from unskilled labor-intensive sectors. Ferreira et al. (2010) also find that there was considerable variation in the poverty-reducing effectiveness of growth by sectors, space, and time in Brazil. Interestingly, they find that growth in the service sector was substantially more poverty-reducing than in either agriculture or industry. Klasen (2007) also emphasizes the role of country-specific conditions in this context.

Similarly, following Dollar and Kray (2002), a number of studies have examined the contribution of specific policies (such as trade or access to finance) in explaining the levels of poverty or inequality. These studies generally observe that a stable macroeconomic framework, a business friendly environment, and access to factors of production (education or credit) are conducive to lower poverty, higher incomes for the poorest, and less inequality.[7]

More particularly, Ghura et al. (2002) argue that simply focusing on economic growth as a strategy to lower poverty may actually leave the poor worse off relative to the average population. Their empirical results suggest the existence of a set of policies and conditions which are super pro-poor, namely lower inflation, lower government consumption, higher levels of financial sector development and higher educational status. Taxes, fiscal redistribution and public service provisioning also matter for distributional aspects of growth. For instance, Balakrishnan et al. (2013) looking at the experience of Asian economies argue for increases in spending on health, education, and social safety nets, as well as reforms to make financial systems more inclusive.

Similarly, studies on inequality seem to agree that higher inflation leads to higher inequality, while more and better infrastructure and more human capital lead to lower inequality (Barro, 2000; Li and Zou, 2002; Lundberg and Squire, 2003; Lopez, 2004; Dabla-Norris et al., 2015). The results on the effects on income distribution of trade, financial development or government spending are, however, mixed.

Finally, another strand in the literature highlights the relevance of initial income distribution for the subsequent elasticities between mean income growth and poverty reduction (e.g. Bourguignon, 2003; Ravallion and Chen, 2007; Klasen and Misselhorn, 2008; Ravallion, 2012; Christiaensen et al. 2013; and Crespo-Cuaresma et al., 2016). This work looks at the highly non-linear relationship between these two variables. Foster and Székely (2008), for instance, adopts a "general means" approach that places progressively less weight on incomes higher up the distribution. Their empirical findings show that the more weight is given to lower income households, the smaller the elasticity between growth and their poverty-sensitive income measure, suggesting that lower incomes do not grow in proportion to average incomes.

[7] See for instance Le Goff and Singh (2014) or Singh and Huang (2015).

III. Data, Methodological Approach, and Cross-Country Results

Dependent Variable

Following Dollar et al. (2016), this paper draws on household data from two sources: the World Bank's POVCALNET covering primarily developing countries and the Luxembourg Income Study databases covering primarily developed countries (LIS). Household income data is organized in "spells," i.e. income changes between two survey years, calculated as average annual log differences. [8] These are calculated for average income, income at the bottom 20 percent and the bottom 40 percent. We focus on those non-overlapping spells that are at least five years long, which provides 299 spells for 117 countries with a median spell length of 6 years, which is the preferred sample of Dollar et al. (2016).

Control Variables

Building on the existing literature, our model also includes two sets of control variables that serve as proxies for a variety of policies and institutions that might matter for growth and relevant for changes in the incomes of the poorest segments of the population (a complete list with sources and descriptive statistics are given in Appendix A). The first group includes variables capturing policies that may matter for the distribution of income:

- The mean income growth rate to take into account the strong link between mean income growth and income growth at lower parts of the distribution (Dollar and Kraay, 2002);
- Inflation and inflation variation as two measures to control for the macroeconomic environment, reflecting the idea that a stable macroeconomic environment is important for economic agents to plan ahead and thus a relevant enabling factor for income generation, especially when access to financial insurance is limited, such as for the poor (e.g. Easterly and Fisher, 2001);
- Telecommunication connectivity (use of land and mobile lines) as a proxy for infrastructure, which has shown to be an important driver of growth and income generation, especially for low-income countries (Calderon and Chong, 2004; Araujo et al., 2014; Moller and Wacker, 2015);[9]
- School enrollment and life expectancy (alternatively child mortality) are included as standard variables in most growth regressions as they reflect the level of human capital and the potential to generate income (see Weil, 2007 and 2014 for the health angle); and

[8] POVCALNET data is either income or consumption, LIS data is disposable income. We still refer to "income" in our paper.

[9] We considered alternative infrastructure indicators such as access to electricity, improved water sources, or paved roads. Their coverage is, however, more limited. They are nevertheless highly correlated with our telecommunication connectivity variable (0.8 for instance in the case of improved water sources).

- Financial development measured by the ratio of credit over GDP (Ghura et al., 2002; Lopez, 2004; Singh and Huang, 2015).

The second group of control variables reflect characteristics which may be less easy to change through policies although potentially important for economic growth and income distribution:

- Democratic accountability captures the type of governance observed in a country and how responsive a government is to its people.[10] Several studies have empirically investigated the relationship between political stability and growth (e.g. Alesina et al., 1996; Feng, 1996; Jong-a-Pin, 2009; Aisen and Veiga, 2013). There has been less discussion, however, about the effects of political instability on growth across various segments of the income distribution, an issue of particular relevance for a country like Haiti (Singh et al., 2016);
- The population aged 15-64 as a share of total population controls for the effects of demographics and variations in the working age population; and
- The initial income level captures initial conditions.

Approach

Given that one has income data at various points in time *t* for several income groups *j* for each country *i*, together with some explanatory (country-specific and time-varying) macroeconomic or policy variables *X*, we propose to start by estimating the equation:

$$\Delta Y_{it}^{j} = a_i + \rho Y_{i,-t}^{j} + bX_{i,-t} + \varepsilon_{it} \qquad (1)$$

using ordinary least squares (with country specific dummy variables a_i), where -*t* indicates that the variable is the value at the beginning of the 'growth spell' (time period between two income data points), Y^j is log income, Δ is the first-difference operator, *X* are the control and policy variables (either in logs or levels), and ε is a standard error term with expected value 0 and existing second moment.[11]

This modeling strategy has several implications. First, it is consistent with an empirical formulation of the standard Solow growth model. This becomes clear after adding Y_{-t} to both sides of equation (1), which leads to:

[10] From the International Country Risk Guide (ICRG) rating, the Democratic Accountability indicator goes from 0 to 6, the highest score for responsive governments. Generally, higher scores are assigned to Alternating Democracies, while the lower scores assigned to Autarchies.

[11] Dollar et al. (2016) use Bayesian Model Averaging to try to deal with model uncertainty. Ciccone and Jarocinski (2010) have, however, questioned this approach, arguing that the results could be too sensitive to small changes in the dependent variable. To overcome this difficulty, Rockey and Temple (2016) recommend to include initial incomes and regional or country fixed effects. While Dollar et al. (2016) include the former, they do not include the latter although they recognize statistically significant differences in the growth-poverty elasticities between regions. Against this backdrop, we preferred adopting here the more traditional OLS framework with the appropriate controls.

$$Y_{it}^{j} = a_i + (\rho + 1)Y_{i,-t}^{j} + bX_{i,-t} + \varepsilon_{it} \qquad (2)$$

The persistence term (ρ+1), which is expected to be below but not too far from 1, controls the dynamics of the steady-state (Solow) income and growth path.[12] Taking first differences of equation (2) leads to:

$$\Delta Y_{it}^{j} = (\rho + 1)\Delta Y_{i,-t}^{j} + b\Delta X_{i,-t} + e_{it} (3)$$

which highlights that innovations (Δ) in X have an effect on the subsequent growth spell, but that the effect on income *growth* is not permanent but transitory (and fades out via the persistence parameter [ρ+1]), while it is permanent on income *levels*, again consistent with the Solow model.

Given the nature of income data at several parts of the distribution, estimating equation (1) is preferred over estimating equation (2). Direct reverse causality can be limited in this case (see below for a more detailed discussion): the growth rate after *t* should not influence other variables at time *t*.[13] Estimating equation (1) is also preferred over estimating equation (3), as the latter would lead to a greater loss of observations because of the first differences. Furthermore, equation (1) makes it clearer that the explanatory variables in *X* can generally be seen as enabling factors for subsequent income generation, which makes it appealing for the underlying question analyzed here.[14] Overall, the estimated parameter *b* from (1) will give us an indication on how important that variable is for generating subsequent income increases.

Econometric Issues

As all panel studies, our estimations could face endogeneity issues. The endogeneity bias may arise from measurement errors, omitted variables or potential reverse causality between the dependent variable, income growth, and our variables of interest. It is possible, for instance, that as income grows, a larger share of the population becomes better educated or live longer. The use of country fixed effects and the consideration of initial income would try to capture relevant initial conditions and variables that could have been omitted.

Furthermore, studies on poverty or on income typically address reverse causality by lagging the explanatory variables so that income growth in a given year is explained by the values on the explanatory variables in the previous year. In this spirit and similar to Dollar and Kraay (2002) and Dollar et al. (2016), we have used the value of the variable at the beginning of the spell. For

[12] Accordingly, ρ itself is expected to be negative but not too far from 0. Since the model includes mean income growth, the term reflects specifically steady-state convergence for the respective income group *j* under investigation.
[13] In macro panels with a sufficiently large time dimension, this endogeneity issue can be addressed using internal instruments. However, the short time dimension of household-survey-based income data makes this approach infeasible or at least highly unreliable.
[14] Of course, this positive effect will be balanced by the negative effect of the higher income level (via ρY_{-t}) that corresponds to the higher *X*. Nevertheless, we find the formulation as in equation (1) instructive.

example, it seems reasonable to assume that income-growth over the period 2000-2005 would be unlikely to influence life expectancy in 2000.

Results

Results are presented in Tables 1 and 2. Following Ravallion (2013), we start with a "naïve" model where the growth of the income of the bottom 40 and bottom 20 is only explained by the average income growth and initial income level (Columns 1 and 2). The results when health is captured through child mortality are presented in Appendix E. Columns 3-11 include control and policy variables, first separately and then together, to see whether they can provide information on policies that affect the lower income groups beyond the overall growth rate of an economy. If the growth of the mean were to explain by itself the growth of the poorest, none of the coefficients would appear statistically significant besides overall growth.

A quick glance at the results in these two columns shows that this is not the case. In line with Dollar and Kraay (2002) and Dollar et al. (2016), we find that income growth at the bottom 20 and 40 percent is positively and statistically significantly associated with mean income growth. The short-run elasticity around 0.88 for the complete model is, however, not statistically different to unity.

Initial income levels are statistically significant and negatively associated with income growth of the various groups.[15] With fixed effects and mean income growth included, this result suggests that income shocks that are specific to a certain income group tend to fade out (and converge to a steady state income path) over time. Demographics also seem to matter beyond their impact on mean growth. The results suggest a pro-poor effect for the share of the working-age population, possibly reflecting the findings from many country analyses that sustainable reductions in poverty were often driven by labor market incomes (e.g. Azevedo et al., 2013). Finally, democratic accountability does not seem to be associated statistically significantly with income growth of the two poorest quintiles.

Turning now to our policy variables, one can observe that macroeconomic conditions do matter for the income growth of the two poorest quintiles. While the level of inflation does not appear to be statistically significant, inflation variations seem to be correlated negatively with income growth at the bottom of the income distribution. The poor do not seem to be affected by inflation any more than the average household (i.e. beyond any effect through the mean income growth), but they seem to be penalized to a greater extent by surprises in the inflation rate. In other words, their coping strategies seem to be as effective as those favored by richer households for steady inflation rates but they seem to be more vulnerable to sudden accelerations in price increases.

[15] Note that in the fixed effects setup, this does not mean income convergence across countries but convergence of each country towards its own steady state. The convergence effect is also visible and significant when using random effects estimation.

Improvements in human capital seem to favor the poor. Life expectancy, included to proxy health conditions more generally, seems to be associated with faster income growth for the bottom 20 and bottom 40 percent. Another year of life expectancy increases growth at the bottom 20 of the distribution by about 0.4 percentage points, which is a very high magnitude.[16] Results remain unchanged if child mortality is used instead of life expectancy. The coefficient for school enrollment, as an indicator of human capital, also appears to be correlated positively with income growth at the bottom of the income distribution.

Similarly, improvements in physical capital seems to be pro-poor. Better and more accessible infrastructure, as measured by land lines and mobile phone use, is also positively associated not only with average income growth, but also with faster income growth at the bottom of the income distribution. The economic magnitude of this relationship is, however, smaller than in the case of life expectancy.

Finally, financial development appears to be detrimental to the poor. Deeper financial sectors as measured by higher private credit-to-GDP ratios is negatively associated with income growth of the two poorest quintiles. This result is in line with the argument that greater access to credit in the absence of accompanying institutional reforms such as stronger property rights and wider access to credit information could be detrimental to the poor.[17]

[16] Increased health might have effects on growth via various channels. See e.g. the contributions by Knowles and Owen (1995), Bloom et al. (2003), Weil (2007), and Jayachandran and Lleras-Muney (2009).
[17] See Singh and Huang (2015), for instance, for a review of this literature.

Table 1: Regression results – Bottom 40

VARIABLES	(1) B40	(2) B40	(3) B40	(4) B40	(5) B40	(6) B40	(7) B40	(8) B40	(9) B40	(10) B40	(11) B40
Initial income level		-0.0404**	-0.0581***	-0.0432**	-0.0487**	-0.0473**	-0.0376*	-0.0550***	-0.0482**	-0.0285	-0.0975***
		(0.0173)	(0.0185)	(0.0215)	(0.0207)	(0.0191)	(0.0202)	(0.0190)	(0.0186)	(0.0206)	(0.0327)
Δ Mean income	0.976***	0.927***	0.908***	0.911***	0.890***	0.887***	0.962***	0.901***	0.904***	0.951***	0.877***
	(0.0768)	(0.0910)	(0.0864)	(0.0978)	(0.123)	(0.105)	(0.110)	(0.0890)	(0.0898)	(0.106)	(0.144)
Life Expectancy			0.00483***								0.00313**
			(0.00110)								(0.00141)
School enrollment (gross)				0.000407*							0.000675*
				(0.000224)							(0.000348)
Inflation					-2.84e-05						3.18e-05
					(3.35e-05)						(3.37e-05)
Inflation variation						-1.87e-05**					-1.33e-05***
						(9.25e-06)					(4.09e-06)
Credit/GDP							-4.64e-06				-0.000331*
							(0.000137)				(0.000176)
Population 15-64								0.00516***			0.00561***
								(0.00140)			(0.00166)
Connectivity									0.000405***		0.000277*
									(0.000129)		(0.000146)
Democratic Accountability										0.00135	-0.00212
										(0.00341)	(0.00385)
Constant	-0.00118	0.285**	0.0864	0.266*	0.348**	0.337**	0.265*	0.0773	0.329**	0.198	0.103
	(0.00130)	(0.124)	(0.122)	(0.153)	(0.150)	(0.137)	(0.141)	(0.128)	(0.131)	(0.142)	(0.185)
Observations	299	299	298	272	265	277	281	299	291	255	207
R-squared	0.708	0.721	0.736	0.703	0.675	0.697	0.667	0.733	0.728	0.689	0.683
Number of countries	117	117	116	111	105	111	114	117	115	98	85

FE Regression. Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2: Regression results – Bottom 20

VARIABLES	(1) B20	(2) B20	(3) B20	(4) B20	(5) B20	(6) B20	(7) B20	(8) B20	(9) B20	(10) B20	(11) B20
Initial income level		-0.0557***	-0.0734***	-0.0551**	-0.0699***	-0.0691***	-0.0588**	-0.0704***	-0.0610**	-0.0411	-0.114***
		(0.0206)	(0.0225)	(0.0277)	(0.0231)	(0.0215)	(0.0237)	(0.0226)	(0.0235)	(0.0287)	(0.0428)
Δ Mean income	1.005***	0.936***	0.919***	0.896***	0.899***	0.871***	0.977***	0.907***	0.910***	0.977***	0.888***
	(0.0871)	(0.0994)	(0.0939)	(0.111)	(0.130)	(0.114)	(0.125)	(0.0965)	(0.0985)	(0.116)	(0.149)
Life Expectancy			0.00654***								0.00388*
			(0.00178)								(0.00198)
School enrollment (gross)				0.000483							0.000876*
				(0.000374)							(0.000501)
Inflation					-2.61e-05						4.22e-05
					(4.05e-05)						(4.43e-05)
Inflation variation						-3.54e-05***					-1.75e-05**
						(8.23e-06)					(7.03e-06)
Credit/GDP							-2.26e-05				-0.000569**
							(0.000196)				(0.000255)
Population 15-64								0.00741***			0.00754***
								(0.00225)			(0.00253)
Connectivity									0.000552***		0.000371*
									(0.000176)		(0.000187)
Democratic Accountability										0.00400	0.000355
										(0.00519)	(0.00558)
Constant	0.000637	0.376***	0.0551	0.327*	0.477***	0.470***	0.398**	0.0276	0.397**	0.263	-0.0113
	(0.00147)	(0.140)	(0.146)	(0.180)	(0.158)	(0.146)	(0.156)	(0.157)	(0.157)	(0.188)	(0.237)
Observations	299	299	298	272	265	277	281	299	291	255	207
R-squared	0.605	0.632	0.655	0.597	0.600	0.622	0.575	0.653	0.641	0.599	0.628
Number of countries	117	117	116	111	105	111	114	117	115	98	85

FE Regression. Cluster-robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Robustness tests

We have investigated the robustness of the results by imposing various sample restrictions and adding control variables. In all cases, the results reported above remain unchanged.

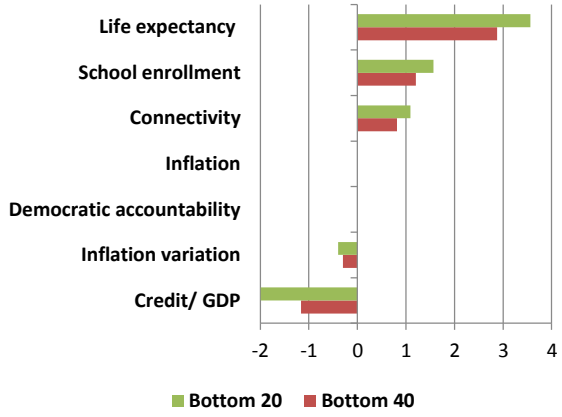
- We created a low-income dummy variable for countries with a GDP per capita below the median (about 2,600 US$) which we interacted with each variable. The reported results remained unchanged;
- The relationships reported in this paper also stayed mostly unaffected if one looked only at the post-1980 period;
- Finally, additional potential control variables (terms of trade, government debt, government consumption, urbanization, governance indicators, share of agricultural GDP) were added without changing the main results.

IV. Application to Haiti

Can the results presented above tell us anything about the relative importance of some policy changes beyond the elasticities? Could benchmarking assist in assessing the likelihood of some policy changes and in identifying dimensions that should call for attention in priority? This section will present two approaches. Similar to the time-series literature, the standard deviation of variables will be used to calibrate the shock to the system under the assumption that variables with a higher standard deviation experience more change and would be easier thus to alter. As alternative, gaps with an aspirational reference group of countries will be used.

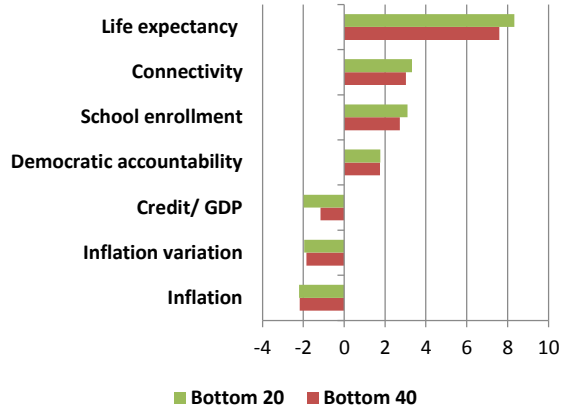
Results of the first exercise are shown in Figures 3 and 4. The results of the full model (Columns 11, Tables 1 and 2) are used to simulate the effects on the income growth of the two poorest quintiles. The obtained parameters are multiplied with the standard deviations of the respective variables. To the extent that the standard deviation could be interpreted as the expected change of a random variable, the resulting magnitude will give a rough estimate of the expected effect of a regular change in a variable on income developments. The results are displayed in Figure 3. To control for any indirect effect of the policy variables through the growth of mean income, a reduced model was estimated linking mean growth to the variable in question and controlling for the initial income level (results are presented in Appendix D). The results of this estimation were added to the previous exercise (Figure 4).

Figure 3: Economic magnitude of estimated parameters
(percentage points increase in growth rates)



Source: authors' estimates

Figure 4: Magnitudes from direct effects and through the mean
(percentage points increase in growth rates)



Source: authors' estimates.

The poorest quintile seems to be the most affected or the biggest beneficiary of good policies. In both exercises, reasonable improvements in human and physical capital seem to be associated with faster income growth for the bottom 20 than for the bottom 40. Similarly, an average deterioration in the macroeconomic environment (or a credit expansion favoring the richest segments of the population) is associated with a slower income growth for the bottom 20 than the bottom 40.

Health policies thus potentially offer considerable income gains. As already suggested by the earlier discussion, life expectancy is quantitatively important for increasing the potential for income generation. In fact, it is the variable with the single highest impact on income developments of the bottom 40 percent. This result holds even when the possible effect on mean income is factored in.

Improvements in school enrollment seem to be associated with faster income growth for the two poorest quintiles than better infrastructure, given a certain growth in mean income. However, physical capital seems to be correlated with faster mean income growth than education, so once the indirect effects through average growth is included, this ranking is reversed. The importance of a stable macroeconomic environment is also enhanced once its indirect association with average income growth is included. A stable political environment, as measured by the democratic accountability index, is associated with faster overall income growth, but not with any change in the income distribution.

An alternative approach would be to define a meaningful reference group to implement the benchmarking exercise. Several previous studies performed a benchmarking exercise of overall growth rates. For example, Loayza et al. (2005) aim to explain differences in Latin American and Caribbean growth rates over the 1990s by benchmarking key policies against the best performing

country over that period, Chile. Building on this idea, Araujo et al. (2014) developed a benchmarking exercise that serves as the key reference point of our analysis.

The main idea in Araujo et al. (2014) is to derive a benchmark in key policy areas (such as education, infrastructure, and stabilization policies) which is defined as the 90th percentile best performer in this variable in the region i.e., the benchmark is set in a way that only 10 percent of regional peers perform better in that particular policy dimension. The growth impetus of these policy variables is identified using a cross-country regression model. By multiplying the difference in policy variables between the country of interest and the benchmark (policy gap) with the estimated growth regression parameter, this exercise provides a counterfactual per capita income for the country of interest, assuming it would catch up to the benchmark level. This idea thus combines identifying areas where policy gaps are large (and thus where progress is considered more realistic to achieve) with the potential growth/income dividend from closing existent gaps.[18]

So, what level of policy variables (our *X)* could or should Haiti aim for? One way to obtain a reasonable benchmark is to relate to top performers of regional peers. This could, for example, be the 90th percentile of the distribution of *X* among regional peers (as in the case of Araujo et al., 2014) or their top three performers (as in the case of Varga and Veld, 2014). Another approach would be to look at the income level the country wants to achieve in the future with its development strategy and look at the levels of *X* for countries that currently display this income level (Moller and Wacker, 2015, take this approach, together with a regional perspective).

In either case, the underlying assumption of this approach is that in areas where gaps are large, it is realistic to expect progress. For example, increasing life expectancy by one year will generally be easier if the country falls short of the benchmark by 40 years instead of 2 years, all else equal. This also illustrates that the key rationale of this approach is to identify policy priority areas, and not to close fully existing gaps. In fact, the more one closes a particular gap, the more policies ought to shift to other aspects.

Defining $X_i^{gap} = (X^* - Xi)$ as the gap in variable *X* between the benchmark (denoted with the asterisk) and country *i*, we obtain the (transitory, estimated) growth effect of:

$$\widehat{\Delta y_{it}^{J}} = bX_i^{gap} \quad (5)$$

This effect is an additional boost to other effects (captured in the fixed effect and the dynamic reversion term) and is a combined summary of the potential ease of making progress in a policy dimension (X_i^{gap}) and the expected growth effect of such progress (*b*). For Haiti, we opted to benchmark the country against the average of Belize, Dominican Republic, Ecuador, El Salvador,

[18] For alternative benchmarking methodologies see, for example, Varga and Veld (2014), the OECD's "Going for Growth" report (first published in 2005), or D'Acosta et al. (2013).

Jamaica, Paraguay, and Peru. In terms of income levels, these LAC countries broadly stand today where Haiti aspires to be after 2030, which is beyond a threshold of USD 2,310 per capita.

We calculate the gap in variables between Haiti and its benchmark group which we then multiply with the direct and indirect effects as in the previous exercise (Figures 5 and 6). The results are pretty similar to those discussed above with the exception of macroeconomic stability. Considerable gaps with the reference group in human and physical capital suggest that closing these gaps would be associated with faster income growth for the poorest two quintiles. Effects of economic stabilization progress are estimated to be modest, however, because the small gap Haiti experiences in this dimension with the reference group. The small gap reflects the progress Haiti has achieved in maintaining macroeconomic stability and not much additional growth impetus should be expected from closing the remaining difference. This does not mean, however, that preserving macroeconomic stability is not important since a deterioration in this dimension could hamper income growth performance, especially at the lowest segments of the income distribution.

Figure 5: Income effects of closing the gap to the reference group
(percentage points increase in growth rates)

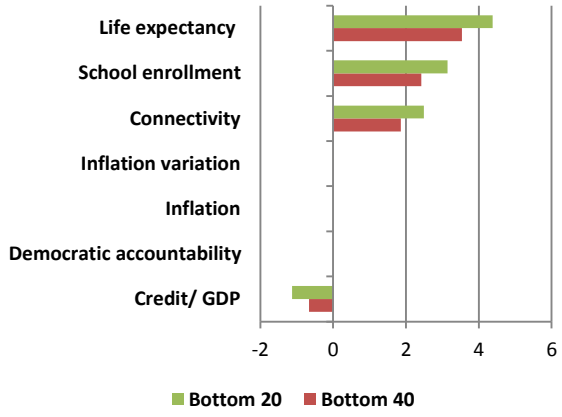
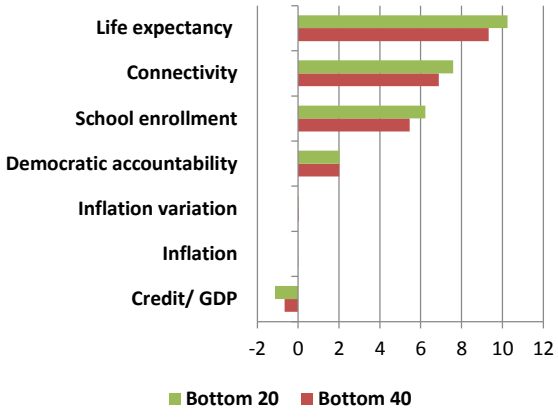


Figure 6: Income effects of closing the gap to the reference group – direct effects and through the mean
(percentage points increase in growth rates)



Source: the authors' calculations

As mentioned above, our specification is consistent with the standard Solow growth model. In such a specification, innovations (Δ) in X, the enabling environment, have an effect on the subsequent growth spell, but that effect is not permanent but only transitory. The persistence parameter (ρ+1) being relatively high, this transitory effect will, however, take some time to fade away.

As a final thought exercise, therefore, we tried to capture this dynamic and simulated the effects of closing the gaps with the reference group for some of our variables. The simulated divergence paths from the baseline scenario of the income growth of the two poorest quintiles are presented in Appendix F. One notices that the effect of an innovation on income growth, while temporary, lingers on almost two decades.

As a result, while the immediate effect could be relatively small, cumulatively improvements in some variables could bring us a long way towards the goal of a 3 percent poverty rate. Closing the gap on life expectancy, for instance, would leave the two poorest quintiles about 40 percent richer than otherwise, with about an additional 2 percent annual income growth on average over two decades. Similarly, closing the gap on school enrollment or connectivity would be associated with an additional annual average income growth for the bottom 40 of about 0.7 percent and 0.6 percent, respectively.

V. Conclusion

Haiti, as many other low-income economies, has a vision to become an emerging economy in the foreseeable future. Even when experiencing periods of economic growth, the country has not been able to share equally the proceeds of this better performance among its population. Meanwhile, the standard view that overall economic growth would sooner or later benefit every segment of the population is being questioned. Recent research is increasingly showing that an economy could grow for sustained periods of time, while leaving large sections of its population behind and sometimes even worse off. Policies to ensure more inclusiveness are hence needed.

The main aim of this paper was to provide an informed assessment of how to prioritize policies in a low-income country with sparse micro data, putting special emphasis on income growth for lower-income households. Drawing on the growing availability of standardized country data on income distribution, this paper examined the drivers of the income of the two poorest quintiles for a sample of 117 countries between 1967 and 2011.

The results suggest that maintaining macroeconomic stability as well as investing in human and physical capital would not only accelerate overall economic growth, but benefit more particularly the poorest segments of the population. This paper shows that there thus need not be a trade-off between inequality and growth: the overall pie can grow larger as well as the slice allocated to the poorest households, all with the same set of policies. Governments can foster faster economic growth while at the same time increasing inclusiveness, ensuring that everyone can live up to their potential.

While our results, derived from a simple cross-country analysis, have limitations, we see our approach as a starting point to identify and prioritize broad policy areas. Financial development, for instance, is a complex process. The literature has been ambiguous about the channels through which finance may be associated with lower poverty (deposits or credit). Measuring credit to the private sector may be thus a too crude indicator and a finer analysis would be called for as alternative financial indicators become available for longer time periods.

Our analysis cannot substitute either for country-specific considerations and study. It offers nevertheless some guidance where additional evidence could be most helpful when existing data and micro-evidence is scarce. Neither does our methodology provide any guidelines which specific

policies should be implemented to make progress in certain policy dimensions. Furthermore, large gaps do not automatically imply that they are quickly or cheaply closed either.[19]

However, by taking into account historical progress in comparable countries with respect to the identified policy gaps, our benchmarking approach allows to find reference countries that made considerable progress from similar starting points. Further work to refine the analysis provided in this paper could thus include case studies of countries where improvements in critical areas have taken place and might provide more concrete policy guidance.

[19] One would expect that it is easier to improve life expectancy by 5 years when starting at an initial level of 40 years than at 70 years, that it is easier to bring down inflation from 12 to 10 percent than from 7 to 5 percent or to improve the school enrollment rate from 20 to 30 than from 85 to 95 percent. However, this does not mean that large gaps automatically translate into fast progress in terms of our policy proxy variables nor whether they would be the best use of public money. For example, it took Ecuador two decades to improve its life expectancy from 62 years (Haiti's current level) to the current average of the reference group (74 years). For Dominican Republic and Belize it took almost four or five decades, respectively.

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Appendix A: Definition of the variables

Variable	Source	Description
Income	POVCALNET and LIS	Level and growth. Data is organized in "spells" (i.e. income changes between two survey years, calculated as average annual log differences), calculated for average income, income at the bottom 20 percent or the bottom 40 percent.
Life expectancy	WDI	Life expectancy at birth, total in years at the beginning of the spell.
School enrollment	WDI	Gross primary school enrollment at the beginning of the spell.
Inflation	WDI	Annual growth of the consumer prices index at the beginning of the spell.
Inflation variation	WDI	Standard deviation of annual inflation during the five years prior to the end of the spell.
Credit/GDP	WDI	Domestic credit to private sector as percentage of GDP at the beginning of the spell.
Population 15-64	WDI	Population ages 15-64 in percent of total population at the beginning of the spell.
Telecommunications connectivity	WDI	Telephone lines and mobile cellular subscriptions per 100 people at the beginning of the spell.
Democratic Accountability	ICRG	Measures how responsive government is to its people (0=not very responsive; 6=very responsive).

Appendix B: Descriptive Statistics

Variable	Units	Observations	Mean	Standard deviation	Minimum	Maximum
initial mean income	log	299	8.023	1.517	5.659	11.102
growth of income B40	decimal	299	0.015	0.083	-0.521	0.386
initial income B40	log	299	7.074	1.553	3.940	10.245
growth of income B20	decimal	299	0.018	0.092	-0.415	0.381
initial income B20	log	299	6.713	1.535	3.387	9.993
growth of mean income	decimal	299	0.017	0.072	-0.261	0.394
life expectancy	years	298	67.255	9.189	40.930	80.780
School enrollment	percent	272	99.174	17.872	27.880	147.510
Inflation	percent	265	27.905	113.243	-4.480	1190.230
Inflation variation	percent	277	31.002	224.715	0.120	3287.571
Credit/GDP	percent	281	40.875	34.962	1.190	183.910
Population 15-64	percent	299	60.325	6.230	47.500	71.110
Connectivity	percent	291	23.492	29.412	0.080	157.150
Democratic accountability	unit	255	4.422	1.375	0.000	6.000

Appendix C: Correlation Matrix

	mean income (log)	growth of income B40	income B40	growth of income B20	income B20	growth of mean income	life expect.	School enroll.	Inflation	Inflation variation	Credit/ GDP	Pop. 15-64	Telecom.	Dem. Account.
mean income (log)	1.000													
growth of income B40	-0.103	1.000												
income B40	0.984	-0.106	1.000											
growth of income B20	-0.108	0.948	-0.131	1.000										
income B20	0.964	-0.100	0.995	-0.140	1.000									
growth of mean income	-0.082	0.780	-0.056	0.672	-0.042	1.000								
life expectancy	0.775	-0.036	0.761	-0.036	0.742	0.004	1.000							
School enrollment	0.214	-0.012	0.164	0.018	0.140	0.014	0.453	1.000						
Inflation	-0.058	-0.039	-0.077	-0.015	-0.086	-0.083	-0.055	0.148	1.000					
Inflation variation	-0.043	-0.046	-0.052	-0.047	-0.054	-0.051	-0.040	0.094	0.272	1.000				
Credit/GDP	0.654	-0.100	0.633	-0.107	0.622	-0.099	0.516	0.133	-0.074	-0.038	1.000			
Population 15-64	0.696	0.059	0.734	0.018	0.743	0.140	0.777	0.323	0.036	-0.039	0.471	1.000		
Connectvity	0.745	0.003	0.753	0.000	0.751	0.006	0.621	0.124	-0.101	-0.074	0.539	0.648	1.000	
Democratic Accountability	0.629	0.016	0.621	0.028	0.609	0.004	0.513	0.071	-0.185	-0.131	0.380	0.497	0.571	1.000

Appendix D: Regression results – Mean

VARIABLES	(1) Mean	(2) Mean	(3) Mean	(4) Mean	(5) Mean	(6) Mean	(7) Mean	(8) Mean	(9) Mean
Initial income level	-0.119*** (0.0388)	-0.148*** (0.0464)	-0.143*** (0.0442)	-0.117** (0.0448)	-0.131*** (0.0434)	-0.0986** (0.0460)	-0.151*** (0.0442)	-0.146*** (0.0425)	-0.0922** (0.0458)
Life Expectancy		0.00585** (0.00271)							
School enrollment (gross)			0.000965* (0.000520)						
Inflation				-0.000219*** (7.75e-05)					
Inflation variation					-7.83e-05* (4.50e-05)				
Credit/GDP						0.000325 (0.000199)			
Population 15-64							0.00897*** (0.00330)		
Connectivity								0.000853*** (0.000236)	
Democratic Accountability									0.0145* (0.00836)
Constant	0.973*** (0.311)	0.808*** (0.271)	1.075*** (0.343)	0.973*** (0.361)	1.074*** (0.348)	0.802** (0.371)	0.684** (0.275)	1.163*** (0.337)	0.706* (0.359)
Observations	299	298	272	265	277	281	299	291	255
R-squared	0.129	0.155	0.177	0.217	0.186	0.092	0.176	0.179	0.095
Number of countries	117	116	111	105	111	114	117	115	98

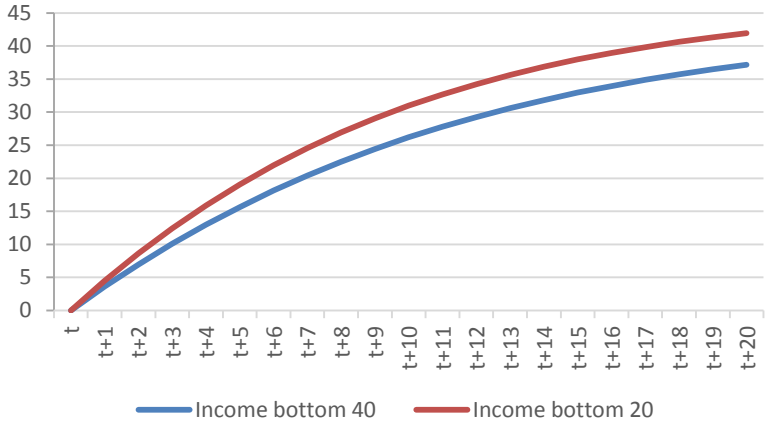
FE Regression. Cluster-robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix E: Regression results – Child mortality

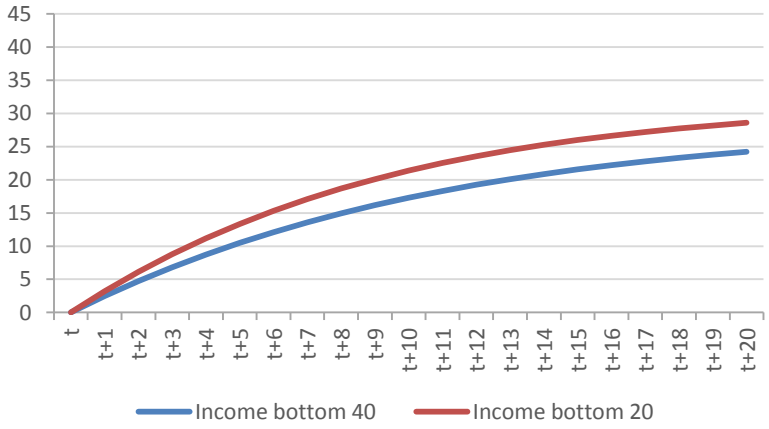
VARIABLES	(1) B40	(2) B40	(3) B20	(4) B20
Initial income level	-0.0544***	-0.0959***	-0.0557***	-0.112***
	(0.0182)	(0.0322)	(0.0206)	(0.0419)
Δ Mean income	0.907***	0.879***	0.936***	0.890***
	(0.0875)	(0.144)	(0.0994)	(0.150)
Child mortality	-0.000666***	-0.000405**		-0.000527**
	(0.000154)	(0.000200)		(0.000259)
School enrollment (gross)		0.000586*		0.000756
		(0.000352)		(0.000499)
Inflation		3.12e-05		4.11e-05
		(3.39e-05)		(4.40e-05)
Inflation variation		-1.24e-05***		-1.63e-05**
		(4.28e-06)		(7.42e-06)
Credit/GDP		-0.000318*		-0.000553**
		(0.000178)		(0.000257)
Population 15-64		0.00545***		0.00726***
		(0.00173)		(0.00272)
Connectivity		0.000368***		0.000484***
		(0.000134)		(0.000169)
Democratic Accountability		-0.00178		0.000730
		(0.00390)		(0.00561)
Constant	0.423***	0.340	0.376***	0.295
	(0.134)	(0.243)	(0.140)	(0.276)
Observations	299	207	299	207
R-squared	0.736	0.683	0.632	0.629
Number of countries	117	85	117	85

Appendix F: Income Dynamics

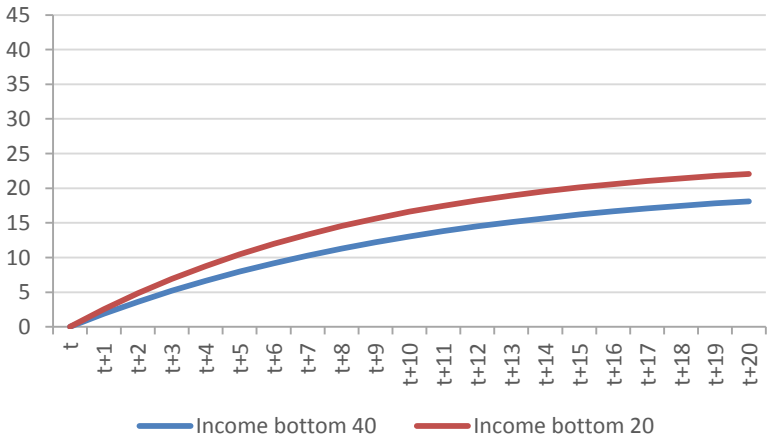
Increase in income from closing the gaps[20]
(in percentage of income of the no-reform scenario)
Life expectancy



School enrollment



Connectivity



[20] Reference values for the variables at time t is 2010.